W12×						Shape		W12×					
72		65		58		lb/ft		72		65[f]		58	
$/\Omega_c$	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{n}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
SD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
32	949	572	859	509	765	Effective length, L_c, ft, with respect to least radius of gyration, r_y, or unbraced length, L_b, ft, for X-X axis bending	0	269	405	237	356	216	32
06	911	549	825	479	720		6	269	405	237	356	216	32
97	898	540	812	469	705		7	269	405	237	356	216	32
87	883	531	798	457	687		8	269	405	237	356	216	32
76	866	521	783	445	668		9	269	405	237	356	215	32
64	847	510	766	431	647		10	269	405	237	356	211	31
50	827	497	747	416	625		11	268	404	237	356	207	31
36	806	484	728	400	601		12	265	398	237	356	204	30
21	783	470	707	384	577		13	261	392	233	350	200	30
05	759	456	685	367	551		14	257	387	230	345	196	29
89	735	441	663	349	525		15	254	381	226	340	192	28
72	709	426	640	332	499		16	250	376	222	334	189	28
55	683	410	616	314	472		17	246	370	219	329	185	27
37	656	393	591	296	445		18	242	364	215	323	181	27
19	629	377	567	278	418		19	239	359	212	318	177	26
01	602	360	542	261	392		20	235	353	208	313	173	26
64	547	327	492	227	341		22	228	342	201	302	166	24
28	493	294	442	194	292		24	220	331	194	291	158	23
92	440	262	394	165	249		26	213	320	186	280	151	22
59	389	231	348	143	214		28	205	309	179	269	143	21
26	340	202	304	124	187		30	198	297	172	259	135	20
99	299	178	267	109	164		32	190	286	165	248	125	18
76	265	157	236	96.7	145		34	183	275	158	237	116	17
57	236	140	211	86.3	130		36	176	264	149	224	108	16
41	212	126	189	77.4	116		38	167	251	139	209	102	15
27	191	114	171	69.9	105		40	157	236	130	196	95.7	14
15	173	103	155				42	148	223	123	185	90.5	13
05	158	93.9	141				44	140	211	116	175	85.8	12
96.2	145	85.9	129				46	133	200	110	166	81.6	12
88.3	133	78.9	119				48	127	191	105	158	77.8	11
81.4	122	72.7	109				50	121	182	100	150	74.3	11

Companion to the
AISC Steel Construction Manual

Volume 2: Design Tables

Version 16.0

Smarter.
Stronger.
Steel.

Companion to the
AISC Steel Construction Manual

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Version 16.0

American Institute of Steel Construction

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PREFACE

The objective of this Companion is to provide additional design tables beyond what are incorporated into the 16th Edition AISC *Steel Construction Manual*.

Tables in this Companion that present available strengths are developed using the geometric conditions indicated and applicable limits states from the 2022 AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360-22). Given the nature of the tables, and the possible governing limit state for each table value, linear interpolation between tabulated values may or may not provide correct strengths.

Tables are arranged with LRFD and ASD designs presented side-by-side for consistency with the AISC *Manual*. Design with ASD and LRFD are based on the same nominal strength for each element so that the only differences between the approaches are the set of load combinations from ASCE/SEI 7-22 used for design, and whether the resistance factor for LRFD or the safety factor for ASD is used.

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The committee gratefully acknowledges the contributions made to this Manual by Patrick J. Fortney and William T. Segui who passed away during this cycle, as well as the AISC Committee on Specifications and the following individuals: Michael Desch, Carlo Lini, and Matt Smith and Duff Zimmerman who both provide AISC Board Oversight.

CONVENTIONS

The following conventions are used throughout these examples:

1. The 2022 AISC *Specification for Structural Steel Buildings* is referred to as the AISC *Specification*, and the 16th Edition AISC *Steel Construction Manual* is referred to as the AISC *Manual*.

2. The source of equations or tabulated values taken from the AISC *Specification* or AISC *Manual* is noted along the right-hand edge of the page.

3. Values are presented to three significant figures throughout this Companion.

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DESIGN TABLE DISCUSSION

Table 4-A. Available Strength in Axial Compression—Composite Filled Rectangular HSS

Available strengths in axial compression are given for filled rectangular HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C) and 4-ksi normal weight concrete. The tabulated values are given for the effective length with respect to the y-axis (L_{cy}). However, the effective length with respect to the x-axis (L_{cx}) must also be investigated. To determine the available strength in axial compression, the table should be entered at the larger of L_{cy} and $L_{cy\ eq}$, where

$$L_{cy\ eq} = \frac{L_{cx}}{\left(\dfrac{r_{mx}}{r_{my}}\right)} \tag{1}$$

Values of the ratio r_{mx}/r_{my} and other properties useful in the design of composite HSS compression members are listed at the bottom of Table 4-A. The values r_{mx} and r_{my} are the radii of gyration for the composite cross section. The ratio r_{mx}/r_{my} is determined as

$$\frac{r_{mx}}{r_{my}} = \sqrt{\frac{P_{ex}\left(L_{cx}\right)^2}{P_{ey}\left(L_{cy}\right)^2}} \tag{2}$$

For compact composite sections, the values of $\phi_b M_n$ and M_n/Ω_b are calculated using the nominal flexural strength equations for Point B of the interaction diagram in AISC *Manual* Table 6-3. For noncompact composite sections, the values of $\phi_b M_n$ and M_n/Ω_b are calculated using the closed formed equations presented in AISC *Specification* Commentary Figure C-I3.8.

The available strengths tabulated in Table 4-A are given for the indicated shape with the associated concrete fill. AISC *Specification* Section I2.2b stipulates that the available compressive strength of a filled composite member need not be less than that specified for the bare steel member, as required by AISC *Specification* Chapter E. In this table, available strengths controlled by the bare steel acting alone are identified. Additionally, there is no longitudinal reinforcement provided because there is no requirement for minimum reinforcement in the AISC *Specification*. The use of filled shapes without longitudinal reinforcement is a common industry practice.

Table 4-B. Available Strength in Axial Compression—Composite Filled Rectangular HSS

Table 4-B is the same as Table 4-A, except it provides the available strength for filled rectangular HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C) and 5-ksi normal weight concrete.

Table 4-C. Available Strength in Axial Compression—Composite Filled Square HSS

Table 4-C is the same as Table 4-A, except it provides the available strength for filled square HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C) and 4-ksi normal weight concrete.

Table 4-D. Available Strength in Axial Compression—Composite Filled Square HSS

Table 4-D is the same as Table 4-A, except it provides the available strength for filled square HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C) and 5-ksi normal weight concrete.

Table 4-E. Available Strength in Axial Compression—Composite Filled Round HSS

Available strengths in axial compression are given for filled round HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C) 4-ksi normal weight concrete. To determine the available strength in axial compression, the table should be entered at the largest effective length, L_c. Other properties useful in the design of compression members are listed at the bottom of Table 4-E.

The values of $\phi_b M_n$ and M_n/Ω_b were calculated using the nominal flexural strength equations for Point B of the interaction diagram in AISC *Manual* Table 6-4.

Table 4-F. Available Strength in Axial Compression—Composite Filled Round HSS

Table 4-F is the same as Table 4-E, except it provides the available strength for filled round HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C) and 5-ksi normal weight concrete.

Table 4-G. Available Strength in Axial Compression—Composite Filled Pipe

Table 4-G is the same as Table 4-E, except it provides the available strength for filled pipe with F_y = 35 ksi and F_u = 60 ksi (ASTM A53/A53M) and 4-ksi normal weight concrete.

Table 4-H. Available Strength in Axial Compression—Composite Filled Pipe

Table 4-H is the same as Table 4-E, except it provides the available strength for filled pipe with F_y = 35 ksi and F_u = 60 ksi (ASTM A53/A53M) and 5-ksi normal weight concrete.

Table 6-A. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—W-Shapes

Table 6-A is the same as AISC *Manual* Table 6-1, except it provides the available strength for F_y = 65 ksi and F_u = 80 ksi (ASTM A913/A913M Grade 65). Discussion on the use of this table can be found in Part 6 of the AISC *Manual*.

Table 6-B. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—W-Shapes

Table 6-B is the same as Table 6-A, except it provides the available strength for F_y = 70 ksi and F_u = 90 ksi (ASTM A913/A913M Grade 70).

Table 6-C. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—Rectangular HSS

The available strengths of rectangular HSS are given in Table 6-C for F_y = 50 ksi and F_u = 65 ksi (ASTM A1085/A1085M Grade A). These tables may be used to design members with only compression, tension, flexure, and shear forces or may be used to design members subject to combined effects. All the information presented in the following is presented in Parts 3, 4, and 5 of the AISC *Manual*, but has been grouped here for ease of use.

HSS Subject to Flexure

The available flexural strengths of rectangular HSS bent about the major (X-X) and minor (Y-Y) principal axis are given in the lower portion of Table 6-C.

The available strength for bending about the major and minor axes is a single value based on the limit states of yielding or flange local buckling. The limit state of lateral-torsional buckling is not included and must be checked for bending in the major axis following AISC *Specification* Section F7.4. Lateral-torsional buckling does not apply to bending of rectangular HSS about the minor axis.

HSS Subject to Shear

The available shear strengths of rectangular HSS for both the major (X-X) and minor (Y-Y) principal axis are given in the lower portion of Table 6-C.

HSS Subject to Compression

The available strengths in axial compression are tabulated for the effective length with respect to the minor axis, L_{cy}. However, the effective length with respect to the major axis, L_{cx}, must also be investigated. To determine the available strength in axial compression, the table should be entered at the larger of L_{cy} and $L_{cy\ eq}$, where

$$L_{cy\ eq} = \frac{L_{cx}}{\frac{r_x}{r_y}} \qquad \text{(\textit{Manual} Eq. 4-1)}$$

Values for the ratio r_x/r_y and other properties useful in the design of rectangular HSS compression members are listed at the bottom of Table 6-C.

HSS Subject to Tension

The available tensile strengths of rectangular HSS are given in the lower portion of Table 6-C for the limit states of tensile yielding and tensile rupture.

Strengths given for the limit state of tensile rupture are based on the assumption that $A_e = 0.75A_g$.

HSS Subject to Combined Forces

AISC *Specification* Equation H1-1a or Equation H1-1b governs the design of HSS subject to combined axial force and flexure. The values of the available strength in tension, compression, or flexure obtained from Table 6-C may be used to check interaction through these equations or the equations given in AISC *Specification* Section H1.3.

Table 6-D. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—Rectangular HSS

Table 6-D is the same as Table 6-C, except it provides the available strength for rectangular HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C).

Table 6-E. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—Square HSS

Table 6-E is the same as Table 6-C, except it provides the available strength for square HSS with F_y = 50 ksi and F_u = 65 ksi (ASTM A1085/A1085M Grade A).

The limit state of lateral-torsional buckling does not apply for a square HSS bending in either the major or minor axis.

Table 6-F. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—Square HSS

Table 6-F is the same as Table 6-E, except it provides the available strength for square HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C).

Table 6-G. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—Round HSS

The available strengths of round HSS are given in Table 6-G for F_y = 50 ksi and F_u = 65 ksi (ASTM A1085/A1085M Grade A). This table is similar to Table 6-C, except the available flexural strength is determined from AISC *Specification* Section F8, and the available strength in axial compression is determined by entering the top of the table with the effective length, L_c.

Table 6-H. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—Round HSS

Table 6-H is the same as Table 6-G, except it provides the available strength for round HSS with F_y = 50 ksi and F_u = 62 ksi (ASTM A500/A500M Grade C).

Table 6-I. Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces—Pipe

Table 6-I is similar to Table 6-G, except it provides the available strengths for pipes with F_y = 35 ksi and F_u = 60 ksi (ASTM A53/A53M Grade B).

Table 6-J. Combined Flexure and Axial Force—W-Shapes

W-shapes with F_y = 50 ksi and F_u = 65 ksi (ASTM A992/A992M) and subject to combined axial force (tension or compression) and flexure may be checked for compliance with the provisions of AISC *Specification* Sections H1.1 and H1.2 using values listed in Table 1 and the appropriate interaction equations provided in the following sections.

Values p, b_x, b_y, t_y, and t_r presented in Table 6-J are defined in Table 1. Values of p, b_x, and b_y already account for section compactness and can be used directly. Given that the limit state of lateral-torsional buckling does not apply to W-shapes bent about their minor axis, values of b_y are independent of unbraced length and C_b. Values of b_x equally apply to combined flexure and compression, as well as combined flexure and tension. Smaller values of variable p for a given L_c and smaller values of b_x for a given L_b indicate higher strength for the type of load in question. For example, a section with a smaller p at a certain L_c is more effective in carrying axial compression than another section with a larger value of p at the same L_c. Similarly, a section with a smaller b_x is more effective for flexure at a given L_b than another section with a larger b_x for the same L_b. This information may be used to select more efficient shapes when relatively large amounts of axial load or bending are present.

Table 1 Variables in Table 6-J				
	LRFD		**ASD**	
Axial Compression	$p = \dfrac{1}{\phi_c P_n}$, (kips)$^{-1}$	(3a)	$p = \dfrac{\Omega_c}{P_n}$, (kips)$^{-1}$	(3b)
Major-Axis Bending	$b_x = \dfrac{8}{9\phi_b M_{nx}}$, (kip-ft)$^{-1}$	(4a)	$b_x = \dfrac{8\Omega_b}{9M_{nx}}$, (kip-ft)$^{-1}$	(4b)
Minor-Axis Bending	$b_y = \dfrac{8}{9\phi_b M_{ny}}$, (kip-ft)$^{-1}$	(5a)	$b_y = \dfrac{8\Omega_b}{9M_{ny}}$, (kip-ft)$^{-1}$	(5b)
Tension Yielding	$t_y = \dfrac{1}{\phi_t F_y A_g}$, (kips)$^{-1}$	(6a)	$t_y = \dfrac{\Omega_t}{F_y A_g}$, (kips)$^{-1}$	(6b)
Tension Rupture	$t_r = \dfrac{1}{\phi_t F_u \left(0.75 A_g\right)}$, (kips)$^{-1}$	(7a)	$t_r = \dfrac{\Omega_t}{F_u \left(0.75 A_g\right)}$, (kips)$^{-1}$	(7b)

The tabulated values of b_x assume that C_b = 1.0. These values may be modified in accordance with AISC *Specification* Sections F1 and H1.2. The following procedure may be used to account for $C_b > 1.0$.

$$b_{x(C_b>1.0)} = \frac{b_{x(C_b=1.0)}}{C_b} \geq b_{x\ min} \tag{8}$$

Combined Flexure and Compression

Equations H1-1a and H1-1b of the AISC *Specification* may be written as follows using the coefficients listed in Table 6-J and defined in Table 1.

When $pP_r \geq 0.2$:

$$pP_r + b_x M_{rx} + b_y M_{ry} \leq 1.0 \tag{9}$$

When $pP_r < 0.2$:

$$\frac{pP_r}{2} + \frac{9}{8}\left(b_x M_{rx} + b_y M_{ry}\right) \leq 1.0 \tag{10}$$

The designer may check acceptability of a given shape using the appropriate interaction Equation 9 or 10. See Aminmansour (2000) for more information on this method, including an alternative approach for selection of a trial shape.

Combined Flexure and Tension

Equations H1-1a and H1-1b of the AISC *Specification* may be written as follows using the coefficients listed in Table 6-J and defined in Table 1.

When $pP_r \geq 0.2$:

$$\left(t_y \text{ or } t_r\right) P_r + b_x M_{rx} + b_y M_{ry} \leq 1.0 \tag{11}$$

When $pP_r < 0.2$:

$$\frac{\left(t_y \text{ or } t_r\right) P_r}{2} + \frac{9}{8}\left(b_x M_{rx} + b_y M_{ry}\right) \leq 1.0 \tag{12}$$

The larger value of t_y and t_r should be used in the above equations.

The designer may check acceptability of a given shape using the approximate interaction Equation 11 or 12 along with variables t_r, t_y, b_x, and b_y. See Aminmansour (2006) for more information on this method.

It is noted that the values for t_r listed in Table 6-J are based on the assumption that $A_e = 0.75A_g$. See Part 5 of the AISC *Manual* for more information on this assumption. When $A_e > 0.75A_g$, the tabulated values for t_r are conservative. When $A_e < 0.75A_g$, t_r must be calculated based upon the actual value of A_e.

Values of $b_{x\ min}$ are listed in Table 6-J at $L_b = 0$. See Aminmansour (2009) for more information on this method. Values for p, b_x, b_y, t_y, and t_r presented in Table 6-J have been multiplied by 10^3. Thus, when used in the appropriate interaction equation they must be multiplied by 10^{-3} (0.001).

Table 10-A. Available Punching Shear Strength of Square or Rectangular HSS with Single-Plate Shear Connection—ASTM A500 Gr. C

Table 10-A provides the available punching shear strength for square or rectangular HSS with a single-plate shear connection using AISC *Manual* Equations 10-10a (LRFD) or 10-10b (ASD). The available strengths are tabulated for $F_y = 50$ ksi and $F_u = 62$ ksi (ASTM A500/A500M Grade C). Table 10-A does not consider the available strength of the single-plate shear connection, supported member, or the supporting HSS member other than the limit state of punching shear. See AISC *Manual* Part 10 for guidance on additional limit states.

The connection lengths provided in Table 10-A follow the single-plate shear connection geometry given in AISC *Manual* Table 10-10a. The tabulated values are based on $e = 3$ in., where e is the eccentricity taken from the face of the HSS wall to the center of gravity of the bolt group. The tabulated values can conservatively be used for a lesser e. Single-plate connections are not to be used for square or rectangular HSS with walls classified as a slender element, therefore the values in Table 10-A are applicable only for HSS when $b/t \le 1.40\sqrt{E/F_y}$ or 33.7 for $F_y = 50$ ksi.

Table 10-B. Available Punching Shear Strength of Square or Rectangular HSS with Single Plate Shear Connection—ASTM A1085 Gr. A

Table 10-B is the same as Table 10-A, except it provides the available strength for square or rectangular HSS with $F_y = 50$ ksi and $F_u = 65$ ksi (ASTM A1085/A1085M Grade A).

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4

COMPOSITE
HSS34–HSS30

Table 4-A
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS34×10×								HSS30×10×			
		1		⅞		¾		⅝		1		⅞	
t_{des}, in.		0.930		0.814		0.698		0.581		0.930		0.814	
Steel, lb/ft		277.07		244.88		212.00		178.41		249.85		221.06	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	2350	3520	2140	3210	1930	2900	1720	2570	2110	3160	1920	2880
	1	2350	3520	2140	3210	1930	2890	1710	2570	2100	3160	1920	2880
	2	2340	3510	2140	3210	1930	2890	1710	2570	2100	3150	1920	2880
	3	2330	3500	2130	3190	1920	2880	1710	2560	2090	3140	1910	2870
	4	2320	3490	2120	3180	1910	2870	1700	2550	2080	3120	1900	2850
	5	2310	3460	2110	3160	1900	2850	1690	2530	2070	3110	1890	2840
	6	2290	3440	2090	3140	1890	2830	1680	2510	2060	3080	1880	2820
	7	2270	3410	2070	3110	1870	2810	1660	2490	2040	3060	1860	2790
	8	2250	3380	2050	3080	1850	2780	1650	2470	2020	3030	1840	2760
	9	2230	3340	2030	3050	1830	2750	1630	2440	1990	2990	1820	2730
	10	2200	3300	2010	3010	1810	2720	1610	2410	1970	2950	1800	2700
	11	2170	3250	1980	2970	1790	2680	1590	2380	1940	2910	1770	2660
	12	2140	3200	1950	2920	1760	2640	1560	2350	1910	2870	1750	2620
	13	2100	3150	1920	2880	1730	2600	1540	2310	1880	2820	1720	2580
	14	2060	3090	1880	2830	1700	2550	1510	2270	1850	2770	1690	2530
	15	2020	3040	1850	2770	1670	2500	1480	2230	1810	2710	1660	2480
	16	1980	2970	1810	2720	1640	2450	1450	2180	1770	2660	1620	2430
	17	1940	2910	1770	2660	1600	2400	1420	2140	1730	2600	1590	2380
	18	1900	2840	1730	2600	1570	2350	1390	2090	1690	2540	1550	2330
	19	1850	2770	1690	2540	1530	2290	1360	2040	1650	2480	1510	2270
	20	1800	2700	1650	2470	1490	2240	1330	1990	1610	2420	1470	2210
	21	1750	2630	1610	2410	1450	2180	1290	1940	1570	2360	1430	2150
	22	1710	2570	1560	2340	1410	2120	1260	1880	1530	2300	1390	2090
	23	1660	2500	1520	2270	1370	2060	1220	1830	1490	2240	1350	2030
	24	1620	2430	1470	2210	1330	2000	1180	1780	1450	2170	1310	1970
	25	1570	2360	1420	2140	1290	1930	1150	1720	1400	2110	1270	1900
	26	1520	2290	1380	2070	1250	1870	1110	1670	1360	2040	1230	1840
	27	1470	2210	1330	2000	1200	1810	1070	1610	1320	1980	1180	1780
	28	1430	2140	1280	1930	1160	1740	1040	1550	1270	1910	1140	1710
	29	1380	2070	1240	1860	1120	1680	999	1500	1230	1850	1100	1660
	30	1330	2000	1190	1790	1080	1620	962	1440	1190	1780	1060	1600
	32	1230	1860	1110	1660	995	1490	888	1330	1100	1650	988	1480
	34	1140	1710	1020	1540	914	1370	816	1220	1010	1520	913	1370
	36	1050	1580	943	1420	835	1250	746	1120	931	1400	840	1260
	38	960	1440	865	1300	763	1150	678	1020	851	1280	769	1160
	40	873	1310	789	1190	698	1050	612	918	772	1160	700	1050
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	2030	3040	1820	2740	1610	2420	1390	2090	1630	2450	1470	2210
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	794	1190	712	1070	627	943	538	809	707	1060	638	958
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		344000		319000		293000		263000		244000		226000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		42800		39500		36000		32200		37700		34900	
r_{mx}/r_{my}		2.84		2.84		2.85		2.86		2.54		2.54	
r_{my}, in.		4.19		4.24		4.29		4.35		4.15		4.20	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS30–HSS24

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS30×10×						HSS24×20×					
		¾		⅝		½		¾		⅝		½	
t_{des}, in.		0.698		0.581		0.465		0.698		0.581		0.465	
Steel, lb/ft		191.58		161.40		130.52		212.00		178.41		144.13	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1730	2600	1540	2310	1330	2000	2170	3250	1950	2930	1740	2600
	1	1730	2600	1540	2310	1330	1990	2170	3250	1950	2930	1730	2600
	2	1730	2590	1540	2300	1330	1990	2170	3250	1950	2930	1730	2600
	3	1720	2580	1530	2300	1320	1980	2170	3250	1950	2930	1730	2600
	4	1710	2570	1520	2290	1320	1970	2160	3240	1950	2920	1730	2590
	5	1700	2560	1520	2270	1310	1960	2160	3240	1940	2920	1730	2590
	6	1690	2540	1500	2260	1300	1950	2150	3230	1940	2910	1720	2580
	7	1680	2520	1490	2240	1290	1930	2150	3220	1940	2900	1720	2580
	8	1660	2490	1480	2220	1280	1910	2140	3220	1930	2890	1710	2570
	9	1640	2460	1460	2190	1260	1890	2140	3210	1920	2890	1710	2560
	10	1620	2430	1440	2160	1250	1870	2130	3190	1920	2880	1700	2550
	11	1600	2400	1420	2140	1230	1840	2120	3180	1910	2860	1690	2540
	12	1580	2370	1400	2100	1210	1820	2110	3170	1900	2850	1690	2530
	13	1550	2330	1380	2070	1190	1790	2100	3150	1890	2840	1680	2520
	14	1520	2290	1360	2030	1170	1750	2090	3140	1880	2820	1670	2500
	15	1500	2240	1330	2000	1150	1720	2080	3120	1870	2810	1660	2490
	16	1470	2200	1300	1960	1120	1690	2070	3100	1860	2790	1650	2480
	17	1430	2150	1280	1910	1100	1650	2060	3080	1850	2770	1640	2460
	18	1400	2100	1250	1870	1080	1610	2040	3060	1840	2760	1630	2440
	19	1370	2050	1220	1830	1050	1570	2030	3040	1820	2740	1620	2420
	20	1330	2000	1190	1780	1020	1540	2010	3020	1810	2720	1600	2410
	21	1300	1950	1160	1730	996	1490	2000	3000	1800	2700	1590	2390
	22	1260	1890	1120	1690	969	1450	1980	2980	1780	2670	1580	2370
	23	1230	1840	1090	1640	940	1410	1970	2950	1770	2650	1560	2350
	24	1190	1780	1060	1590	912	1370	1950	2920	1750	2630	1550	2320
	25	1150	1730	1030	1540	883	1320	1930	2900	1740	2600	1530	2300
	26	1110	1670	992	1490	854	1280	1910	2870	1720	2580	1520	2280
	27	1080	1610	959	1440	825	1240	1900	2840	1700	2550	1500	2260
	28	1040	1560	925	1390	796	1190	1880	2810	1680	2530	1490	2230
	29	1000	1500	891	1340	766	1150	1860	2780	1670	2500	1470	2210
	30	962	1440	858	1290	737	1110	1840	2750	1650	2470	1450	2180
	32	887	1330	791	1190	680	1020	1790	2690	1610	2410	1420	2130
	34	813	1220	726	1090	623	935	1750	2630	1570	2350	1380	2070
	36	742	1110	663	995	569	853	1710	2560	1530	2290	1350	2020
	38	679	1020	602	903	516	773	1660	2490	1490	2230	1310	1960
	40	620	931	543	815	465	698	1610	2420	1440	2160	1270	1900
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	1300	1950	1120	1690	935	1410	1360	2040	1160	1750	965	1450
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	563	846	482	725	393	590	1180	1780	1010	1520	837	1260
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		207000		187000		161000		192000		170000		146000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		31900		28600		24400		141000		124000		107000	
r_{mx}/r_{my}		2.55		2.56		2.57		1.17		1.17		1.17	
r_{my}, in.		4.25		4.31		4.36		8.02		8.08		8.13	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS24

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS24×20×		HSS24×18×								HSS24×16×	
		⅜		¾		⅝		½		⅜		¾	
t_{des}, in.		0.349		0.698		0.581		0.465		0.349		0.698	
Steel, lb/ft		109.15		201.79		169.91		137.32		104.04		191.58	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1460	2190	2020	3030	1820	2730	1610	2410	1350	2020	1880	2810
	1	1460	2190	2020	3030	1820	2730	1610	2410	1350	2020	1870	2810
	2	1460	2180	2020	3030	1820	2720	1610	2410	1350	2020	1870	2810
	3	1450	2180	2020	3030	1810	2720	1610	2410	1350	2020	1870	2810
	4	1450	2180	2020	3020	1810	2720	1600	2400	1340	2010	1870	2800
	5	1450	2170	2010	3020	1810	2710	1600	2400	1340	2010	1860	2790
	6	1450	2170	2010	3010	1800	2710	1600	2390	1340	2010	1860	2790
	7	1440	2160	2000	3000	1800	2700	1590	2390	1330	2000	1850	2780
	8	1440	2160	1990	2990	1790	2690	1590	2380	1330	1990	1840	2760
	9	1430	2150	1990	2980	1780	2680	1580	2370	1320	1980	1830	2750
	10	1430	2140	1980	2970	1780	2670	1570	2360	1320	1970	1820	2740
	11	1420	2130	1970	2950	1770	2650	1560	2350	1310	1960	1810	2720
	12	1420	2120	1960	2940	1760	2640	1560	2330	1300	1950	1800	2700
	13	1410	2110	1950	2920	1750	2620	1550	2320	1290	1940	1790	2680
	14	1400	2100	1940	2900	1740	2610	1540	2300	1290	1930	1780	2660
	15	1390	2090	1920	2880	1730	2590	1530	2290	1280	1920	1760	2640
	16	1380	2080	1910	2860	1720	2570	1520	2270	1270	1900	1750	2620
	17	1380	2060	1900	2840	1700	2550	1500	2250	1260	1890	1730	2600
	18	1370	2050	1880	2820	1690	2530	1490	2240	1250	1870	1710	2570
	19	1360	2030	1870	2800	1670	2510	1480	2220	1240	1850	1700	2550
	20	1350	2020	1850	2770	1660	2490	1460	2200	1230	1840	1680	2520
	21	1330	2000	1830	2750	1640	2470	1450	2180	1210	1820	1660	2490
	22	1320	1980	1810	2720	1630	2440	1440	2150	1200	1800	1640	2460
	23	1310	1970	1800	2690	1610	2420	1420	2130	1190	1780	1620	2430
	24	1300	1950	1780	2670	1590	2390	1410	2110	1170	1760	1600	2400
	25	1290	1930	1760	2640	1580	2360	1390	2080	1160	1740	1580	2370
	26	1270	1910	1740	2610	1560	2340	1370	2060	1150	1720	1560	2330
	27	1260	1890	1720	2580	1540	2310	1360	2030	1130	1700	1530	2300
	28	1250	1870	1700	2550	1520	2280	1340	2010	1120	1680	1510	2270
	29	1230	1850	1680	2510	1500	2250	1320	1980	1100	1650	1490	2230
	30	1220	1830	1650	2480	1480	2220	1300	1950	1090	1630	1460	2190
	32	1190	1780	1610	2410	1440	2160	1260	1900	1050	1580	1410	2120
	34	1160	1740	1560	2340	1400	2090	1230	1840	1020	1530	1360	2040
	36	1120	1690	1510	2270	1350	2030	1190	1780	988	1480	1310	1970
	38	1090	1640	1460	2200	1310	1960	1150	1720	954	1430	1260	1890
	40	1060	1590	1410	2120	1260	1890	1100	1660	919	1380	1210	1810
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	753	1130	1270	1900	1090	1630	902	1360	707	1060	1170	1770
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	624	937	1020	1530	876	1320	721	1080	540	811	867	1300
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		120000		177000		156000		134000		111000		162000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		88000		109000		96000		82400		67800		81800	
r_{mx}/r_{my}		1.17		1.27		1.27		1.28		1.28		1.41	
r_{my}, in.		8.19		7.29		7.34		7.39		7.45		6.53	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

4

COMPOSITE
HSS24

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS24×16×						HSS24×14×					
		⅝		½		⅜		¾		⅝		½	
t_{des}, in.		0.581		0.465		0.349		0.698		0.581		0.465	
Steel, lb/ft		161.40		130.52		98.94		181.37		152.89		123.71	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1680	2520	1490	2230	1240	1860	1730	2590	1550	2320	1360	2040
	1	1680	2520	1490	2230	1240	1860	1730	2590	1540	2320	1360	2040
	2	1680	2520	1480	2230	1240	1860	1730	2590	1540	2310	1360	2040
	3	1680	2520	1480	2220	1240	1850	1720	2580	1540	2310	1360	2030
	4	1680	2510	1480	2220	1230	1850	1720	2580	1540	2300	1350	2030
	5	1670	2510	1470	2210	1230	1850	1710	2570	1530	2300	1350	2020
	6	1670	2500	1470	2210	1230	1840	1710	2560	1530	2290	1340	2010
	7	1660	2490	1460	2200	1220	1830	1700	2550	1520	2280	1340	2000
	8	1650	2480	1460	2190	1220	1830	1690	2540	1510	2270	1330	1990
	9	1650	2470	1450	2180	1210	1820	1680	2520	1500	2250	1320	1980
	10	1640	2450	1440	2160	1200	1810	1670	2500	1490	2240	1310	1970
	11	1630	2440	1430	2150	1200	1790	1660	2480	1480	2220	1300	1950
	12	1620	2420	1420	2140	1190	1780	1640	2460	1470	2200	1290	1930
	13	1600	2410	1410	2120	1180	1770	1630	2440	1450	2180	1280	1920
	14	1590	2390	1400	2110	1170	1760	1610	2420	1440	2160	1270	1900
	15	1580	2370	1390	2090	1160	1740	1600	2400	1430	2140	1250	1880
	16	1570	2350	1380	2070	1150	1720	1580	2370	1410	2120	1240	1860
	17	1550	2330	1370	2050	1140	1710	1560	2340	1390	2090	1220	1830
	18	1540	2300	1350	2030	1130	1690	1540	2310	1380	2060	1210	1810
	19	1520	2280	1340	2010	1110	1670	1520	2280	1360	2040	1190	1790
	20	1500	2260	1320	1980	1100	1650	1500	2250	1340	2010	1170	1760
	21	1490	2230	1310	1960	1090	1630	1480	2220	1320	1980	1160	1730
	22	1470	2200	1290	1940	1070	1610	1460	2190	1300	1950	1140	1710
	23	1450	2180	1270	1910	1060	1590	1430	2150	1280	1920	1120	1680
	24	1430	2150	1260	1890	1050	1570	1410	2120	1260	1890	1100	1650
	25	1410	2120	1240	1860	1030	1550	1390	2080	1240	1850	1080	1620
	26	1390	2090	1220	1830	1020	1520	1360	2040	1210	1820	1060	1590
	27	1370	2060	1200	1800	999	1500	1340	2010	1190	1790	1040	1560
	28	1350	2020	1180	1780	983	1470	1310	1970	1170	1750	1020	1530
	29	1330	1990	1160	1750	967	1450	1290	1930	1140	1720	998	1500
	30	1310	1960	1140	1720	950	1420	1260	1890	1120	1680	977	1470
	32	1260	1890	1100	1660	916	1370	1200	1810	1070	1610	933	1400
	34	1220	1820	1060	1590	881	1320	1150	1730	1020	1530	889	1330
	36	1170	1750	1020	1530	845	1270	1090	1640	972	1460	845	1270
	38	1120	1680	977	1470	809	1210	1040	1560	922	1380	800	1200
	40	1070	1610	934	1400	772	1160	984	1480	872	1310	755	1130
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	1010	1520	838	1260	657	988	1080	1620	931	1400	773	1160
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	742	1120	614	923	460	691	723	1090	619	931	512	769
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		143000		123000		101000		147000		129000		111000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		72000		61700		50500		59100		52100		44600	
r_{mx}/r_{my}		1.41		1.41		1.41		1.58		1.57		1.58	
r_{my}, in.		6.59		6.64		6.69		5.77		5.82		5.87	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

4

COMPOSITE
HSS24

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS24×14×		HSS24×12×									
		3/8		1		7/8		3/4		5/8		1/2	
t_{des}, in.		0.349		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		93.83		222.63		197.24		171.16		144.39		116.91	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1130	1700	1910	2870	1750	2630	1580	2380	1410	2120	1240	1850
	1	1130	1700	1910	2870	1750	2630	1580	2380	1410	2110	1240	1850
	2	1130	1690	1910	2860	1750	2620	1580	2370	1410	2110	1230	1850
	3	1130	1690	1900	2860	1740	2620	1580	2370	1400	2110	1230	1850
	4	1120	1690	1900	2850	1740	2610	1570	2360	1400	2100	1230	1840
	5	1120	1680	1890	2830	1730	2600	1570	2350	1390	2090	1220	1830
	6	1120	1670	1880	2820	1720	2580	1560	2340	1390	2080	1210	1820
	7	1110	1670	1870	2800	1710	2570	1550	2320	1380	2070	1210	1810
	8	1100	1660	1850	2780	1700	2550	1540	2310	1370	2050	1200	1800
	9	1100	1650	1840	2760	1680	2530	1520	2290	1360	2040	1190	1780
	10	1090	1630	1820	2730	1670	2500	1510	2270	1340	2020	1180	1770
	11	1080	1620	1800	2710	1650	2480	1500	2240	1330	2000	1170	1750
	12	1070	1610	1780	2680	1630	2450	1480	2220	1320	1980	1150	1730
	13	1060	1590	1760	2640	1620	2420	1460	2190	1300	1950	1140	1710
	14	1050	1580	1740	2610	1590	2390	1440	2170	1290	1930	1120	1690
	15	1040	1560	1720	2570	1570	2360	1420	2140	1270	1900	1110	1660
	16	1030	1540	1690	2540	1550	2320	1400	2110	1250	1870	1090	1640
	17	1020	1520	1660	2500	1530	2290	1380	2070	1230	1840	1070	1610
	18	1000	1500	1640	2450	1500	2250	1360	2040	1210	1810	1060	1590
	19	989	1480	1610	2410	1470	2210	1340	2000	1190	1780	1040	1560
	20	974	1460	1580	2360	1450	2170	1310	1970	1170	1750	1020	1530
	21	960	1440	1550	2320	1420	2130	1290	1930	1140	1720	998	1500
	22	944	1420	1510	2270	1390	2080	1260	1890	1120	1680	978	1470
	23	929	1390	1480	2220	1360	2040	1230	1850	1100	1650	957	1440
	24	912	1370	1450	2170	1330	1990	1210	1810	1070	1610	935	1400
	25	896	1340	1410	2120	1300	1950	1180	1770	1050	1570	913	1370
	26	879	1320	1380	2070	1270	1900	1150	1730	1020	1530	891	1340
	27	862	1290	1340	2020	1240	1850	1120	1680	998	1500	868	1300
	28	844	1270	1310	1960	1200	1810	1090	1640	972	1460	846	1270
	29	826	1240	1270	1910	1170	1760	1060	1600	946	1420	823	1230
	30	808	1210	1240	1860	1140	1710	1040	1550	920	1380	799	1200
	32	772	1160	1170	1750	1070	1610	977	1470	868	1300	753	1130
	34	735	1100	1100	1650	1010	1510	918	1380	815	1220	706	1060
	36	697	1050	1030	1560	943	1410	859	1290	762	1140	660	990
	38	660	990	969	1460	879	1320	801	1200	711	1070	614	921
	40	622	934	905	1360	816	1220	744	1120	660	990	569	854
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	609	916	1230	1850	1110	1670	987	1480	849	1280	708	1060
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	386	579	738	1110	663	997	586	881	503	756	417	626
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		91700		152000		142000		130000		116000		99800	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		36500		47700		44200		40400		35800		30800	
r_{mx}/r_{my}		1.59		1.79		1.79		1.79		1.80		1.80	
r_{my}, in.		5.92		4.88		4.93		4.98		5.03		5.08	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS24–HSS22

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS24×12×		HSS24×8×				HSS22×20×					
		⅜		½		⅜		¾		⅝		½	
t_{des}, in.		0.349		0.465		0.349		0.698		0.581		0.465	
Steel, lb/ft		88.73		103.30		78.52		201.79		169.91		137.32	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1020	1530	984	1480	806	1210	2040	3050	1830	2750	1620	2430
	1	1020	1530	983	1480	805	1210	2040	3050	1830	2750	1620	2430
	2	1020	1530	980	1470	803	1200	2030	3050	1830	2750	1620	2430
	3	1020	1530	976	1460	798	1200	2030	3050	1830	2740	1620	2430
	4	1010	1520	969	1450	793	1190	2030	3040	1830	2740	1620	2430
	5	1010	1520	960	1440	786	1180	2030	3040	1820	2730	1610	2420
	6	1000	1510	949	1420	777	1170	2020	3030	1820	2730	1610	2420
	7	999	1500	937	1410	767	1150	2020	3030	1810	2720	1610	2410
	8	991	1490	923	1380	755	1130	2010	3020	1810	2710	1600	2400
	9	983	1470	907	1360	742	1110	2010	3010	1800	2710	1600	2400
	10	974	1460	890	1330	728	1090	2000	3000	1800	2700	1590	2390
	11	964	1450	871	1310	713	1070	1990	2990	1790	2690	1580	2380
	12	953	1430	851	1280	696	1040	1980	2970	1780	2670	1580	2370
	13	942	1410	829	1240	679	1020	1970	2960	1770	2660	1570	2350
	14	929	1390	807	1210	660	991	1960	2940	1760	2650	1560	2340
	15	916	1370	784	1180	641	962	1950	2930	1750	2630	1550	2330
	16	902	1350	759	1140	621	932	1940	2910	1740	2620	1540	2310
	17	888	1330	734	1100	601	902	1930	2890	1730	2600	1530	2300
	18	873	1310	709	1060	580	870	1920	2870	1720	2580	1520	2280
	19	857	1290	683	1020	559	838	1900	2850	1710	2560	1510	2270
	20	841	1260	656	984	537	806	1890	2830	1700	2550	1500	2250
	21	824	1240	630	944	515	773	1870	2810	1680	2530	1490	2230
	22	807	1210	603	904	493	740	1860	2790	1670	2510	1480	2210
	23	789	1180	576	864	471	707	1840	2770	1660	2480	1460	2190
	24	771	1160	549	824	449	674	1830	2740	1640	2460	1450	2170
	25	753	1130	522	784	427	641	1810	2720	1630	2440	1440	2150
	26	734	1100	496	744	406	609	1790	2690	1610	2420	1420	2130
	27	716	1070	470	705	385	577	1780	2660	1590	2390	1410	2110
	28	697	1040	445	667	364	546	1760	2640	1580	2370	1390	2090
	29	677	1020	420	629	343	515	1740	2610	1560	2340	1380	2060
	30	658	987	395	593	323	485	1720	2580	1540	2310	1360	2040
	32	619	929	348	522	285	427	1680	2520	1510	2260	1330	1990
	34	580	871	308	462	252	378	1640	2460	1470	2200	1290	1940
	36	542	813	275	413	225	337	1600	2400	1430	2150	1260	1890
	38	504	756	247	370	202	303	1550	2330	1390	2090	1220	1830
	40	467	700	223	334	182	273	1510	2260	1350	2020	1180	1780
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	558	839	575	864	454	682	1190	1790	1020	1540	847	1270
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	315	474	247	371	189	285	1110	1670	953	1430	788	1180
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		82100		76600		62900		154000		136000		117000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		25200		11700		9570		131000		116000		99500	
r_{mx}/r_{my}		1.80		2.56		2.56		1.08		1.08		1.08	
r_{my}, in.		5.14		3.44		3.50		7.93		7.99		8.04	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

4

COMPOSITE
HSS22

Table 4-A (continued)

Available Strength in Axial Compression, kips

Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS22×20×		HSS22×18×								HSS22×16×	
		⅜		¾		⅝		½		⅜		¾	
t_{des}, in.		0.349		0.698		0.581		0.465		0.349		0.698	
Steel, lb/ft		104.04		191.58		161.40		130.52		98.94		181.37	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1400	2100	1900	2840	1700	2560	1510	2260	1290	1940	1760	2630
	1	1400	2100	1900	2840	1700	2550	1510	2260	1290	1940	1760	2630
	2	1400	2100	1890	2840	1700	2550	1500	2260	1290	1940	1750	2630
	3	1400	2100	1890	2840	1700	2550	1500	2250	1290	1940	1750	2630
	4	1390	2090	1890	2830	1700	2550	1500	2250	1290	1930	1750	2620
	5	1390	2090	1890	2830	1690	2540	1500	2250	1290	1930	1740	2620
	6	1390	2080	1880	2820	1690	2530	1490	2240	1280	1920	1740	2610
	7	1390	2080	1870	2810	1680	2530	1490	2230	1280	1920	1730	2600
	8	1380	2070	1870	2800	1680	2520	1480	2230	1270	1910	1720	2590
	9	1380	2060	1860	2790	1670	2510	1480	2220	1270	1900	1720	2570
	10	1370	2060	1850	2780	1660	2500	1470	2210	1260	1890	1710	2560
	11	1360	2050	1840	2770	1660	2480	1460	2200	1250	1880	1700	2550
	12	1360	2040	1840	2750	1650	2470	1460	2180	1250	1870	1690	2530
	13	1350	2030	1820	2740	1640	2460	1450	2170	1240	1860	1670	2510
	14	1340	2020	1810	2720	1630	2440	1440	2160	1230	1850	1660	2490
	15	1340	2000	1800	2700	1620	2430	1430	2140	1220	1830	1650	2470
	16	1330	1990	1790	2680	1610	2410	1420	2130	1210	1820	1630	2450
	17	1320	1980	1780	2660	1590	2390	1410	2110	1200	1810	1620	2430
	18	1310	1960	1760	2640	1580	2370	1390	2090	1190	1790	1600	2410
	19	1300	1950	1750	2620	1570	2350	1380	2070	1180	1770	1590	2380
	20	1290	1930	1730	2600	1550	2330	1370	2050	1170	1760	1570	2350
	21	1280	1920	1720	2570	1540	2310	1360	2030	1160	1740	1550	2330
	22	1270	1900	1700	2550	1520	2290	1340	2010	1150	1720	1530	2300
	23	1250	1880	1680	2520	1510	2260	1330	1990	1130	1700	1510	2270
	24	1240	1860	1660	2500	1490	2240	1310	1970	1120	1680	1490	2240
	25	1230	1850	1650	2470	1470	2210	1300	1950	1110	1660	1470	2210
	26	1220	1830	1630	2440	1460	2190	1280	1920	1090	1640	1450	2180
	27	1200	1810	1610	2410	1440	2160	1270	1900	1080	1620	1430	2150
	28	1190	1790	1590	2380	1420	2130	1250	1870	1060	1600	1410	2110
	29	1180	1770	1570	2350	1400	2100	1230	1850	1050	1570	1390	2080
	30	1160	1740	1550	2320	1380	2080	1220	1820	1030	1550	1360	2050
	32	1130	1700	1500	2260	1350	2020	1180	1770	1000	1500	1320	1980
	34	1100	1650	1460	2190	1310	1960	1140	1720	971	1460	1270	1910
	36	1070	1610	1410	2120	1260	1900	1110	1660	938	1410	1220	1830
	38	1040	1560	1370	2050	1220	1830	1070	1600	904	1360	1170	1760
	40	1010	1510	1320	1980	1180	1770	1030	1540	869	1300	1120	1680
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	662	995	1110	1670	955	1430	790	1190	619	931	1020	1540
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	600	902	956	1440	819	1230	677	1020	517	777	810	1220
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		96200		142000		125000		107000		88600		129000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		81900		101000		89100		76300		62800		75600	
r_{mx}/r_{my}		1.08		1.19		1.18		1.18		1.19		1.31	
r_{my}, in.		8.10		7.21		7.26		7.31		7.37		6.47	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

4

COMPOSITE
HSS22

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS22×16×						HSS22×14×					
		⅝		½		⅜		¾		⅝		½	
t_{des}, in.		0.581		0.465		0.349		0.698		0.581		0.465	
Steel, lb/ft		152.89		123.71		93.83		171.16		144.39		116.91	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1570	2360	1390	2080	1190	1780	1620	2430	1440	2170	1270	1910
	1	1570	2360	1390	2080	1190	1780	1620	2430	1440	2170	1270	1900
	2	1570	2360	1390	2080	1190	1780	1620	2420	1440	2160	1270	1900
	3	1570	2350	1380	2080	1180	1780	1610	2420	1440	2160	1270	1900
	4	1570	2350	1380	2070	1180	1770	1610	2410	1440	2150	1260	1890
	5	1560	2340	1380	2070	1180	1770	1600	2410	1430	2150	1260	1890
	6	1560	2330	1370	2060	1170	1760	1600	2400	1430	2140	1250	1880
	7	1550	2330	1370	2050	1170	1750	1590	2390	1420	2130	1250	1870
	8	1540	2320	1360	2040	1160	1750	1580	2370	1410	2120	1240	1860
	9	1540	2310	1350	2030	1160	1740	1570	2360	1400	2100	1230	1850
	10	1530	2290	1350	2020	1150	1730	1560	2340	1390	2090	1220	1840
	11	1520	2280	1340	2010	1140	1720	1550	2320	1380	2070	1210	1820
	12	1510	2260	1330	1990	1140	1700	1540	2310	1370	2060	1200	1810
	13	1500	2250	1320	1980	1130	1690	1520	2280	1360	2040	1190	1790
	14	1490	2230	1310	1960	1120	1680	1510	2260	1350	2020	1180	1770
	15	1480	2210	1300	1950	1110	1660	1490	2240	1330	2000	1170	1750
	16	1460	2190	1290	1930	1100	1650	1480	2210	1320	1980	1160	1730
	17	1450	2170	1270	1910	1090	1630	1460	2190	1300	1950	1140	1710
	18	1430	2150	1260	1890	1080	1610	1440	2160	1290	1930	1130	1690
	19	1420	2130	1250	1870	1060	1600	1420	2130	1270	1900	1110	1670
	20	1400	2110	1230	1850	1050	1580	1400	2100	1250	1880	1090	1640
	21	1390	2080	1220	1830	1040	1560	1380	2070	1230	1850	1080	1620
	22	1370	2060	1200	1810	1020	1540	1360	2040	1210	1820	1060	1590
	23	1350	2030	1190	1780	1010	1520	1340	2010	1190	1790	1040	1570
	24	1340	2000	1170	1760	996	1490	1320	1970	1170	1760	1030	1540
	25	1320	1980	1160	1730	981	1470	1290	1940	1150	1730	1010	1510
	26	1300	1950	1140	1710	966	1450	1270	1910	1130	1700	988	1480
	27	1280	1920	1120	1680	951	1430	1250	1870	1110	1670	969	1450
	28	1260	1890	1100	1660	935	1400	1220	1830	1090	1630	949	1420
	29	1240	1860	1090	1630	919	1380	1200	1800	1070	1600	929	1390
	30	1220	1830	1070	1600	902	1350	1170	1760	1040	1570	909	1360
	32	1180	1760	1030	1540	869	1300	1120	1680	999	1500	868	1300
	34	1130	1700	990	1490	835	1250	1070	1600	953	1430	827	1240
	36	1090	1630	951	1430	800	1200	1020	1530	906	1360	785	1180
	38	1040	1560	910	1370	765	1150	964	1450	859	1290	743	1110
	40	998	1500	870	1310	729	1090	912	1370	812	1220	701	1050
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	884	1330	733	1100	576	865	942	1420	812	1220	674	1010
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	694	1040	574	862	440	661	672	1010	577	867	477	717
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		114000		97900		80700		117000		103000		88900	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		66700		57400		47000		54400		48400		41200	
r_{mx}/r_{my}		1.31		1.31		1.31		1.47		1.46		1.47	
r_{my}, in.		6.52		6.57		6.63		5.71		5.76		5.81	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS22–HSS20

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS22×14×		HSS22×10×						HSS20×16×			
		⅜		⅝		½		⅜		¾		⅝	
t_{des}, in.		0.349		0.581		0.465		0.349		0.698		0.581	
Steel, lb/ft		88.73		127.37		103.30		78.52		171.16		144.39	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1080	1620	1190	1780	1030	1550	868	1300	1640	2460	1460	2200
	1	1080	1620	1190	1780	1030	1550	868	1300	1640	2460	1460	2200
	2	1080	1620	1180	1780	1030	1540	866	1300	1640	2460	1460	2190
	3	1080	1620	1180	1770	1030	1540	863	1290	1630	2450	1460	2190
	4	1070	1610	1170	1760	1020	1530	859	1290	1630	2450	1460	2190
	5	1070	1610	1170	1750	1010	1520	853	1280	1630	2440	1450	2180
	6	1070	1600	1160	1740	1010	1510	847	1270	1620	2430	1450	2170
	7	1060	1590	1150	1720	998	1500	839	1260	1620	2420	1440	2170
	8	1050	1580	1140	1710	988	1480	831	1250	1610	2410	1440	2160
	9	1050	1570	1120	1690	977	1470	821	1230	1600	2400	1430	2150
	10	1040	1560	1110	1670	965	1450	810	1210	1590	2390	1420	2130
	11	1030	1550	1090	1640	951	1430	798	1200	1580	2380	1410	2120
	12	1020	1530	1080	1620	936	1400	785	1180	1570	2360	1410	2110
	13	1010	1520	1060	1590	920	1380	772	1160	1560	2340	1400	2090
	14	1000	1500	1040	1560	904	1360	758	1140	1550	2330	1380	2080
	15	991	1490	1020	1530	886	1330	742	1110	1540	2310	1370	2060
	16	979	1470	1000	1500	868	1300	727	1090	1520	2290	1360	2040
	17	967	1450	978	1470	849	1270	710	1070	1510	2260	1350	2020
	18	954	1430	955	1430	829	1240	693	1040	1500	2240	1330	2000
	19	940	1410	931	1400	808	1210	675	1010	1480	2220	1320	1980
	20	926	1390	907	1360	787	1180	657	986	1460	2190	1310	1960
	21	912	1370	883	1320	766	1150	639	958	1450	2170	1290	1940
	22	897	1350	857	1290	744	1120	620	930	1430	2140	1270	1910
	23	882	1320	832	1250	721	1080	601	901	1410	2120	1260	1890
	24	866	1300	806	1210	699	1050	581	872	1390	2090	1240	1860
	25	850	1270	780	1170	676	1010	562	843	1370	2060	1220	1840
	26	833	1250	753	1130	653	980	542	813	1350	2030	1210	1810
	27	816	1220	727	1090	630	945	523	784	1330	2000	1190	1780
	28	799	1200	701	1050	607	910	503	754	1310	1970	1170	1750
	29	782	1170	674	1010	584	876	483	725	1290	1940	1150	1730
	30	764	1150	648	972	561	842	464	696	1270	1910	1130	1700
	32	729	1090	596	894	516	774	426	638	1230	1840	1090	1640
	34	692	1040	545	818	472	708	388	582	1180	1770	1050	1580
	36	656	984	496	744	429	644	352	528	1140	1700	1010	1510
	38	620	930	448	673	388	581	317	475	1090	1630	967	1450
	40	584	875	405	607	350	525	286	429	1040	1560	925	1390
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	532	799	666	1000	556	835	438	659	887	1330	764	1150
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	367	552	368	553	305	459	235	353	751	1130	645	970
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		73100		81000		70100		57500		102000		89800	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		33800		21300		18400		15000		69800		61400	
r_{mx}/r_{my}		1.47		1.95		1.95		1.96		1.21		1.21	
r_{my}, in.		5.87		4.19		4.24		4.29		6.39		6.44	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

4

COMPOSITE
HSS20

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS20×16×						HSS20×12×					
		½		⅜		5⁄16		1		⅞		¾	
t_{des}, in.		0.465		0.349		0.291		0.930		0.814		0.698	
Steel, lb/ft		116.91		88.73		74.38		195.40		173.43		150.75	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1290	1940	1110	1660	983	1470	1660	2480	1520	2270	1370	2060
	1	1290	1940	1110	1660	983	1470	1660	2480	1510	2270	1370	2060
	2	1290	1930	1110	1660	982	1470	1650	2480	1510	2270	1370	2050
	3	1290	1930	1110	1660	980	1470	1650	2470	1510	2260	1370	2050
	4	1280	1930	1100	1660	978	1470	1640	2460	1500	2260	1360	2040
	5	1280	1920	1100	1650	975	1460	1640	2450	1500	2250	1360	2030
	6	1280	1920	1100	1650	972	1460	1630	2440	1490	2230	1350	2020
	7	1270	1910	1090	1640	968	1450	1620	2420	1480	2220	1340	2010
	8	1270	1900	1090	1630	964	1450	1600	2410	1470	2200	1330	2000
	9	1260	1890	1080	1620	959	1440	1590	2390	1460	2180	1320	1980
	10	1250	1880	1080	1610	953	1430	1580	2360	1440	2160	1310	1960
	11	1250	1870	1070	1600	947	1420	1560	2340	1430	2140	1290	1940
	12	1240	1860	1060	1590	940	1410	1540	2310	1410	2120	1280	1920
	13	1230	1840	1050	1580	933	1400	1520	2280	1390	2090	1260	1900
	14	1220	1830	1040	1570	925	1390	1500	2250	1380	2060	1250	1870
	15	1210	1810	1030	1550	917	1380	1480	2220	1360	2030	1230	1840
	16	1200	1800	1020	1540	908	1360	1460	2190	1340	2000	1210	1820
	17	1190	1780	1010	1520	899	1350	1430	2150	1310	1970	1190	1790
	18	1170	1760	1000	1510	889	1330	1410	2110	1290	1940	1170	1760
	19	1160	1740	992	1490	879	1320	1380	2080	1270	1900	1150	1730
	20	1150	1720	980	1470	869	1300	1360	2040	1240	1870	1130	1690
	21	1130	1700	968	1450	858	1290	1330	1990	1220	1830	1110	1660
	22	1120	1680	955	1430	846	1270	1300	1950	1190	1790	1080	1630
	23	1100	1660	942	1410	835	1250	1270	1910	1170	1750	1060	1590
	24	1090	1630	928	1390	823	1230	1240	1860	1140	1710	1040	1560
	25	1070	1610	914	1370	810	1220	1210	1820	1110	1670	1010	1520
	26	1060	1590	900	1350	798	1200	1180	1770	1090	1630	987	1480
	27	1040	1560	885	1330	785	1180	1150	1730	1060	1590	962	1440
	28	1020	1540	870	1310	771	1160	1120	1690	1030	1540	937	1410
	29	1010	1510	855	1280	758	1140	1090	1640	1000	1500	911	1370
	30	990	1480	840	1260	744	1120	1060	1600	972	1460	885	1330
	32	954	1430	808	1210	716	1070	1000	1510	915	1370	834	1250
	34	918	1380	776	1160	688	1030	946	1420	857	1290	782	1170
	36	880	1320	743	1110	659	988	886	1330	800	1200	730	1100
	38	843	1260	710	1060	629	944	828	1240	744	1120	679	1020
	40	805	1210	676	1010	600	899	771	1160	694	1040	630	945
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	634	952	498	749	424	637	918	1380	829	1250	735	1110
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	536	805	419	629	341	513	631	948	569	855	504	758
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		76900		63500		56300		93900		87500		80200	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		52700		43200		38300		40000		37000		34000	
r_{mx}/r_{my}		1.21		1.21		1.21		1.53		1.54		1.54	
r_{my}, in.		6.50		6.55		6.58		4.78		4.83		4.88	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS20

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS20×12×								HSS20×8×			
		5/8		1/2		3/8		5/16		1		7/8	
t_{des}, in.		0.581		0.465		0.349		0.291		0.930		0.814	
Steel, lb/ft		127.37		103.30		78.52		65.87		168.18		149.61	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1220	1830	1070	1600	908	1360	803	1200	1390	2090	1230	1850
	1	1220	1830	1070	1600	908	1360	802	1200	1390	2090	1230	1850
	2	1220	1830	1060	1600	906	1360	801	1200	1380	2080	1230	1850
	3	1220	1820	1060	1590	904	1360	799	1200	1380	2070	1220	1840
	4	1210	1820	1060	1590	901	1350	796	1190	1370	2050	1210	1820
	5	1210	1810	1050	1580	897	1340	792	1190	1350	2030	1200	1810
	6	1200	1800	1050	1570	892	1340	788	1180	1340	2010	1190	1790
	7	1190	1790	1040	1560	886	1330	783	1170	1320	1980	1170	1770
	8	1180	1780	1030	1550	879	1320	777	1170	1300	1950	1160	1740
	9	1170	1760	1020	1540	871	1310	770	1160	1280	1920	1140	1710
	10	1160	1750	1010	1520	863	1290	763	1140	1250	1880	1120	1680
	11	1150	1730	1000	1510	854	1280	754	1130	1230	1840	1090	1640
	12	1140	1710	993	1490	844	1270	746	1120	1200	1800	1070	1600
	13	1130	1690	981	1470	833	1250	736	1100	1170	1750	1040	1560
	14	1110	1670	968	1450	822	1230	726	1090	1130	1700	1010	1520
	15	1100	1640	954	1430	809	1210	715	1070	1100	1650	984	1480
	16	1080	1620	940	1410	797	1200	704	1060	1070	1600	954	1430
	17	1060	1590	925	1390	783	1180	692	1040	1030	1550	923	1390
	18	1040	1570	909	1360	769	1150	680	1020	994	1490	891	1340
	19	1030	1540	893	1340	755	1130	667	1000	956	1440	859	1290
	20	1010	1510	876	1310	740	1110	654	981	918	1380	826	1240
	21	987	1480	858	1290	725	1090	640	961	880	1320	793	1190
	22	967	1450	840	1260	709	1060	626	940	842	1270	759	1140
	23	946	1420	822	1230	693	1040	612	918	804	1210	726	1090
	24	925	1390	803	1200	676	1010	598	896	766	1150	692	1040
	25	903	1350	784	1180	660	990	583	874	728	1090	659	991
	26	881	1320	765	1150	643	964	568	852	690	1040	626	941
	27	859	1290	745	1120	626	938	553	829	653	982	594	892
	28	836	1250	725	1090	608	912	537	806	617	928	562	845
	29	813	1220	705	1060	591	886	522	783	582	875	531	798
	30	791	1190	685	1030	573	860	506	759	547	823	500	752
	32	745	1120	644	967	538	807	475	713	481	723	441	663
	34	699	1050	604	906	503	754	444	666	426	641	391	587
	36	653	979	564	846	468	702	413	620	380	572	348	524
	38	608	912	524	786	434	651	383	575	341	513	313	470
	40	564	845	485	728	401	601	354	531	308	463	282	424
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	636	955	530	796	417	626	359	540	719	1080	654	982
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	434	653	358	539	281	423	232	348	363	545	328	493
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		72300		62100		51100		45100		68300		63900	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		30500		26100		21400		18900		14600		13600	
r_{mx}/r_{my}		1.54		1.54		1.55		1.54		2.16		2.17	
r_{my}, in.		4.93		4.99		5.04		5.07		3.19		3.24	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS20

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS20×8×										HSS20×6×	
		¾		⅝		½		⅜		5/16		⅝	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.581	
Steel, lb/ft		130.33		110.36		89.68		68.31		57.36		101.85	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1110	1660	976	1460	844	1270	707	1060	620	930	854	1280
	1	1100	1660	975	1460	843	1260	706	1060	619	929	853	1280
	2	1100	1650	972	1460	840	1260	704	1060	617	926	848	1270
	3	1100	1640	967	1450	836	1250	700	1050	614	921	840	1260
	4	1090	1630	960	1440	830	1250	695	1040	610	914	829	1240
	5	1080	1610	951	1430	822	1230	689	1030	604	906	816	1220
	6	1060	1600	940	1410	813	1220	681	1020	597	895	799	1200
	7	1050	1570	927	1390	802	1200	671	1010	589	883	780	1170
	8	1030	1550	913	1370	790	1180	661	991	580	869	759	1140
	9	1010	1520	897	1340	776	1160	649	974	569	854	735	1100
	10	994	1490	879	1320	761	1140	636	954	558	837	710	1060
	11	972	1460	860	1290	745	1120	622	933	546	819	684	1030
	12	948	1420	839	1260	727	1090	607	911	533	799	658	989
	13	923	1380	818	1230	709	1060	592	887	519	778	631	948
	14	897	1350	795	1190	689	1030	575	862	504	757	603	906
	15	869	1300	771	1160	669	1000	558	836	489	734	574	862
	16	841	1260	746	1120	648	971	540	809	474	710	545	819
	17	812	1220	721	1080	626	939	521	782	457	686	515	774
	18	784	1180	695	1040	604	905	502	753	441	661	486	730
	19	757	1140	668	1000	581	871	483	725	424	636	456	686
	20	728	1090	642	963	558	837	464	695	407	611	427	642
	21	700	1050	615	922	535	802	444	666	390	585	399	599
	22	671	1010	588	881	512	767	424	636	373	559	371	558
	23	642	966	560	841	488	732	405	607	355	533	344	517
	24	614	923	534	800	465	698	385	578	338	507	317	477
	25	585	880	507	760	442	663	366	549	321	482	292	439
	26	557	837	480	721	419	629	347	520	304	457	270	406
	27	529	795	456	685	397	596	328	492	288	432	251	377
	28	501	754	433	651	375	563	309	464	272	408	233	350
	29	474	713	410	616	354	530	291	437	256	384	217	326
	30	448	673	388	583	333	499	273	410	240	361	203	305
	32	396	595	345	518	293	439	240	360	211	317	178	268
	34	351	527	305	459	259	389	213	319	187	281	158	237
	36	313	470	272	409	231	347	190	285	167	250	141	212
	38	281	422	244	367	207	311	170	256	150	225	126	190
	40	254	381	221	331	187	281	154	231	135	203	114	172
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	580	872	504	758	422	635	334	503	287	432	436	655
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	291	438	253	380	210	316	165	248	138	207	174	261
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		58700		53000		46700		38600		34100		43200	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		12500		11200		9840		8080		7100		5560	
r_{mx}/r_{my}		2.17		2.18		2.18		2.19		2.19		2.79	
r_{my}, in.		3.29		3.34		3.39		3.44		3.47		2.50	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS20

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS20×6×						HSS20×4×					
		½		⅜		5/16		½		⅜		5/16	
t_{des}, in.		0.465		0.349		0.291		0.465		0.349		0.291	
Steel, lb/ft		82.88		63.21		53.11		76.07		58.10		48.86	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	734	1100	606	909	531	797	622	933	508	762	440	660
	1	733	1100	605	908	530	795	619	929	506	759	438	657
	2	729	1090	602	903	527	791	612	917	500	750	433	650
	3	722	1080	597	895	523	784	599	899	490	735	425	637
	4	713	1070	589	884	516	774	582	873	477	715	414	620
	5	701	1050	580	870	508	762	561	841	460	690	399	599
	6	688	1030	569	853	498	747	536	804	440	661	383	574
	7	672	1010	556	833	487	730	508	762	418	627	364	546
	8	654	980	541	812	474	711	479	721	394	591	344	516
	9	634	951	525	787	460	690	458	688	368	552	322	483
	10	612	918	507	761	445	667	431	648	342	512	299	449
	11	589	884	489	733	429	643	398	599	314	471	276	414
	12	565	848	469	704	411	617	366	550	287	430	253	379
	13	540	810	449	673	394	591	333	501	260	389	230	345
	14	514	771	428	642	375	563	301	453	233	350	207	311
	15	488	732	406	609	356	535	270	406	208	312	185	278
	16	461	692	384	577	337	506	241	361	192	288	164	246
	17	434	652	362	544	318	477	213	320	173	260	145	218
	18	408	612	341	511	299	449	190	286	154	232	130	194
	19	381	572	319	478	280	420	171	256	138	208	116	175
	20	357	537	297	446	261	392	154	231	125	188	107	160
	21	334	502	277	415	243	365	140	210	113	170	97.1	146
	22	312	469	256	384	225	338	127	191	103	155	88.5	133
	23	290	436	236	354	208	312	116	175	94.5	142	81.0	122
	24	269	404	217	326	191	287	107	161	86.8	130	74.4	112
	25	248	372	200	300	176	264	98.5	148	80.0	120	68.5	103
	26	229	344	185	277	163	244	91.1	137	73.9	111	63.4	95.2
	27	212	319	171	257	151	226	84.5	127	68.6	103	58.8	88.3
	28	197	297	159	239	140	210	78.5	118	63.8	95.8	54.6	82.1
	29	184	277	149	223	131	196					50.9	76.6
	30	172	258	139	208	122	183						
	32	151	227	122	183	107	161						
	34	134	201	108	162	95.2	143						
	36	119	179	96.5	145	84.9	127						
	38	107	161	86.6	130	76.2	114						
	40	96.7	145	78.1	117	68.8	103						
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	367	552	290	436	250	376	308	463	245	369	211	318
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	145	218	114	172	96.3	145	87.1	131	69.2	104	59.0	88.6
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		38200		32300		28500		29400		24900		22500	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		4870		4110		3610		1820		1540		1380	
r_{mx}/r_{my}		2.80		2.80		2.81		4.02		4.02		4.04	
r_{my}, in.		2.55		2.60		2.63		1.68		1.73		1.75	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS18

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS18×10×								HSS18×8×			
		⅝		½		⅜		5/16		⅝		½	
t_{des}, in.		0.581		0.465		0.349		0.291		0.581		0.465	
Steel, lb/ft		110.36		89.68		68.31		57.36		101.85		82.88	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1010	1510	878	1320	741	1110	668	1000	895	1340	775	1160
	1	1010	1510	877	1320	740	1110	668	1000	894	1340	774	1160
	2	1010	1510	875	1310	739	1110	666	999	891	1340	772	1160
	3	1000	1510	872	1310	736	1100	664	996	887	1330	768	1150
	4	999	1500	868	1300	733	1100	660	991	880	1320	762	1140
	5	993	1490	863	1290	728	1090	656	984	872	1310	755	1130
	6	985	1480	856	1280	722	1080	651	976	862	1290	746	1120
	7	976	1460	849	1270	716	1070	645	967	850	1270	736	1100
	8	966	1450	840	1260	708	1060	638	957	836	1250	725	1090
	9	955	1430	830	1250	699	1050	630	945	821	1230	712	1070
	10	943	1410	819	1230	690	1040	621	932	805	1210	698	1050
	11	929	1390	807	1210	680	1020	612	918	787	1180	683	1020
	12	914	1370	795	1190	669	1000	602	902	768	1150	666	999
	13	899	1350	781	1170	657	985	591	886	748	1120	649	974
	14	882	1320	767	1150	644	967	579	869	727	1090	631	946
	15	865	1300	751	1130	631	947	567	851	705	1060	612	918
	16	846	1270	736	1100	618	926	554	831	682	1020	592	889
	17	827	1240	719	1080	603	905	541	812	658	987	572	858
	18	807	1210	702	1050	588	883	527	791	634	951	552	828
	19	787	1180	684	1030	573	860	513	770	610	915	531	796
	20	766	1150	666	999	557	836	499	749	585	877	509	764
	21	745	1120	647	971	541	812	484	727	560	840	488	732
	22	723	1080	628	942	525	788	469	704	535	802	466	700
	23	701	1050	609	914	508	763	454	681	510	765	445	667
	24	678	1020	590	884	492	738	439	658	485	728	424	635
	25	656	984	570	855	475	712	423	635	460	691	402	604
	26	633	949	550	825	458	687	408	612	438	658	381	572
	27	610	915	530	796	441	662	393	589	416	625	361	541
	28	587	881	511	766	424	636	377	566	395	593	341	511
	29	565	847	491	736	407	611	362	543	374	562	321	481
	30	542	813	471	707	390	586	347	520	353	531	301	452
	32	498	746	433	649	357	536	317	475	313	470	265	397
	34	454	681	395	592	325	488	287	431	277	416	235	352
	36	412	619	358	538	295	442	259	389	247	371	209	314
	38	371	557	323	484	265	397	233	349	222	333	188	282
	40	335	503	291	437	239	358	210	315	200	301	170	254
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	481	723	401	603	318	477	273	410	423	636	354	532
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	311	467	258	388	202	304	171	256	230	346	192	289
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		47500		41500		34000		30000		39900		35200	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		17600		15300		12500		11000		10100		8910	
r_{mx}/r_{my}		1.64		1.65		1.65		1.65		1.99		1.99	
r_{my}, in.		4.10		4.16		4.21		4.23		3.31		3.36	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS18

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS18×8×				HSS18×6×							
		3/8		5/16		3/4		5/8		1/2		3/8	
t_{des}, in.		0.349		0.291		0.698		0.581		0.465		0.349	
Steel, lb/ft		63.21		53.11		109.91		93.34		76.07		58.10	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	647	971	582	873	907	1360	780	1170	669	1000	556	834
	1	646	970	581	872	906	1360	779	1170	668	1000	555	832
	2	644	967	580	869	901	1350	775	1160	664	997	552	828
	3	641	961	576	865	893	1340	767	1150	658	988	547	820
	4	636	954	572	858	882	1330	757	1140	650	975	540	810
	5	630	945	566	850	868	1300	745	1120	639	959	531	797
	6	623	934	560	840	851	1280	729	1090	627	940	521	781
	7	614	921	552	828	831	1250	712	1070	612	918	509	763
	8	605	907	543	815	809	1220	692	1040	595	893	495	742
	9	594	891	533	800	785	1180	670	1010	577	866	480	720
	10	582	873	522	783	759	1140	648	975	557	836	464	695
	11	569	854	510	766	731	1100	625	940	536	805	446	669
	12	555	833	498	747	702	1050	601	904	514	771	428	642
	13	541	811	484	727	671	1010	576	866	491	737	409	614
	14	526	788	471	706	640	961	550	827	468	701	390	584
	15	510	764	456	684	607	913	523	787	443	665	370	554
	16	493	740	441	661	575	864	496	746	419	628	349	524
	17	476	714	425	638	542	814	469	705	394	592	329	494
	18	459	688	409	614	509	765	442	664	370	555	309	463
	19	441	662	393	590	477	716	415	623	346	519	289	433
	20	423	635	377	566	445	668	388	583	324	487	269	404
	21	405	608	361	541	413	621	362	544	303	455	250	375
	22	387	581	344	516	383	575	336	505	282	424	231	347
	23	369	554	328	492	353	531	311	468	262	394	213	319
	24	351	527	311	467	324	487	286	431	242	364	195	293
	25	333	500	295	443	299	449	264	397	223	336	180	270
	26	316	474	279	419	276	415	244	367	207	310	166	250
	27	298	448	264	396	256	385	226	340	192	288	154	231
	28	282	422	248	373	238	358	210	316	178	268	143	215
	29	265	397	234	350	222	334	196	295	166	250	134	201
	30	249	373	219	328	208	312	183	276	155	233	125	187
	32	218	328	192	288	182	274	161	242	136	205	110	165
	34	194	290	170	255	162	243	143	215	121	182	97.3	146
	36	173	259	152	228	144	217	127	191	108	162	86.8	130
	38	155	232	136	204	129	194	114	172	96.7	145	77.9	117
	40	140	210	123	184	117	175	103	155	87.3	131	70.3	105
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	280	421	241	363	418	628	362	544	306	460	242	364
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	151	226	127	191	181	272	158	237	132	199	104	157
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		29200		25800		35700		32300		28500		24300	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		7350		6460		5540		5010		4410		3690	
r_{mx}/r_{my}		1.99		2.00		2.54		2.54		2.54		2.57	
r_{my}, in.		3.41		3.44		2.43		2.48		2.53		2.58	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS18–HSS16

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS18×6×		HSS16×12×									
		5/16		1		7/8		3/4		5/8		1/2	
t_{des}, in.		0.291		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		48.86		168.18		149.61		130.33		110.36		89.68	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	494	740	1400	2100	1280	1920	1160	1740	1030	1550	898	1350
	1	493	739	1400	2100	1280	1920	1160	1740	1030	1540	898	1350
	2	490	735	1400	2100	1280	1920	1160	1740	1030	1540	896	1340
	3	485	728	1400	2090	1280	1910	1150	1730	1030	1540	894	1340
	4	479	719	1390	2090	1270	1910	1150	1730	1020	1530	891	1340
	5	472	707	1380	2080	1270	1900	1150	1720	1020	1530	887	1330
	6	462	693	1380	2060	1260	1890	1140	1710	1010	1520	882	1320
	7	451	677	1370	2050	1250	1880	1130	1700	1010	1510	876	1310
	8	439	659	1360	2030	1240	1860	1120	1680	998	1500	870	1300
	9	426	639	1340	2020	1230	1850	1110	1670	990	1480	862	1290
	10	411	617	1330	2000	1220	1830	1100	1650	980	1470	854	1280
	11	396	594	1320	1970	1210	1810	1090	1640	970	1460	845	1270
	12	380	569	1300	1950	1190	1790	1080	1620	959	1440	836	1250
	13	363	544	1280	1930	1180	1760	1070	1600	947	1420	825	1240
	14	345	518	1270	1900	1160	1740	1050	1580	934	1400	814	1220
	15	328	491	1250	1870	1140	1710	1040	1550	921	1380	802	1200
	16	310	464	1230	1840	1120	1690	1020	1530	907	1360	790	1180
	17	292	437	1210	1810	1110	1660	1000	1500	892	1340	777	1170
	18	273	410	1190	1780	1090	1630	985	1480	877	1310	763	1140
	19	256	384	1160	1750	1070	1600	966	1450	861	1290	749	1120
	20	238	357	1140	1720	1040	1570	948	1420	844	1270	735	1100
	21	221	331	1120	1680	1020	1530	928	1390	827	1240	720	1080
	22	204	307	1100	1650	1000	1500	908	1360	809	1210	704	1060
	23	188	282	1070	1610	978	1470	888	1330	791	1190	688	1030
	24	173	259	1050	1580	955	1430	867	1300	773	1160	672	1010
	25	159	239	1020	1540	931	1400	846	1270	754	1130	656	984
	26	147	221	998	1500	907	1360	824	1240	735	1100	639	959
	27	136	205	973	1460	883	1320	802	1200	716	1070	623	934
	28	127	190	947	1420	858	1290	780	1170	697	1050	606	908
	29	118	177	921	1380	833	1250	758	1140	677	1020	588	883
	30	110	166	895	1340	809	1210	736	1100	658	987	571	857
	32	97.1	146	842	1270	759	1140	691	1040	618	927	537	805
	34	86.0	129	789	1190	711	1070	646	970	579	868	502	753
	36	76.7	115	737	1110	665	1000	602	903	540	810	468	702
	38	68.9	103	686	1030	620	932	559	838	501	752	434	652
	40	62.1	93.2	635	955	575	865	516	775	464	696	402	602
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	209	314	645	969	583	877	519	781	450	676	375	563
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	88.4	133	523	786	472	709	420	631	363	545	302	454
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		21400		52300		48800		44800		40300		34900	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3270		32400		30200		27600		24900		21500	
r_{mx}/r_{my}		2.56		1.27		1.27		1.27		1.27		1.27	
r_{my}, in.		2.61		4.64		4.70		4.75		4.80		4.86	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS16

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS16×12×				HSS16×10×							
		3/8		5/16		5/8		1/2		3/8		5/16	
t_{des}, in.		0.349		0.291		0.581		0.465		0.349		0.291	
Steel, lb/ft		68.31		57.36		101.85		82.88		63.21		53.11	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	761	1140	692	1040	922	1380	802	1200	674	1010	612	918
	1	761	1140	691	1040	922	1380	801	1200	674	1010	611	917
	2	760	1140	690	1040	920	1380	800	1200	672	1010	610	915
	3	758	1140	688	1030	917	1370	797	1200	670	1000	608	912
	4	755	1130	686	1030	912	1370	793	1190	667	1000	605	907
	5	751	1130	682	1020	906	1360	788	1180	662	993	601	901
	6	747	1120	678	1020	899	1350	782	1170	657	986	596	893
	7	742	1110	674	1010	891	1340	775	1160	651	976	590	885
	8	736	1100	668	1000	882	1320	767	1150	644	966	583	875
	9	730	1090	662	993	871	1310	758	1140	636	954	576	864
	10	723	1080	656	983	860	1290	748	1120	627	941	568	852
	11	715	1070	648	972	847	1270	737	1110	618	927	559	839
	12	706	1060	640	960	833	1250	725	1090	608	912	550	825
	13	697	1050	632	948	819	1230	712	1070	597	895	540	810
	14	688	1030	623	934	803	1210	699	1050	585	878	529	794
	15	677	1020	613	920	787	1180	685	1030	573	860	518	777
	16	666	1000	603	905	770	1160	670	1010	561	841	506	759
	17	655	983	592	889	752	1130	655	982	548	821	494	741
	18	643	965	581	872	734	1100	639	959	534	801	481	722
	19	631	947	570	855	715	1070	623	934	520	780	468	703
	20	618	927	558	837	696	1040	606	909	505	758	455	683
	21	605	908	546	819	676	1010	589	883	491	736	441	662
	22	592	888	534	801	656	984	571	857	476	714	428	641
	23	578	867	521	782	635	953	554	830	461	691	414	620
	24	564	846	508	762	615	922	536	803	445	668	399	599
	25	550	825	495	742	594	891	518	776	430	645	385	578
	26	536	803	482	722	573	859	499	749	414	621	371	556
	27	521	782	468	702	552	828	481	722	399	598	357	535
	28	506	760	455	682	531	796	463	694	383	575	343	514
	29	492	737	441	661	510	765	445	667	368	552	328	493
	30	477	715	427	641	489	734	427	640	353	529	314	472
	32	447	670	400	600	448	672	391	587	322	484	287	430
	34	417	626	372	559	408	612	357	535	293	440	260	390
	36	388	582	346	518	370	555	323	485	265	398	234	351
	38	359	539	319	479	333	499	291	436	238	357	210	315
	40	331	497	294	440	300	450	262	394	215	322	190	285
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	296	444	253	381	399	600	335	503	264	396	227	341
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	237	356	203	304	282	423	235	353	184	277	157	237
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		28700		25400		34700		30500		25000		22100	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		17600		15600		15800		13800		11300		9970	
r_{mx}/r_{my}		1.28		1.28		1.48		1.49		1.49		1.49	
r_{my}, in.		4.91		4.94		4.05		4.10		4.15		4.18	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS16

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS16×10×		HSS16×8×									
		¼		⅞		¾		⅝		½		⅜	
t_{des}, in.		0.233		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		42.84		125.79		109.91		93.34		76.07		58.10	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	529	793	1040	1560	921	1380	814	1220	703	1050	590	885
	1	529	793	1040	1560	920	1380	814	1220	703	1050	589	884
	2	527	791	1030	1550	917	1380	811	1220	700	1050	587	881
	3	525	788	1030	1550	912	1370	807	1210	697	1040	584	876
	4	523	784	1020	1540	905	1360	800	1200	691	1040	580	870
	5	519	779	1010	1520	896	1340	793	1190	685	1030	574	861
	6	515	772	1000	1500	885	1330	783	1170	677	1020	567	851
	7	510	765	987	1480	872	1310	772	1160	668	1000	559	839
	8	504	756	972	1460	858	1290	760	1140	657	985	550	826
	9	498	747	954	1430	842	1260	746	1120	645	968	540	811
	10	491	736	936	1410	825	1240	731	1100	632	948	529	794
	11	483	725	915	1380	806	1210	714	1070	618	927	518	776
	12	475	713	893	1340	786	1180	697	1050	603	905	505	757
	13	466	699	870	1310	764	1150	678	1020	587	881	491	737
	14	457	685	846	1270	743	1120	659	988	571	856	477	716
	15	447	671	821	1230	722	1080	638	957	553	830	463	694
	16	437	655	794	1190	700	1050	617	926	535	803	447	671
	17	426	639	767	1150	676	1020	596	893	517	775	432	648
	18	415	623	740	1110	653	981	573	860	498	747	416	624
	19	404	606	712	1070	629	945	551	826	479	718	400	599
	20	392	589	683	1030	604	908	528	792	459	689	383	575
	21	381	571	655	984	580	871	505	758	440	659	366	550
	22	369	553	626	940	555	834	482	723	420	630	350	525
	23	356	535	597	897	530	797	459	689	400	600	333	500
	24	344	516	568	854	505	760	436	656	381	571	317	475
	25	332	498	540	811	481	723	416	625	361	542	300	451
	26	319	479	512	769	457	686	395	594	342	513	284	427
	27	307	460	484	727	433	650	375	564	323	485	269	403
	28	295	442	457	687	409	615	356	534	305	457	253	380
	29	282	424	430	647	386	580	336	505	287	430	238	357
	30	270	405	404	608	364	547	317	477	269	404	223	334
	32	246	369	355	534	320	481	280	421	237	355	196	294
	34	223	335	315	473	284	426	248	373	210	314	174	260
	36	201	301	281	422	253	380	221	333	187	280	155	232
	38	180	270	252	379	227	341	199	299	168	252	139	208
	40	163	244	227	342	205	308	179	269	151	227	125	188
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	188	282	448	674	400	601	348	524	291	438	232	348
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	125	188	269	404	239	359	208	312	174	261	137	205
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		19100		34900		32100		29100		25700		21400	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		8540		10900		10100		9060		7950		6590	
r_{mx}/r_{my}		1.50		1.79		1.78		1.79		1.80		1.80	
r_{my}, in.		4.21		3.17		3.22		3.27		3.32		3.37	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS16

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS16×8×				HSS16×6×							
		5/16		1/4		5/8		1/2		3/8		5/16	
t_{des}, in.		0.291		0.233		0.581		0.465		0.349		0.291	
Steel, lb/ft		48.86		39.43		84.84		69.27		53.00		44.60	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	529	794	455	682	704	1060	605	907	503	754	447	670
	1	529	793	454	682	703	1050	603	905	502	753	446	669
	2	527	790	453	679	699	1050	600	900	499	749	444	665
	3	524	786	450	676	692	1040	595	892	495	742	440	659
	4	520	780	447	670	683	1020	587	880	488	732	434	651
	5	515	772	442	664	671	1010	577	866	480	720	427	640
	6	509	763	437	656	657	986	566	848	471	706	418	627
	7	502	752	431	646	641	963	552	828	460	690	408	613
	8	493	740	424	636	624	938	537	806	447	671	397	596
	9	484	726	416	624	606	911	520	781	434	650	385	577
	10	474	711	407	611	586	881	502	754	419	628	372	558
	11	464	695	398	597	565	849	483	725	403	605	358	536
	12	452	678	388	582	543	816	463	695	386	580	343	514
	13	440	660	378	566	520	781	442	663	369	554	327	491
	14	427	640	366	550	496	746	421	631	351	527	312	467
	15	414	620	355	532	472	709	399	598	333	500	295	443
	16	400	600	343	515	447	672	377	565	315	472	279	418
	17	386	578	331	496	422	634	354	531	296	445	263	394
	18	371	556	318	477	397	597	332	498	278	417	246	369
	19	356	534	306	458	372	559	311	468	260	390	230	345
	20	341	512	293	439	348	523	292	438	242	363	214	321
	21	326	489	280	420	324	487	272	409	225	337	198	298
	22	311	467	267	400	301	452	253	381	208	311	183	275
	23	296	444	254	381	278	418	235	353	191	286	168	253
	24	281	422	241	362	256	384	217	326	175	263	155	232
	25	267	400	228	343	235	354	200	300	162	242	143	214
	26	252	378	216	324	218	327	185	278	149	224	132	198
	27	238	357	204	306	202	303	171	258	139	208	122	183
	28	224	336	192	288	188	282	159	240	129	193	114	170
	29	210	316	180	270	175	263	149	223	120	180	106	159
	30	197	295	168	252	164	246	139	209	112	168	99.0	149
	32	173	259	148	222	144	216	122	183	98.6	148	87.0	131
	34	153	230	131	197	127	191	108	162	87.4	131	77.1	116
	36	137	205	117	175	114	171	96.4	145	77.9	117	68.8	103
	38	123	184	105	157	102	153	86.5	130	69.9	105	61.7	92.6
	40	111	166	94.7	142	92.0	138	78.1	117	63.1	94.7	55.7	83.5
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	199	299	166	249	297	446	249	375	198	298	171	257
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	117	175	93.6	141	142	213	119	179	93.8	141	80.4	121
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		18900		16200		23400		20700		17600		15600	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		5820		4980		4470		3940		3320		2930	
r_{mx}/r_{my}		1.80		1.80		2.29		2.29		2.30		2.31	
r_{my}, in.		3.40		3.42		2.46		2.51		2.56		2.58	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS16

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS16×6×		HSS16×4×									
		¼		⅝		½		⅜		5/16		¼	
t_{des}, in.		0.233		0.581		0.465		0.349		0.291		0.233	
Steel, lb/ft		36.03		76.33		62.46		47.90		40.35		32.63	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	383	575	629	945	515	774	416	624	367	550	311	466
	1	383	574	626	941	513	771	414	621	366	548	309	464
	2	380	571	618	930	507	762	409	614	361	542	306	459
	3	377	565	606	911	497	748	401	601	354	531	300	450
	4	372	558	589	885	484	728	390	584	344	516	292	438
	5	366	549	567	853	468	703	376	564	332	498	282	423
	6	359	538	542	815	448	673	359	539	318	477	270	405
	7	350	525	514	773	426	640	341	511	302	453	257	385
	8	341	511	483	726	402	604	321	481	284	426	242	363
	9	330	495	451	677	376	566	299	449	266	398	227	340
	10	319	478	417	626	350	526	277	416	246	369	211	316
	11	307	460	382	575	323	485	255	382	226	340	194	291
	12	294	441	348	523	295	443	235	354	207	310	178	266
	13	281	421	314	472	268	403	215	323	187	281	161	242
	14	267	400	281	422	241	363	195	293	168	252	145	218
	15	253	379	249	375	216	324	176	264	150	224	130	194
	16	239	358	219	329	191	287	157	236	135	203	115	172
	17	225	337	194	292	169	254	139	210	120	180	102	152
	18	211	316	173	260	151	227	124	187	107	161	90.6	136
	19	197	295	155	234	135	204	112	168	96.1	144	81.3	122
	20	183	275	140	211	122	184	101	151	86.7	130	73.4	110
	21	170	255	127	191	111	167	91.4	137	78.6	118	66.6	99.8
	22	157	235	116	174	101	152	83.2	125	71.6	108	60.6	91.0
	23	144	216	106	159	92.4	139	76.2	114	65.6	98.5	55.5	83.2
	24	132	198	97.4	146	84.9	128	69.9	105	60.2	90.5	51.0	76.4
	25	122	183	89.8	135	78.2	118	64.5	96.9	55.5	83.4	47.0	70.4
	26	113	169	83.0	125	72.3	109	59.6	89.6	51.3	77.1	43.4	65.1
	27	105	157			67.0	101	55.3	83.1	47.6	71.5	40.3	60.4
	28	97.2	146					51.4	77.2	44.2	66.5	37.4	56.2
	29	90.6	136									34.9	52.4
	30	84.7	127										
	32	74.4	112										
	34	65.9	98.9										
	36	58.8	88.2										
	38	52.8	79.2										
	40	47.6	71.4										
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	142	214	244	367	206	310	164	247	142	213	118	178
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	65.0	97.8	82.8	124	70.3	106	56.2	84.4	48.2	72.4	39.5	59.4
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		13400		17800		15700		13300		12000		10500	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		2500		1630		1460		1240		1110		964	
r_{mx}/r_{my}		2.32		3.30		3.28		3.28		3.29		3.30	
r_{my}, in.		2.61		1.60		1.65		1.71		1.73		1.76	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS14

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14×12×										HSS14×10×	
		⅝		½		⅜		5/16		¼		⅞	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.814	
Steel, lb/ft		101.85		82.88		63.21		53.11		42.84		125.79	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	936	1400	816	1220	688	1030	625	938	559	839	1040	1560
	1	936	1400	815	1220	688	1030	625	937	559	838	1040	1560
	2	934	1400	814	1220	686	1030	624	936	558	837	1040	1560
	3	932	1400	812	1220	685	1030	622	933	556	835	1040	1550
	4	928	1390	809	1210	682	1020	620	930	554	831	1030	1550
	5	924	1390	805	1210	679	1020	617	925	551	827	1020	1530
	6	919	1380	801	1200	675	1010	613	920	548	822	1010	1520
	7	913	1370	795	1190	670	1010	609	913	544	816	1010	1510
	8	906	1360	789	1180	665	998	604	906	539	809	994	1490
	9	898	1350	783	1170	659	989	598	898	534	801	982	1480
	10	889	1330	775	1160	653	979	592	889	529	793	969	1460
	11	880	1320	767	1150	646	968	586	878	522	784	955	1430
	12	870	1300	758	1140	638	957	578	868	516	773	939	1410
	13	859	1290	748	1120	629	944	571	856	508	763	923	1390
	14	847	1270	738	1110	621	931	562	843	501	751	906	1360
	15	834	1250	727	1090	611	917	554	830	493	739	888	1330
	16	821	1230	715	1070	601	902	544	817	484	726	869	1310
	17	808	1210	703	1060	591	886	535	802	475	713	849	1280
	18	793	1190	691	1040	580	870	525	787	466	699	828	1240
	19	778	1170	678	1020	569	854	514	771	456	684	807	1210
	20	763	1140	665	997	557	836	503	755	446	669	785	1180
	21	747	1120	651	976	546	818	492	739	436	654	763	1150
	22	731	1100	637	955	533	800	481	722	426	638	741	1110
	23	714	1070	622	933	521	781	469	704	415	622	718	1080
	24	697	1050	607	911	508	762	458	687	404	606	694	1040
	25	680	1020	592	888	495	743	446	669	393	590	671	1010
	26	663	994	577	866	482	723	434	650	382	573	648	973
	27	645	967	562	842	469	703	421	632	371	556	624	938
	28	627	941	546	819	456	683	409	613	359	539	600	902
	29	609	914	530	795	442	663	396	595	348	522	577	867
	30	591	886	514	772	429	643	384	576	337	505	554	832
	32	555	832	483	724	402	602	359	539	314	471	508	763
	34	518	778	451	677	375	562	334	501	291	437	463	696
	36	483	724	420	630	348	522	310	465	269	404	420	631
	38	447	671	389	584	322	483	286	429	248	372	378	568
	40	413	620	360	539	297	445	263	394	227	340	341	512
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	365	549	305	459	242	363	207	312	171	257	417	627
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	328	492	272	409	215	323	184	276	150	225	326	490
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		28600		24900		20400		18100		15600		29400	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		22100		19200		15800		13900		12000		16800	
r_{mx}/r_{my}		1.14		1.14		1.14		1.14		1.14		1.32	
r_{my}, in.		4.72		4.78		4.83		4.86		4.88		3.88	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS14

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14×10×											
		¾		⅝		½		⅜		5/16		¼	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.233	
Steel, lb/ft		109.91		93.34		76.07		58.10		48.86		39.43	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	941	1410	835	1250	724	1090	610	915	550	825	488	733
	1	940	1410	834	1250	723	1080	610	915	549	824	488	732
	2	938	1410	832	1250	722	1080	608	913	548	822	487	730
	3	935	1400	829	1240	719	1080	606	909	546	819	485	728
	4	930	1400	825	1240	716	1070	603	905	543	815	482	724
	5	924	1390	820	1230	711	1070	599	899	540	809	479	719
	6	917	1370	813	1220	705	1060	594	892	535	803	475	713
	7	908	1360	806	1210	699	1050	589	883	530	795	470	705
	8	898	1350	797	1200	692	1040	582	873	524	786	465	697
	9	887	1330	787	1180	683	1020	575	863	517	776	459	688
	10	875	1310	777	1170	674	1010	567	851	510	765	452	678
	11	861	1290	765	1150	664	996	559	838	502	753	445	667
	12	847	1270	752	1130	653	980	549	824	494	740	437	655
	13	831	1250	739	1110	642	963	539	809	484	727	429	643
	14	815	1220	725	1090	630	944	529	793	475	712	420	630
	15	798	1200	710	1060	617	925	518	777	465	697	410	616
	16	780	1170	694	1040	603	905	506	759	454	681	401	601
	17	761	1140	678	1020	589	884	494	741	443	664	391	586
	18	742	1110	661	991	575	862	482	723	432	647	380	570
	19	722	1080	643	965	560	840	469	703	420	630	370	554
	20	702	1050	625	938	545	817	456	684	408	612	359	538
	21	681	1020	607	911	529	793	442	663	395	593	347	521
	22	660	989	588	883	513	770	429	643	383	574	336	504
	23	638	957	570	854	497	745	415	622	370	555	325	487
	24	617	925	551	826	481	721	401	601	357	536	313	469
	25	595	892	531	797	464	696	387	580	345	517	301	452
	26	573	860	512	768	448	671	373	559	332	498	290	434
	27	552	830	493	739	431	647	358	538	319	478	278	417
	28	532	799	474	711	414	622	344	516	306	459	266	400
	29	511	769	455	682	398	597	330	495	293	440	255	382
	30	491	738	436	653	382	573	316	475	281	421	244	365
	32	451	678	398	597	349	524	289	433	256	384	221	332
	34	413	620	362	543	318	477	262	394	232	348	200	300
	36	375	564	327	491	288	432	237	355	208	313	179	268
	38	338	508	294	442	259	388	213	319	187	281	161	241
	40	305	459	266	399	234	350	192	288	169	253	145	217
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	373	561	324	487	271	407	214	322	184	277	153	229
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	292	439	253	380	211	317	166	250	142	214	116	175
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		27100		24500		21600		17800		15700		13500	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		15500		13900		12300		10100		8870		7620	
r_{mx}/r_{my}		1.32		1.33		1.33		1.33		1.33		1.33	
r_{my}, in.		3.93		3.98		4.04		4.09		4.12		4.14	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS14

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14×8×										HSS14×6×	
		⅝		½		⅜		5/16		¼		⅝	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.581	
Steel, lb/ft		84.84		69.27		53.00		44.60		36.03		76.33	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	731	1100	632	948	530	795	474	711	420	630	630	945
	1	730	1100	631	947	529	794	474	710	420	629	629	943
	2	728	1090	629	944	528	791	472	708	418	627	625	938
	3	724	1090	626	938	525	787	469	704	416	624	619	930
	4	718	1080	621	931	521	781	466	699	412	619	611	918
	5	711	1070	615	922	516	774	461	692	408	612	601	904
	6	703	1050	608	911	510	764	456	683	403	605	590	886
	7	693	1040	599	899	502	754	449	674	397	596	576	866
	8	681	1020	589	884	494	741	442	663	390	586	561	843
	9	669	1000	579	868	485	728	433	650	383	574	544	818
	10	655	982	567	850	475	713	424	637	375	562	526	791
	11	640	960	554	831	464	697	415	622	366	549	507	762
	12	624	936	540	811	453	679	404	607	356	534	486	731
	13	607	910	526	789	441	661	393	590	346	519	465	699
	14	589	883	511	766	428	642	382	573	336	503	443	666
	15	570	856	495	743	415	622	370	555	325	487	421	633
	16	551	827	479	718	401	601	357	536	313	470	398	599
	17	531	797	462	693	387	580	344	517	302	453	376	564
	18	511	767	445	667	372	558	331	497	290	435	353	530
	19	491	736	427	641	358	536	318	477	278	417	330	496
	20	470	705	410	614	343	514	305	457	266	399	308	463
	21	449	674	392	588	328	491	291	437	254	380	286	430
	22	428	643	374	561	313	469	278	417	241	362	265	399
	23	408	613	356	534	298	446	264	396	229	344	245	368
	24	389	584	338	508	283	424	251	376	217	326	225	338
	25	370	556	321	481	268	402	238	356	205	308	207	311
	26	351	528	304	455	254	380	225	337	194	291	191	288
	27	333	500	287	430	239	359	212	318	182	273	178	267
	28	315	473	270	405	225	338	199	299	171	257	165	248
	29	297	446	254	381	212	318	187	281	160	240	154	231
	30	280	420	238	357	198	297	175	262	150	224	144	216
	32	246	370	209	313	174	261	154	231	132	197	126	190
	34	218	328	185	278	154	231	136	204	116	175	112	168
	36	195	292	165	248	138	206	122	182	104	156	99.9	150
	38	175	262	148	222	124	185	109	164	93.3	140	89.6	135
	40	158	237	134	201	112	167	98.4	148	84.2	126	80.9	122
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	279	420	235	354	187	281	161	242	134	201	236	355
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	185	278	155	233	123	184	105	158	85.9	129	125	188
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		20400		18000		15100		13300		11400		16300	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		7980		7030		5860		5170		4420		3920	
r_{mx}/r_{my}		1.60		1.60		1.61		1.60		1.61		2.04	
r_{my}, in.		3.22		3.27		3.32		3.35		3.38		2.43	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS14

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14×6×								HSS14×4×			
		½		⅜		5/16		¼		⅝		½	
t_{des}, in.		0.465		0.349		0.291		0.233		0.581		0.465	
Steel, lb/ft		62.46		47.90		40.35		32.63		67.82		55.66	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	542	814	450	675	401	601	351	526	560	841	458	688
	1	541	812	449	673	400	600	350	525	558	838	456	686
	2	538	807	446	670	398	597	348	522	551	828	451	678
	3	533	800	442	663	394	591	345	517	539	811	442	665
	4	526	789	437	655	389	584	340	510	524	787	430	647
	5	517	776	429	644	383	574	334	502	505	758	415	624
	6	506	760	421	631	375	562	327	491	482	724	398	598
	7	494	741	411	616	366	549	319	479	457	686	378	568
	8	480	720	399	599	356	534	310	466	429	645	357	536
	9	465	698	387	580	345	517	300	451	400	601	334	501
	10	449	673	373	560	333	499	290	435	369	555	310	465
	11	431	646	359	539	320	480	278	418	338	508	285	429
	12	413	619	344	516	306	460	266	400	307	462	261	392
	13	393	590	329	493	292	439	254	381	277	416	236	355
	14	374	561	312	469	278	417	241	362	248	372	213	320
	15	354	531	296	444	263	395	228	342	219	330	190	285
	16	334	500	280	419	248	373	215	323	193	290	168	252
	17	314	472	263	394	234	350	202	303	171	257	149	223
	18	296	444	246	370	219	328	189	283	152	229	133	199
	19	278	417	230	345	204	306	176	264	137	205	119	179
	20	260	390	214	321	190	285	163	245	123	185	107	161
	21	242	364	198	297	176	264	151	227	112	168	97.4	146
	22	225	338	183	275	162	243	139	209	102	153	88.7	133
	23	208	313	168	252	149	223	127	191	93.3	140	81.2	122
	24	192	288	154	231	137	205	117	175	85.7	129	74.6	112
	25	177	266	142	213	126	189	108	162	79.0	119	68.7	103
	26	163	246	131	197	116	175	99.7	150	73.0	110	63.5	95.5
	27	151	228	122	183	108	162	92.4	139			58.9	88.6
	28	141	212	113	170	100	151	86.0	129				
	29	131	197	106	159	93.6	140	80.1	120				
	30	123	184	98.8	148	87.5	131	74.9	112				
	32	108	162	86.8	130	76.9	115	65.8	98.7				
	34	95.5	144	76.9	115	68.1	102	58.3	87.4				
	36	85.2	128	68.6	103	60.8	91.1	52.0	78.0				
	38	76.5	115	61.5	92.3	54.5	81.8	46.7	70.0				
	40	69.0	104	55.5	83.3	49.2	73.8	42.1	63.2				
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	199	299	159	239	137	206	114	171	191	288	162	244
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	106	159	83.6	126	71.8	108	59.0	88.7	72.7	109	61.9	93.0
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		14400		12300		10900		9380		12200		10800	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3440		2920		2590		2210		1430		1280	
r_{mx}/r_{my}		2.05		2.05		2.05		2.06		2.92		2.90	
r_{my}, in.		2.48		2.53		2.55		2.58		1.59		1.64	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS14–HSS12

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14×4×						HSS12×10×					
		3/8		5/16		1/4		5/8		1/2		3/8	
t_{des}, in.		0.349		0.291		0.233		0.581		0.465		0.349	
Steel, lb/ft		42.79		36.10		29.23		84.84		69.27		53.00	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	369	554	326	489	282	422	745	1120	645	968	544	815
	1	368	552	325	487	281	421	744	1120	645	967	543	815
	2	363	545	321	481	277	416	743	1110	643	965	542	813
	3	356	534	314	471	272	408	740	1110	641	962	540	810
	4	346	519	305	458	264	396	736	1100	638	957	537	806
	5	333	500	295	442	255	382	731	1100	634	951	534	800
	6	319	478	282	423	244	366	725	1090	629	943	529	794
	7	302	453	267	401	232	347	718	1080	623	934	524	786
	8	284	426	252	378	218	327	710	1070	616	924	518	777
	9	265	397	235	353	204	306	701	1050	608	912	512	768
	10	245	368	218	327	189	283	692	1040	600	900	505	757
	11	226	340	200	300	174	260	681	1020	591	886	497	745
	12	208	312	182	273	158	238	669	1000	581	871	488	733
	13	189	285	165	247	143	215	657	986	570	856	479	719
	14	172	258	148	222	129	193	644	966	559	839	470	705
	15	154	232	133	200	115	172	630	946	548	821	460	690
	16	137	207	119	179	101	152	616	924	535	803	449	674
	17	122	183	106	159	89.5	134	601	902	523	784	439	658
	18	109	163	94.5	142	79.8	120	586	879	509	764	427	641
	19	97.4	146	84.9	128	71.6	107	570	855	496	744	416	624
	20	87.9	132	76.6	115	64.7	97.0	554	831	482	723	404	606
	21	79.8	120	69.5	104	58.6	88.0	537	806	468	702	392	588
	22	72.7	109	63.3	95.1	53.4	80.2	520	780	453	680	379	569
	23	66.5	99.9	57.9	87.0	48.9	73.3	503	755	439	658	367	550
	24	61.1	91.8	53.2	79.9	44.9	67.3	486	729	424	636	354	532
	25	56.3	84.6	49.0	73.7	41.4	62.1	469	703	409	613	342	513
	26	52.0	78.2	45.3	68.1	38.3	57.4	451	677	394	591	329	494
	27	48.3	72.5	42.0	63.2	35.5	53.2	434	651	379	568	316	474
	28	44.9	67.4	39.1	58.7	33.0	49.5	416	625	364	546	304	455
	29					30.8	46.1	399	599	349	524	291	437
	30							382	573	334	502	279	418
	32							349	523	306	458	254	381
	34							316	474	277	416	230	346
	36							285	428	250	375	207	311
	38							256	385	225	337	186	279
	40							231	347	203	304	168	252
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	130	195	112	169	93.7	141	255	384	214	322	170	255
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	49.5	74.4	42.8	64.3	35.4	53.2	223	336	187	282	148	223
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		9210		8310		7310		16400		14500		12000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		1080		974		849		12100		10700		8820	
r_{mx}/r_{my}		2.92		2.92		2.93		1.16		1.16		1.17	
r_{my}, in.		1.69		1.72		1.74		3.90		3.96		4.01	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS12

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12×10×						HSS12×8×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		44.60		36.03		27.29		76.33		62.46		47.90	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	488	732	434	652	363	545	650	976	563	844	470	705
	1	487	731	434	651	363	545	650	975	562	843	470	704
	2	486	729	433	650	362	543	648	971	560	840	468	702
	3	484	727	431	647	361	541	644	966	557	836	465	698
	4	482	723	429	643	359	538	639	958	553	829	462	693
	5	479	718	426	639	356	534	632	948	547	821	457	686
	6	475	712	422	633	353	530	624	937	541	811	452	678
	7	470	705	418	627	349	524	615	923	533	799	445	668
	8	465	697	413	620	345	518	605	907	524	786	438	657
	9	459	688	408	612	341	511	593	890	514	771	430	644
	10	452	678	402	603	336	503	581	871	504	755	421	631
	11	445	668	395	593	330	495	567	850	492	738	411	616
	12	437	656	388	582	324	486	552	828	479	719	401	601
	13	429	644	381	571	318	476	537	805	466	699	390	584
	14	421	631	373	559	311	466	521	781	453	679	378	567
	15	412	617	364	546	304	456	504	756	438	657	366	549
	16	402	603	356	533	296	444	486	729	423	635	354	530
	17	392	588	346	520	289	433	468	702	408	612	341	511
	18	382	573	337	506	281	421	450	675	392	589	328	492
	19	371	557	328	491	272	409	432	647	377	565	315	472
	20	361	541	318	477	264	396	413	620	361	541	301	452
	21	350	524	308	461	256	383	395	594	345	517	288	432
	22	338	508	297	446	247	371	377	567	328	493	274	412
	23	327	491	287	431	238	357	360	541	312	469	261	392
	24	316	474	277	415	230	344	343	515	297	445	248	372
	25	304	456	266	400	221	331	325	489	281	421	235	352
	26	293	439	256	384	212	318	308	463	265	398	222	333
	27	281	422	246	368	203	305	292	438	250	375	209	314
	28	270	405	235	353	194	292	275	413	235	353	197	295
	29	259	388	225	337	186	279	259	389	221	331	185	277
	30	247	371	215	322	177	266	243	366	206	310	172	259
	32	225	338	195	292	161	241	214	321	181	272	152	227
	34	204	306	176	264	145	217	189	285	161	241	134	201
	36	183	275	157	236	129	194	169	254	143	215	120	180
	38	164	246	141	212	116	174	152	228	129	193	107	161
	40	148	222	127	191	105	157	137	206	116	174	97.0	145
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	146	219	121	182	93.9	141	219	329	184	277	147	221
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	127	191	105	158	77.7	117	163	244	137	206	108	163
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		10600		9110		7510		13600		12000		10100	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		7790		6690		5490		6900		6100		5100	
r_{mx}/r_{my}		1.17		1.17		1.17		1.40		1.40		1.41	
r_{my}, in.		4.04		4.07		4.09		3.16		3.21		3.27	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS12

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12×8×						HSS12×6×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		40.35		32.63		24.73		67.82		55.66		42.79	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	421	632	372	557	309	464	560	841	478	716	397	595
	1	421	631	371	557	309	463	559	840	477	715	396	594
	2	419	629	370	555	308	462	556	835	474	711	394	591
	3	417	626	368	552	306	459	551	828	469	704	390	585
	4	414	621	365	547	303	455	544	817	463	695	385	577
	5	410	614	361	542	300	450	535	804	455	683	378	567
	6	405	607	356	535	296	445	524	787	445	668	371	556
	7	399	598	351	527	292	438	512	769	434	652	361	542
	8	392	588	345	518	287	430	498	748	422	633	351	527
	9	385	577	338	507	281	422	482	725	408	613	340	510
	10	376	565	331	496	275	412	466	700	394	590	328	492
	11	368	551	323	484	268	402	448	673	378	567	315	473
	12	358	537	314	472	261	391	429	645	361	542	302	453
	13	348	522	305	458	253	380	410	616	344	517	288	432
	14	338	507	296	444	245	368	390	586	327	490	274	410
	15	327	490	286	429	237	356	370	556	309	464	259	388
	16	316	473	276	414	229	343	349	525	291	438	244	366
	17	304	456	266	399	220	330	329	494	275	413	229	344
	18	292	438	255	383	211	316	308	463	258	388	215	322
	19	280	421	244	367	202	303	288	433	242	364	200	300
	20	268	402	234	351	193	289	268	403	226	339	186	279
	21	256	384	223	334	184	276	248	373	210	316	172	258
	22	244	366	212	318	175	262	229	345	195	293	158	238
	23	232	348	201	302	166	248	211	317	180	270	145	218
	24	220	330	191	286	157	235	194	291	165	248	133	200
	25	208	312	180	270	148	222	178	268	152	229	123	184
	26	196	295	170	254	139	209	165	248	141	211	114	170
	27	185	278	160	239	131	196	153	230	130	196	105	158
	28	174	261	150	225	123	184	142	214	121	182	97.9	147
	29	163	244	140	210	114	172	133	199	113	170	91.3	137
	30	152	228	131	196	107	160	124	186	106	159	85.3	128
	32	134	201	115	172	93.9	141	109	164	92.9	140	75.0	112
	34	119	178	102	153	83.2	125	96.4	145	82.2	124	66.4	99.6
	36	106	159	90.7	136	74.2	111	86.0	129	73.4	110	59.2	88.8
	38	94.9	142	81.4	122	66.6	99.9	77.2	116	65.8	99.0	53.2	79.7
	40	85.7	128	73.5	110	60.1	90.1			59.4	89.3	48.0	72.0
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	126	190	105	158	82.0	123	182	274	154	232	123	185
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	93.1	140	76.9	116	57.3	86.2	109	164	92.1	138	73.4	110
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		8930		7690		6310		10800		9520		8120	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		4500		3860		3160		3380		2980		2520	
r_{mx}/r_{my}		1.41		1.41		1.41		1.79		1.79		1.80	
r_{my}, in.		3.29		3.32		3.35		2.39		2.44		2.49	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS12

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12×6×						HSS12×4×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		36.10		29.23		22.18		59.32		48.85		37.69	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	353	530	309	464	255	383	491	738	404	607	323	485
	1	352	529	309	463	255	382	489	735	403	605	322	483
	2	350	526	307	460	253	380	483	725	398	598	318	477
	3	347	521	304	456	251	376	472	710	390	586	311	467
	4	343	514	300	450	247	371	459	689	379	570	302	454
	5	337	505	295	442	243	364	441	663	366	550	291	437
	6	330	495	288	433	238	357	421	633	350	526	278	417
	7	322	483	281	422	232	348	398	599	332	499	263	395
	8	313	469	273	410	225	338	374	561	313	470	247	371
	9	303	454	264	397	218	326	347	522	292	439	230	346
	10	292	438	255	382	210	315	320	481	271	407	213	321
	11	281	421	245	367	201	302	293	440	249	374	197	296
	12	269	403	234	351	192	289	265	399	227	341	181	272
	13	256	385	223	334	183	275	239	359	205	308	165	247
	14	244	365	212	317	174	261	213	319	184	277	149	223
	15	231	346	200	300	164	246	188	282	164	246	133	200
	16	217	326	188	283	154	232	165	248	144	217	118	178
	17	204	306	177	265	145	217	146	219	128	192	105	157
	18	191	287	165	248	135	203	130	196	114	172	93.4	140
	19	178	267	154	231	126	189	117	176	102	154	83.9	126
	20	166	248	143	214	116	175	105	159	92.5	139	75.7	114
	21	153	230	132	198	107	161	95.7	144	83.9	126	68.7	103
	22	141	212	121	182	98.7	148	87.2	131	76.4	115	62.6	94.0
	23	129	194	111	166	90.3	135	79.8	120	69.9	105	57.2	86.0
	24	119	178	102	153	82.9	124	73.3	110	64.2	96.5	52.6	79.0
	25	109	164	93.9	141	76.4	115	67.5	101	59.2	88.9	48.4	72.8
	26	101	152	86.8	130	70.7	106	62.4	93.8	54.7	82.2	44.8	67.3
	27	93.9	141	80.5	121	65.5	98.3			50.7	76.2	41.5	62.4
	28	87.3	131	74.8	112	60.9	91.4						
	29	81.4	122	69.8	105	56.8	85.2						
	30	76.0	114	65.2	97.8	53.1	79.6						
	32	66.8	100	57.3	85.9	46.6	70.0						
	34	59.2	88.8	50.7	76.1	41.3	62.0						
	36	52.8	79.2	45.3	67.9	36.9	55.3						
	38	47.4	71.1	40.6	60.9	33.1	49.6						
	40	42.8	64.2	36.7	55.0	29.9	44.8						
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	106	160	88.7	133	69.6	105	145	218	124	186	99.2	149
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	63.1	94.9	52.2	78.5	39.3	59.1	62.5	94.0	53.7	80.7	43.1	64.8
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		7260		6230		5120		7930		7070		6030	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		2250		1930		1570		1220		1090		932	
r_{mx}/r_{my}		1.80		1.80		1.81		2.55		2.55		2.54	
r_{my}, in.		2.52		2.54		2.57		1.57		1.62		1.67	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS12–HSS10

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12×4×						HSS10×8×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		31.84		25.82		19.63		67.82		55.66		42.79	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	285	428	247	370	201	302	570	855	491	737	410	615
	1	284	426	246	369	200	301	569	854	491	736	410	615
	2	281	421	243	364	198	297	567	851	489	733	408	613
	3	275	412	238	357	194	291	564	846	486	729	406	609
	4	267	401	231	347	189	283	559	839	482	723	403	604
	5	257	386	223	334	182	273	553	830	477	716	399	598
	6	246	369	213	320	174	261	546	819	471	707	394	591
	7	233	350	202	303	165	247	538	807	464	696	388	582
	8	219	329	190	285	155	233	528	792	456	684	382	572
	9	205	307	177	266	145	217	518	777	447	671	374	561
	10	189	284	164	246	134	201	506	759	438	657	366	549
	11	174	260	151	226	123	185	494	741	427	641	358	537
	12	158	237	137	206	112	168	481	721	416	624	348	523
	13	143	214	124	186	101	152	467	700	404	607	339	508
	14	128	193	111	167	90.8	136	452	678	392	588	329	493
	15	116	174	98.8	148	80.7	121	437	657	379	569	318	477
	16	103	155	87.0	131	71.0	107	422	635	366	549	307	460
	17	91.4	137	77.1	116	62.9	94.4	407	612	352	528	296	443
	18	81.6	123	68.8	103	56.1	84.2	392	589	338	507	284	426
	19	73.2	110	61.7	92.6	50.4	75.6	376	565	324	486	272	409
	20	66.1	99.3	55.7	83.5	45.5	68.2	360	541	310	465	261	391
	21	59.9	90.1	50.5	75.8	41.2	61.9	344	517	296	443	249	373
	22	54.6	82.1	46.0	69.0	37.6	56.4	328	493	281	422	237	356
	23	50.0	75.1	42.1	63.2	34.4	51.6	312	470	267	401	225	338
	24	45.9	69.0	38.7	58.0	31.6	47.4	297	446	253	380	214	320
	25	42.3	63.5	35.6	53.5	29.1	43.6	281	422	239	359	202	303
	26	39.1	58.8	33.0	49.4	26.9	40.4	266	399	226	338	191	286
	27	36.2	54.5	30.6	45.8	24.9	37.4	251	377	212	318	180	269
	28	33.7	50.7	28.4	42.6	23.2	34.8	236	354	199	299	169	253
	29					21.6	32.4	221	333	187	280	158	237
	30							207	311	175	263	148	221
	32							182	274	154	231	130	195
	34							161	242	136	205	115	172
	36							144	216	121	183	102	154
	38							129	194	109	164	92.0	138
	40							116	175	98.4	148	83.0	125
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	85.9	129	71.8	108	56.6	85.1	165	247	139	209	111	167
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	37.1	55.8	30.8	46.4	23.6	35.5	140	210	118	178	94.0	141
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		5430		4800		3930		8450		7480		6340	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		838		732		597		5820		5140		4360	
r_{mx}/r_{my}		2.55		2.56		2.57		1.20		1.21		1.21	
r_{my}, in.		1.70		1.72		1.75		3.09		3.14		3.19	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS10

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS10×8×						HSS10×6×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		36.10		29.23		22.18		59.32		48.85		37.69	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	367	550	323	484	277	416	491	738	415	623	344	515
	1	366	549	322	484	277	415	490	737	415	622	343	514
	2	365	547	321	482	276	413	487	732	412	618	341	511
	3	363	544	319	479	274	411	483	725	408	612	338	507
	4	360	540	317	475	272	407	476	716	402	603	333	500
	5	356	534	313	470	269	403	468	703	395	593	327	491
	6	352	528	309	464	265	397	458	689	386	580	320	481
	7	347	520	305	457	261	391	447	672	377	565	312	469
	8	341	511	299	449	256	384	434	653	365	548	303	455
	9	334	501	293	440	251	376	420	632	353	530	293	440
	10	327	490	287	430	245	367	405	609	340	510	283	424
	11	319	479	280	420	239	358	389	585	326	489	271	407
	12	311	466	272	409	232	348	372	560	311	467	260	389
	13	302	453	265	397	225	337	355	533	296	445	247	371
	14	293	439	256	384	217	326	337	506	282	423	235	352
	15	283	425	248	371	210	315	319	479	267	401	222	332
	16	273	410	239	358	202	303	300	451	252	379	209	313
	17	263	395	230	344	194	291	282	423	237	357	196	293
	18	253	379	220	331	186	278	263	396	222	334	183	274
	19	242	364	211	316	177	266	245	369	208	312	170	255
	20	232	348	201	302	169	254	228	342	193	291	158	236
	21	221	332	192	288	161	241	210	316	179	269	145	218
	22	211	316	182	274	152	229	194	291	166	249	134	201
	23	200	300	173	260	144	216	177	266	152	229	122	184
	24	189	284	164	246	136	204	163	245	140	210	112	169
	25	179	269	155	232	128	192	150	225	129	194	104	155
	26	169	253	146	218	120	180	139	208	119	179	95.7	144
	27	159	238	137	205	113	169	129	193	110	166	88.8	133
	28	149	224	128	192	105	158	120	180	103	154	82.6	124
	29	140	209	120	179	97.9	147	111	168	95.7	144	77.0	116
	30	130	196	112	168	91.5	137	104	157	89.4	134	71.9	108
	32	115	172	98.2	147	80.4	121	91.5	138	78.6	118	63.2	94.9
	34	102	152	87.0	130	71.2	107	81.1	122	69.6	105	56.0	84.0
	36	90.6	136	77.6	116	63.5	95.3	72.3	109	62.1	93.3	49.9	75.0
	38	81.3	122	69.6	104	57.0	85.5	64.9	97.6	55.7	83.8	44.8	67.3
	40	73.4	110	62.8	94.3	51.5	77.2					40.4	60.7
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	95.5	144	79.5	119	62.0	93.2	135	203	115	172	92.0	138
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	80.9	122	67.1	101	52.1	78.2	92.8	139	78.8	118	62.9	94.6
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		5610		4810		3950		6600		5860		5020	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3860		3300		2700		2810		2500		2130	
r_{mx}/r_{my}		1.21		1.21		1.21		1.53		1.53		1.54	
r_{my}, in.		3.22		3.25		3.28		2.34		2.39		2.44	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS10

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS10×6×						HSS10×5×					
		5/16		1/4		3/16		3/8		5/16		1/4	
t_{des}, in.		0.291		0.233		0.174		0.349		0.291		0.233	
Steel, lb/ft		31.84		25.82		19.63		35.13		29.72		24.12	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	306	458	267	401	227	340	310	464	275	412	239	359
	1	305	458	267	400	226	340	309	463	274	411	239	358
	2	303	455	265	398	225	338	306	459	272	408	237	355
	3	300	451	262	394	223	334	302	453	268	402	233	350
	4	296	444	259	388	220	329	296	444	263	395	229	343
	5	291	437	254	381	216	323	289	433	257	385	223	335
	6	285	428	249	373	211	316	280	420	249	374	217	325
	7	278	417	243	364	205	308	270	406	241	361	209	314
	8	270	405	235	353	199	299	259	389	231	346	201	301
	9	261	392	228	342	192	288	248	371	220	331	192	287
	10	252	378	219	329	185	277	235	352	209	314	182	273
	11	242	363	210	316	177	266	222	333	198	297	172	258
	12	231	347	201	302	169	253	208	312	186	279	161	242
	13	220	331	191	287	161	241	194	291	173	260	151	226
	14	209	314	182	272	152	228	180	270	161	242	140	210
	15	198	297	171	257	143	215	166	250	149	223	129	194
	16	186	279	161	242	134	201	153	229	137	205	119	178
	17	175	262	151	227	126	188	140	211	125	188	109	163
	18	163	245	141	212	117	175	129	193	114	171	98.7	148
	19	152	228	131	197	108	162	117	176	103	154	89.0	133
	20	141	212	121	182	100	150	106	159	92.6	139	80.3	120
	21	130	195	112	168	91.9	138	96.2	145	84.0	126	72.8	109
	22	120	180	103	154	84.0	126	87.6	132	76.5	115	66.4	99.5
	23	110	165	94.1	141	76.9	115	80.2	121	70.0	105	60.7	91.1
	24	101	151	86.4	130	70.6	106	73.6	111	64.3	96.5	55.8	83.6
	25	92.9	139	79.6	119	65.0	97.6	67.9	102	59.3	88.9	51.4	77.1
	26	85.8	129	73.6	110	60.1	90.2	62.7	94.3	54.8	82.2	47.5	71.3
	27	79.6	119	68.3	102	55.8	83.7	58.2	87.5	50.8	76.2	44.1	66.1
	28	74.0	111	63.5	95.2	51.9	77.8	54.1	81.3	47.2	70.9	41.0	61.5
	29	69.0	104	59.2	88.8	48.3	72.5	50.4	75.8	44.0	66.1	38.2	57.3
	30	64.5	96.7	55.3	82.9	45.2	67.8	47.1	70.8	41.2	61.7	35.7	53.5
	32	56.7	85.0	48.6	72.9	39.7	59.6	41.4	62.3	36.2	54.3	31.4	47.1
	34	50.2	75.3	43.1	64.6	35.2	52.8	36.7	55.2	32.0	48.1	27.8	41.7
	36	44.8	67.2	38.4	57.6	31.4	47.1						
	38	40.2	60.3	34.5	51.7	28.2	42.2						
	40	36.3	54.4	31.1	46.7	25.4	38.1						
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	79.6	120	66.5	99.9	52.1	78.3	82.3	124	71.5	107	59.7	89.7
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	54.2	81.4	45.1	67.7	35.0	52.7	49.2	73.9	42.4	63.8	35.4	53.2
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		4530		3880		3180		4320		3930		3410	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		1910		1630		1340		1350		1220		1050	
r_{mx}/r_{my}		1.54		1.54		1.54		1.79		1.79		1.80	
r_{my}, in.		2.47		2.49		2.52		2.05		2.07		2.10	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS10

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS10×4×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		50.81		42.05		32.58		27.59		22.42		17.08	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	419	630	347	522	276	414	244	367	211	317	177	265
	1	417	627	346	520	275	413	243	365	211	316	176	264
	2	412	619	342	513	272	407	240	360	208	312	174	261
	3	403	605	335	503	266	399	235	353	204	306	170	255
	4	390	587	325	488	258	387	229	343	198	297	165	248
	5	375	564	313	470	248	373	220	330	191	286	159	238
	6	357	537	299	449	237	355	210	315	182	273	152	228
	7	337	507	283	426	224	336	199	299	173	259	144	216
	8	315	474	266	400	210	315	187	280	162	243	135	202
	9	293	440	248	373	196	294	174	261	151	227	126	188
	10	269	404	229	344	182	273	161	241	140	210	116	174
	11	245	368	210	315	167	251	147	221	128	192	106	159
	12	221	332	191	287	153	230	134	201	116	175	96.3	145
	13	198	298	172	258	139	208	120	181	105	157	86.7	130
	14	176	264	154	231	125	187	108	163	93.9	141	77.4	116
	15	154	232	136	205	111	167	97.2	146	83.2	125	68.4	103
	16	135	203	120	180	98.4	148	86.3	130	73.2	110	60.2	90.2
	17	120	180	106	159	87.1	131	76.5	115	64.8	97.2	53.3	79.9
	18	107	161	94.5	142	77.7	117	68.2	102	57.8	86.7	47.5	71.3
	19	96.0	144	84.8	127	69.8	105	61.2	92.0	51.9	77.8	42.7	64.0
	20	86.6	130	76.5	115	63.0	94.6	55.2	83.0	46.8	70.2	38.5	57.8
	21	78.6	118	69.4	104	57.1	85.8	50.1	75.3	42.5	63.7	34.9	52.4
	22	71.6	108	63.2	95.1	52.0	78.2	45.7	68.6	38.7	58.1	31.8	47.7
	23	65.5	98.5	57.9	87.0	47.6	71.5	41.8	62.8	35.4	53.1	29.1	43.7
	24	60.2	90.4	53.1	79.9	43.7	65.7	38.4	57.7	32.5	48.8	26.7	40.1
	25	55.5	83.3	49.0	73.6	40.3	60.6	35.4	53.1	30.0	45.0	24.6	37.0
	26			45.3	68.1	37.3	56.0	32.7	49.1	27.7	41.6	22.8	34.2
	27					34.5	51.9	30.3	45.6	25.7	38.5	21.1	31.7
	28									23.9	35.8	19.6	29.5
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	105	158	89.8	135	72.6	109	63.0	94.6	52.8	79.4	41.7	62.7
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	52.6	79.0	45.3	68.0	36.4	54.7	31.7	47.6	26.4	39.7	20.5	30.8
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		4760		4280		3660		3310		2930		2410	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		1010		911		781		704		615		506	
r_{mx}/r_{my}		2.17		2.17		2.16		2.17		2.18		2.18	
r_{my}, in.		1.54		1.59		1.64		1.67		1.70		1.72	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS9

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS9×7×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		59.32		48.85		37.69		31.84		25.82		19.63	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	491	738	420	631	349	523	311	466	272	408	232	348
	1	490	737	420	630	348	522	310	465	272	408	232	348
	2	488	734	418	627	347	520	309	463	271	406	231	346
	3	485	728	415	622	344	516	307	460	269	403	229	343
	4	480	721	410	615	341	511	303	455	266	399	226	339
	5	473	711	405	607	336	504	299	449	262	393	223	335
	6	466	700	398	597	331	496	295	442	258	387	219	329
	7	457	687	390	585	324	486	289	434	253	379	215	322
	8	447	672	381	572	317	476	283	424	247	371	210	315
	9	436	655	372	557	309	464	276	413	241	361	204	306
	10	424	637	361	541	301	451	268	402	234	351	198	297
	11	411	618	350	524	291	437	260	390	227	340	192	288
	12	398	598	338	506	282	423	251	377	219	329	185	278
	13	383	576	325	487	271	407	242	363	211	316	178	267
	14	368	554	312	468	261	391	233	349	203	304	170	256
	15	353	531	298	448	250	375	223	334	194	291	163	244
	16	337	507	285	427	239	358	213	319	185	278	155	233
	17	321	483	271	406	227	341	203	304	176	264	147	221
	18	305	459	257	385	216	324	192	289	167	250	139	209
	19	289	435	243	365	204	306	182	273	158	237	131	197
	20	273	411	230	345	193	289	172	258	149	223	124	186
	21	257	387	217	326	181	272	162	243	140	210	116	174
	22	242	363	204	307	170	255	152	228	131	197	108	163
	23	226	340	191	288	159	239	142	213	123	184	101	151
	24	211	317	179	269	148	223	133	199	114	171	93.8	141
	25	196	295	167	251	138	207	123	185	106	159	86.6	130
	26	182	273	155	234	128	192	114	171	98.0	147	80.1	120
	27	169	253	144	217	118	178	106	159	90.9	136	74.3	111
	28	157	236	134	201	110	165	98.4	148	84.5	127	69.1	104
	29	146	220	125	188	103	154	91.8	138	78.8	118	64.4	96.6
	30	137	205	117	175	95.9	144	85.8	129	73.6	110	60.2	90.2
	32	120	180	103	154	84.3	126	75.4	113	64.7	97.0	52.9	79.3
	34	106	160	90.8	137	74.7	112	66.8	100	57.3	86.0	46.8	70.2
	36	94.9	143	81.0	122	66.6	99.9	59.5	89.3	51.1	76.7	41.8	62.7
	38	85.1	128	72.7	109	59.8	89.7	53.4	80.2	45.9	68.8	37.5	56.2
	40	76.8	115	65.6	98.7	53.9	80.9	48.2	72.4	41.4	62.1	33.8	50.8
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	127	191	108	162	86.4	130	74.6	112	62.2	93.5	48.6	73.0
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	106	159	89.7	135	71.6	108	61.8	92.9	51.4	77.3	40.1	60.2
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		5700		5080		4330		3870		3330		2730	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3750		3320		2830		2530		2180		1780	
r_{mx}/r_{my}		1.23		1.24		1.24		1.24		1.24		1.24	
r_{my}, in.		2.68		2.73		2.78		2.81		2.84		2.87	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS9

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS9×5×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		50.81		42.05		32.58		27.59		22.42		17.08	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	419	630	347	522	285	427	253	379	220	330	185	278
	1	418	628	346	521	284	426	252	378	219	329	185	277
	2	414	623	344	516	282	422	250	375	218	326	183	275
	3	409	614	339	509	278	417	247	370	215	322	180	271
	4	400	602	333	500	272	408	242	363	210	316	177	265
	5	390	587	325	488	265	398	236	354	205	308	172	259
	6	378	568	315	473	257	386	229	343	199	299	167	251
	7	364	548	304	457	248	372	221	331	192	288	161	241
	8	349	525	292	439	238	357	212	318	184	276	154	231
	9	333	500	279	419	227	340	202	303	176	264	147	220
	10	315	473	265	398	215	323	192	288	167	250	139	209
	11	297	446	250	376	203	304	181	271	157	236	131	197
	12	278	418	235	353	190	285	170	255	148	221	123	184
	13	259	389	220	330	177	266	158	238	138	207	114	172
	14	239	360	204	307	164	246	147	221	128	192	106	159
	15	220	331	189	284	151	227	136	204	118	177	97.5	146
	16	202	303	173	261	140	210	125	187	108	162	89.2	134
	17	184	276	159	238	128	193	114	171	98.8	148	81.2	122
	18	166	250	144	217	117	176	103	155	89.7	135	73.5	110
	19	149	224	130	196	107	160	93.0	140	80.8	121	66.0	99.0
	20	135	202	117	177	96.5	145	83.9	126	72.9	109	59.6	89.4
	21	122	184	107	160	87.5	131	76.1	114	66.1	99.2	54.1	81.1
	22	111	167	97.1	146	79.7	120	69.4	104	60.3	90.4	49.2	73.9
	23	102	153	88.8	134	72.9	110	63.5	95.2	55.1	82.7	45.1	67.6
	24	93.5	141	81.6	123	67.0	101	58.3	87.4	50.6	76.0	41.4	62.1
	25	86.2	130	75.2	113	61.7	92.8	53.7	80.6	46.7	70.0	38.1	57.2
	26	79.7	120	69.5	104	57.1	85.8	49.7	74.5	43.1	64.7	35.3	52.9
	27	73.9	111	64.5	96.9	52.9	79.5	46.1	69.1	40.0	60.0	32.7	49.0
	28	68.7	103	59.9	90.1	49.2	74.0	42.8	64.2	37.2	55.8	30.4	45.6
	29	64.1	96.3	55.9	84.0	45.9	69.0	39.9	59.9	34.7	52.0	28.3	42.5
	30	59.9	90.0	52.2	78.5	42.9	64.4	37.3	56.0	32.4	48.6	26.5	39.7
	32	52.6	79.1	45.9	69.0	37.7	56.6	32.8	49.2	28.5	42.7	23.3	34.9
	34							29.0	43.6	25.2	37.8	20.6	30.9

Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	100	151	85.9	129	69.3	104	60.1	90.4	50.4	75.8	39.5	59.4
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	65.1	97.8	55.8	83.9	45.0	67.6	38.8	58.2	32.2	48.4	25.2	37.9
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			4270		3840		3280		2960		2590		2120	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			1600		1430		1220		1100		958		783	
r_{mx}/r_{my}			1.63		1.64		1.64		1.64		1.64		1.65	
r_{my}, in.			1.92		1.97		2.03		2.05		2.08		2.10	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS8

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS8×6×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		50.81		42.05		32.58		27.59		22.42		17.08	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	419	630	351	526	290	435	258	387	225	338	190	285
	1	418	629	350	525	289	434	257	386	225	337	190	285
	2	416	625	348	522	288	431	256	384	223	335	189	283
	3	412	619	344	516	285	427	253	380	221	332	187	280
	4	406	610	339	509	281	421	250	375	218	327	184	276
	5	398	599	333	499	276	413	245	368	214	321	181	271
	6	389	585	325	488	270	404	240	360	209	314	176	265
	7	379	570	317	475	263	394	234	351	204	306	172	258
	8	368	553	307	461	255	382	227	341	198	297	166	250
	9	355	534	296	446	246	369	219	329	191	287	161	241
	10	342	514	286	429	237	355	211	317	184	276	154	232
	11	327	492	274	412	227	340	203	304	176	265	148	222
	12	312	469	262	394	217	325	193	290	168	253	141	211
	13	297	446	250	375	206	309	184	276	160	240	134	201
	14	281	422	237	356	195	293	174	262	152	228	126	190
	15	265	398	224	336	184	276	165	247	143	215	119	179
	16	248	373	210	316	173	259	155	232	134	202	112	167
	17	232	349	197	297	162	242	145	217	126	189	104	156
	18	216	325	184	277	151	226	135	203	117	176	96.9	145
	19	200	301	171	258	140	210	125	188	109	163	89.7	135
	20	185	278	159	239	129	194	116	174	101	151	82.7	124
	21	170	256	147	220	119	178	107	160	92.6	139	75.9	114
	22	156	234	135	202	109	164	98.0	147	84.8	127	69.3	104
	23	142	214	123	185	100	151	89.6	134	77.6	116	63.4	95.1
	24	131	196	113	170	92.1	138	82.3	123	71.2	107	58.2	87.3
	25	120	181	104	157	84.9	128	75.9	114	65.7	98.5	53.7	80.5
	26	111	167	96.4	145	78.5	118	70.1	105	60.7	91.0	49.6	74.4
	27	103	155	89.4	134	72.8	109	65.0	97.6	56.3	84.4	46.0	69.0
	28	96.0	144	83.1	125	67.6	102	60.5	90.7	52.3	78.5	42.8	64.2
	29	89.5	135	77.5	116	63.1	94.8	56.4	84.6	48.8	73.2	39.9	59.8
	30	83.7	126	72.4	109	58.9	88.6	52.7	79.0	45.6	68.4	37.3	55.9
	32	73.5	111	63.6	95.7	51.8	77.8	46.3	69.5	40.1	60.1	32.7	49.1
	34	65.1	97.9	56.4	84.7	45.9	69.0	41.0	61.5	35.5	53.2	29.0	43.5
	36	58.1	87.3	50.3	75.6	40.9	61.5	36.6	54.9	31.7	47.5	25.9	38.8
	38			45.1	67.8	36.7	55.2	32.8	49.3	28.4	42.6	23.2	34.8
	40							29.6	44.5	25.6	38.5	21.0	31.4
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	94.2	142	80.6	121	64.9	97.5	56.2	84.4	46.9	70.5	37.0	55.5
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	76.4	115	65.2	97.9	52.6	79.1	45.4	68.2	37.8	56.9	29.7	44.6
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		3650		3270		2790		2530		2190		1790	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		2270		2020		1730		1560		1350		1100	
r_{mx}/r_{my}		1.27		1.27		1.27		1.27		1.27		1.28	
r_{my}, in.		2.27		2.32		2.38		2.40		2.43		2.46	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS8

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS8×4×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		42.30		35.24		27.48		23.34		19.02		14.53	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	350	526	292	438	230	345	204	306	176	264	147	220
	1	349	524	290	436	229	344	203	304	175	263	146	219
	2	344	517	287	431	226	339	200	300	173	260	144	217
	3	336	505	280	422	221	332	196	294	170	254	141	212
	4	325	489	272	409	215	322	190	285	165	247	137	206
	5	312	469	262	393	206	309	183	274	158	238	132	198
	6	297	446	250	375	196	295	174	262	151	227	126	189
	7	279	420	236	355	186	280	165	247	143	214	119	179
	8	261	392	221	332	175	263	155	232	134	201	112	167
	9	241	362	205	309	163	245	144	215	125	187	104	156
	10	221	332	189	284	151	227	132	198	115	172	95.5	143
	11	200	301	173	260	139	209	121	181	105	158	87.3	131
	12	180	271	156	235	126	190	109	164	95.3	143	79.1	119
	13	161	241	140	211	114	172	98.5	148	85.7	128	71.0	106
	14	142	213	125	188	102	154	88.5	133	76.3	115	63.2	94.8
	15	124	186	110	165	91.0	137	78.9	119	67.4	101	55.7	83.5
	16	109	163	96.6	145	80.1	120	69.7	105	59.2	88.8	48.9	73.4
	17	96.4	145	85.6	129	71.0	107	61.7	92.7	52.4	78.7	43.4	65.0
	18	85.9	129	76.4	115	63.3	95.1	55.0	82.7	46.8	70.2	38.7	58.0
	19	77.1	116	68.5	103	56.8	85.4	49.4	74.2	42.0	63.0	34.7	52.1
	20	69.6	105	61.9	93.0	51.3	77.1	44.6	67.0	37.9	56.8	31.3	47.0
	21	63.1	94.9	56.1	84.3	46.5	69.9	40.4	60.8	34.4	51.6	28.4	42.6
	22	57.5	86.5	51.1	76.8	42.4	63.7	36.8	55.4	31.3	47.0	25.9	38.8
	23	52.6	79.1	46.8	70.3	38.8	58.3	33.7	50.7	28.7	43.0	23.7	35.5
	24	48.3	72.7	43.0	64.6	35.6	53.5	31.0	46.5	26.3	39.5	21.8	32.6
	25	44.6	67.0	39.6	59.5	32.8	49.3	28.5	42.9	24.2	36.4	20.0	30.1
	26			36.6	55.0	30.3	45.6	26.4	39.6	22.4	33.6	18.5	27.8
	27							24.5	36.8	20.8	31.2	17.2	25.8
	28											16.0	24.0

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	70.9	107	61.5	92.4	50.1	75.3	43.5	65.3	36.6	54.9	28.8	43.3
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	42.4	63.7	36.8	55.3	29.9	45.0	26.0	39.1	21.7	32.7	17.0	25.6
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			2570		2330		2010		1820		1600		1330	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			800		727		628		568		498		411	
r_{mx}/r_{my}			1.79		1.79		1.79		1.79		1.79		1.80	
r_{my}, in.			1.51		1.56		1.61		1.63		1.66		1.69	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS8–HSS7

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS8×4×		HSS7×5×									
		⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		9.86		35.24		27.48		23.34		19.02		14.53	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	114	170	292	438	235	353	209	313	181	272	152	228
	1	113	170	291	437	235	352	208	312	181	271	152	227
	2	112	167	288	433	233	349	206	310	179	269	150	225
	3	109	164	284	427	229	344	203	305	177	265	148	222
	4	106	159	278	419	225	337	199	299	173	260	145	218
	5	102	153	271	408	219	328	194	291	169	253	141	212
	6	96.9	145	263	395	212	318	188	282	164	245	137	205
	7	91.4	137	253	380	204	306	181	272	158	236	132	198
	8	85.6	128	242	364	195	293	174	260	151	227	126	189
	9	79.4	119	231	347	186	278	165	248	144	216	120	180
	10	73.0	110	219	328	176	263	156	235	136	204	114	170
	11	66.5	99.8	206	309	165	248	147	221	128	193	107	160
	12	60.1	90.2	192	289	154	231	138	207	120	180	99.8	150
	13	53.8	80.8	179	269	143	216	128	192	112	168	92.8	139
	14	47.8	71.7	166	249	133	200	119	178	104	156	85.7	129
	15	41.9	62.9	152	229	123	185	109	164	95.5	143	78.8	118
	16	36.9	55.3	139	209	113	170	99.7	150	87.4	131	72.0	108
	17	32.7	49.0	127	190	104	156	90.7	136	79.5	119	65.3	98.0
	18	29.1	43.7	114	172	94.2	142	82.0	123	72.0	108	58.9	88.4
	19	26.1	39.2	103	154	85.1	128	73.6	111	64.7	97.0	52.9	79.3
	20	23.6	35.4	92.7	139	76.8	115	66.4	99.9	58.4	87.5	47.7	71.6
	21	21.4	32.1	84.1	126	69.6	105	60.3	90.6	52.9	79.4	43.3	65.0
	22	19.5	29.3	76.6	115	63.4	95.4	54.9	82.5	48.2	72.3	39.5	59.2
	23	17.8	26.8	70.1	105	58.0	87.2	50.2	75.5	44.1	66.2	36.1	54.1
	24	16.4	24.6	64.4	96.8	53.3	80.1	46.1	69.4	40.5	60.8	33.2	49.7
	25	15.1	22.7	59.3	89.2	49.1	73.8	42.5	63.9	37.3	56.0	30.6	45.8
	26	14.0	20.9	54.9	82.5	45.4	68.3	39.3	59.1	34.5	51.8	28.2	42.4
	27	12.9	19.4	50.9	76.5	42.1	63.3	36.5	54.8	32.0	48.0	26.2	39.3
	28	12.0	18.1	47.3	71.1	39.2	58.9	33.9	51.0	29.8	44.7	24.4	36.5
	29			44.1	66.3	36.5	54.9	31.6	47.5	27.8	41.6	22.7	34.1
	30			41.2	61.9	34.1	51.3	29.5	44.4	25.9	38.9	21.2	31.8
	32					30.0	45.1	26.0	39.0	22.8	34.2	18.6	28.0
	34											16.5	24.8

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	20.6	31.0	57.4	86.2	46.6	70.1	40.5	60.8	34.0	51.1	26.7	40.2
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	11.6	17.5	44.9	67.5	36.3	54.6	31.6	47.5	26.4	39.8	20.7	31.2
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			1010		1970		1690		1530		1350		1110	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			310		1120		967		872		767		627	
r_{mx}/r_{my}			1.81		1.33		1.32		1.32		1.33		1.33	
r_{my}, in.			1.71		1.91		1.97		1.99		2.02		2.05	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS7

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape	HSS7×5×		HSS7×4×									
	⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.	0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft	9.86		31.84		24.93		21.21		17.32		13.25	
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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
0	122	183	264	396	207	311	183	275	158	238	132	198
1	122	183	263	395	206	309	183	274	158	237	131	197
2	121	181	259	389	203	305	180	270	156	234	130	195
3	119	178	253	381	199	298	176	264	152	229	127	190
4	116	174	245	369	193	289	171	256	148	222	123	185
5	113	169	236	354	185	279	164	246	142	213	118	178
6	109	164	224	337	177	266	156	235	136	203	113	169
7	105	157	212	318	168	252	148	222	128	192	107	160
8	100	150	198	297	157	236	138	207	120	180	99.8	150
9	95.0	143	183	275	146	220	128	192	112	167	92.6	139
10	89.6	134	168	253	135	203	118	177	103	154	85.3	128
11	84.0	126	153	230	124	186	108	161	93.8	141	77.8	117
12	78.2	117	138	207	112	169	97.6	147	84.9	127	70.4	106
13	72.4	109	123	185	101	152	88.2	133	76.1	114	63.1	94.6
14	66.6	99.8	109	164	90.1	135	79.0	119	67.7	102	56.0	84.1
15	60.8	91.3	95.7	144	79.7	120	70.2	106	59.6	89.4	49.3	73.9
16	55.3	82.9	84.1	126	70.0	105	61.8	92.9	52.4	78.6	43.3	65.0
17	49.9	74.9	74.5	112	62.0	93.2	54.8	82.3	46.4	69.6	38.4	57.5
18	44.7	67.0	66.4	99.9	55.3	83.2	48.9	73.4	41.4	62.1	34.2	51.3
19	40.1	60.2	59.6	89.6	49.7	74.6	43.8	65.9	37.2	55.8	30.7	46.1
20	36.2	54.3	53.8	80.9	44.8	67.4	39.6	59.5	33.5	50.3	27.7	41.6
21	32.8	49.2	48.8	73.4	40.7	61.1	35.9	53.9	30.4	45.6	25.1	37.7
22	29.9	44.9	44.5	66.8	37.0	55.7	32.7	49.2	27.7	41.6	22.9	34.4
23	27.4	41.1	40.7	61.2	33.9	50.9	29.9	45.0	25.4	38.0	21.0	31.4
24	25.1	37.7	37.4	56.2	31.1	46.8	27.5	41.3	23.3	34.9	19.2	28.9
25	23.2	34.7	34.4	51.8	28.7	43.1	25.3	38.1	21.5	32.2	17.7	26.6
26	21.4	32.1			26.5	39.9	23.4	35.2	19.8	29.8	16.4	24.6
27	19.9	29.8							18.4	27.6	15.2	22.8
28	18.5	27.7										
29	17.2	25.8										
30	16.1	24.1										
32	14.1	21.2										
34	12.5	18.8										

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	19.0	28.6	49.0	73.7	40.0	60.2	35.2	52.8	29.5	44.3	23.3	35.0
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	14.5	21.7	32.4	48.7	26.6	39.9	23.2	34.8	19.5	29.2	15.3	23.0
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			841		1620		1410		1280		1130		940	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			475		637		553		501		440		364	
r_{mx}/r_{my}			1.33		1.59		1.60		1.60		1.60		1.61	
r_{my}, in.			2.07		1.53		1.58		1.61		1.64		1.66	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS7–HSS6

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS7×4×		HSS6×5×									
		⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		9.01		31.84		24.93		21.21		17.32		13.25	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	105	157	264	396	211	316	187	280	162	243	135	203
	1	104	156	263	395	210	315	186	279	161	242	135	203
	2	103	154	261	392	208	312	185	277	160	240	134	201
	3	100	151	257	386	205	307	182	273	158	236	132	198
	4	97.2	146	251	378	201	301	178	267	154	232	129	194
	5	93.3	140	245	368	195	293	173	260	150	226	126	189
	6	88.7	133	237	356	189	283	168	252	146	219	122	183
	7	83.6	125	228	342	182	272	162	242	140	210	117	176
	8	78.0	117	218	327	173	260	154	232	134	201	112	168
	9	72.2	108	207	311	165	247	147	220	128	192	106	160
	10	66.2	99.3	195	293	156	233	139	208	121	181	101	151
	11	60.1	90.1	183	275	146	219	130	196	114	170	94.6	142
	12	54.1	81.1	171	257	137	205	122	183	106	159	88.4	133
	13	48.2	72.3	159	238	127	191	113	170	98.8	148	82.0	123
	14	42.6	63.9	146	220	118	177	104	157	91.3	137	75.7	114
	15	37.3	55.9	134	201	108	163	95.8	144	83.9	126	69.5	104
	16	32.7	49.1	122	183	99.2	149	87.3	131	76.6	115	63.4	95.1
	17	29.0	43.5	110	166	90.2	136	79.2	119	69.6	104	57.5	86.2
	18	25.9	38.8	99.3	149	81.6	123	71.4	107	62.8	94.2	51.7	77.6
	19	23.2	34.8	89.1	134	73.3	110	64.3	96.7	56.3	84.5	46.4	69.7
	20	21.0	31.4	80.4	121	66.2	99.5	58.0	87.2	50.8	76.3	41.9	62.9
	21	19.0	28.5	72.9	110	60.0	90.2	52.7	79.1	46.1	69.2	38.0	57.0
	22	17.3	26.0	66.4	99.9	54.7	82.2	48.0	72.1	42.0	63.0	34.6	52.0
	23	15.8	23.8	60.8	91.4	50.0	75.2	43.9	66.0	38.4	57.7	31.7	47.5
	24	14.6	21.8	55.8	83.9	46.0	69.1	40.3	60.6	35.3	53.0	29.1	43.7
	25	13.4	20.1	51.5	77.3	42.4	63.7	37.2	55.8	32.5	48.8	26.8	40.2
	26	12.4	18.6	47.6	71.5	39.2	58.9	34.3	51.6	30.1	45.1	24.8	37.2
	27	11.5	17.2	44.1	66.3	36.3	54.6	31.9	47.9	27.9	41.8	23.0	34.5
	28	10.7	16.0	41.0	61.6	33.8	50.8	29.6	44.5	25.9	38.9	21.4	32.1
	29			38.2	57.5	31.5	47.3	27.6	41.5	24.2	36.3	19.9	29.9
	30			35.7	53.7	29.4	44.2	25.8	38.8	22.6	33.9	18.6	27.9
	32					25.9	38.9	22.7	34.1	19.9	29.8	16.4	24.6

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	16.7	25.0	44.8	67.4	36.5	54.9	31.9	47.9	26.8	40.3	21.2	31.8
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	10.7	16.1	39.4	59.2	32.1	48.2	27.9	41.9	23.5	35.3	18.5	27.7
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			714		1310		1130		1030		905		748	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			275		968		838		758		668		551	
r_{mx}/r_{my}			1.61		1.16		1.16		1.17		1.16		1.17	
r_{my}, in.			1.69		1.87		1.92		1.95		1.98		2.01	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS6

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS6×5×		HSS6×4×									
		⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		9.01		28.43		22.37		19.08		15.62		11.97	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	108	162	236	355	185	278	163	244	141	211	117	176
	1	108	162	235	353	184	277	162	243	140	210	117	175
	2	107	160	232	348	182	273	160	240	138	207	115	172
	3	105	158	226	340	178	267	156	235	135	203	112	169
	4	103	154	219	329	173	259	151	227	131	196	109	164
	5	100	150	210	315	166	249	145	218	126	189	105	157
	6	96.7	145	199	300	158	238	138	208	120	180	99.8	150
	7	92.8	139	188	282	149	224	130	196	113	170	94.2	141
	8	88.6	133	175	263	140	210	122	183	106	159	88.2	132
	9	84.0	126	161	243	130	195	113	169	98.0	147	81.8	123
	10	79.2	119	148	222	119	179	104	155	90.1	135	75.2	113
	11	74.1	111	134	201	109	164	94.5	142	82.0	123	68.5	103
	12	69.0	103	120	181	98.4	148	85.8	129	74.0	111	61.9	92.8
	13	63.8	95.7	107	161	88.2	133	77.2	116	66.2	99.3	55.4	83.1
	14	58.6	87.9	94.3	142	78.4	118	68.9	104	58.7	88.1	49.2	73.7
	15	53.5	80.3	82.3	124	68.9	104	60.9	91.6	51.6	77.6	43.1	64.7
	16	48.6	72.9	72.3	109	60.5	91.0	53.5	80.5	45.4	68.3	37.9	56.9
	17	43.8	65.7	64.0	96.2	53.6	80.6	47.4	71.3	40.3	60.5	33.6	50.4
	18	39.2	58.8	57.1	85.9	47.8	71.9	42.3	63.6	35.9	54.0	30.0	44.9
	19	35.2	52.8	51.3	77.1	42.9	64.5	38.0	57.1	32.2	48.4	26.9	40.3
	20	31.7	47.6	46.3	69.5	38.7	58.2	34.3	51.5	29.1	43.7	24.3	36.4
	21	28.8	43.2	42.0	63.1	35.1	52.8	31.1	46.7	26.4	39.7	22.0	33.0
	22	26.2	39.3	38.2	57.5	32.0	48.1	28.3	42.6	24.0	36.1	20.1	30.1
	23	24.0	36.0	35.0	52.6	29.3	44.0	25.9	38.9	22.0	33.1	18.3	27.5
	24	22.0	33.1	32.1	48.3	26.9	40.4	23.8	35.8	20.2	30.4	16.8	25.3
	25	20.3	30.5	29.6	44.5	24.8	37.3	21.9	33.0	18.6	28.0	15.5	23.3
	26	18.8	28.2					20.3	30.5	17.2	25.9	14.4	21.5
	27	17.4	26.1									13.3	20.0
	28	16.2	24.3										
	29	15.1	22.6										
	30	14.1	21.2										
	32	12.4	18.6										

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	15.1	22.6	37.9	57.0	31.4	47.1	27.5	41.3	23.1	34.7	18.3	27.5
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	13.1	19.6	28.3	42.5	23.3	35.0	20.3	30.6	17.1	25.7	13.5	20.3
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			566		1070		936		849		752		632	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			417		546		475		433		380		319	
r_{mx}/r_{my}			1.17		1.40		1.40		1.40		1.41		1.41	
r_{my}, in.			2.03		1.50		1.55		1.58		1.61		1.63	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS6–HSS5

Table 4-A (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS6×4×		HSS5×4×									
		⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		8.16		25.03		19.82		16.96		13.91		10.70	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	92.7	139	208	313	164	247	143	214	123	185	102	153
	1	92.2	138	207	311	163	245	142	213	123	184	102	152
	2	91.0	136	204	307	161	242	140	210	121	181	100	150
	3	88.9	133	199	299	157	237	137	205	118	177	98.0	147
	4	86.0	129	192	289	153	229	132	198	114	172	95.0	142
	5	82.5	124	184	276	146	220	127	190	110	165	91.2	137
	6	78.4	118	174	262	139	209	120	180	104	157	86.7	130
	7	73.8	111	163	246	131	197	113	170	98.3	147	81.8	123
	8	68.9	103	152	228	123	184	105	159	91.7	138	76.4	115
	9	63.6	95.4	139	210	113	170	97.8	147	84.8	127	70.8	106
	10	58.3	87.4	127	191	104	156	89.9	135	77.7	117	64.9	97.4
	11	52.8	79.3	114	172	94.5	142	81.9	123	70.5	106	59.0	88.5
	12	47.5	71.2	102	154	85.1	128	73.9	111	63.4	95.2	53.2	79.8
	13	42.3	63.4	90.3	136	76.0	114	66.2	99.5	56.5	84.8	47.5	71.3
	14	37.3	56.0	78.9	119	67.2	101	58.7	88.2	49.9	74.9	42.0	63.1
	15	32.6	48.8	68.7	103	58.7	88.3	51.5	77.4	43.9	66.0	36.8	55.2
	16	28.6	42.9	60.4	90.8	51.6	77.6	45.3	68.0	38.6	58.0	32.3	48.5
	17	25.3	38.0	53.5	80.4	45.7	68.7	40.1	60.3	34.2	51.4	28.6	43.0
	18	22.6	33.9	47.7	71.7	40.8	61.3	35.8	53.7	30.5	45.8	25.5	38.3
	19	20.3	30.4	42.8	64.4	36.6	55.0	32.1	48.2	27.4	41.1	22.9	34.4
	20	18.3	27.5	38.7	58.1	33.0	49.7	29.0	43.5	24.7	37.1	20.7	31.0
	21	16.6	24.9	35.1	52.7	30.0	45.0	26.3	39.5	22.4	33.7	18.8	28.2
	22	15.1	22.7	31.9	48.0	27.3	41.0	23.9	36.0	20.4	30.7	17.1	25.7
	23	13.8	20.8	29.2	43.9	25.0	37.5	21.9	32.9	18.7	28.1	15.6	23.5
	24	12.7	19.1	26.8	40.4	22.9	34.5	20.1	30.2	17.2	25.8	14.4	21.6
	25	11.7	17.6			21.1	31.8	18.5	27.9	15.8	23.8	13.2	19.9
	26	10.8	16.3							14.6	22.0	12.2	18.4
	27	10.0	15.1										
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	13.1	19.7	28.1	42.3	23.5	35.3	20.6	31.0	17.4	26.2	13.8	20.8
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	9.57	14.4	24.0	36.1	19.9	30.0	17.5	26.3	14.8	22.2	11.7	17.6
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		478		659		579		528		468		397	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		241		456		400		363		322		272	
r_{mx}/r_{my}		1.41		1.20		1.20		1.21		1.21		1.21	
r_{my}, in.		1.66		1.46		1.52		1.54		1.57		1.60	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS5

Table 4-A (continued)

Available Strength in Axial Compression, kips

Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS5×4×	
		⅛	
t_{des}, in.		0.116	
Steel, lb/ft		7.31	
Design		P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	80.5	121
	1	80.1	120
	2	79.0	119
	3	77.2	116
	4	74.7	112
	5	71.6	107
	6	67.9	102
	7	63.9	95.8
	8	59.5	89.3
	9	54.9	82.4
	10	50.2	75.3
	11	45.5	68.2
	12	40.8	61.2
	13	36.3	54.4
	14	31.9	47.9
	15	27.8	41.7
	16	24.5	36.7
	17	21.7	32.5
	18	19.3	29.0
	19	17.3	26.0
	20	15.7	23.5
	21	14.2	21.3
	22	12.9	19.4
	23	11.8	17.8
	24	10.9	16.3
	25	10.0	15.0
	26	9.26	13.9
	27	8.59	12.9

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	9.90	14.9
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	8.35	12.6
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			300	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			206	
r_{mx}/r_{my}			1.21	
r_{my}, in.			1.62	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS34–HSS30

Table 4-B
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS34×10×								HSS30×10×			
		1		⅞		¾		⅝		1		⅞	
t_{des}, in.		0.930		0.814		0.698		0.581		0.930		0.814	
Steel, lb/ft		277.07		244.88		212.00		178.41		249.85		221.06	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	2460	3690	2260	3390	2050	3080	1840	2760	2200	3300	2020	3040
	1	2460	3690	2260	3380	2050	3070	1840	2760	2200	3300	2020	3030
	2	2450	3680	2250	3380	2040	3070	1830	2750	2200	3290	2020	3030
	3	2440	3670	2240	3370	2040	3060	1830	2740	2190	3280	2010	3020
	4	2430	3650	2230	3350	2030	3040	1820	2730	2180	3270	2000	3000
	5	2420	3630	2220	3330	2020	3020	1810	2710	2160	3250	1990	2980
	6	2400	3600	2200	3300	2000	3000	1790	2690	2150	3220	1970	2960
	7	2380	3570	2180	3280	1980	2980	1780	2670	2130	3190	1960	2930
	8	2350	3530	2160	3240	1960	2950	1760	2640	2110	3160	1940	2900
	9	2330	3490	2140	3200	1940	2910	1740	2610	2080	3120	1910	2870
	10	2300	3450	2110	3160	1920	2870	1720	2580	2050	3080	1890	2830
	11	2260	3400	2080	3120	1890	2830	1690	2540	2020	3040	1860	2790
	12	2230	3340	2050	3070	1860	2790	1670	2500	1990	2990	1830	2750
	13	2190	3290	2010	3020	1830	2740	1640	2460	1960	2940	1800	2700
	14	2150	3230	1980	2960	1800	2690	1610	2420	1920	2880	1770	2650
	15	2110	3160	1940	2910	1760	2640	1580	2370	1880	2820	1730	2600
	16	2060	3100	1900	2850	1720	2590	1550	2320	1840	2760	1700	2540
	17	2020	3030	1860	2780	1690	2530	1510	2270	1800	2700	1660	2490
	18	1970	2960	1810	2720	1650	2470	1480	2220	1760	2640	1620	2430
	19	1920	2880	1770	2650	1610	2410	1440	2160	1710	2570	1580	2370
	20	1870	2810	1720	2580	1560	2350	1400	2110	1670	2500	1540	2300
	21	1820	2730	1670	2510	1520	2280	1370	2050	1620	2430	1490	2240
	22	1770	2650	1630	2440	1480	2220	1330	1990	1570	2360	1450	2170
	23	1710	2570	1580	2360	1430	2150	1290	1930	1520	2290	1410	2110
	24	1660	2490	1530	2290	1390	2080	1250	1870	1480	2210	1360	2040
	25	1600	2410	1480	2220	1340	2020	1210	1810	1430	2140	1320	1970
	26	1550	2320	1430	2140	1300	1950	1160	1750	1380	2060	1270	1910
	27	1490	2240	1380	2060	1250	1880	1120	1690	1330	1990	1220	1840
	28	1440	2160	1330	1990	1210	1810	1080	1620	1280	1910	1180	1770
	29	1380	2080	1280	1910	1160	1740	1040	1560	1230	1850	1130	1700
	30	1330	2000	1230	1840	1120	1670	1000	1500	1190	1780	1090	1630
	32	1230	1860	1130	1690	1030	1540	921	1380	1100	1650	999	1500
	34	1140	1710	1030	1550	939	1410	843	1260	1010	1520	913	1370
	36	1050	1580	943	1420	854	1280	767	1150	931	1400	840	1260
	38	960	1440	865	1300	771	1160	692	1040	851	1280	769	1160
	40	873	1310	789	1190	698	1050	625	937	772	1160	700	1050
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	2060	3090	1860	2790	1640	2470	1420	2140	1660	2490	1490	2240
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	798	1200	716	1080	631	948	542	814	711	1070	641	964
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		352000		328000		302000		272000		249000		232000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		43300		40100		36600		32800		38100		35400	
r_{mx}/r_{my}		2.85		2.86		2.87		2.88		2.56		2.56	
r_{my}, in.		4.19		4.24		4.29		4.35		4.15		4.20	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS30–HSS24

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS30×10×						HSS24×20×					
		¾		⅝		½		¾		⅝		½	
t_{des}, in.		0.698		0.581		0.465		0.698		0.581		0.465	
Steel, lb/ft		191.58		161.40		130.52		212.00		178.41		144.13	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1840	2760	1650	2470	1440	2160	2350	3520	2140	3200	1920	2880
	1	1840	2750	1650	2470	1440	2160	2350	3520	2140	3200	1920	2880
	2	1830	2750	1640	2470	1440	2150	2350	3520	2130	3200	1920	2880
	3	1830	2740	1640	2460	1430	2150	2340	3520	2130	3200	1920	2880
	4	1820	2730	1630	2450	1420	2140	2340	3510	2130	3190	1920	2870
	5	1810	2710	1620	2430	1410	2120	2340	3500	2130	3190	1910	2870
	6	1790	2690	1610	2410	1400	2110	2330	3500	2120	3180	1910	2860
	7	1780	2670	1590	2390	1390	2090	2330	3490	2120	3170	1900	2850
	8	1760	2640	1580	2370	1380	2070	2320	3480	2110	3160	1900	2840
	9	1740	2610	1560	2340	1360	2040	2310	3470	2100	3150	1890	2830
	10	1720	2570	1540	2310	1340	2010	2300	3450	2090	3140	1880	2820
	11	1690	2540	1520	2280	1320	1990	2290	3440	2080	3130	1870	2810
	12	1670	2500	1490	2240	1300	1950	2280	3420	2080	3110	1860	2800
	13	1640	2460	1470	2200	1280	1920	2270	3410	2060	3100	1860	2780
	14	1610	2410	1440	2160	1260	1880	2260	3390	2050	3080	1840	2770
	15	1580	2360	1410	2120	1230	1850	2250	3370	2040	3060	1830	2750
	16	1540	2310	1380	2080	1210	1810	2230	3350	2030	3040	1820	2730
	17	1510	2260	1350	2030	1180	1770	2220	3330	2020	3020	1810	2710
	18	1470	2210	1320	1980	1150	1720	2200	3310	2000	3000	1800	2690
	19	1440	2150	1290	1930	1120	1680	2190	3280	1990	2980	1780	2670
	20	1400	2100	1260	1880	1090	1640	2170	3260	1970	2960	1770	2650
	21	1360	2040	1220	1830	1060	1590	2150	3230	1960	2930	1750	2630
	22	1320	1980	1190	1780	1030	1540	2140	3200	1940	2910	1740	2600
	23	1280	1920	1150	1720	998	1500	2120	3180	1920	2880	1720	2580
	24	1240	1860	1110	1670	966	1450	2100	3150	1900	2850	1700	2550
	25	1200	1800	1080	1610	933	1400	2080	3120	1880	2830	1690	2530
	26	1160	1740	1040	1560	901	1350	2060	3090	1870	2800	1670	2500
	27	1120	1680	1000	1500	869	1300	2040	3060	1850	2770	1650	2470
	28	1080	1610	966	1450	836	1250	2020	3020	1830	2740	1630	2450
	29	1040	1550	929	1390	804	1210	1990	2990	1800	2710	1610	2420
	30	995	1490	893	1340	771	1160	1970	2960	1780	2670	1590	2390
	32	914	1370	820	1230	708	1060	1920	2880	1740	2610	1550	2330
	34	835	1250	750	1120	646	969	1870	2810	1690	2540	1510	2260
	36	759	1140	681	1020	586	879	1820	2740	1650	2470	1460	2200
	38	685	1030	615	922	528	792	1770	2660	1600	2400	1420	2130
	40	620	931	555	832	477	715	1720	2580	1550	2320	1370	2060
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	1320	1990	1140	1720	957	1440	1380	2080	1180	1780	982	1480
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	566	851	486	730	396	595	1200	1800	1030	1540	849	1280
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		214000		193000		167000		198000		175000		151000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		32500		29200		25000		145000		128000		110000	
r_{mx}/r_{my}		2.57		2.57		2.58		1.17		1.17		1.17	
r_{my}, in.		4.25		4.31		4.36		8.02		8.08		8.13	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS24

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS24×20×		HSS24×18×								HSS24×16×	
		⅜		¾		⅝		½		⅜		¾	
t_{des}, in.		0.349		0.698		0.581		0.465		0.349		0.698	
Steel, lb/ft		109.15		201.79		169.91		137.32		104.04		191.58	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1630	2450	2180	3270	1980	2970	1780	2660	1510	2260	2020	3020
	1	1630	2450	2180	3270	1980	2970	1780	2660	1510	2260	2020	3020
	2	1630	2450	2180	3270	1980	2970	1770	2660	1510	2260	2010	3020
	3	1630	2450	2180	3270	1980	2970	1770	2660	1500	2260	2010	3020
	4	1630	2440	2170	3260	1970	2960	1770	2650	1500	2250	2010	3010
	5	1630	2440	2170	3250	1970	2950	1770	2650	1500	2250	2000	3000
	6	1620	2430	2160	3240	1960	2950	1760	2640	1490	2240	1990	2990
	7	1620	2430	2160	3230	1960	2940	1750	2630	1490	2230	1990	2980
	8	1610	2420	2150	3220	1950	2930	1750	2620	1480	2220	1980	2970
	9	1610	2410	2140	3210	1940	2910	1740	2610	1480	2210	1970	2950
	10	1600	2400	2130	3200	1930	2900	1730	2600	1470	2200	1960	2940
	11	1590	2390	2120	3180	1920	2890	1720	2580	1460	2190	1950	2920
	12	1580	2380	2110	3160	1910	2870	1710	2570	1450	2180	1930	2900
	13	1580	2360	2100	3140	1900	2850	1700	2550	1440	2160	1920	2880
	14	1570	2350	2080	3130	1890	2830	1690	2540	1430	2150	1900	2860
	15	1560	2340	2070	3100	1880	2820	1680	2520	1420	2130	1890	2830
	16	1550	2320	2050	3080	1860	2790	1670	2500	1410	2120	1870	2810
	17	1540	2300	2040	3060	1850	2770	1650	2480	1400	2100	1850	2780
	18	1520	2290	2020	3030	1830	2750	1640	2460	1390	2080	1830	2750
	19	1510	2270	2000	3010	1820	2720	1620	2430	1370	2060	1820	2720
	20	1500	2250	1990	2980	1800	2700	1610	2410	1360	2040	1790	2690
	21	1490	2230	1970	2950	1780	2670	1590	2380	1350	2020	1770	2660
	22	1470	2210	1950	2920	1760	2640	1570	2360	1330	2000	1750	2630
	23	1460	2190	1930	2890	1740	2620	1560	2330	1320	1970	1730	2590
	24	1440	2170	1910	2860	1720	2590	1540	2310	1300	1950	1710	2560
	25	1430	2140	1880	2830	1700	2560	1520	2280	1280	1920	1680	2520
	26	1410	2120	1860	2790	1680	2520	1500	2250	1270	1900	1660	2490
	27	1400	2100	1840	2760	1660	2490	1480	2220	1250	1870	1630	2450
	28	1380	2070	1810	2720	1640	2460	1460	2190	1230	1850	1610	2410
	29	1360	2050	1790	2690	1620	2430	1440	2160	1210	1820	1580	2370
	30	1350	2020	1770	2650	1590	2390	1420	2120	1200	1790	1550	2330
	32	1310	1970	1710	2570	1550	2320	1370	2060	1160	1740	1500	2250
	34	1270	1910	1660	2490	1500	2250	1330	1990	1120	1680	1440	2160
	36	1240	1860	1610	2410	1450	2170	1280	1920	1080	1620	1380	2080
	38	1200	1800	1550	2330	1400	2100	1240	1850	1040	1560	1330	1990
	40	1160	1740	1500	2250	1350	2020	1190	1780	998	1500	1270	1900
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	766	1150	1290	1930	1110	1660	919	1380	720	1080	1190	1800
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	635	954	1030	1550	887	1330	730	1100	549	825	876	1320
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		125000		182000		161000		139000		116000		167000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		91600		112000		98900		85100		70400		83800	
r_{mx}/r_{my}		1.17		1.27		1.28		1.28		1.28		1.41	
r_{my}, in.		8.19		7.29		7.34		7.39		7.45		6.53	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS24

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS24×16×						HSS24×14×					
		⅝		½		⅜		¾		⅝		½	
t_{des}, in.		0.581		0.465		0.349		0.698		0.581		0.465	
Steel, lb/ft		161.40		130.52		98.94		181.37		152.89		123.71	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1830	2740	1630	2450	1380	2070	1850	2770	1670	2500	1490	2230
	1	1830	2740	1630	2450	1380	2070	1850	2770	1670	2500	1490	2230
	2	1820	2740	1630	2450	1380	2070	1850	2770	1670	2500	1490	2230
	3	1820	2730	1630	2440	1380	2060	1840	2770	1660	2500	1480	2220
	4	1820	2730	1630	2440	1370	2060	1840	2760	1660	2490	1480	2220
	5	1810	2720	1620	2430	1370	2050	1830	2750	1650	2480	1470	2210
	6	1810	2710	1620	2420	1360	2050	1830	2740	1650	2470	1470	2200
	7	1800	2700	1610	2410	1360	2040	1820	2720	1640	2460	1460	2190
	8	1790	2690	1600	2400	1350	2030	1810	2710	1630	2450	1450	2180
	9	1780	2680	1590	2390	1350	2020	1800	2690	1620	2430	1440	2160
	10	1770	2660	1580	2380	1340	2010	1780	2670	1610	2410	1430	2150
	11	1760	2640	1570	2360	1330	1990	1770	2650	1600	2390	1420	2130
	12	1750	2630	1560	2340	1320	1980	1750	2630	1580	2370	1410	2110
	13	1740	2610	1550	2330	1310	1960	1740	2610	1570	2350	1390	2090
	14	1720	2590	1540	2310	1300	1950	1720	2580	1550	2330	1380	2070
	15	1710	2560	1520	2290	1290	1930	1700	2550	1530	2300	1360	2040
	16	1690	2540	1510	2260	1270	1910	1680	2520	1520	2270	1350	2020
	17	1680	2510	1490	2240	1260	1890	1660	2490	1500	2250	1330	1990
	18	1660	2490	1480	2220	1250	1870	1640	2460	1480	2220	1310	1970
	19	1640	2460	1460	2190	1230	1850	1620	2430	1460	2190	1290	1940
	20	1620	2430	1440	2170	1220	1820	1600	2390	1440	2150	1270	1910
	21	1600	2400	1430	2140	1200	1800	1570	2360	1410	2120	1250	1880
	22	1580	2370	1410	2110	1180	1780	1550	2320	1390	2090	1230	1850
	23	1560	2340	1390	2080	1170	1750	1520	2280	1370	2050	1210	1820
	24	1540	2310	1370	2050	1150	1720	1500	2240	1340	2020	1190	1780
	25	1520	2280	1350	2020	1130	1700	1470	2200	1320	1980	1170	1750
	26	1490	2240	1330	1990	1110	1670	1440	2160	1290	1940	1140	1710
	27	1470	2210	1300	1960	1090	1640	1410	2120	1270	1900	1120	1680
	28	1450	2170	1280	1920	1080	1610	1390	2080	1240	1860	1100	1640
	29	1420	2130	1260	1890	1060	1580	1360	2030	1220	1820	1070	1610
	30	1400	2100	1240	1860	1040	1560	1330	1990	1190	1780	1050	1570
	32	1350	2020	1190	1790	997	1500	1270	1900	1140	1700	997	1500
	34	1300	1940	1140	1710	956	1430	1210	1810	1080	1620	947	1420
	36	1240	1860	1090	1640	914	1370	1150	1720	1020	1540	897	1350
	38	1190	1780	1050	1570	872	1310	1090	1630	969	1450	847	1270
	40	1130	1700	996	1490	830	1250	1030	1540	914	1370	797	1190
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	1030	1550	854	1280	670	1010	1100	1650	949	1430	789	1190
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	751	1130	621	934	467	702	730	1100	626	940	517	778
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		148000		127000		105000		151000		134000		116000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		74000		63700		52300		60500		53400		45900	
r_{mx}/r_{my}		1.41		1.41		1.42		1.58		1.58		1.59	
r_{my}, in.		6.59		6.64		6.69		5.77		5.82		5.87	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS24

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS24×14×		HSS24×12×									
		⅜		1		⅞		¾		⅝		½	
t_{des}, in.		0.349		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		93.83		222.63		197.24		171.16		144.39		116.91	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1250	1880	2010	3010	1850	2770	1690	2530	1520	2270	1340	2020
	1	1250	1880	2010	3010	1850	2770	1690	2530	1510	2270	1340	2020
	2	1250	1880	2000	3010	1850	2770	1680	2520	1510	2270	1340	2010
	3	1250	1870	2000	3000	1840	2760	1680	2520	1510	2260	1340	2010
	4	1250	1870	1990	2990	1830	2750	1670	2510	1500	2250	1330	2000
	5	1240	1860	1980	2970	1830	2740	1670	2500	1500	2240	1330	1990
	6	1240	1850	1970	2960	1820	2720	1660	2480	1490	2230	1320	1980
	7	1230	1840	1960	2940	1800	2710	1650	2470	1480	2220	1310	1970
	8	1220	1830	1940	2920	1790	2690	1630	2450	1470	2200	1300	1950
	9	1210	1820	1930	2890	1780	2660	1620	2430	1460	2180	1290	1940
	10	1200	1810	1910	2870	1760	2640	1600	2410	1440	2160	1280	1920
	11	1190	1790	1890	2840	1740	2610	1590	2380	1430	2140	1260	1900
	12	1180	1780	1870	2800	1720	2580	1570	2360	1410	2120	1250	1870
	13	1170	1760	1850	2770	1700	2550	1550	2330	1390	2090	1230	1850
	14	1160	1740	1820	2730	1680	2520	1530	2300	1370	2060	1220	1820
	15	1150	1720	1790	2690	1650	2480	1510	2260	1350	2030	1200	1800
	16	1130	1700	1770	2650	1630	2440	1490	2230	1330	2000	1180	1770
	17	1120	1680	1740	2610	1600	2400	1460	2190	1310	1970	1160	1740
	18	1100	1650	1710	2560	1570	2360	1440	2160	1290	1930	1140	1710
	19	1090	1630	1680	2510	1550	2320	1410	2120	1270	1900	1120	1680
	20	1070	1600	1640	2470	1520	2270	1380	2080	1240	1860	1100	1640
	21	1050	1580	1610	2420	1490	2230	1360	2040	1220	1820	1070	1610
	22	1030	1550	1580	2360	1450	2180	1330	1990	1190	1790	1050	1570
	23	1010	1520	1540	2310	1420	2130	1300	1950	1160	1750	1030	1540
	24	996	1490	1510	2260	1390	2080	1270	1900	1140	1710	1000	1500
	25	976	1460	1470	2200	1360	2030	1240	1860	1110	1660	976	1460
	26	957	1430	1430	2150	1320	1980	1210	1810	1080	1620	951	1430
	27	937	1400	1390	2090	1290	1930	1180	1770	1050	1580	925	1390
	28	916	1370	1360	2040	1250	1880	1150	1720	1030	1540	899	1350
	29	895	1340	1320	1980	1220	1830	1110	1670	997	1500	873	1310
	30	875	1310	1280	1920	1180	1780	1080	1620	968	1450	847	1270
	32	832	1250	1200	1800	1110	1670	1020	1530	910	1360	795	1190
	34	789	1180	1130	1690	1040	1560	954	1430	852	1280	743	1110
	36	746	1120	1050	1580	973	1460	890	1340	795	1190	691	1040
	38	704	1060	975	1460	904	1360	828	1240	738	1110	641	961
	40	661	991	905	1360	836	1250	766	1150	683	1020	592	887
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	622	935	1250	1880	1130	1700	1000	1510	866	1300	722	1090
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	391	588	743	1120	669	1010	591	889	508	763	421	632
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		95600		156000		145000		134000		120000		103000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		37800		48400		45000		41200		36700		31600	
r_{mx}/r_{my}		1.59		1.80		1.80		1.80		1.81		1.81	
r_{my}, in.		5.92		4.88		4.93		4.98		5.03		5.08	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS24–HSS22

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS24×12×		HSS24×8×				HSS22×20×					
		⅜		½		⅜		¾		⅝		½	
t_{des}, in.		0.349		0.465		0.349		0.698		0.581		0.465	
Steel, lb/ft		88.73		103.30		78.52		201.79		169.91		137.32	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1130	1690	1050	1580	873	1310	2200	3300	2000	3000	1790	2690
	1	1130	1690	1050	1580	872	1310	2200	3300	2000	3000	1790	2690
	2	1120	1690	1050	1570	869	1300	2200	3300	2000	3000	1790	2690
	3	1120	1680	1040	1570	865	1300	2190	3290	1990	2990	1790	2690
	4	1120	1680	1040	1550	858	1290	2190	3290	1990	2990	1790	2680
	5	1110	1670	1030	1540	850	1270	2190	3280	1990	2980	1780	2680
	6	1110	1660	1010	1520	840	1260	2180	3270	1980	2980	1780	2670
	7	1100	1650	1000	1500	828	1240	2180	3270	1980	2970	1780	2660
	8	1090	1630	984	1480	815	1220	2170	3260	1970	2960	1770	2650
	9	1080	1620	967	1450	800	1200	2160	3250	1970	2950	1760	2640
	10	1070	1600	947	1420	784	1180	2160	3230	1960	2940	1760	2630
	11	1060	1590	927	1390	767	1150	2150	3220	1950	2930	1750	2620
	12	1040	1570	904	1360	748	1120	2140	3210	1940	2910	1740	2610
	13	1030	1550	880	1320	728	1090	2130	3190	1930	2900	1730	2600
	14	1020	1530	856	1280	707	1060	2120	3170	1920	2880	1720	2580
	15	1000	1500	830	1240	686	1030	2100	3160	1910	2860	1710	2570
	16	985	1480	803	1200	663	995	2090	3140	1900	2850	1700	2550
	17	969	1450	775	1160	640	960	2080	3120	1890	2830	1690	2530
	18	951	1430	747	1120	617	925	2060	3090	1870	2810	1680	2510
	19	933	1400	718	1080	593	889	2050	3070	1860	2790	1660	2490
	20	914	1370	689	1030	568	853	2030	3050	1840	2770	1650	2470
	21	895	1340	659	989	544	816	2020	3020	1830	2740	1630	2450
	22	875	1310	630	945	520	779	2000	3000	1810	2720	1620	2430
	23	854	1280	601	901	495	743	1980	2970	1800	2690	1610	2410
	24	834	1250	571	857	471	706	1960	2950	1780	2670	1590	2380
	25	812	1220	542	813	447	670	1940	2920	1760	2640	1570	2360
	26	791	1190	514	770	423	634	1930	2890	1740	2620	1560	2330
	27	769	1150	486	728	399	599	1910	2860	1730	2590	1540	2310
	28	748	1120	458	687	377	565	1890	2830	1710	2560	1520	2280
	29	726	1090	431	647	354	531	1860	2800	1690	2530	1500	2250
	30	704	1060	404	606	332	498	1840	2760	1670	2500	1480	2230
	32	659	989	355	533	292	438	1800	2700	1630	2440	1450	2170
	34	615	923	315	472	259	388	1750	2630	1580	2370	1410	2110
	36	572	858	281	421	231	346	1700	2560	1540	2310	1370	2050
	38	529	794	252	378	207	310	1660	2480	1490	2240	1320	1990
	40	488	732	227	341	187	280	1610	2410	1450	2170	1280	1920
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	570	857	587	882	464	698	1210	1820	1040	1570	861	1290
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	319	480	248	373	191	287	1130	1690	967	1450	799	1200
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		85500		79200		65400		159000		140000		121000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		26000		12000		9810		135000		119000		103000	
r_{mx}/r_{my}		1.81		2.57		2.58		1.09		1.08		1.08	
r_{my}, in.		5.14		3.44		3.50		7.93		7.99		8.04	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS22

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS22×20×		HSS22×18×								HSS22×16×	
		3/8		3/4		5/8		1/2		3/8		3/4	
t_{des}, in.		0.349		0.698		0.581		0.465		0.349		0.698	
Steel, lb/ft		104.04		191.58		161.40		130.52		98.94		181.37	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1570	2360	2040	3060	1850	2780	1660	2490	1450	2170	1880	2830
	1	1570	2360	2040	3060	1850	2780	1660	2490	1450	2170	1880	2820
	2	1570	2350	2040	3060	1850	2780	1660	2490	1450	2170	1880	2820
	3	1570	2350	2040	3060	1850	2770	1660	2480	1440	2170	1880	2820
	4	1570	2350	2030	3050	1850	2770	1650	2480	1440	2160	1870	2810
	5	1560	2340	2030	3040	1840	2760	1650	2470	1440	2160	1870	2800
	6	1560	2340	2020	3040	1840	2750	1640	2470	1430	2150	1860	2800
	7	1550	2330	2020	3030	1830	2750	1640	2460	1430	2140	1860	2790
	8	1550	2320	2010	3020	1820	2740	1630	2450	1420	2130	1850	2770
	9	1540	2310	2000	3000	1820	2720	1630	2440	1420	2120	1840	2760
	10	1540	2300	1990	2990	1810	2710	1620	2430	1410	2110	1830	2740
	11	1530	2290	1980	2980	1800	2700	1610	2410	1400	2100	1820	2730
	12	1520	2280	1970	2960	1790	2680	1600	2400	1390	2090	1810	2710
	13	1510	2270	1960	2940	1780	2670	1590	2380	1380	2070	1790	2690
	14	1500	2260	1950	2920	1770	2650	1580	2370	1370	2060	1780	2670
	15	1490	2240	1940	2900	1750	2630	1570	2350	1360	2040	1760	2650
	16	1480	2230	1920	2880	1740	2610	1550	2330	1350	2030	1750	2620
	17	1470	2210	1910	2860	1730	2590	1540	2310	1340	2010	1730	2600
	18	1460	2190	1890	2840	1710	2570	1530	2290	1330	1990	1710	2570
	19	1450	2170	1870	2810	1700	2540	1510	2270	1310	1970	1690	2540
	20	1440	2160	1860	2780	1680	2520	1500	2250	1300	1950	1680	2510
	21	1420	2140	1840	2760	1660	2500	1480	2230	1290	1930	1660	2480
	22	1410	2120	1820	2730	1650	2470	1470	2200	1270	1910	1630	2450
	23	1400	2100	1800	2700	1630	2440	1450	2180	1260	1880	1610	2420
	24	1380	2070	1780	2670	1610	2420	1430	2150	1240	1860	1590	2390
	25	1370	2050	1760	2640	1590	2390	1420	2120	1220	1840	1570	2350
	26	1350	2030	1740	2610	1570	2360	1400	2100	1210	1810	1550	2320
	27	1340	2000	1720	2580	1550	2330	1380	2070	1190	1790	1520	2280
	28	1320	1980	1690	2540	1530	2300	1360	2040	1170	1760	1500	2250
	29	1300	1960	1670	2510	1510	2260	1340	2010	1160	1730	1470	2210
	30	1290	1930	1650	2470	1490	2230	1320	1980	1140	1710	1450	2170
	32	1250	1880	1600	2400	1440	2170	1280	1920	1100	1650	1400	2090
	34	1220	1820	1550	2330	1400	2100	1240	1860	1060	1590	1340	2010
	36	1180	1770	1500	2250	1350	2030	1190	1790	1020	1540	1290	1930
	38	1140	1710	1450	2170	1300	1960	1150	1730	984	1480	1230	1850
	40	1100	1650	1400	2100	1250	1880	1110	1660	944	1420	1180	1770
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	673	1010	1130	1690	971	1460	804	1210	630	947	1040	1570
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	610	917	968	1460	830	1250	687	1030	525	789	820	1230
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		100000		146000		129000		111000		92300		133000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		85300		104000		91700		78900		65300		77500	
r_{mx}/r_{my}		1.08		1.18		1.19		1.19		1.19		1.31	
r_{my}, in.		8.10		7.21		7.26		7.31		7.37		6.47	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS22

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS22×16×						HSS22×14×					
		⅝		½		⅜		¾		⅝		½	
t_{des}, in.		0.581		0.465		0.349		0.698		0.581		0.465	
Steel, lb/ft		152.89		123.71		93.83		171.16		144.39		116.91	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1700	2560	1520	2280	1320	1980	1730	2590	1560	2340	1390	2080
	1	1700	2560	1520	2280	1320	1980	1730	2590	1560	2340	1390	2080
	2	1700	2550	1520	2280	1320	1980	1730	2590	1560	2330	1390	2080
	3	1700	2550	1520	2280	1320	1980	1720	2580	1550	2330	1380	2070
	4	1700	2540	1510	2270	1320	1970	1720	2580	1550	2320	1380	2070
	5	1690	2540	1510	2270	1310	1970	1710	2570	1540	2310	1370	2060
	6	1690	2530	1500	2260	1310	1960	1710	2560	1540	2310	1370	2050
	7	1680	2520	1500	2250	1300	1950	1700	2550	1530	2290	1360	2040
	8	1670	2510	1490	2240	1300	1940	1690	2530	1520	2280	1350	2030
	9	1660	2490	1480	2230	1290	1930	1680	2520	1510	2270	1340	2020
	10	1650	2480	1480	2210	1280	1920	1660	2500	1500	2250	1330	2000
	11	1640	2460	1470	2200	1270	1910	1650	2480	1490	2230	1320	1980
	12	1630	2450	1460	2180	1260	1890	1640	2460	1480	2210	1310	1970
	13	1620	2430	1440	2170	1250	1880	1620	2430	1460	2190	1300	1950
	14	1610	2410	1430	2150	1240	1860	1610	2410	1450	2170	1280	1930
	15	1590	2390	1420	2130	1230	1840	1590	2380	1430	2150	1270	1900
	16	1580	2370	1410	2110	1220	1830	1570	2360	1410	2120	1250	1880
	17	1560	2340	1390	2090	1200	1810	1550	2330	1400	2090	1240	1860
	18	1550	2320	1380	2060	1190	1780	1530	2300	1380	2070	1220	1830
	19	1530	2290	1360	2040	1180	1760	1510	2270	1360	2040	1200	1800
	20	1510	2270	1340	2020	1160	1740	1490	2230	1340	2010	1180	1780
	21	1490	2240	1330	1990	1150	1720	1470	2200	1320	1980	1170	1750
	22	1470	2210	1310	1960	1130	1690	1440	2160	1300	1950	1150	1720
	23	1450	2180	1290	1940	1110	1670	1420	2130	1280	1910	1130	1690
	24	1430	2150	1270	1910	1100	1640	1390	2090	1250	1880	1110	1660
	25	1410	2120	1250	1880	1080	1620	1370	2050	1230	1840	1080	1630
	26	1390	2090	1230	1850	1060	1590	1340	2010	1210	1810	1060	1590
	27	1370	2050	1210	1820	1040	1560	1320	1970	1180	1770	1040	1560
	28	1350	2020	1190	1790	1020	1540	1290	1930	1160	1740	1020	1530
	29	1320	1990	1170	1760	1000	1510	1260	1890	1130	1700	996	1490
	30	1300	1950	1150	1730	985	1480	1230	1850	1110	1660	973	1460
	32	1250	1880	1110	1660	946	1420	1180	1770	1060	1590	926	1390
	34	1210	1810	1060	1600	906	1360	1120	1680	1010	1510	879	1320
	36	1160	1730	1020	1530	866	1300	1060	1600	954	1430	832	1250
	38	1110	1660	972	1460	825	1240	1010	1510	902	1350	785	1180
	40	1060	1580	927	1390	784	1180	950	1420	850	1280	738	1110
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	899	1350	746	1120	587	882	958	1440	826	1240	687	1030
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	703	1060	581	873	446	671	679	1020	583	876	483	725
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		118000		101000		84100		120000		107000		92100	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		68600		59200		48700		55700		49600		42400	
r_{mx}/r_{my}		1.31		1.31		1.31		1.47		1.47		1.47	
r_{my}, in.		6.52		6.57		6.63		5.71		5.76		5.81	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS22–HSS20

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS22×14×		HSS22×10×						HSS20×16×			
		3/8		5/8		1/2		3/8		3/4		5/8	
t_{des}, in.		0.349		0.581		0.465		0.349		0.698		0.581	
Steel, lb/ft		88.73		127.37		103.30		78.52		171.16		144.39	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1200	1800	1270	1900	1110	1670	951	1430	1750	2630	1580	2380
	1	1200	1800	1260	1900	1110	1670	950	1430	1750	2630	1580	2370
	2	1200	1800	1260	1890	1110	1670	948	1420	1750	2630	1580	2370
	3	1190	1790	1260	1890	1110	1660	945	1420	1750	2620	1580	2370
	4	1190	1790	1250	1880	1100	1650	940	1410	1750	2620	1580	2360
	5	1190	1780	1240	1870	1090	1640	934	1400	1740	2610	1570	2360
	6	1180	1770	1230	1850	1080	1630	926	1390	1740	2600	1570	2350
	7	1180	1760	1220	1830	1070	1610	917	1380	1730	2590	1560	2340
	8	1170	1750	1210	1820	1060	1600	907	1360	1720	2580	1550	2330
	9	1160	1740	1200	1790	1050	1580	896	1340	1710	2570	1550	2320
	10	1150	1730	1180	1770	1040	1550	883	1320	1700	2550	1540	2300
	11	1140	1710	1160	1740	1020	1530	869	1300	1690	2540	1530	2290
	12	1130	1690	1140	1720	1000	1510	855	1280	1680	2520	1520	2270
	13	1120	1680	1120	1690	987	1480	839	1260	1670	2500	1500	2260
	14	1110	1660	1100	1650	968	1450	822	1230	1660	2480	1490	2240
	15	1090	1640	1080	1620	948	1420	805	1210	1640	2460	1480	2220
	16	1080	1620	1060	1590	927	1390	787	1180	1630	2440	1470	2200
	17	1060	1600	1030	1550	906	1360	768	1150	1610	2420	1450	2180
	18	1050	1570	1010	1510	884	1330	748	1120	1590	2390	1440	2150
	19	1030	1550	982	1470	861	1290	728	1090	1580	2360	1420	2130
	20	1020	1520	955	1430	837	1260	707	1060	1560	2340	1400	2100
	21	999	1500	928	1390	813	1220	686	1030	1540	2310	1390	2080
	22	982	1470	901	1350	788	1180	664	996	1520	2280	1370	2050
	23	964	1450	873	1310	763	1150	642	964	1500	2250	1350	2020
	24	945	1420	844	1270	738	1110	620	931	1480	2220	1330	2000
	25	926	1390	816	1220	713	1070	598	897	1460	2190	1310	1970
	26	907	1360	787	1180	687	1030	576	864	1440	2150	1290	1940
	27	887	1330	758	1140	662	993	554	831	1410	2120	1270	1910
	28	867	1300	729	1090	636	955	532	798	1390	2090	1250	1870
	29	847	1270	701	1050	611	917	510	765	1370	2050	1230	1840
	30	827	1240	672	1010	586	879	488	732	1340	2020	1210	1810
	32	785	1180	616	924	536	805	445	668	1300	1940	1160	1740
	34	744	1120	561	842	488	732	404	605	1250	1870	1120	1670
	36	702	1050	509	763	442	663	363	545	1200	1790	1070	1610
	38	660	990	458	686	397	595	326	489	1140	1720	1020	1540
	40	619	929	413	619	358	537	294	441	1090	1640	976	1460
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	542	815	678	1020	567	852	448	674	901	1350	776	1170
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	372	559	371	558	308	463	238	357	761	1140	654	983
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		76100		83400		72500		59800		104000		92500	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		35000		21700		18800		15500		71500		63200	
r_{mx}/r_{my}		1.47		1.96		1.96		1.96		1.21		1.21	
r_{my}, in.		5.87		4.19		4.24		4.29		6.39		6.44	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS20

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS20×16×						HSS20×12×					
		½		⅜		5⁄16		1		⅞		¾	
t_{des}, in.		0.465		0.349		0.291		0.930		0.814		0.698	
Steel, lb/ft		116.91		88.73		74.38		195.40		173.43		150.75	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1410	2120	1230	1850	1100	1650	1730	2600	1600	2390	1460	2180
	1	1410	2120	1230	1850	1100	1650	1730	2600	1600	2390	1460	2180
	2	1410	2120	1230	1850	1100	1650	1730	2600	1590	2390	1450	2180
	3	1410	2110	1230	1850	1100	1650	1730	2590	1590	2380	1450	2170
	4	1410	2110	1230	1840	1100	1640	1720	2580	1580	2370	1440	2170
	5	1400	2100	1220	1840	1090	1640	1710	2570	1580	2360	1440	2160
	6	1400	2100	1220	1830	1090	1630	1700	2550	1570	2350	1430	2140
	7	1390	2090	1210	1820	1080	1620	1690	2540	1560	2340	1420	2130
	8	1380	2080	1210	1810	1080	1620	1680	2520	1540	2320	1410	2110
	9	1380	2070	1200	1800	1070	1610	1660	2500	1530	2300	1400	2100
	10	1370	2050	1190	1790	1070	1600	1650	2470	1520	2280	1380	2080
	11	1360	2040	1190	1780	1060	1590	1630	2440	1500	2250	1370	2050
	12	1350	2030	1180	1770	1050	1570	1610	2420	1480	2220	1350	2030
	13	1340	2010	1170	1750	1040	1560	1590	2380	1460	2200	1340	2000
	14	1330	1990	1160	1740	1030	1550	1570	2350	1440	2170	1320	1980
	15	1320	1970	1150	1720	1020	1530	1540	2320	1420	2130	1300	1950
	16	1300	1960	1130	1700	1010	1520	1520	2280	1400	2100	1280	1920
	17	1290	1940	1120	1680	1000	1500	1490	2240	1380	2070	1260	1890
	18	1280	1910	1110	1660	989	1480	1470	2200	1350	2030	1240	1850
	19	1260	1890	1100	1640	976	1460	1440	2160	1330	1990	1210	1820
	20	1250	1870	1080	1620	964	1450	1410	2120	1300	1950	1190	1780
	21	1230	1850	1070	1600	951	1430	1380	2070	1270	1910	1160	1750
	22	1210	1820	1050	1580	937	1410	1350	2030	1250	1870	1140	1710
	23	1200	1800	1040	1550	923	1390	1320	1980	1220	1830	1110	1670
	24	1180	1770	1020	1530	909	1360	1290	1930	1190	1780	1090	1630
	25	1160	1740	1000	1510	894	1340	1260	1890	1160	1740	1060	1590
	26	1140	1710	986	1480	879	1320	1220	1840	1130	1700	1030	1550
	27	1120	1690	969	1450	864	1300	1190	1790	1100	1650	1010	1510
	28	1110	1660	952	1430	848	1270	1160	1740	1070	1600	979	1470
	29	1090	1630	934	1400	832	1250	1120	1690	1040	1560	951	1430
	30	1070	1600	916	1370	816	1220	1090	1640	1010	1510	923	1380
	32	1030	1540	879	1320	783	1170	1020	1540	946	1420	867	1300
	34	983	1480	841	1260	749	1120	956	1430	884	1330	811	1220
	36	941	1410	803	1200	715	1070	890	1330	823	1230	755	1130
	38	899	1350	764	1150	681	1020	828	1240	763	1140	701	1050
	40	856	1280	726	1090	647	970	771	1160	705	1060	647	971
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	645	969	507	763	432	649	930	1400	841	1260	747	1120
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	543	816	424	638	347	522	636	956	574	863	509	765
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		79600		66000		58700		95700		89400		82300	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		54300		44800		39900		40600		37700		34700	
r_{mx}/r_{my}		1.21		1.21		1.21		1.54		1.54		1.54	
r_{my}, in.		6.50		6.55		6.58		4.78		4.83		4.88	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS20

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS20×12×								HSS20×8×			
		5/8		1/2		3/8		5/16		1		7/8	
t_{des}, in.		0.581		0.465		0.349		0.291		0.930		0.814	
Steel, lb/ft		127.37		103.30		78.52		65.87		168.18		149.61	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1310	1960	1160	1730	1000	1500	890	1340	1400	2090	1280	1920
	1	1310	1960	1160	1730	1000	1500	890	1330	1390	2090	1280	1910
	2	1310	1960	1150	1730	999	1500	888	1330	1390	2080	1270	1910
	3	1300	1950	1150	1730	996	1490	886	1330	1380	2070	1260	1900
	4	1300	1950	1150	1720	992	1490	882	1320	1370	2050	1250	1880
	5	1290	1940	1140	1710	987	1480	878	1320	1360	2030	1240	1860
	6	1280	1930	1130	1700	981	1470	873	1310	1340	2010	1230	1840
	7	1280	1910	1130	1690	974	1460	867	1300	1320	1980	1210	1810
	8	1270	1900	1120	1680	966	1450	860	1290	1300	1950	1190	1780
	9	1260	1880	1110	1660	958	1440	852	1280	1280	1920	1170	1750
	10	1240	1870	1100	1650	948	1420	843	1260	1250	1880	1140	1710
	11	1230	1850	1090	1630	937	1410	833	1250	1230	1840	1120	1670
	12	1220	1820	1070	1610	925	1390	823	1230	1200	1800	1090	1630
	13	1200	1800	1060	1590	913	1370	811	1220	1170	1750	1060	1590
	14	1180	1780	1040	1570	899	1350	799	1200	1130	1700	1030	1540
	15	1170	1750	1030	1540	885	1330	787	1180	1100	1650	992	1490
	16	1150	1720	1010	1520	870	1310	774	1160	1070	1600	959	1440
	17	1130	1700	995	1490	855	1280	760	1140	1030	1550	924	1390
	18	1110	1670	977	1470	838	1260	745	1120	994	1490	891	1340
	19	1090	1630	958	1440	822	1230	730	1100	956	1440	859	1290
	20	1070	1600	939	1410	804	1210	715	1070	918	1380	826	1240
	21	1050	1570	919	1380	787	1180	699	1050	880	1320	793	1190
	22	1020	1540	899	1350	768	1150	683	1020	842	1270	759	1140
	23	1000	1500	878	1320	750	1120	666	999	804	1210	726	1090
	24	978	1470	857	1290	731	1100	649	973	766	1150	692	1040
	25	954	1430	836	1250	711	1070	632	948	728	1090	659	991
	26	929	1390	814	1220	692	1040	614	922	690	1040	626	941
	27	905	1360	792	1190	672	1010	597	895	653	982	594	892
	28	880	1320	769	1150	652	978	579	868	617	928	562	845
	29	855	1280	747	1120	632	948	561	842	582	875	531	798
	30	830	1240	724	1090	612	918	543	815	547	823	500	752
	32	779	1170	679	1020	572	858	508	761	481	723	441	663
	34	729	1090	634	951	532	798	472	708	426	641	391	587
	36	679	1020	590	885	493	739	437	656	380	572	348	524
	38	630	945	546	819	455	682	403	605	341	513	313	470
	40	582	873	504	756	418	626	370	555	308	463	282	424
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	647	972	540	811	425	639	367	551	727	1090	662	995
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	439	660	362	545	285	428	235	353	364	548	330	496
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		74400		64100		53100		47000		69400		65100	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		31200		26800		22100		19600		14700		13700	
r_{mx}/r_{my}		1.54		1.55		1.55		1.55		2.17		2.18	
r_{my}, in.		4.93		4.99		5.04		5.07		3.19		3.24	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS20

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS20×8×										HSS20×6×	
		¾		⅝		½		⅜		5⁄16		⅝	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.581	
Steel, lb/ft		130.33		110.36		89.68		68.31		57.36		101.85	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1160	1740	1030	1550	901	1350	767	1150	677	1020	893	1340
	1	1160	1730	1030	1540	900	1350	766	1150	676	1010	891	1340
	2	1150	1730	1030	1540	897	1350	763	1150	674	1010	886	1330
	3	1150	1720	1020	1530	892	1340	759	1140	670	1010	878	1320
	4	1140	1710	1010	1520	886	1330	753	1130	665	997	866	1300
	5	1130	1690	1000	1500	877	1320	746	1120	658	987	851	1280
	6	1110	1670	991	1490	867	1300	737	1100	650	975	834	1250
	7	1100	1650	977	1470	855	1280	726	1090	641	961	813	1220
	8	1080	1620	961	1440	841	1260	714	1070	630	945	790	1190
	9	1060	1590	944	1420	826	1240	701	1050	618	927	765	1150
	10	1040	1560	924	1390	809	1210	686	1030	605	908	737	1110
	11	1010	1520	903	1350	791	1190	670	1000	591	887	708	1060
	12	988	1480	881	1320	771	1160	653	979	576	864	678	1020
	13	961	1440	857	1290	751	1130	635	952	560	841	646	969
	14	932	1400	832	1250	729	1090	616	924	544	816	614	920
	15	903	1350	807	1210	706	1060	597	895	526	790	580	871
	16	873	1310	780	1170	683	1020	576	864	508	763	547	821
	17	841	1260	752	1130	659	989	555	833	490	735	515	774
	18	810	1210	724	1090	635	952	534	801	471	707	486	730
	19	777	1170	695	1040	610	915	513	769	452	678	456	686
	20	744	1120	667	1000	585	877	491	736	433	649	427	642
	21	711	1070	637	956	559	839	469	703	414	620	399	599
	22	678	1020	608	912	534	801	447	670	394	591	371	558
	23	646	968	579	869	508	763	425	637	375	562	344	517
	24	614	923	550	825	483	725	403	605	356	533	317	477
	25	585	880	522	782	458	687	382	573	337	505	292	439
	26	557	837	493	740	434	650	361	541	318	477	270	406
	27	529	795	466	699	409	614	340	510	300	450	251	377
	28	501	754	439	658	386	579	320	480	282	423	233	350
	29	474	713	412	618	363	544	300	450	264	397	217	326
	30	448	673	388	583	340	510	280	420	247	371	203	305
	32	396	595	345	518	299	448	246	369	217	326	178	268
	34	351	527	305	459	264	397	218	327	192	289	158	237
	36	313	470	272	409	236	354	195	292	172	257	141	212
	38	281	422	244	367	212	318	175	262	154	231	126	190
	40	254	381	221	331	191	287	158	236	139	208	114	172
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	589	885	513	771	431	647	342	514	294	442	443	665
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	293	441	254	382	212	318	166	249	139	209	175	263
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		60000		54300		48200		40000		35500		44200	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		12600		11400		10000		8280		7300		5620	
r_{mx}/r_{my}		2.18		2.18		2.20		2.20		2.21		2.80	
r_{my}, in.		3.29		3.34		3.39		3.44		3.47		2.50	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS20

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS20×6×						HSS20×4×					
		½		⅜		5/16		½		⅜		5/16	
t_{des}, in.		0.465		0.349		0.291		0.465		0.349		0.291	
Steel, lb/ft		82.88		63.21		53.11		76.07		58.10		48.86	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	775	1160	650	975	573	859	647	970	535	803	466	699
	1	774	1160	649	973	572	857	644	966	533	800	464	696
	2	769	1150	645	967	568	853	636	953	526	790	459	688
	3	762	1140	639	958	563	845	622	933	516	774	449	674
	4	752	1130	631	946	556	834	604	906	501	751	437	656
	5	739	1110	620	930	547	820	582	872	483	724	422	632
	6	724	1090	607	911	535	803	555	833	461	692	403	605
	7	707	1060	593	889	523	784	525	788	437	656	383	574
	8	687	1030	576	865	508	762	493	739	411	616	361	541
	9	665	998	558	838	492	738	459	688	383	575	337	505
	10	642	963	539	808	475	713	431	648	354	531	312	468
	11	617	925	518	777	457	685	398	599	325	487	287	431
	12	591	886	496	745	438	656	366	550	295	443	262	393
	13	563	845	474	711	418	627	333	501	266	400	237	355
	14	535	803	450	676	397	596	301	453	238	357	213	319
	15	507	760	427	640	376	564	270	406	211	317	189	284
	16	478	717	403	604	355	533	241	361	192	288	167	250
	17	449	674	379	568	334	501	213	320	173	260	148	222
	18	420	631	355	532	313	469	190	286	154	232	132	198
	19	392	588	331	496	292	438	171	256	138	208	118	177
	20	364	546	308	462	271	407	154	231	125	188	107	160
	21	337	506	285	427	251	377	140	210	113	170	97.1	146
	22	312	469	263	394	232	348	127	191	103	155	88.5	133
	23	290	436	241	362	213	319	116	175	94.5	142	81.0	122
	24	269	404	222	332	195	293	107	161	86.8	130	74.4	112
	25	248	372	204	306	180	270	98.5	148	80.0	120	68.5	103
	26	229	344	189	283	167	250	91.1	137	73.9	111	63.4	95.2
	27	212	319	175	263	154	232	84.5	127	68.6	103	58.8	88.3
	28	197	297	163	244	144	215	78.5	118	63.8	95.8	54.6	82.1
	29	184	277	152	228	134	201					50.9	76.6
	30	172	258	142	213	125	188						
	32	151	227	125	187	110	165						
	34	134	201	110	166	97.4	146						
	36	119	179	98.5	148	86.9	130						
	38	107	161	88.4	133	78.0	117						
	40	96.7	145	79.8	120	70.4	106						
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	374	562	296	446	256	385	313	470	250	376	216	325
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	146	220	115	173	97.1	146	87.4	131	69.4	104	59.3	89.1
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		39300		33500		29600		30100		25600		23200	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		4950		4190		3700		1840		1560		1400	
r_{mx}/r_{my}		2.82		2.83		2.83		4.04		4.05		4.07	
r_{my}, in.		2.55		2.60		2.63		1.68		1.73		1.75	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE HSS18

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS18×10×								HSS18×8×			
		5/8		1/2		3/8		5/16		5/8		1/2	
t_{des}, in.		0.581		0.465		0.349		0.291		0.581		0.465	
Steel, lb/ft		110.36		89.68		68.31		57.36		101.85		82.88	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	1070	1610	944	1420	809	1210	737	1110	944	1420	826	1240
	1	1070	1610	943	1410	809	1210	736	1100	943	1410	825	1240
	2	1070	1610	941	1410	807	1210	735	1100	940	1410	822	1230
	3	1070	1600	937	1410	804	1210	732	1100	935	1400	818	1230
	4	1060	1590	933	1400	800	1200	728	1090	928	1390	812	1220
	5	1050	1580	927	1390	794	1190	723	1080	918	1380	804	1210
	6	1050	1570	919	1380	788	1180	717	1070	907	1360	794	1190
	7	1040	1550	911	1370	780	1170	709	1060	894	1340	783	1170
	8	1020	1540	901	1350	771	1160	701	1050	880	1320	770	1160
	9	1010	1520	890	1330	761	1140	692	1040	863	1290	756	1130
	10	999	1500	878	1320	750	1130	682	1020	845	1270	740	1110
	11	984	1480	864	1300	739	1110	671	1010	826	1240	724	1090
	12	967	1450	850	1280	726	1090	659	988	805	1210	706	1060
	13	950	1430	835	1250	712	1070	646	969	783	1170	686	1030
	14	932	1400	819	1230	698	1050	633	949	760	1140	666	1000
	15	913	1370	802	1200	683	1020	618	928	736	1100	646	968
	16	892	1340	784	1180	667	1000	604	905	712	1070	624	936
	17	872	1310	765	1150	650	976	588	882	686	1030	602	903
	18	850	1270	746	1120	634	950	572	859	660	990	579	869
	19	827	1240	726	1090	616	924	556	834	634	950	556	834
	20	805	1210	706	1060	598	897	539	809	607	910	533	800
	21	781	1170	685	1030	580	870	522	784	580	870	510	764
	22	757	1140	664	996	561	842	505	758	553	830	486	729
	23	733	1100	643	964	543	814	488	732	526	789	463	694
	24	709	1060	621	932	524	785	470	705	500	750	440	659
	25	684	1030	600	899	505	757	453	679	473	710	417	625
	26	660	989	578	867	486	728	435	652	447	671	394	591
	27	635	952	556	834	466	700	417	626	422	633	372	558
	28	610	915	534	801	447	671	400	600	397	596	350	525
	29	586	879	513	769	429	643	382	574	374	562	329	493
	30	561	842	491	737	410	615	365	548	353	531	308	461
	32	513	770	449	673	373	560	332	497	313	470	270	406
	34	467	700	408	612	338	507	299	449	277	416	239	359
	36	422	633	369	553	303	455	268	401	247	371	214	320
	38	379	568	331	496	272	408	240	360	222	333	192	288
	40	342	513	298	448	246	368	217	325	200	301	173	260
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	489	735	409	614	324	487	279	419	430	646	361	542
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	313	471	261	392	204	307	173	259	232	349	194	291
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		48800		42800		35200		31200		40800		36200	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		18000		15700		12900		11400		10300		9090	
r_{mx}/r_{my}		1.65		1.65		1.65		1.65		1.99		2.00	
r_{my}, in.		4.10		4.16		4.21		4.23		3.31		3.36	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS18

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS18×8×				HSS18×6×							
		⅜		5⁄16		¾		⅝		½		⅜	
t_{des}, in.		0.349		0.291		0.698		0.581		0.465		0.349	
Steel, lb/ft		63.21		53.11		109.91		93.34		76.07		58.10	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	701	1050	636	955	919	1380	815	1220	706	1060	595	892
	1	700	1050	636	953	917	1380	813	1220	705	1060	594	890
	2	698	1050	633	950	912	1370	809	1210	701	1050	590	885
	3	694	1040	630	945	903	1350	801	1200	694	1040	585	877
	4	688	1030	625	937	890	1340	790	1190	685	1030	577	865
	5	681	1020	618	927	875	1310	776	1160	673	1010	567	851
	6	673	1010	610	916	856	1280	760	1140	659	989	555	833
	7	663	995	601	902	834	1250	741	1110	643	965	542	813
	8	652	978	591	887	810	1220	720	1080	625	938	527	790
	9	640	960	580	869	785	1180	697	1040	605	908	510	765
	10	626	940	567	850	759	1140	671	1010	584	876	492	738
	11	612	918	553	830	731	1100	645	967	561	841	473	709
	12	596	894	539	808	702	1050	617	925	537	805	452	678
	13	580	870	524	785	671	1010	587	881	512	768	431	647
	14	562	844	507	761	640	961	557	836	486	730	410	615
	15	544	817	491	736	607	913	527	790	460	690	388	582
	16	526	789	473	710	575	864	496	746	434	651	366	548
	17	507	760	456	684	542	814	469	705	408	611	343	515
	18	487	731	438	657	509	765	442	664	381	572	321	482
	19	467	701	419	629	477	716	415	623	355	533	299	449
	20	447	671	401	601	445	668	388	583	330	495	278	417
	21	427	641	382	574	413	621	362	544	305	458	257	386
	22	407	611	364	546	383	575	336	505	282	424	237	356
	23	387	581	345	518	353	531	311	468	262	394	217	326
	24	367	551	327	491	324	487	286	431	242	364	199	299
	25	348	521	309	464	299	449	264	397	223	336	184	276
	26	328	492	292	437	276	415	244	367	207	310	170	255
	27	309	464	274	411	256	385	226	340	192	288	158	236
	28	291	436	257	386	238	358	210	316	178	268	147	220
	29	273	409	241	361	222	334	196	295	166	250	137	205
	30	255	382	225	337	208	312	183	276	155	233	128	191
	32	224	336	198	296	182	274	161	242	136	205	112	168
	34	198	298	175	262	162	243	143	215	121	182	99.4	149
	36	177	265	156	234	144	217	127	191	108	162	88.6	133
	38	159	238	140	210	129	194	114	172	96.7	145	79.5	119
	40	143	215	126	190	117	175	103	155	87.3	131	71.8	108
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	286	430	247	371	423	636	368	552	311	468	247	372
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	152	228	129	193	182	273	159	238	133	200	105	158
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		30200		26800		36300		33000		29300		25100	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		7530		6640		5590		5070		4480		3770	
r_{mx}/r_{my}		2.00		2.01		2.55		2.55		2.56		2.58	
r_{my}, in.		3.41		3.44		2.43		2.48		2.53		2.58	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS18–HSS16

Table 4-B (continued)

Available Strength in Axial Compression, kips

Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS18×6×		HSS16×12×									
		5/16		1		7/8		3/4		5/8		1/2	
t_{des}, in.		0.291		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		48.86		168.18		149.61		130.33		110.36		89.68	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	533	800	1460	2190	1350	2020	1230	1840	1100	1650	969	1450
	1	532	798	1460	2190	1340	2020	1230	1840	1100	1650	969	1450
	2	529	794	1460	2190	1340	2010	1220	1830	1100	1640	967	1450
	3	524	786	1460	2180	1340	2010	1220	1830	1090	1640	965	1450
	4	517	776	1450	2180	1330	2000	1220	1820	1090	1630	961	1440
	5	508	762	1440	2170	1330	1990	1210	1810	1080	1630	956	1430
	6	497	746	1440	2150	1320	1980	1200	1800	1080	1620	951	1430
	7	485	728	1430	2140	1310	1970	1190	1790	1070	1610	944	1420
	8	471	707	1410	2120	1300	1950	1190	1780	1060	1590	937	1410
	9	456	684	1400	2100	1290	1930	1170	1760	1050	1580	928	1390
	10	440	660	1390	2080	1280	1910	1160	1740	1040	1560	919	1380
	11	422	634	1370	2060	1260	1890	1150	1730	1030	1550	909	1360
	12	404	606	1350	2030	1250	1870	1140	1700	1020	1530	898	1350
	13	385	578	1340	2000	1230	1850	1120	1680	1010	1510	886	1330
	14	366	549	1320	1980	1210	1820	1110	1660	992	1490	874	1310
	15	346	519	1300	1940	1190	1790	1090	1630	977	1470	860	1290
	16	326	489	1280	1910	1180	1760	1070	1610	962	1440	846	1270
	17	306	459	1250	1880	1150	1730	1050	1580	945	1420	832	1250
	18	286	429	1230	1840	1130	1700	1030	1550	928	1390	817	1220
	19	266	399	1210	1810	1110	1670	1010	1520	911	1370	801	1200
	20	247	371	1180	1770	1090	1630	994	1490	892	1340	784	1180
	21	228	342	1150	1730	1070	1600	973	1460	874	1310	768	1150
	22	210	315	1130	1690	1040	1560	951	1430	854	1280	750	1130
	23	192	289	1100	1650	1020	1530	929	1390	834	1250	733	1100
	24	177	265	1070	1610	992	1490	906	1360	814	1220	715	1070
	25	163	244	1050	1570	967	1450	883	1320	794	1190	696	1040
	26	151	226	1020	1530	941	1410	860	1290	773	1160	678	1020
	27	140	209	989	1480	915	1370	836	1250	752	1130	659	989
	28	130	195	960	1440	889	1330	812	1220	731	1100	640	960
	29	121	182	931	1400	862	1290	789	1180	710	1060	621	932
	30	113	170	902	1350	836	1250	765	1150	688	1030	602	903
	32	99.4	149	844	1270	783	1170	716	1070	645	968	564	846
	34	88.0	132	789	1190	730	1090	668	1000	602	904	526	789
	36	78.5	118	737	1110	678	1020	621	932	560	840	488	733
	38	70.5	106	686	1030	627	940	575	862	519	778	452	678
	40	63.6	95.4	635	955	577	866	530	794	478	717	416	624
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	214	321	652	980	591	888	527	792	457	687	381	573
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	89.1	134	528	793	476	716	424	638	367	551	306	460
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		22200		53100		49700		45800		41400		36000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3340		32800		30700		28200		25500		22100	
r_{mx}/r_{my}		2.58		1.27		1.27		1.27		1.27		1.28	
r_{my}, in.		2.61		4.64		4.70		4.75		4.80		4.86	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS16

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS16×12×				HSS16×10×							
		3/8		5/16		5/8		1/2		3/8		5/16	
t_{des}, in.		0.349		0.291		0.581		0.465		0.349		0.291	
Steel, lb/ft		68.31		57.36		101.85		82.88		63.21		53.11	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	835	1250	766	1150	978	1470	860	1290	735	1100	673	1010
	1	834	1250	766	1150	977	1470	859	1290	734	1100	673	1010
	2	833	1250	765	1150	975	1460	858	1290	733	1100	671	1010
	3	831	1250	762	1140	972	1460	854	1280	730	1090	669	1000
	4	827	1240	759	1140	967	1450	850	1280	726	1090	665	997
	5	823	1230	756	1130	960	1440	844	1270	721	1080	660	990
	6	818	1230	751	1130	953	1430	838	1260	715	1070	655	982
	7	812	1220	745	1120	944	1420	830	1240	708	1060	648	972
	8	806	1210	739	1110	933	1400	821	1230	700	1050	640	960
	9	798	1200	732	1100	922	1380	810	1220	691	1040	632	948
	10	790	1180	724	1090	909	1360	799	1200	681	1020	622	933
	11	781	1170	715	1070	895	1340	787	1180	670	1000	612	918
	12	771	1160	706	1060	880	1320	774	1160	658	987	601	902
	13	760	1140	696	1040	864	1300	760	1140	646	969	589	884
	14	749	1120	685	1030	847	1270	745	1120	633	949	577	865
	15	737	1110	674	1010	829	1240	729	1090	619	928	564	846
	16	725	1090	662	993	811	1220	713	1070	604	906	550	825
	17	711	1070	649	974	791	1190	696	1040	589	884	536	804
	18	698	1050	636	955	771	1160	678	1020	574	861	521	782
	19	684	1030	623	935	751	1130	660	990	558	837	506	760
	20	669	1000	609	914	729	1090	641	962	541	812	491	737
	21	654	981	595	893	708	1060	622	933	525	787	475	713
	22	639	958	581	871	686	1030	603	904	508	762	460	689
	23	623	935	566	849	664	995	583	875	491	736	443	665
	24	607	911	551	826	641	962	564	845	473	710	427	641
	25	591	886	536	803	618	928	544	815	456	684	411	617
	26	574	862	520	780	596	894	524	785	439	658	395	592
	27	558	837	505	757	573	860	504	755	421	632	379	568
	28	541	812	489	733	550	826	484	726	404	606	363	544
	29	524	787	473	710	528	792	464	696	387	580	347	520
	30	508	761	457	686	506	758	444	666	370	554	331	496
	32	474	711	426	639	462	692	406	608	336	504	300	450
	34	441	661	395	592	419	629	368	552	304	456	270	405
	36	408	612	364	547	378	567	332	498	273	409	242	362
	38	376	564	335	502	339	509	298	447	245	367	217	325
	40	345	517	306	459	306	459	269	403	221	331	196	294
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	301	452	258	388	406	610	340	512	269	404	231	348
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	240	361	205	308	284	427	237	357	186	280	159	239
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		29700		26300		35600		31400		25900		23000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		18200		16100		16100		14100		11600		10300	
r_{mx}/r_{my}		1.28		1.28		1.49		1.49		1.49		1.49	
r_{my}, in.		4.91		4.94		4.05		4.10		4.15		4.18	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS16

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS16×10×		HSS16×8×									
		¼		⅞		¾		⅝		½		⅜	
t_{des}, in.		0.233		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		42.84		125.79		109.91		93.34		76.07		58.10	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	587	881	1060	1590	962	1440	857	1290	749	1120	637	956
	1	587	880	1060	1590	960	1440	857	1280	748	1120	636	955
	2	586	878	1060	1580	957	1440	854	1280	745	1120	634	951
	3	583	875	1050	1570	952	1430	849	1270	741	1110	631	946
	4	580	870	1040	1560	944	1420	842	1260	735	1100	626	939
	5	576	864	1030	1550	935	1400	834	1250	728	1090	619	929
	6	571	856	1020	1530	923	1380	824	1240	719	1080	612	917
	7	565	847	1000	1500	909	1360	812	1220	709	1060	603	904
	8	558	837	985	1480	894	1340	798	1200	697	1050	592	889
	9	551	826	966	1450	877	1320	783	1170	684	1030	581	872
	10	542	813	945	1420	858	1290	766	1150	670	1000	569	853
	11	533	800	922	1380	838	1260	749	1120	654	981	555	833
	12	523	785	898	1350	816	1220	729	1090	638	957	541	811
	13	513	770	872	1310	793	1190	709	1060	620	930	526	789
	14	502	753	846	1270	769	1150	688	1030	602	903	510	765
	15	491	736	821	1230	744	1120	666	999	583	874	493	740
	16	479	718	794	1190	719	1080	643	965	563	845	476	714
	17	466	699	767	1150	692	1040	620	930	543	814	459	688
	18	453	680	740	1110	665	998	596	894	522	783	441	661
	19	440	660	712	1070	638	957	572	858	501	752	423	634
	20	426	640	683	1030	610	915	547	821	480	720	404	606
	21	413	619	655	984	582	873	523	784	458	688	386	579
	22	399	598	626	940	555	834	498	747	437	655	367	551
	23	385	577	597	897	530	797	473	710	416	623	349	524
	24	370	556	568	854	505	760	449	674	394	592	331	496
	25	356	534	540	811	481	723	425	638	374	560	313	470
	26	342	513	512	769	457	686	401	602	353	529	295	443
	27	328	492	484	727	433	650	378	567	333	499	278	417
	28	314	470	457	687	409	615	356	534	313	470	261	392
	29	300	450	430	647	386	580	336	505	294	441	245	367
	30	286	429	404	608	364	547	317	477	275	412	229	343
	32	259	388	355	534	320	481	280	421	241	362	201	301
	34	233	349	315	473	284	426	248	373	214	321	178	267
	36	208	312	281	422	253	380	221	333	191	286	159	238
	38	187	280	252	379	227	341	199	299	171	257	142	214
	40	168	253	227	342	205	308	179	269	154	232	129	193
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	192	288	454	682	405	609	354	531	297	446	236	355
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	127	191	271	407	241	362	209	315	175	263	138	207
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		19900		35400		32800		29700		26400		22100	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		8850		11000		10200		9200		8110		6750	
r_{mx}/r_{my}		1.50		1.79		1.79		1.80		1.80		1.81	
r_{my}, in.		4.21		3.17		3.22		3.27		3.32		3.37	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS16

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS16×8×				HSS16×6×							
		5/16		1/4		5/8		1/2		3/8		5/16	
t_{des}, in.		0.291		0.233		0.581		0.465		0.349		0.291	
Steel, lb/ft		48.86		39.43		84.84		69.27		53.00		44.60	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	578	867	501	752	734	1100	637	955	537	806	482	724
	1	577	866	500	751	733	1100	636	954	536	804	481	722
	2	575	863	499	748	729	1090	632	948	533	800	479	718
	3	572	858	496	744	722	1080	626	939	528	792	474	711
	4	567	851	492	738	712	1070	618	927	521	781	468	701
	5	561	842	487	730	699	1050	607	911	512	768	460	689
	6	554	831	480	720	684	1030	594	892	501	752	450	675
	7	546	819	473	709	667	1000	580	870	489	734	439	658
	8	536	805	465	697	648	972	563	845	475	713	426	639
	9	526	789	455	683	627	940	545	818	460	690	412	618
	10	514	771	445	668	604	906	526	789	444	666	397	596
	11	502	753	435	652	579	869	505	757	426	639	381	572
	12	489	733	423	634	554	831	483	725	408	612	365	547
	13	475	712	411	616	527	791	460	691	389	583	347	521
	14	460	690	398	597	500	750	437	656	369	554	330	495
	15	445	667	384	577	473	709	414	620	349	524	312	467
	16	429	643	371	556	447	672	390	584	329	494	293	440
	17	413	619	357	535	422	634	366	549	309	464	275	413
	18	396	594	342	513	397	597	342	513	289	434	257	386
	19	379	569	328	491	372	559	319	478	269	404	239	359
	20	363	544	313	469	348	523	296	443	250	375	222	333
	21	346	519	298	447	324	487	273	410	231	347	205	307
	22	329	493	283	425	301	452	253	381	213	319	188	283
	23	312	468	269	403	278	418	235	353	195	292	172	259
	24	295	443	254	382	256	384	217	326	179	269	158	238
	25	279	418	240	360	235	354	200	300	165	247	146	219
	26	263	394	226	339	218	327	185	278	153	229	135	202
	27	247	371	212	319	202	303	171	258	141	212	125	188
	28	232	348	199	299	188	282	159	240	132	197	116	174
	29	216	325	186	279	175	263	149	223	123	184	108	163
	30	202	303	174	260	164	246	139	209	115	172	101	152
	32	178	267	153	229	144	216	122	183	101	151	89.1	134
	34	157	236	135	203	127	191	108	162	89.2	134	78.9	118
	36	140	211	121	181	114	171	96.4	145	79.6	119	70.4	106
	38	126	189	108	162	102	153	86.5	130	71.4	107	63.2	94.7
	40	114	171	97.7	147	92.0	138	78.1	117	64.4	96.7	57.0	85.5
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	203	306	169	254	301	452	253	381	202	304	175	263
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	118	177	94.8	142	142	214	120	180	94.5	142	81.0	122
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		19600		16900		23900		21200		18200		16100	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		5980		5130		4520		4000		3390		3000	
r_{mx}/r_{my}		1.81		1.82		2.30		2.30		2.32		2.32	
r_{my}, in.		3.40		3.42		2.46		2.51		2.56		2.58	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS16

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS16×6×		HSS16×4×									
		¼		⅝		½		⅜		5/16		¼	
t_{des}, in.		0.233		0.581		0.465		0.349		0.291		0.233	
Steel, lb/ft		36.03		76.33		62.46		47.90		40.35		32.63	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	417	626	629	945	528	792	437	656	389	584	332	498
	1	416	625	626	941	526	788	435	653	388	582	331	496
	2	414	621	618	930	519	778	430	645	383	574	327	490
	3	410	615	606	911	508	762	421	631	375	563	320	481
	4	404	606	589	885	493	739	409	613	364	546	311	467
	5	397	596	567	853	474	711	394	590	351	526	300	450
	6	389	583	542	815	452	678	376	564	335	503	287	431
	7	379	569	514	773	427	641	356	534	318	476	272	408
	8	368	552	483	726	402	604	334	501	298	447	256	384
	9	356	534	451	677	376	566	311	467	278	417	239	358
	10	343	515	417	626	350	526	287	431	257	385	221	332
	11	329	494	382	575	323	485	263	394	235	353	203	305
	12	315	472	348	523	295	443	239	358	214	321	185	277
	13	300	450	314	472	268	403	215	323	193	289	167	251
	14	284	426	281	422	241	363	195	293	172	258	150	224
	15	269	403	249	375	216	324	176	264	153	229	133	199
	16	253	379	219	329	191	287	157	236	135	203	117	176
	17	237	355	194	292	169	254	139	210	120	180	104	156
	18	221	332	173	260	151	227	124	187	107	161	92.5	139
	19	206	309	155	234	135	204	112	168	96.1	144	83.0	125
	20	191	286	140	211	122	184	101	151	86.7	130	74.9	112
	21	176	264	127	191	111	167	91.4	137	78.6	118	67.9	102
	22	162	243	116	174	101	152	83.2	125	71.6	108	61.9	92.9
	23	148	222	106	159	92.4	139	76.2	114	65.6	98.5	56.6	85.0
	24	136	204	97.4	146	84.9	128	69.9	105	60.2	90.5	52.0	78.0
	25	125	188	89.8	135	78.2	118	64.5	96.9	55.5	83.4	47.9	71.9
	26	116	174	83.0	125	72.3	109	59.6	89.6	51.3	77.1	44.3	66.5
	27	107	161			67.0	101	55.3	83.1	47.6	71.5	41.1	61.7
	28	99.8	150					51.4	77.2	44.2	66.5	38.2	57.3
	29	93.0	140									35.6	53.4
	30	86.9	130										
	32	76.4	115										
	34	67.7	102										
	36	60.4	90.6										
	38	54.2	81.3										
	40	48.9	73.4										
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	146	219	247	371	209	314	167	251	145	217	121	182
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	65.7	98.7	83.1	125	70.6	106	56.4	84.8	48.4	72.7	39.8	59.7
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		14000		18100		16000		13700		12400		10900	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		2570		1650		1470		1250		1130		984	
r_{mx}/r_{my}		2.33		3.31		3.30		3.31		3.31		3.33	
r_{my}, in.		2.61		1.60		1.65		1.71		1.73		1.76	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS14

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14×12×										HSS14×10×	
		5/8		1/2		3/8		5/16		1/4		7/8	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.814	
Steel, lb/ft		101.85		82.88		63.21		53.11		42.84		125.79	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	995	1490	877	1320	752	1130	690	1040	625	938	1090	1630
	1	995	1490	877	1310	751	1130	690	1040	625	937	1090	1630
	2	993	1490	875	1310	750	1130	689	1030	624	936	1080	1620
	3	990	1490	873	1310	748	1120	687	1030	622	933	1080	1620
	4	987	1480	870	1300	745	1120	684	1030	619	929	1070	1610
	5	982	1470	865	1300	741	1110	680	1020	616	924	1070	1600
	6	976	1460	860	1290	737	1110	676	1010	612	918	1060	1590
	7	969	1450	854	1280	732	1100	671	1010	607	910	1050	1570
	8	962	1440	847	1270	725	1090	665	998	601	902	1030	1550
	9	953	1430	840	1260	719	1080	659	988	595	893	1020	1530
	10	944	1420	831	1250	711	1070	652	977	588	883	1010	1510
	11	933	1400	822	1230	703	1050	644	966	581	872	990	1480
	12	922	1380	812	1220	694	1040	635	953	573	859	972	1460
	13	910	1360	801	1200	684	1030	626	939	564	846	954	1430
	14	897	1340	790	1180	674	1010	616	925	555	833	934	1400
	15	883	1320	777	1170	663	995	606	909	545	818	914	1370
	16	868	1300	765	1150	652	978	595	893	535	803	892	1340
	17	853	1280	751	1130	640	960	584	876	525	787	870	1300
	18	838	1260	737	1110	628	941	572	859	514	770	847	1270
	19	821	1230	723	1080	615	922	560	840	502	753	823	1230
	20	805	1210	708	1060	602	902	548	822	490	736	798	1200
	21	787	1180	692	1040	588	882	535	802	478	718	774	1160
	22	769	1150	677	1010	574	861	522	783	466	699	748	1120
	23	751	1130	660	991	560	840	508	763	454	680	723	1080
	24	733	1100	644	966	545	818	495	742	441	661	697	1050
	25	714	1070	627	941	531	796	481	721	428	642	672	1010
	26	695	1040	610	916	516	774	467	700	415	622	648	973
	27	675	1010	593	890	501	751	453	679	402	603	624	938
	28	656	984	576	864	486	729	439	658	388	583	600	902
	29	636	955	559	838	471	706	424	637	375	563	577	867
	30	617	925	541	812	455	683	410	615	362	543	554	832
	32	577	866	506	760	425	638	382	573	336	504	508	763
	34	538	808	472	708	395	592	354	531	310	465	463	696
	36	500	750	438	657	365	548	326	489	285	427	420	631
	38	462	693	404	606	336	505	300	449	260	390	378	568
	40	425	638	372	558	308	463	274	411	236	354	341	512
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	371	557	310	466	246	369	211	317	174	262	422	634
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	331	498	276	415	218	328	187	280	152	229	329	495
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		29300		25600		21100		18700		16200		29900	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		22600		19700		16300		14400		12400		17000	
r_{mx}/r_{my}		1.14		1.14		1.14		1.14		1.14		1.33	
r_{my}, in.		4.72		4.78		4.83		4.86		4.88		3.88	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS14

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14×10×											
		¾		⅝		½		⅜		5/16		¼	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.233	
Steel, lb/ft		109.91		93.34		76.07		58.10		48.86		39.43	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	987	1480	883	1320	774	1160	663	994	603	905	543	815
	1	986	1480	882	1320	773	1160	662	993	603	904	543	814
	2	984	1480	880	1320	772	1160	661	991	601	902	541	812
	3	980	1470	877	1320	769	1150	658	987	599	899	539	808
	4	975	1460	872	1310	765	1150	655	982	596	894	536	804
	5	969	1450	867	1300	760	1140	650	975	592	887	532	798
	6	960	1440	859	1290	754	1130	645	967	586	880	527	791
	7	951	1430	851	1280	746	1120	638	957	580	870	521	782
	8	940	1410	842	1260	738	1110	631	946	573	860	515	772
	9	928	1390	831	1250	729	1090	623	934	566	849	508	762
	10	915	1370	819	1230	719	1080	614	920	557	836	500	750
	11	901	1350	806	1210	708	1060	604	906	548	822	491	737
	12	885	1330	793	1190	696	1040	593	890	538	807	482	723
	13	868	1300	778	1170	683	1020	582	873	528	791	472	708
	14	851	1280	762	1140	669	1000	570	855	516	774	461	692
	15	832	1250	746	1120	655	982	557	836	505	757	451	676
	16	813	1220	729	1090	640	960	544	816	492	738	439	659
	17	793	1190	711	1070	625	937	530	796	479	719	427	641
	18	772	1160	693	1040	609	913	516	774	466	700	415	622
	19	751	1130	674	1010	592	888	502	753	453	679	402	604
	20	729	1090	654	981	575	863	487	730	439	658	390	584
	21	707	1060	634	951	558	837	472	708	425	637	377	565
	22	684	1030	614	921	540	811	456	685	411	616	363	545
	23	661	991	594	891	523	784	441	661	396	594	350	525
	24	638	957	573	860	505	757	425	638	382	572	337	505
	25	615	922	553	829	487	730	409	614	367	551	323	485
	26	591	887	532	798	469	703	394	590	352	529	310	465
	27	568	852	511	767	450	676	378	567	338	507	297	445
	28	545	817	490	736	432	649	362	543	323	485	283	425
	29	522	783	470	705	415	622	347	520	309	464	270	405
	30	499	748	450	674	397	595	331	497	295	442	257	386
	32	454	681	410	614	362	543	301	451	267	401	232	348
	34	413	620	371	557	328	492	272	408	241	361	208	312
	36	375	564	333	500	295	443	244	365	215	322	185	278
	38	338	508	299	449	265	397	219	328	193	289	166	250
	40	305	459	270	405	239	359	197	296	174	261	150	225
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	378	568	328	494	275	414	218	328	188	282	155	234
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	295	443	255	384	214	321	168	253	144	217	118	177
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		27600		25000		22200		18400		16200		14000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		15700		14200		12600		10400		9150		7890	
r_{mx}/r_{my}		1.33		1.33		1.33		1.33		1.33		1.33	
r_{my}, in.		3.93		3.98		4.04		4.09		4.12		4.14	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS14

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14×8×										HSS14×6×	
		5/8		1/2		3/8		5/16		1/4		5/8	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.581	
Steel, lb/ft		84.84		69.27		53.00		44.60		36.03		76.33	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	768	1150	671	1010	571	857	516	775	463	695	656	985
	1	768	1150	670	1010	571	856	516	774	463	694	655	983
	2	765	1150	668	1000	569	853	514	771	461	691	651	977
	3	761	1140	664	996	565	848	511	766	458	687	645	967
	4	755	1130	659	988	561	841	507	760	454	681	636	954
	5	747	1120	652	978	555	833	501	752	449	674	624	937
	6	737	1110	644	966	548	822	495	743	443	665	611	916
	7	727	1090	635	952	540	810	488	731	436	654	595	893
	8	714	1070	624	936	531	796	479	719	428	642	578	867
	9	700	1050	612	919	521	781	470	704	419	629	558	838
	10	685	1030	599	899	509	764	459	689	410	615	538	806
	11	669	1000	585	878	497	746	448	672	399	599	516	773
	12	652	978	570	855	484	726	436	654	388	583	492	739
	13	633	950	554	832	471	706	424	635	377	565	468	703
	14	614	921	538	807	456	684	410	616	364	547	444	666
	15	594	891	520	781	441	662	397	595	352	528	421	633
	16	573	860	503	754	426	639	383	574	339	508	398	599
	17	552	828	484	726	410	615	368	552	325	488	376	564
	18	531	796	465	698	394	591	353	530	312	467	353	530
	19	509	763	446	670	378	566	338	508	298	447	330	496
	20	486	730	427	641	361	542	323	485	284	426	308	463
	21	464	696	408	612	345	517	308	462	270	405	286	430
	22	442	663	389	583	328	492	293	439	256	384	265	399
	23	420	630	369	554	311	467	278	417	242	364	245	368
	24	398	597	350	525	295	443	263	395	229	343	225	338
	25	376	564	331	497	279	418	248	373	216	323	207	311
	26	355	532	313	469	263	395	234	351	203	304	191	288
	27	334	501	295	442	248	371	220	330	190	285	178	267
	28	315	473	277	415	232	349	206	309	177	266	165	248
	29	297	446	259	389	217	326	192	289	165	248	154	231
	30	280	420	242	364	203	305	180	270	154	232	144	216
	32	246	370	213	320	179	268	158	237	136	203	126	190
	34	218	328	189	283	158	237	140	210	120	180	112	168
	36	195	292	168	253	141	212	125	187	107	161	99.9	150
	38	175	262	151	227	127	190	112	168	96.2	144	89.6	135
	40	158	237	136	205	114	171	101	152	86.8	130	80.9	122
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	283	426	239	359	190	286	164	247	136	205	239	359
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	187	281	157	236	124	186	106	160	86.9	131	126	190
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		20800		18500		15600		13800		11900		16600	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		8100		7170		6010		5310		4560		3960	
r_{mx}/r_{my}		1.60		1.61		1.61		1.61		1.62		2.05	
r_{my}, in.		3.22		3.27		3.32		3.35		3.38		2.43	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS14

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14×6×								HSS14×4×			
		½		⅜		5/16		¼		⅝		½	
t_{des}, in.		0.465		0.349		0.291		0.233		0.581		0.465	
Steel, lb/ft		62.46		47.90		40.35		32.63		67.82		55.66	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	570	856	480	719	432	648	382	574	560	842	467	701
	1	569	854	479	718	431	646	382	572	558	838	465	698
	2	566	849	476	714	428	643	379	569	551	828	459	689
	3	560	841	471	707	424	636	376	563	539	811	449	674
	4	553	829	465	697	418	628	370	555	524	787	436	654
	5	543	815	457	685	411	617	364	545	505	758	419	628
	6	531	797	447	671	402	603	355	533	482	724	399	599
	7	518	777	436	654	392	588	346	519	457	686	378	568
	8	503	754	424	635	381	571	336	504	429	645	357	536
	9	486	730	410	615	368	552	324	487	400	601	334	501
	10	469	703	395	593	355	532	312	468	369	555	310	465
	11	450	674	379	569	340	511	299	449	338	508	285	429
	12	430	644	363	544	325	488	286	428	307	462	261	392
	13	409	614	346	518	310	465	271	407	277	416	236	355
	14	388	582	328	492	294	441	257	385	248	372	213	320
	15	366	550	310	465	277	416	242	363	219	330	190	285
	16	345	517	292	438	261	392	228	341	193	290	168	252
	17	323	484	274	411	245	367	213	319	171	257	149	223
	18	301	452	256	384	228	343	198	297	152	229	133	199
	19	280	420	238	357	212	318	184	276	137	205	119	179
	20	260	390	221	331	197	295	170	255	123	185	107	161
	21	242	364	204	306	181	272	156	234	112	168	97.4	146
	22	225	338	187	281	167	250	143	214	102	153	88.7	133
	23	208	313	171	257	152	229	131	196	93.3	140	81.2	122
	24	192	288	157	236	140	210	120	180	85.7	129	74.6	112
	25	177	266	145	218	129	193	111	166	79.0	119	68.7	103
	26	163	246	134	201	119	179	102	154	73.0	110	63.5	95.5
	27	151	228	124	187	111	166	94.9	142			58.9	88.6
	28	141	212	116	174	103	154	88.3	132				
	29	131	197	108	162	95.8	144	82.3	123				
	30	123	184	101	151	89.6	134	76.9	115				
	32	108	162	88.6	133	78.7	118	67.6	101				
	34	95.5	144	78.5	118	69.7	105	59.9	89.8				
	36	85.2	128	70.0	105	62.2	93.3	53.4	80.1				
	38	76.5	115	62.8	94.2	55.8	83.7	47.9	71.9				
	40	69.0	104	56.7	85.0	50.4	75.6	43.3	64.9				
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	202	304	162	243	140	210	117	175	193	291	164	247
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	106	160	84.3	127	72.4	109	59.5	89.4	72.9	110	62.2	93.4
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		14800		12700		11300		9740		12400		11000	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3490		2980		2650		2270		1430		1290	
r_{mx}/r_{my}		2.06		2.06		2.06		2.07		2.94		2.92	
r_{my}, in.		2.48		2.53		2.55		2.58		1.59		1.64	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS14–HSS12

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14×4×						HSS12×10×					
		3/8		5/16		1/4		5/8		1/2		3/8	
t_{des}, in.		0.349		0.291		0.233		0.581		0.465		0.349	
Steel, lb/ft		42.79		36.10		29.23		84.84		69.27		53.00	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	388	582	345	518	302	453	785	1180	688	1030	588	882
	1	386	580	344	516	301	451	785	1180	687	1030	588	882
	2	382	572	340	509	297	445	783	1170	686	1030	586	880
	3	374	560	332	499	291	436	780	1170	683	1020	584	876
	4	363	544	323	484	282	423	776	1160	680	1020	581	871
	5	349	523	311	466	272	408	771	1160	675	1010	577	865
	6	333	499	297	445	260	389	764	1150	669	1000	572	858
	7	315	473	281	422	246	369	756	1130	663	994	566	849
	8	296	443	264	396	231	346	748	1120	655	983	559	839
	9	275	412	246	368	215	322	738	1110	647	970	552	828
	10	254	380	227	340	198	298	727	1090	638	956	544	816
	11	232	348	208	311	182	273	716	1070	627	941	535	803
	12	210	315	188	283	165	247	703	1050	617	925	526	788
	13	189	285	170	254	149	223	690	1030	605	907	515	773
	14	172	258	151	227	133	199	676	1010	593	889	505	757
	15	154	232	134	201	117	176	661	991	580	870	493	740
	16	137	207	119	179	103	155	645	968	566	849	482	722
	17	122	183	106	159	91.4	137	629	944	552	828	469	704
	18	109	163	94.5	142	81.5	122	612	919	538	807	457	685
	19	97.4	146	84.9	128	73.1	110	595	893	523	784	444	665
	20	87.9	132	76.6	115	66.0	99.0	578	867	507	761	430	645
	21	79.8	120	69.5	104	59.9	89.8	560	840	492	738	417	625
	22	72.7	109	63.3	95.1	54.6	81.8	542	813	476	714	403	604
	23	66.5	99.9	57.9	87.0	49.9	74.9	523	785	460	690	389	584
	24	61.1	91.8	53.2	79.9	45.8	68.8	505	757	444	666	375	562
	25	56.3	84.6	49.0	73.7	42.2	63.4	486	729	428	641	361	541
	26	52.0	78.2	45.3	68.1	39.1	58.6	467	701	411	617	347	520
	27	48.3	72.5	42.0	63.2	36.2	54.3	449	673	395	593	333	499
	28	44.9	67.4	39.1	58.7	33.7	50.5	430	645	379	568	319	478
	29					31.4	47.1	412	618	363	544	305	457
	30							394	590	347	520	291	437
	32							358	537	316	474	264	396
	34							323	485	286	428	238	357
	36							290	435	256	384	213	320
	38							260	390	230	345	191	287
	40							235	352	207	311	173	259
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	132	199	114	172	95.8	144	258	388	217	327	173	259
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	49.8	74.8	43.0	64.6	35.6	53.5	226	339	190	285	150	226
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		9440		8560		7570		16700		14800		12400	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		1100		990		867		12300		10900		9070	
r_{mx}/r_{my}		2.93		2.94		2.95		1.17		1.17		1.17	
r_{my}, in.		1.69		1.72		1.74		3.90		3.96		4.01	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS12

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12×10×						HSS12×8×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		44.60		36.03		27.29		76.33		62.46		47.90	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	533	800	481	722	408	611	682	1020	596	894	505	758
	1	533	799	481	721	407	611	681	1020	595	893	505	757
	2	532	797	479	719	406	609	679	1020	593	890	503	754
	3	530	794	477	716	405	607	675	1010	590	885	500	750
	4	527	790	475	712	402	603	669	1000	585	878	496	744
	5	523	784	471	707	399	598	662	993	579	868	491	736
	6	518	777	467	700	395	593	654	980	572	857	484	727
	7	513	769	462	693	391	586	644	966	563	845	477	716
	8	507	760	456	684	386	579	633	949	553	830	469	703
	9	500	750	450	674	380	570	620	930	543	814	460	689
	10	492	739	442	664	374	561	606	910	531	796	450	674
	11	484	726	435	652	367	551	592	887	518	777	439	658
	12	475	713	426	640	360	540	576	864	505	757	427	641
	13	466	699	418	626	353	529	559	839	490	735	415	622
	14	456	684	408	612	344	517	542	813	475	713	402	603
	15	445	668	399	598	336	504	524	785	459	689	389	583
	16	435	652	388	582	327	491	505	757	443	665	375	562
	17	423	635	378	567	318	477	486	729	427	640	361	541
	18	412	617	367	550	309	463	466	699	410	615	346	519
	19	400	599	356	533	299	448	446	669	393	589	332	497
	20	387	581	344	516	289	434	426	640	375	563	317	475
	21	375	562	333	499	279	419	406	609	358	537	302	453
	22	362	543	321	481	269	403	386	579	341	511	287	431
	23	349	524	309	463	259	388	366	550	323	485	273	409
	24	336	505	297	446	248	373	347	520	306	459	258	387
	25	323	485	285	428	238	357	327	491	289	434	244	366
	26	311	466	273	410	228	342	308	463	273	409	230	345
	27	298	446	261	392	218	327	292	438	257	385	216	324
	28	285	427	250	374	208	312	275	413	241	361	203	304
	29	272	408	238	357	198	297	259	389	225	338	189	284
	30	260	389	227	340	188	282	243	366	210	316	177	265
	32	235	353	204	306	169	254	214	321	185	277	155	233
	34	211	317	183	274	151	226	189	285	164	246	138	206
	36	189	283	163	244	134	201	169	254	146	219	123	184
	38	169	254	146	219	121	181	152	228	131	197	110	165
	40	153	229	132	198	109	163	137	206	118	177	99.4	149
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	148	223	123	185	95.5	144	222	333	187	281	149	224
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	129	193	106	160	79.1	119	164	246	138	208	109	165
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		11000		9460		7830		13900		12300		10400	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		8030		6930		5720		7000		6220		5220	
r_{mx}/r_{my}		1.17		1.17		1.17		1.41		1.41		1.41	
r_{my}, in.		4.04		4.07		4.09		3.16		3.21		3.27	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS12

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12×8×						HSS12×6×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		40.35		32.63		24.73		67.82		55.66		42.79	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	457	686	409	613	344	516	578	867	501	752	422	633
	1	457	685	408	612	344	516	577	866	500	751	421	632
	2	455	683	407	610	343	514	574	860	497	746	419	628
	3	452	679	404	606	340	511	568	852	492	739	415	622
	4	449	673	401	601	337	506	560	840	486	728	409	613
	5	444	666	396	594	334	500	550	824	477	715	402	603
	6	438	657	391	586	329	493	537	806	467	700	393	590
	7	431	647	385	577	324	485	523	785	455	682	383	575
	8	424	636	377	566	317	476	507	761	441	662	372	558
	9	415	623	370	554	311	466	490	735	426	640	360	539
	10	406	609	361	542	303	455	471	707	410	616	346	520
	11	396	594	352	528	295	443	452	677	394	590	332	498
	12	385	578	342	513	287	430	431	646	376	564	317	476
	13	374	561	332	497	278	417	410	616	357	536	302	453
	14	362	543	321	481	269	403	390	586	339	508	286	430
	15	350	525	309	464	259	388	370	556	320	479	270	406
	16	337	506	298	447	249	373	349	525	300	451	254	382
	17	324	486	286	429	239	358	329	494	281	422	238	357
	18	311	466	274	411	228	343	308	463	262	393	222	334
	19	297	446	261	392	218	327	288	433	243	365	207	310
	20	284	426	249	374	207	311	268	403	226	339	191	287
	21	270	406	237	355	197	295	248	373	210	316	176	265
	22	257	385	225	337	186	280	229	345	195	293	162	243
	23	243	365	212	319	176	264	211	317	180	270	148	222
	24	230	345	200	301	166	249	194	291	165	248	136	204
	25	217	326	189	283	156	234	178	268	152	229	125	188
	26	204	307	177	266	146	219	165	248	141	211	116	174
	27	192	288	166	249	137	205	153	230	130	196	107	161
	28	180	270	155	232	127	191	142	214	121	182	99.9	150
	29	168	251	144	216	119	178	133	199	113	170	93.1	140
	30	157	235	135	202	111	166	124	186	106	159	87.0	131
	32	138	206	118	178	97.4	146	109	164	92.9	140	76.5	115
	34	122	183	105	157	86.3	129	96.4	145	82.2	124	67.7	102
	36	109	163	93.6	140	76.9	115	86.0	129	73.4	110	60.4	90.6
	38	97.6	146	84.0	126	69.0	104	77.2	116	65.8	99.0	54.2	81.3
	40	88.0	132	75.8	114	62.3	93.5			59.4	89.3	48.9	73.4
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	129	193	107	161	83.6	126	184	277	156	235	125	188
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	94.1	142	77.8	117	58.2	87.5	110	165	92.8	139	74.1	111
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		9230		7970		6580		10900		9730		8350	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		4630		3980		3270		3410		3020		2570	
r_{mx}/r_{my}		1.41		1.42		1.42		1.79		1.79		1.80	
r_{my}, in.		3.29		3.32		3.35		2.39		2.44		2.49	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS12

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12×6×						HSS12×4×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		36.10		29.23		22.18		59.32		48.85		37.69	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	379	569	336	504	281	421	491	738	409	614	339	509
	1	379	568	336	503	280	421	489	735	407	611	338	506
	2	376	564	334	500	279	418	483	725	402	603	333	500
	3	373	559	330	495	276	414	472	710	393	590	326	489
	4	367	551	325	488	272	408	459	689	381	572	316	475
	5	361	541	319	479	267	400	441	663	366	550	304	456
	6	353	530	312	469	261	391	421	633	350	526	290	435
	7	344	516	304	456	254	380	398	599	332	499	274	411
	8	334	501	295	442	246	369	374	561	313	470	257	386
	9	323	484	285	427	237	356	347	522	292	439	239	358
	10	311	466	274	411	228	342	320	481	271	407	220	330
	11	298	447	262	394	218	327	293	440	249	374	201	301
	12	285	427	250	376	208	312	265	399	227	341	182	273
	13	271	407	238	357	197	296	239	359	205	308	165	247
	14	257	385	225	338	186	280	213	319	184	277	149	223
	15	243	364	212	318	175	263	188	282	164	246	133	200
	16	228	342	199	299	164	247	165	248	144	217	118	178
	17	214	320	186	279	153	230	146	219	128	192	105	157
	18	199	299	173	260	143	214	130	196	114	172	93.4	140
	19	185	278	160	241	132	198	117	176	102	154	83.9	126
	20	171	257	148	222	122	182	105	159	92.5	139	75.7	114
	21	158	237	136	204	112	167	95.7	144	83.9	126	68.7	103
	22	145	217	124	187	102	153	87.2	131	76.4	115	62.6	94.0
	23	132	199	114	171	93.2	140	79.8	120	69.9	105	57.2	86.0
	24	122	182	105	157	85.6	128	73.3	110	64.2	96.5	52.6	79.0
	25	112	168	96.4	145	78.8	118	67.5	101	59.2	88.9	48.4	72.8
	26	104	155	89.1	134	72.9	109	62.4	93.8	54.7	82.2	44.8	67.3
	27	96.1	144	82.6	124	67.6	101			50.7	76.2	41.5	62.4
	28	89.3	134	76.8	115	62.9	94.3						
	29	83.3	125	71.6	107	58.6	87.9						
	30	77.8	117	66.9	100	54.8	82.1						
	32	68.4	103	58.8	88.2	48.1	72.2						
	34	60.6	90.9	52.1	78.2	42.6	63.9						
	36	54.0	81.1	46.5	69.7	38.0	57.0						
	38	48.5	72.8	41.7	62.6	34.1	51.2						
	40	43.8	65.7	37.7	56.5	30.8	46.2						
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	108	163	90.5	136	71.2	107	146	220	125	188	101	152
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	63.7	95.8	52.7	79.2	39.8	59.8	62.8	94.3	54.0	81.1	43.3	65.1
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		7500		6460		5330		8030		7200		6180	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		2300		1980		1620		1230		1100		944	
r_{mx}/r_{my}		1.81		1.81		1.81		2.56		2.56		2.56	
r_{my}, in.		2.52		2.54		2.57		1.57		1.62		1.67	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS12–HSS10

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12×4×						HSS10×8×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		31.84		25.82		19.63		67.82		55.66		42.79	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	302	453	264	396	218	327	595	893	518	778	439	659
	1	300	451	263	394	217	325	595	892	518	777	439	658
	2	297	445	260	389	214	321	592	889	516	774	437	656
	3	290	436	254	381	210	314	589	883	513	769	434	652
	4	282	423	247	370	203	305	584	876	509	763	431	646
	5	271	407	237	356	196	294	577	866	503	755	426	639
	6	259	388	226	340	187	280	570	855	497	745	421	631
	7	245	367	214	321	177	265	561	841	489	733	414	622
	8	230	344	201	301	166	248	551	826	480	720	407	611
	9	214	320	187	280	154	231	539	809	471	706	399	598
	10	197	295	172	259	142	213	527	791	460	690	390	585
	11	180	270	158	236	130	194	514	771	449	673	381	571
	12	163	245	143	214	117	176	500	750	437	655	370	555
	13	147	220	128	193	106	158	485	727	424	636	359	539
	14	131	196	115	172	94.0	141	469	704	410	615	348	522
	15	116	174	101	152	82.9	124	453	679	396	595	336	505
	16	103	155	88.8	133	72.8	109	436	654	382	573	324	486
	17	91.4	137	78.7	118	64.5	96.8	419	628	367	551	312	468
	18	81.6	123	70.2	105	57.5	86.3	401	602	352	528	299	449
	19	73.2	110	63.0	94.5	51.6	77.5	384	576	337	506	286	430
	20	66.1	99.3	56.9	85.3	46.6	69.9	366	549	322	483	273	410
	21	59.9	90.1	51.6	77.4	42.3	63.4	348	522	306	460	261	391
	22	54.6	82.1	47.0	70.5	38.5	57.8	330	496	291	437	248	371
	23	50.0	75.1	43.0	64.5	35.2	52.9	313	470	276	414	235	352
	24	45.9	69.0	39.5	59.2	32.4	48.6	297	446	261	391	222	333
	25	42.3	63.5	36.4	54.6	29.8	44.7	281	422	246	369	210	314
	26	39.1	58.8	33.6	50.5	27.6	41.4	266	399	231	347	197	296
	27	36.2	54.5	31.2	46.8	25.6	38.4	251	377	217	326	185	278
	28	33.7	50.7	29.0	43.5	23.8	35.7	236	354	204	305	174	260
	29					22.2	33.3	221	333	190	285	162	243
	30							207	311	177	266	151	227
	32							182	274	156	234	133	199
	34							161	242	138	207	118	177
	36							144	216	123	185	105	158
	38							129	194	111	166	94.3	141
	40							116	175	99.7	150	85.1	128
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	87.5	132	73.3	110	58.0	87.1	166	250	141	212	113	169
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	37.4	56.1	31.0	46.7	23.8	35.8	141	212	119	180	95.2	143
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		5580		4960		4080		8590		7640		6520	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		852		747		612		5900		5240		4470	
r_{mx}/r_{my}		2.56		2.58		2.58		1.21		1.21		1.21	
r_{my}, in.		1.70		1.72		1.75		3.09		3.14		3.19	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS10

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS10×8×						HSS10×6×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		36.10		29.23		22.18		59.32		48.85		37.69	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	396	594	353	530	308	463	500	750	435	652	365	547
	1	396	594	353	529	308	462	499	749	434	651	364	546
	2	394	592	352	527	307	460	496	744	431	647	362	542
	3	392	588	349	524	305	457	491	736	427	640	358	537
	4	389	583	346	519	302	453	484	725	421	631	353	529
	5	385	577	342	514	298	447	474	712	413	619	347	520
	6	379	569	338	507	294	441	463	695	404	605	339	508
	7	374	560	332	498	289	433	451	676	393	589	330	495
	8	367	550	326	489	283	425	437	655	381	571	320	480
	9	359	539	319	479	277	415	421	632	368	552	309	464
	10	351	527	312	468	270	405	405	609	354	530	298	446
	11	343	514	304	456	263	394	389	585	339	508	285	428
	12	333	500	295	443	255	382	372	560	323	484	272	408
	13	323	485	286	429	246	370	355	533	307	460	259	388
	14	313	469	276	415	238	357	337	506	290	435	245	368
	15	302	453	267	400	229	343	319	479	273	410	231	347
	16	291	437	257	385	220	329	300	451	256	384	217	325
	17	280	420	246	369	210	315	282	423	239	359	203	304
	18	268	402	236	353	201	301	263	396	223	334	189	283
	19	256	385	225	337	191	287	245	369	208	312	175	263
	20	245	367	214	321	181	272	228	342	193	291	162	243
	21	233	349	204	305	172	258	210	316	179	269	149	224
	22	221	332	193	289	162	243	194	291	166	249	136	205
	23	209	314	182	273	153	229	177	266	152	229	125	187
	24	198	297	172	258	144	215	163	245	140	210	115	172
	25	187	280	162	243	135	202	150	225	129	194	106	158
	26	175	263	152	228	126	189	139	208	119	179	97.6	146
	27	165	247	142	213	117	176	129	193	110	166	90.5	136
	28	154	231	132	198	109	163	120	180	103	154	84.2	126
	29	143	215	123	185	101	152	111	168	95.7	144	78.5	118
	30	134	201	115	173	94.8	142	104	157	89.4	134	73.3	110
	32	118	177	101	152	83.3	125	91.5	138	78.6	118	64.4	96.7
	34	104	157	89.7	135	73.8	111	81.1	122	69.6	105	57.1	85.6
	36	93.1	140	80.0	120	65.8	98.8	72.3	109	62.1	93.3	50.9	76.4
	38	83.6	125	71.8	108	59.1	88.6	64.9	97.6	55.7	83.8	45.7	68.6
	40	75.4	113	64.8	97.2	53.3	80.0					41.2	61.9
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	97.1	146	80.9	122	63.2	94.9	136	205	116	175	93.5	141
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	82.0	123	68.0	102	52.8	79.3	93.4	140	79.4	119	63.5	95.5
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		5780		4980		4110		6700		5980		5150	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3960		3410		2800		2840		2540		2170	
r_{mx}/r_{my}		1.21		1.21		1.21		1.54		1.53		1.54	
r_{my}, in.		3.22		3.25		3.28		2.34		2.39		2.44	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS10

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS10×6×						HSS10×5×					
		5/16		1/4		3/16		3/8		5/16		1/4	
t_{des}, in.		0.291		0.233		0.174		0.349		0.291		0.233	
Steel, lb/ft		31.84		25.82		19.63		35.13		29.72		24.12	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	327	491	290	434	250	375	327	490	293	439	258	386
	1	327	490	289	433	250	374	326	488	292	438	257	385
	2	325	487	287	431	248	372	323	484	289	434	255	382
	3	321	482	284	426	245	368	318	477	285	428	251	376
	4	317	475	280	420	242	362	312	468	280	419	246	369
	5	311	467	275	412	237	355	304	456	272	409	240	359
	6	304	456	269	403	231	347	295	442	264	396	232	348
	7	296	445	261	392	225	337	284	426	254	382	224	336
	8	288	431	253	380	217	326	272	408	244	366	214	321
	9	278	417	245	367	209	314	259	388	232	349	204	306
	10	267	401	235	353	201	301	245	368	220	330	193	290
	11	256	384	225	338	192	288	231	346	207	311	182	273
	12	245	367	215	322	182	274	216	324	194	291	170	255
	13	233	349	204	306	173	259	201	302	181	271	158	238
	14	220	330	193	289	163	244	186	279	168	251	147	220
	15	208	311	181	272	153	229	171	257	154	232	135	202
	16	195	292	170	255	143	214	157	235	141	212	123	185
	17	182	274	159	238	133	199	143	214	129	193	112	168
	18	170	255	148	221	123	185	129	194	117	175	101	152
	19	158	237	137	205	113	170	117	176	105	157	91.1	137
	20	146	219	126	189	104	156	106	159	94.5	142	82.2	123
	21	134	201	116	174	95.1	143	96.2	145	85.7	129	74.6	112
	22	123	184	106	158	86.7	130	87.6	132	78.1	117	68.0	102
	23	112	168	96.6	145	79.3	119	80.2	121	71.4	107	62.2	93.3
	24	103	155	88.7	133	72.8	109	73.6	111	65.6	98.4	57.1	85.7
	25	95.0	143	81.8	123	67.1	101	67.9	102	60.5	90.7	52.6	78.9
	26	87.9	132	75.6	113	62.0	93.1	62.7	94.3	55.9	83.9	48.7	73.0
	27	81.5	122	70.1	105	57.5	86.3	58.2	87.5	51.8	77.8	45.1	67.7
	28	75.8	114	65.2	97.8	53.5	80.2	54.1	81.3	48.2	72.3	42.0	62.9
	29	70.6	106	60.8	91.1	49.9	74.8	50.4	75.8	44.9	67.4	39.1	58.7
	30	66.0	99.0	56.8	85.2	46.6	69.9	47.1	70.8	42.0	63.0	36.5	54.8
	32	58.0	87.0	49.9	74.8	41.0	61.4	41.4	62.3	36.9	55.4	32.1	48.2
	34	51.4	77.1	44.2	66.3	36.3	54.4	36.7	55.2	32.7	49.0	28.5	42.7
	36	45.8	68.7	39.4	59.1	32.4	48.5						
	38	41.1	61.7	35.4	53.1	29.0	43.6						
	40	37.1	55.7	31.9	47.9	26.2	39.3						
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	81.0	122	67.7	102	53.2	79.9	83.6	126	72.7	109	60.9	91.5
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	54.7	82.3	45.6	68.5	35.4	53.2	49.6	74.5	42.8	64.3	35.7	53.7
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		4670		4010		3310		4430		4040		3520	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		1950		1680		1380		1370		1240		1080	
r_{mx}/r_{my}		1.55		1.54		1.55		1.80		1.81		1.81	
r_{my}, in.		2.47		2.49		2.52		2.05		2.07		2.10	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS10

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS10×4×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		50.81		42.05		32.58		27.59		22.42		17.08	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	419	630	349	523	289	434	258	387	226	339	192	287
	1	417	627	347	521	288	432	257	385	225	337	191	286
	2	412	619	342	514	284	426	254	380	222	333	188	282
	3	403	605	335	503	278	417	248	372	217	326	184	276
	4	390	587	325	488	270	404	241	361	211	316	178	268
	5	375	564	313	470	259	389	231	347	203	304	171	257
	6	357	537	299	449	247	370	221	331	193	290	163	245
	7	337	507	283	426	233	350	208	313	183	274	154	231
	8	315	474	266	400	218	327	195	293	171	257	144	216
	9	293	440	248	373	202	304	181	272	159	238	134	200
	10	269	404	229	344	186	279	167	250	146	220	123	184
	11	245	368	210	315	170	255	152	229	134	200	112	168
	12	221	332	191	287	153	230	138	207	121	181	101	151
	13	198	298	172	258	139	208	124	186	109	163	90.2	135
	14	176	264	154	231	125	187	110	165	96.5	145	80.0	120
	15	154	232	136	205	111	167	97.2	146	85.0	127	70.2	105
	16	135	203	120	180	98.4	148	86.3	130	74.7	112	61.7	92.5
	17	120	180	106	159	87.1	131	76.5	115	66.2	99.2	54.6	81.9
	18	107	161	94.5	142	77.7	117	68.2	102	59.0	88.5	48.7	73.1
	19	96.0	144	84.8	127	69.8	105	61.2	92.0	53.0	79.4	43.7	65.6
	20	86.6	130	76.5	115	63.0	94.6	55.2	83.0	47.8	71.7	39.5	59.2
	21	78.6	118	69.4	104	57.1	85.8	50.1	75.3	43.4	65.0	35.8	53.7
	22	71.6	108	63.2	95.1	52.0	78.2	45.7	68.6	39.5	59.3	32.6	48.9
	23	65.5	98.5	57.9	87.0	47.6	71.5	41.8	62.8	36.1	54.2	29.8	44.8
	24	60.2	90.4	53.1	79.9	43.7	65.7	38.4	57.7	33.2	49.8	27.4	41.1
	25	55.5	83.3	49.0	73.6	40.3	60.6	35.4	53.1	30.6	45.9	25.3	37.9
	26			45.3	68.1	37.3	56.0	32.7	49.1	28.3	42.4	23.4	35.0
	27					34.5	51.9	30.3	45.6	26.2	39.3	21.7	32.5
	28									24.4	36.6	20.1	30.2

Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	106	159	90.9	137	73.6	111	64.0	96.2	53.8	80.9	42.7	64.1
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	52.8	79.3	45.5	68.4	36.6	55.1	31.9	48.0	26.6	40.0	20.7	31.1
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			4820		4340		3740		3400		3020		2500	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			1020		919		791		715		628		518	
r_{mx}/r_{my}			2.17		2.17		2.17		2.18		2.19		2.20	
r_{my}, in.			1.54		1.59		1.64		1.67		1.70		1.72	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS9

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS9×7×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		59.32		48.85		37.69		31.84		25.82		19.63	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	507	760	441	662	371	556	334	500	296	444	256	385
	1	506	759	441	661	370	556	333	500	295	443	256	384
	2	503	755	438	658	369	553	332	497	294	441	255	382
	3	499	749	435	652	366	549	329	494	292	438	253	379
	4	494	741	430	645	362	543	325	488	288	433	250	375
	5	487	730	424	636	357	535	321	481	284	427	246	369
	6	478	717	417	625	351	526	316	473	279	419	241	362
	7	468	702	408	613	344	516	309	464	274	411	236	354
	8	457	686	399	598	336	504	302	453	267	401	230	345
	9	445	667	388	583	327	491	294	442	260	390	224	336
	10	431	647	377	565	318	477	286	429	252	378	217	325
	11	417	625	365	547	308	462	277	415	244	366	209	314
	12	402	603	352	528	297	446	267	401	235	353	201	302
	13	386	579	338	507	286	429	257	385	226	339	193	290
	14	369	554	324	486	274	411	246	370	217	325	184	277
	15	353	531	310	464	262	393	236	353	207	310	176	264
	16	337	507	295	442	250	375	225	337	197	295	167	250
	17	321	483	280	420	237	356	213	320	187	280	158	237
	18	305	459	265	397	225	337	202	303	177	265	149	223
	19	289	435	250	375	212	319	191	286	166	250	140	210
	20	273	411	235	353	200	300	180	270	156	235	131	196
	21	257	387	220	331	188	282	169	253	147	220	122	183
	22	242	363	206	309	176	264	158	237	137	205	114	170
	23	226	340	192	288	164	246	147	221	127	191	105	158
	24	211	317	179	269	152	229	137	205	118	177	97.2	146
	25	196	295	167	251	141	212	127	190	109	164	89.6	134
	26	182	273	155	234	131	196	117	176	101	151	82.8	124
	27	169	253	144	217	121	182	109	163	93.5	140	76.8	115
	28	157	236	134	201	113	169	101	151	86.9	130	71.4	107
	29	146	220	125	188	105	157	94.1	141	81.1	122	66.6	99.9
	30	137	205	117	175	98.0	147	88.0	132	75.7	114	62.2	93.3
	32	120	180	103	154	86.2	129	77.3	116	66.6	99.9	54.7	82.0
	34	106	160	90.8	137	76.3	114	68.5	103	59.0	88.5	48.4	72.6
	36	94.9	143	81.0	122	68.1	102	61.1	91.6	52.6	78.9	43.2	64.8
	38	85.1	128	72.7	109	61.1	91.6	54.8	82.2	47.2	70.8	38.8	58.2
	40	76.8	115	65.6	98.7	55.1	82.7	49.5	74.2	42.6	63.9	35.0	52.5
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	128	193	109	164	87.6	132	75.8	114	63.3	95.1	49.4	74.3
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	106	160	90.5	136	72.4	109	62.6	94.0	52.1	78.3	40.6	61.0
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		5780		5180		4440		3980		3430		2830	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		3790		3380		2900		2600		2240		1840	
r_{mx}/r_{my}		1.23		1.24		1.24		1.24		1.24		1.24	
r_{my}, in.		2.68		2.73		2.78		2.81		2.84		2.87	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS9

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS9×5×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		50.81		42.05		32.58		27.59		22.42		17.08	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	419	630	359	539	300	450	269	403	236	355	202	303
	1	418	628	358	537	299	449	268	402	236	354	202	302
	2	414	623	355	533	296	445	266	398	234	350	200	300
	3	409	614	350	525	292	438	262	393	230	345	197	295
	4	400	602	343	514	286	429	257	385	226	338	193	289
	5	390	587	334	500	279	418	250	375	220	330	187	281
	6	378	568	323	484	270	405	242	363	213	319	181	272
	7	364	548	310	466	260	390	233	350	205	308	174	262
	8	349	525	297	445	249	373	223	335	196	294	167	250
	9	333	500	282	423	237	355	213	319	187	280	158	237
	10	315	473	267	400	224	336	201	302	177	265	149	224
	11	297	446	250	376	211	316	190	284	166	249	140	210
	12	278	418	235	353	197	296	177	266	156	233	131	196
	13	259	389	220	330	183	275	165	248	145	217	121	182
	14	239	360	204	307	170	254	153	229	134	201	112	168
	15	220	331	189	284	156	234	141	211	123	184	102	153
	16	202	303	173	261	142	214	129	193	112	169	93.2	140
	17	184	276	159	238	129	194	117	175	102	153	84.3	126
	18	166	250	144	217	117	176	106	159	92.2	138	75.7	114
	19	149	224	130	196	107	160	94.9	142	82.7	124	67.9	102
	20	135	202	117	177	96.5	145	85.6	128	74.7	112	61.3	91.9
	21	122	184	107	160	87.5	131	77.6	116	67.7	102	55.6	83.4
	22	111	167	97.1	146	79.7	120	70.7	106	61.7	92.6	50.7	76.0
	23	102	153	88.8	134	72.9	110	64.7	97.1	56.5	84.7	46.3	69.5
	24	93.5	141	81.6	123	67.0	101	59.4	89.2	51.9	77.8	42.6	63.8
	25	86.2	130	75.2	113	61.7	92.8	54.8	82.2	47.8	71.7	39.2	58.8
	26	79.7	120	69.5	104	57.1	85.8	50.7	76.0	44.2	66.3	36.3	54.4
	27	73.9	111	64.5	96.9	52.9	79.5	47.0	70.5	41.0	61.5	33.6	50.4
	28	68.7	103	59.9	90.1	49.2	74.0	43.7	65.5	38.1	57.1	31.3	46.9
	29	64.1	96.3	55.9	84.0	45.9	69.0	40.7	61.1	35.5	53.3	29.2	43.7
	30	59.9	90.0	52.2	78.5	42.9	64.4	38.0	57.1	33.2	49.8	27.2	40.9
	32	52.6	79.1	45.9	69.0	37.7	56.6	33.4	50.2	29.2	43.8	23.9	35.9
	34							29.6	44.4	25.8	38.8	21.2	31.8
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	101	152	86.9	131	70.3	106	61.1	91.9	51.3	77.2	40.3	60.6
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	65.5	98.4	56.2	84.5	45.4	68.2	39.1	58.8	32.5	48.9	25.5	38.3
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		4330		3900		3350		3040		2670		2200	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		1610		1450		1240		1120		981		805	
r_{mx}/r_{my}		1.64		1.64		1.64		1.65		1.65		1.65	
r_{my}, in.		1.92		1.97		2.03		2.05		2.08		2.10	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS8

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS8×6×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		50.81		42.05		32.58		27.59		22.42		17.08	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	420	630	366	549	306	459	275	413	243	364	209	313
	1	419	629	365	547	306	458	274	412	242	363	208	312
	2	416	625	363	544	304	456	273	409	241	361	207	310
	3	412	619	359	538	301	451	270	405	238	357	204	307
	4	406	610	353	530	296	444	266	399	235	352	201	302
	5	398	599	347	520	291	436	261	392	230	345	197	296
	6	389	585	339	508	284	426	255	383	225	337	193	289
	7	379	570	329	494	276	415	248	373	219	328	187	281
	8	368	553	319	478	268	402	241	361	212	318	181	272
	9	355	534	307	461	258	388	232	349	205	307	174	262
	10	342	514	295	443	248	373	223	335	196	295	167	251
	11	327	492	282	423	238	356	214	321	188	282	160	239
	12	312	469	268	403	226	340	204	306	179	269	152	227
	13	297	446	254	382	215	322	193	290	170	255	143	215
	14	281	422	240	360	203	305	183	274	160	241	135	203
	15	265	398	226	338	191	287	172	258	151	226	127	190
	16	248	373	211	317	179	269	161	242	141	212	118	178
	17	232	349	197	297	167	251	151	226	132	198	110	165
	18	216	325	184	277	155	233	140	210	122	183	102	153
	19	200	301	171	258	144	216	130	195	113	170	93.8	141
	20	185	278	159	239	132	199	120	179	104	156	86.0	129
	21	170	256	147	220	121	182	110	165	95.5	143	78.4	118
	22	156	234	135	202	111	166	100	150	87.0	131	71.5	107
	23	142	214	123	185	101	152	91.7	138	79.6	119	65.4	98.1
	24	131	196	113	170	93.1	140	84.2	126	73.1	110	60.0	90.1
	25	120	181	104	157	85.8	129	77.6	116	67.4	101	55.3	83.0
	26	111	167	96.4	145	79.3	119	71.7	108	62.3	93.5	51.2	76.7
	27	103	155	89.4	134	73.5	110	66.5	99.8	57.8	86.7	47.4	71.2
	28	96.0	144	83.1	125	68.4	103	61.9	92.8	53.7	80.6	44.1	66.2
	29	89.5	135	77.5	116	63.8	95.6	57.7	86.5	50.1	75.1	41.1	61.7
	30	83.7	126	72.4	109	59.6	89.4	53.9	80.8	46.8	70.2	38.4	57.6
	32	73.5	111	63.6	95.7	52.4	78.5	47.4	71.0	41.1	61.7	33.8	50.7
	34	65.1	97.9	56.4	84.7	46.4	69.6	42.0	62.9	36.4	54.7	29.9	44.9
	36	58.1	87.3	50.3	75.6	41.4	62.1	37.4	56.1	32.5	48.8	26.7	40.0
	38			45.1	67.8	37.1	55.7	33.6	50.4	29.2	43.8	24.0	35.9
	40							30.3	45.5	26.3	39.5	21.6	32.4
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	95.1	143	81.5	122	65.8	98.8	57.0	85.7	47.7	71.7	37.6	56.5
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	76.9	116	65.7	98.8	53.1	79.9	45.9	69.0	38.3	57.6	30.0	45.2
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		3700		3320		2860		2590		2250		1850	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		2290		2050		1760		1590		1380		1140	
r_{mx}/r_{my}		1.27		1.27		1.27		1.28		1.28		1.27	
r_{my}, in.		2.27		2.32		2.38		2.40		2.43		2.46	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS8

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS8×4×											
		5/8		1/2		3/8		5/16		1/4		3/16	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		42.30		35.24		27.48		23.34		19.02		14.53	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	350	526	292	438	241	361	214	322	187	281	159	238
	1	349	524	290	436	239	359	214	320	187	280	158	237
	2	344	517	287	431	236	354	211	316	184	276	156	234
	3	336	505	280	422	231	346	206	309	180	270	152	229
	4	325	489	272	409	224	335	200	299	175	262	148	222
	5	312	469	262	393	215	322	192	288	168	252	142	213
	6	297	446	250	375	204	306	183	274	160	240	135	202
	7	279	420	236	355	192	289	172	258	151	226	127	191
	8	261	392	221	332	180	270	161	242	141	212	119	178
	9	241	362	205	309	166	249	149	224	131	196	110	165
	10	221	332	189	284	152	229	137	206	120	180	101	151
	11	200	301	173	260	139	209	125	187	109	164	91.7	138
	12	180	271	156	235	126	190	113	169	98.8	148	82.6	124
	13	161	241	140	211	114	172	101	151	88.4	133	73.8	111
	14	142	213	125	188	102	154	89.1	134	78.4	118	65.2	97.9
	15	124	186	110	165	91.0	137	78.9	119	68.7	103	57.1	85.6
	16	109	163	96.6	145	80.1	120	69.7	105	60.4	90.6	50.2	75.3
	17	96.4	145	85.6	129	71.0	107	61.7	92.7	53.5	80.3	44.4	66.7
	18	85.9	129	76.4	115	63.3	95.1	55.0	82.7	47.7	71.6	39.6	59.5
	19	77.1	116	68.5	103	56.8	85.4	49.4	74.2	42.8	64.2	35.6	53.4
	20	69.6	105	61.9	93.0	51.3	77.1	44.6	67.0	38.7	58.0	32.1	48.2
	21	63.1	94.9	56.1	84.3	46.5	69.9	40.4	60.8	35.1	52.6	29.1	43.7
	22	57.5	86.5	51.1	76.8	42.4	63.7	36.8	55.4	31.9	47.9	26.5	39.8
	23	52.6	79.1	46.8	70.3	38.8	58.3	33.7	50.7	29.2	43.8	24.3	36.4
	24	48.3	72.7	43.0	64.6	35.6	53.5	31.0	46.5	26.8	40.3	22.3	33.4
	25	44.6	67.0	39.6	59.5	32.8	49.3	28.5	42.9	24.7	37.1	20.6	30.8
	26			36.6	55.0	30.3	45.6	26.4	39.6	22.9	34.3	19.0	28.5
	27							24.5	36.8	21.2	31.8	17.6	26.4
	28											16.4	24.6
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	71.5	107	62.1	93.4	50.8	76.3	44.1	66.3	37.2	55.9	29.4	44.1
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	42.6	64.0	37.0	55.6	30.1	45.3	26.2	39.4	21.9	33.0	17.2	25.8
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		2600		2360		2050		1860		1650		1380	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		805		733		636		577		508		422	
r_{mx}/r_{my}		1.80		1.79		1.80		1.80		1.80		1.81	
r_{my}, in.		1.51		1.56		1.61		1.63		1.66		1.69	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS8–HSS7

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS8×4×		HSS7×5×									
		⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		9.86		35.24		27.48		23.34		19.02		14.53	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	125	188	296	443	247	370	221	331	194	291	165	248
	1	124	187	295	442	246	369	220	330	193	290	165	247
	2	123	184	292	438	244	366	218	327	192	287	163	245
	3	120	180	287	431	240	360	215	322	189	283	161	241
	4	116	174	281	422	235	353	211	316	185	277	157	236
	5	111	167	273	410	229	343	205	307	180	270	153	229
	6	106	158	264	396	221	332	198	297	174	261	148	222
	7	99.3	149	253	380	213	319	191	286	168	251	142	213
	8	92.5	139	242	364	203	305	182	273	160	240	136	203
	9	85.4	128	231	347	193	290	173	260	152	228	129	193
	10	78.1	117	219	328	182	274	164	246	144	216	121	182
	11	70.7	106	206	309	171	257	154	231	135	203	114	171
	12	63.4	95.1	192	289	160	239	143	215	126	189	106	159
	13	56.4	84.6	179	269	148	222	133	200	117	176	98.0	147
	14	49.6	74.5	166	249	136	205	123	184	108	162	90.2	135
	15	43.3	64.9	152	229	125	187	113	169	99.2	149	82.5	124
	16	38.0	57.1	139	209	114	171	103	154	90.5	136	74.9	112
	17	33.7	50.5	127	190	104	156	92.9	139	82.0	123	67.7	102
	18	30.1	45.1	114	172	94.2	142	83.5	125	73.8	111	60.6	90.9
	19	27.0	40.5	103	154	85.1	128	75.0	112	66.2	99.3	54.4	81.6
	20	24.3	36.5	92.7	139	76.8	115	67.7	102	59.8	89.6	49.1	73.6
	21	22.1	33.1	84.1	126	69.6	105	61.4	92.1	54.2	81.3	44.5	66.8
	22	20.1	30.2	76.6	115	63.4	95.4	55.9	83.9	49.4	74.1	40.6	60.9
	23	18.4	27.6	70.1	105	58.0	87.2	51.2	76.8	45.2	67.8	37.1	55.7
	24	16.9	25.4	64.4	96.8	53.3	80.1	47.0	70.5	41.5	62.2	34.1	51.1
	25	15.6	23.4	59.3	89.2	49.1	73.8	43.3	65.0	38.2	57.4	31.4	47.1
	26	14.4	21.6	54.9	82.5	45.4	68.3	40.0	60.1	35.4	53.0	29.1	43.6
	27	13.4	20.0	50.9	76.5	42.1	63.3	37.1	55.7	32.8	49.2	26.9	40.4
	28	12.4	18.6	47.3	71.1	39.2	58.9	34.5	51.8	30.5	45.7	25.1	37.6
	29			44.1	66.3	36.5	54.9	32.2	48.3	28.4	42.6	23.4	35.0
	30			41.2	61.9	34.1	51.3	30.1	45.1	26.6	39.8	21.8	32.7
	32					30.0	45.1	26.4	39.6	23.3	35.0	19.2	28.8
	34											17.0	25.5

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	21.1	31.7	57.9	87.1	47.2	71.0	41.1	61.7	34.6	51.9	27.2	40.9
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	11.8	17.7	45.2	68.0	36.6	55.1	31.9	48.0	26.8	40.2	21.0	31.5
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			1050		1990		1730		1570		1390		1150	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			320		1140		982		889		785		645	
r_{mx}/r_{my}			1.81		1.32		1.33		1.33		1.33		1.34	
r_{my}, in.			1.71		1.91		1.97		1.99		2.02		2.05	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS7

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS7×5×		HSS7×4×									
		⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		9.86		31.84		24.93		21.21		17.32		13.25	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	136	204	264	396	216	324	193	289	168	252	142	213
	1	135	203	263	395	215	322	192	288	167	251	142	212
	2	134	201	259	389	212	318	189	284	165	248	140	210
	3	132	198	253	381	207	311	185	277	162	242	137	205
	4	129	193	245	369	201	301	179	269	156	235	132	198
	5	125	187	236	354	192	288	172	258	150	225	127	190
	6	120	181	224	337	183	274	163	245	143	214	121	181
	7	115	173	212	318	172	258	154	231	135	202	114	170
	8	110	165	198	297	160	241	144	216	126	189	106	159
	9	104	156	183	275	148	222	133	200	117	175	98.1	147
	10	97.4	146	168	253	136	204	122	183	107	161	89.9	135
	11	90.8	136	153	230	124	186	111	166	97.4	146	81.6	122
	12	84.1	126	138	207	112	169	99.8	150	87.8	132	73.4	110
	13	77.4	116	123	185	101	152	89.0	134	78.4	118	65.4	98.2
	14	70.8	106	109	164	90.1	135	79.0	119	69.4	104	57.8	86.7
	15	64.3	96.4	95.7	144	79.7	120	70.2	106	60.8	91.2	50.5	75.8
	16	58.0	87.0	84.1	126	70.0	105	61.8	92.9	53.4	80.1	44.4	66.6
	17	51.9	77.8	74.5	112	62.0	93.2	54.8	82.3	47.3	71.0	39.3	59.0
	18	46.3	69.4	66.4	99.9	55.3	83.2	48.9	73.4	42.2	63.3	35.1	52.6
	19	41.5	62.3	59.6	89.6	49.7	74.6	43.8	65.9	37.9	56.8	31.5	47.2
	20	37.5	56.2	53.8	80.9	44.8	67.4	39.6	59.5	34.2	51.3	28.4	42.6
	21	34.0	51.0	48.8	73.4	40.7	61.1	35.9	53.9	31.0	46.5	25.8	38.7
	22	31.0	46.5	44.5	66.8	37.0	55.7	32.7	49.2	28.3	42.4	23.5	35.2
	23	28.3	42.5	40.7	61.2	33.9	50.9	29.9	45.0	25.9	38.8	21.5	32.2
	24	26.0	39.0	37.4	56.2	31.1	46.8	27.5	41.3	23.7	35.6	19.7	29.6
	25	24.0	36.0	34.4	51.8	28.7	43.1	25.3	38.1	21.9	32.8	18.2	27.3
	26	22.2	33.3			26.5	39.9	23.4	35.2	20.2	30.3	16.8	25.2
	27	20.6	30.8							18.8	28.1	15.6	23.4
	28	19.1	28.7										
	29	17.8	26.7										
	30	16.7	25.0										
	32	14.6	22.0										
	34	13.0	19.5										

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	19.4	29.1	49.5	74.4	40.5	60.9	35.7	53.6	30.0	45.0	23.7	35.7
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	14.7	22.0	32.6	49.0	26.8	40.2	23.4	35.1	19.6	29.5	15.4	23.2
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			875		1650		1430		1300		1160		970	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			492		642		560		508		449		373	
r_{mx}/r_{my}			1.33		1.60		1.60		1.60		1.61		1.61	
r_{my}, in.			2.07		1.53		1.58		1.61		1.64		1.66	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE HSS7–HSS6

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS7×4×		HSS6×5×									
		⅛		½		⅜		5⁄16		¼		3⁄16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		9.01		31.84		24.93		21.21		17.32		13.25	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	115	173	264	396	220	330	197	295	172	259	147	220
	1	115	172	263	395	220	329	196	295	172	258	146	219
	2	113	170	261	392	218	326	195	292	170	256	145	217
	3	110	166	257	386	214	321	192	287	168	252	143	214
	4	107	160	251	378	210	314	188	281	164	246	139	209
	5	102	153	245	368	204	306	182	274	160	240	136	203
	6	96.8	145	237	356	197	295	176	264	155	232	131	196
	7	90.8	136	228	342	189	284	169	254	149	223	126	189
	8	84.3	127	218	327	180	271	162	243	142	213	120	180
	9	77.6	116	207	311	171	257	154	230	135	202	114	171
	10	70.7	106	195	293	161	242	145	217	127	191	107	161
	11	63.8	95.7	183	275	151	226	136	204	119	179	100	151
	12	57.0	85.5	171	257	140	211	127	190	111	167	93.5	140
	13	50.4	75.6	159	238	130	195	117	176	103	155	86.5	130
	14	44.1	66.2	146	220	119	179	108	162	95.0	143	79.5	119
	15	38.4	57.6	134	201	109	164	98.6	148	87.0	130	72.6	109
	16	33.8	50.7	122	183	99.2	149	89.7	134	79.2	119	65.9	98.9
	17	29.9	44.9	110	166	90.2	136	81.0	122	71.6	107	59.5	89.2
	18	26.7	40.0	99.3	149	81.6	123	72.6	109	64.2	96.4	53.2	79.8
	19	24.0	35.9	89.1	134	73.3	110	65.1	97.7	57.7	86.5	47.8	71.6
	20	21.6	32.4	80.4	121	66.2	99.5	58.8	88.2	52.0	78.1	43.1	64.6
	21	19.6	29.4	72.9	110	60.0	90.2	53.3	80.0	47.2	70.8	39.1	58.6
	22	17.9	26.8	66.4	99.9	54.7	82.2	48.6	72.9	43.0	64.5	35.6	53.4
	23	16.3	24.5	60.8	91.4	50.0	75.2	44.5	66.7	39.3	59.0	32.6	48.9
	24	15.0	22.5	55.8	83.9	46.0	69.1	40.8	61.2	36.1	54.2	29.9	44.9
	25	13.8	20.8	51.5	77.3	42.4	63.7	37.6	56.4	33.3	50.0	27.6	41.4
	26	12.8	19.2	47.6	71.5	39.2	58.9	34.8	52.2	30.8	46.2	25.5	38.3
	27	11.9	17.8	44.1	66.3	36.3	54.6	32.3	48.4	28.6	42.8	23.6	35.5
	28	11.0	16.5	41.0	61.6	33.8	50.8	30.0	45.0	26.5	39.8	22.0	33.0
	29			38.2	57.5	31.5	47.3	28.0	41.9	24.7	37.1	20.5	30.7
	30			35.7	53.7	29.4	44.2	26.1	39.2	23.1	34.7	19.2	28.7
	32					25.9	38.9	23.0	34.5	20.3	30.5	16.8	25.3

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	17.0	25.6	45.2	68.0	36.9	55.5	32.3	48.5	27.2	40.9	21.5	32.3
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	10.8	16.3	39.7	59.7	32.4	48.7	28.2	42.4	23.8	35.7	18.7	28.1
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			742		1330		1150		1050		928		771	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			284		978		850		772		683		566	
r_{mx}/r_{my}			1.62		1.17		1.16		1.17		1.17		1.17	
r_{my}, in.			1.69		1.87		1.92		1.95		1.98		2.01	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS6

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS6×5×		HSS6×4×									
		⅛		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		9.01		28.43		22.37		19.08		15.62		11.97	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	120	180	236	355	191	287	171	256	149	223	126	189
	1	120	179	235	353	191	286	170	255	148	222	125	188
	2	118	177	232	348	188	282	168	251	146	219	123	185
	3	116	175	226	340	183	275	164	245	143	214	121	181
	4	114	170	219	329	177	266	158	238	138	207	117	175
	5	110	165	210	315	170	255	152	228	133	199	112	168
	6	106	159	199	300	161	242	144	216	126	189	106	160
	7	102	153	188	282	151	227	136	204	119	178	100	150
	8	96.8	145	175	263	141	211	127	190	111	166	93.5	140
	9	91.4	137	161	243	130	195	117	175	102	154	86.4	130
	10	85.8	129	148	222	119	179	107	160	93.7	141	79.1	119
	11	80.0	120	134	201	109	164	96.9	145	85.1	128	71.7	108
	12	74.0	111	120	181	98.4	148	87.0	131	76.5	115	64.5	96.7
	13	68.1	102	107	161	88.2	133	77.4	116	68.1	102	57.4	86.1
	14	62.2	93.3	94.3	142	78.4	118	68.9	104	60.1	90.1	50.6	76.0
	15	56.4	84.7	82.3	124	68.9	104	60.9	91.6	52.5	78.7	44.2	66.3
	16	50.9	76.3	72.3	109	60.5	91.0	53.5	80.5	46.1	69.2	38.9	58.3
	17	45.5	68.2	64.0	96.2	53.6	80.6	47.4	71.3	40.8	61.3	34.4	51.6
	18	40.6	60.8	57.1	85.9	47.8	71.9	42.3	63.6	36.4	54.7	30.7	46.1
	19	36.4	54.6	51.3	77.1	42.9	64.5	38.0	57.1	32.7	49.1	27.6	41.3
	20	32.9	49.3	46.3	69.5	38.7	58.2	34.3	51.5	29.5	44.3	24.9	37.3
	21	29.8	44.7	42.0	63.1	35.1	52.8	31.1	46.7	26.8	40.2	22.6	33.8
	22	27.2	40.7	38.2	57.5	32.0	48.1	28.3	42.6	24.4	36.6	20.6	30.8
	23	24.8	37.3	35.0	52.6	29.3	44.0	25.9	38.9	22.3	33.5	18.8	28.2
	24	22.8	34.2	32.1	48.3	26.9	40.4	23.8	35.8	20.5	30.7	17.3	25.9
	25	21.0	31.5	29.6	44.5	24.8	37.3	21.9	33.0	18.9	28.3	15.9	23.9
	26	19.4	29.2					20.3	30.5	17.5	26.2	14.7	22.1
	27	18.0	27.0									13.6	20.5
	28	16.8	25.1										
	29	15.6	23.4										
	30	14.6	21.9										
	32	12.8	19.3										
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	15.3	23.0	38.2	57.4	31.7	47.7	27.8	41.8	23.4	35.2	18.6	28.0
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	13.2	19.9	28.5	42.8	23.5	35.2	20.5	30.9	17.3	26.0	13.7	20.5
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		588		1090		950		865		770		651	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		432		551		481		440		388		327	
r_{mx}/r_{my}		1.17		1.41		1.41		1.40		1.41		1.41	
r_{my}, in.		2.03		1.50		1.55		1.58		1.61		1.63	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS6–HSS5

Table 4-B (continued)
Available Strength in Axial Compression, kips
Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS6×4×		HSS5×4×									
		⅛		½		⅜		5⁄16		¼		3⁄16	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		8.16		25.03		19.82		16.96		13.91		10.70	
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, L_c (ft), with respect to the least radius of gyration, r_y	0	102	153	208	313	167	250	149	223	130	195	109	164
	1	101	152	207	311	166	249	148	222	129	194	109	163
	2	99.9	150	204	307	164	246	146	219	127	191	107	161
	3	97.5	146	199	299	160	239	143	214	124	187	105	157
	4	94.1	141	192	289	154	231	138	207	120	181	101	152
	5	90.0	135	184	276	147	221	132	198	115	173	97.1	146
	6	85.3	128	174	262	140	209	125	187	109	164	92.2	138
	7	80.0	120	163	246	131	197	117	176	103	154	86.7	130
	8	74.2	111	152	228	123	184	109	163	95.8	144	80.8	121
	9	68.2	102	139	210	113	170	100	150	88.3	132	74.5	112
	10	62.1	93.2	127	191	104	156	91.4	137	80.6	121	68.1	102
	11	56.0	84.0	114	172	94.5	142	82.5	124	72.9	109	61.7	92.5
	12	50.0	74.9	102	154	85.1	128	73.9	111	65.4	98.0	55.3	83.0
	13	44.1	66.2	90.3	136	76.0	114	66.2	99.5	58.0	87.0	49.2	73.7
	14	38.6	57.8	78.9	119	67.2	101	58.7	88.2	51.0	76.5	43.3	64.9
	15	33.6	50.4	68.7	103	58.7	88.3	51.5	77.4	44.4	66.6	37.7	56.6
	16	29.5	44.3	60.4	90.8	51.6	77.6	45.3	68.0	39.0	58.6	33.1	49.7
	17	26.1	39.2	53.5	80.4	45.7	68.7	40.1	60.3	34.6	51.9	29.4	44.0
	18	23.3	35.0	47.7	71.7	40.8	61.3	35.8	53.7	30.9	46.3	26.2	39.3
	19	20.9	31.4	42.8	64.4	36.6	55.0	32.1	48.2	27.7	41.5	23.5	35.3
	20	18.9	28.3	38.7	58.1	33.0	49.7	29.0	43.5	25.0	37.5	21.2	31.8
	21	17.1	25.7	35.1	52.7	30.0	45.0	26.3	39.5	22.7	34.0	19.2	28.9
	22	15.6	23.4	31.9	48.0	27.3	41.0	23.9	36.0	20.7	31.0	17.5	26.3
	23	14.3	21.4	29.2	43.9	25.0	37.5	21.9	32.9	18.9	28.3	16.0	24.1
	24	13.1	19.7	26.8	40.4	22.9	34.5	20.1	30.2	17.4	26.0	14.7	22.1
	25	12.1	18.1			21.1	31.8	18.5	27.9	16.0	24.0	13.6	20.4
	26	11.2	16.8							14.8	22.2	12.6	18.8
	27	10.4	15.5										
Properties													
M_{nx}/Ω_b	$\phi_b M_{nx}$ kip-ft	13.3	20.1	28.3	42.6	23.7	35.6	20.8	31.3	17.6	26.5	14.0	21.1
M_{ny}/Ω_b	$\phi_b M_{ny}$ kip-ft	9.69	14.6	24.2	36.3	20.1	30.2	17.7	26.6	15.0	22.5	11.9	17.8
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}		495		665		587		536		478		408	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}		248		459		405		368		328		279	
r_{mx}/r_{my}		1.41		1.20		1.20		1.21		1.21		1.21	
r_{my}, in.		1.66		1.46		1.52		1.54		1.57		1.60	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Dashed line indicates the L_c beyond which the bare steel strength controls.
2. Heavy line indicates L_c/r_{my} equal to or greater than 200.

5

COMPOSITE
HSS5

Table 4-B (continued)

Available Strength in Axial Compression, kips

Filled Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS5×4×	
		⅛	
t_{des}, in.		0.116	
Steel, lb/ft		7.31	
Design		P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	88.2	132
	1	87.7	132
	2	86.4	130
	3	84.3	126
	4	81.4	122
	5	77.8	117
	6	73.6	110
	7	69.0	103
	8	64.0	96.0
	9	58.7	88.1
	10	53.4	80.1
	11	48.1	72.1
	12	42.8	64.3
	13	37.8	56.7
	14	33.0	49.4
	15	28.7	43.1
	16	25.2	37.8
	17	22.3	33.5
	18	19.9	29.9
	19	17.9	26.8
	20	16.1	24.2
	21	14.6	22.0
	22	13.3	20.0
	23	12.2	18.3
	24	11.2	16.8
	25	10.3	15.5
	26	9.55	14.3
	27	8.86	13.3

Properties

M_{nx}/Ω_b	$\phi_b M_{nx}$	kip-ft	10.1	15.1
M_{ny}/Ω_b	$\phi_b M_{ny}$	kip-ft	8.47	12.7
$P_{ex}(L_c)^2/10^4$, kip-in.^{2}			311	
$P_{ey}(L_c)^2/10^4$, kip-in.^{2}			212	
r_{mx}/r_{my}			1.21	
r_{my}, in.			1.62	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Heavy line indicates L_c/r_{my} equal to or greater than 200.

4

COMPOSITE
HSS22–HSS20

Table 4-C
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS22×22×										HSS20×20×	
		1		⅞		¾		⅝		½		1	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.930	
Steel, lb/ft		277.07		244.88		212.00		178.41		144.13		249.85	
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, L_c (ft), with respect to the least radius of gyration, r	0	2590	3890	2390	3580	2180	3260	1960	2940	1740	2610	2280	3410
	1	2590	3890	2390	3580	2180	3260	1960	2940	1740	2610	2280	3410
	2	2590	3890	2390	3580	2170	3260	1960	2940	1740	2610	2270	3410
	3	2590	3880	2380	3580	2170	3260	1960	2940	1740	2610	2270	3410
	4	2590	3880	2380	3570	2170	3260	1960	2930	1740	2610	2270	3400
	5	2580	3870	2380	3570	2170	3250	1950	2930	1730	2600	2260	3400
	6	2580	3870	2370	3560	2160	3250	1950	2920	1730	2600	2260	3390
	7	2570	3860	2370	3550	2160	3240	1940	2920	1730	2590	2250	3380
	8	2570	3850	2360	3550	2150	3230	1940	2910	1720	2590	2250	3370
	9	2560	3840	2360	3540	2150	3220	1930	2900	1720	2580	2240	3360
	10	2550	3830	2350	3530	2140	3210	1930	2890	1710	2570	2230	3350
	11	2550	3820	2340	3510	2130	3200	1920	2880	1710	2560	2220	3340
	12	2540	3800	2330	3500	2130	3190	1920	2870	1700	2550	2210	3320
	13	2530	3790	2330	3490	2120	3180	1910	2860	1690	2540	2200	3310
	14	2520	3770	2320	3470	2110	3160	1900	2850	1690	2530	2190	3290
	15	2500	3760	2300	3460	2100	3150	1890	2840	1680	2520	2180	3270
	16	2490	3740	2290	3440	2090	3130	1880	2820	1670	2500	2170	3250
	17	2480	3720	2280	3420	2080	3120	1870	2810	1660	2490	2150	3230
	18	2470	3700	2270	3400	2070	3100	1860	2790	1650	2480	2140	3210
	19	2450	3680	2260	3390	2060	3080	1850	2770	1640	2460	2130	3190
	20	2440	3660	2240	3360	2040	3060	1840	2760	1630	2440	2110	3160
	21	2420	3630	2230	3340	2030	3040	1830	2740	1620	2430	2090	3140
	22	2410	3610	2210	3320	2020	3020	1810	2720	1610	2410	2080	3120
	23	2390	3580	2200	3300	2000	3000	1800	2700	1590	2390	2060	3090
	24	2370	3560	2180	3270	1990	2980	1790	2680	1580	2370	2040	3060
	25	2350	3530	2170	3250	1970	2960	1770	2660	1570	2350	2020	3030
	26	2330	3500	2150	3220	1960	2930	1760	2640	1560	2330	2000	3000
	27	2320	3470	2130	3200	1940	2910	1740	2620	1540	2310	1980	2970
	28	2300	3440	2110	3170	1920	2880	1730	2590	1530	2290	1960	2940
	29	2280	3410	2090	3140	1910	2860	1710	2570	1510	2270	1940	2910
	30	2260	3380	2080	3110	1890	2830	1700	2540	1500	2250	1920	2880
	32	2210	3320	2040	3050	1850	2780	1660	2490	1470	2200	1880	2810
	34	2170	3250	1990	2990	1810	2720	1630	2440	1440	2150	1830	2740
	36	2120	3180	1950	2930	1770	2660	1590	2390	1400	2110	1780	2670
	38	2070	3110	1910	2860	1730	2600	1550	2330	1370	2050	1730	2600
	40	2020	3030	1860	2790	1690	2540	1520	2270	1330	2000	1680	2520
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1610	2420	1450	2180	1280	1920	1090	1640	903	1360	1310	1960
$P_e(L_c)^2/10^4$, kip-in.^{2}		201000		185000		166000		147000		126000		145000	
r_m, in.		8.54		8.59		8.65		8.70		8.76		7.72	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

4

COMPOSITE
HSS20

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS20×20×											
		⅞		¾		⅝		½		⅜		5/16	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		221.06		191.58		161.40		130.52		98.94		82.88	
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, L_c (ft), with respect to the least radius of gyration, r	0	2090	3140	1900	2850	1710	2570	1510	2270	1310	1970	1160	1740
	1	2090	3140	1900	2850	1710	2560	1510	2270	1310	1970	1160	1740
	2	2090	3140	1900	2850	1710	2560	1510	2270	1310	1960	1160	1740
	3	2090	3130	1900	2850	1710	2560	1510	2270	1310	1960	1160	1740
	4	2090	3130	1900	2850	1710	2560	1510	2260	1310	1960	1160	1740
	5	2080	3120	1890	2840	1700	2550	1510	2260	1300	1960	1160	1740
	6	2080	3120	1890	2830	1700	2550	1500	2250	1300	1950	1150	1730
	7	2070	3110	1890	2830	1690	2540	1500	2250	1300	1950	1150	1730
	8	2070	3100	1880	2820	1690	2530	1490	2240	1290	1940	1150	1720
	9	2060	3090	1870	2810	1680	2530	1490	2230	1290	1930	1140	1720
	10	2050	3080	1870	2800	1680	2520	1480	2220	1280	1930	1140	1710
	11	2050	3070	1860	2790	1670	2510	1480	2220	1280	1920	1130	1700
	12	2040	3060	1850	2780	1660	2500	1470	2210	1270	1910	1130	1690
	13	2030	3040	1840	2760	1660	2480	1460	2190	1270	1900	1120	1680
	14	2020	3030	1830	2750	1650	2470	1460	2180	1260	1890	1120	1670
	15	2010	3010	1820	2740	1640	2460	1450	2170	1250	1880	1110	1660
	16	1990	2990	1810	2720	1630	2440	1440	2160	1240	1860	1100	1650
	17	1980	2970	1800	2700	1620	2430	1430	2140	1230	1850	1090	1640
	18	1970	2950	1790	2680	1610	2410	1420	2130	1230	1840	1090	1630
	19	1960	2930	1780	2670	1600	2390	1410	2110	1220	1820	1080	1620
	20	1940	2910	1760	2650	1580	2380	1400	2100	1210	1810	1070	1600
	21	1930	2890	1750	2630	1570	2360	1390	2080	1200	1790	1060	1590
	22	1910	2870	1740	2600	1560	2340	1370	2060	1190	1780	1050	1580
	23	1890	2840	1720	2580	1540	2320	1360	2040	1170	1760	1040	1560
	24	1880	2820	1710	2560	1530	2300	1350	2020	1160	1740	1030	1550
	25	1860	2790	1690	2540	1520	2270	1340	2000	1150	1730	1020	1530
	26	1840	2770	1670	2510	1500	2250	1320	1980	1140	1710	1010	1510
	27	1830	2740	1660	2490	1490	2230	1310	1960	1130	1690	999	1500
	28	1810	2710	1640	2460	1470	2210	1290	1940	1110	1670	987	1480
	29	1790	2680	1620	2430	1450	2180	1280	1920	1100	1650	975	1460
	30	1770	2650	1610	2410	1440	2160	1270	1900	1090	1630	963	1450
	32	1730	2590	1570	2350	1400	2110	1230	1850	1060	1590	939	1410
	34	1680	2530	1530	2290	1370	2050	1200	1800	1030	1550	913	1370
	36	1640	2460	1490	2230	1330	2000	1170	1750	1000	1500	887	1330
	38	1600	2390	1450	2170	1300	1940	1140	1700	970	1460	860	1290
	40	1550	2320	1410	2110	1260	1890	1100	1650	939	1410	832	1250
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1180	1770	1040	1560	890	1340	738	1110	575	864	467	701
$P_e(L_c)^2/10^4$, kip-in.^{2}		134000		121000		107000		91900		75900		67000	
r_m, in.		7.77		7.84		7.88		7.95		8.00		8.03	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS18

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS18×18×											
		1		⅞		¾		⅝		½		⅜	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		222.63		197.24		171.16		144.39		116.91		88.73	
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, L_c (ft), with respect to the least radius of gyration, r	0	1970	2960	1810	2720	1650	2470	1470	2210	1300	1950	1120	1670
	1	1970	2960	1810	2720	1650	2470	1470	2210	1300	1950	1120	1670
	2	1970	2960	1810	2720	1640	2470	1470	2210	1300	1940	1120	1670
	3	1970	2950	1810	2710	1640	2460	1470	2200	1290	1940	1110	1670
	4	1970	2950	1810	2710	1640	2460	1470	2200	1290	1940	1110	1670
	5	1960	2940	1800	2700	1640	2450	1460	2190	1290	1930	1110	1660
	6	1960	2940	1800	2700	1630	2450	1460	2190	1290	1930	1110	1660
	7	1950	2930	1790	2690	1630	2440	1450	2180	1280	1920	1100	1650
	8	1940	2920	1790	2680	1620	2430	1450	2170	1280	1920	1100	1650
	9	1940	2910	1780	2670	1610	2420	1440	2170	1270	1910	1090	1640
	10	1930	2890	1770	2660	1610	2410	1440	2160	1270	1900	1090	1630
	11	1920	2880	1760	2640	1600	2400	1430	2150	1260	1890	1080	1620
	12	1910	2860	1750	2630	1590	2390	1420	2130	1250	1880	1080	1610
	13	1900	2850	1740	2610	1580	2370	1410	2120	1250	1870	1070	1600
	14	1880	2830	1730	2600	1570	2360	1410	2110	1240	1860	1060	1590
	15	1870	2810	1720	2580	1560	2340	1400	2090	1230	1840	1050	1580
	16	1860	2790	1710	2560	1550	2330	1390	2080	1220	1830	1050	1570
	17	1840	2770	1690	2540	1540	2310	1370	2060	1210	1820	1040	1560
	18	1830	2740	1680	2520	1530	2290	1360	2050	1200	1800	1030	1540
	19	1810	2720	1670	2500	1510	2270	1350	2030	1190	1780	1020	1530
	20	1800	2690	1650	2480	1500	2250	1340	2010	1180	1770	1010	1510
	21	1780	2670	1640	2450	1490	2230	1330	1990	1170	1750	998	1500
	22	1760	2640	1620	2430	1470	2210	1310	1970	1150	1730	987	1480
	23	1740	2610	1600	2400	1460	2180	1300	1950	1140	1710	976	1460
	24	1720	2590	1580	2380	1440	2160	1290	1930	1130	1690	965	1450
	25	1700	2560	1570	2350	1420	2140	1270	1910	1120	1670	953	1430
	26	1680	2530	1550	2320	1410	2110	1260	1880	1100	1650	941	1410
	27	1660	2490	1530	2290	1390	2090	1240	1860	1090	1630	928	1390
	28	1640	2460	1510	2260	1370	2060	1220	1840	1070	1610	915	1370
	29	1620	2430	1490	2230	1350	2030	1210	1810	1060	1590	902	1350
	30	1600	2400	1470	2200	1340	2000	1190	1790	1040	1570	889	1330
	32	1550	2330	1430	2140	1300	1950	1160	1740	1010	1520	861	1290
	34	1500	2260	1380	2080	1260	1890	1120	1680	982	1470	833	1250
	36	1450	2180	1340	2010	1220	1830	1090	1630	949	1420	804	1210
	38	1400	2110	1290	1940	1180	1770	1050	1570	916	1370	774	1160
	40	1350	2030	1250	1870	1140	1700	1010	1520	882	1320	744	1120
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1030	1550	932	1400	822	1240	709	1070	589	885	459	690
$P_e(L_c)^2/10^4$, kip-in.^{2}		101000		93800		85700		75500		64900		53100	
r_m, in.		6.90		6.96		7.02		7.07		7.13		7.18	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS18–HSS16

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS18×18×		HSS16×16×									
		5/16		1		7/8		3/4		5/8		1/2	
t_{des}, in.		0.291		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		74.38		195.40		173.43		150.75		127.37		103.30	
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, L_c (ft), with respect to the least radius of gyration, r	0	1020	1530	1680	2530	1540	2310	1400	2100	1250	1870	1090	1640
	1	1020	1530	1680	2520	1540	2310	1400	2100	1250	1870	1090	1640
	2	1020	1530	1680	2520	1540	2310	1400	2100	1250	1870	1090	1640
	3	1020	1530	1680	2520	1540	2310	1400	2090	1250	1870	1090	1640
	4	1020	1520	1680	2510	1540	2300	1390	2090	1240	1860	1090	1630
	5	1010	1520	1670	2510	1530	2300	1390	2080	1240	1860	1090	1630
	6	1010	1520	1670	2500	1530	2290	1380	2080	1240	1850	1080	1620
	7	1010	1510	1660	2490	1520	2280	1380	2070	1230	1850	1080	1620
	8	1000	1500	1650	2480	1510	2270	1370	2060	1230	1840	1070	1610
	9	999	1500	1640	2460	1510	2260	1370	2050	1220	1830	1070	1600
	10	994	1490	1630	2450	1500	2250	1360	2040	1210	1820	1060	1590
	11	988	1480	1620	2430	1490	2230	1350	2030	1210	1810	1050	1580
	12	982	1470	1610	2420	1480	2220	1340	2010	1200	1800	1050	1570
	13	976	1460	1600	2400	1470	2200	1330	2000	1190	1780	1040	1560
	14	969	1450	1590	2380	1460	2180	1320	1980	1180	1770	1030	1550
	15	962	1440	1570	2360	1440	2160	1310	1960	1170	1750	1020	1530
	16	954	1430	1560	2340	1430	2140	1300	1950	1160	1740	1010	1520
	17	946	1420	1540	2310	1420	2120	1290	1930	1150	1720	1000	1500
	18	937	1410	1530	2290	1400	2100	1270	1910	1140	1700	992	1490
	19	928	1390	1510	2260	1390	2080	1260	1890	1120	1680	981	1470
	20	919	1380	1490	2240	1370	2050	1240	1870	1110	1670	970	1450
	21	909	1360	1470	2210	1350	2030	1230	1840	1100	1650	958	1440
	22	899	1350	1450	2180	1340	2000	1210	1820	1080	1620	945	1420
	23	889	1330	1430	2150	1320	1980	1200	1800	1070	1600	933	1400
	24	878	1320	1410	2120	1300	1950	1180	1770	1050	1580	920	1380
	25	867	1300	1390	2090	1280	1920	1160	1750	1040	1560	906	1360
	26	855	1280	1370	2060	1260	1890	1150	1720	1020	1540	893	1340
	27	844	1270	1350	2030	1240	1860	1130	1690	1010	1510	878	1320
	28	832	1250	1330	1990	1220	1830	1110	1670	992	1490	864	1300
	29	819	1230	1310	1960	1200	1800	1090	1640	975	1460	849	1270
	30	807	1210	1280	1920	1180	1770	1070	1610	958	1440	834	1250
	32	781	1170	1240	1850	1140	1710	1030	1550	924	1390	804	1210
	34	755	1130	1190	1780	1090	1640	995	1490	889	1330	773	1160
	36	728	1090	1140	1710	1050	1570	955	1430	853	1280	741	1110
	38	700	1050	1090	1630	1000	1510	914	1370	817	1220	709	1060
	40	672	1010	1040	1560	958	1440	873	1310	780	1170	676	1010
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	385	578	796	1200	717	1080	635	954	547	822	456	685
$P_e(L_c)^2/10^4$, kip-in.^{2}		47200		67200		62500		57200		51200		43900	
r_m, in.		7.21		6.09		6.14		6.19		6.25		6.31	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS16–HSS14

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS16×16×						HSS14×14×					
		3/8		5/16		1/4		1		7/8		3/4	
t_{des}, in.		0.349		0.291		0.233		0.930		0.814		0.698	
Steel, lb/ft		78.52		65.87		53.05		168.18		149.61		130.33	
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, L_c (ft), with respect to the least radius of gyration, r	0	935	1400	856	1280	746	1120	1410	2110	1290	1930	1170	1750
	1	935	1400	856	1280	746	1120	1410	2110	1290	1930	1170	1750
	2	934	1400	855	1280	745	1120	1410	2110	1290	1930	1170	1750
	3	933	1400	854	1280	744	1120	1400	2110	1280	1930	1160	1740
	4	931	1400	852	1280	742	1110	1400	2100	1280	1920	1160	1740
	5	928	1390	850	1270	740	1110	1400	2090	1280	1910	1160	1730
	6	925	1390	847	1270	737	1110	1390	2080	1270	1910	1150	1730
	7	921	1380	843	1260	734	1100	1380	2070	1260	1900	1140	1720
	8	917	1380	839	1260	731	1100	1370	2060	1260	1890	1140	1710
	9	912	1370	834	1250	727	1090	1360	2050	1250	1870	1130	1700
	10	907	1360	829	1240	722	1080	1350	2030	1240	1860	1120	1680
	11	901	1350	824	1240	717	1080	1340	2010	1230	1840	1110	1670
	12	894	1340	817	1230	712	1070	1330	2000	1220	1830	1100	1660
	13	887	1330	811	1220	706	1060	1320	1980	1210	1810	1090	1640
	14	880	1320	804	1210	700	1050	1300	1950	1190	1790	1080	1620
	15	872	1310	796	1190	693	1040	1290	1930	1180	1770	1070	1600
	16	863	1300	788	1180	686	1030	1270	1910	1170	1750	1060	1580
	17	854	1280	780	1170	679	1020	1260	1880	1150	1730	1040	1560
	18	845	1270	771	1160	671	1010	1240	1860	1130	1700	1030	1540
	19	835	1250	762	1140	663	995	1220	1830	1120	1680	1010	1520
	20	825	1240	752	1130	655	982	1200	1800	1100	1650	999	1500
	21	815	1220	743	1110	646	969	1180	1770	1080	1630	983	1470
	22	804	1210	732	1100	637	956	1160	1740	1070	1600	967	1450
	23	793	1190	722	1080	628	942	1140	1710	1050	1570	950	1430
	24	781	1170	711	1070	618	927	1120	1680	1030	1540	933	1400
	25	769	1150	700	1050	608	913	1100	1650	1010	1510	916	1370
	26	757	1140	688	1030	598	898	1080	1620	988	1480	898	1350
	27	745	1120	676	1010	588	882	1050	1580	968	1450	879	1320
	28	732	1100	665	997	578	867	1030	1550	947	1420	861	1290
	29	719	1080	652	979	567	851	1010	1520	926	1390	842	1260
	30	706	1060	640	960	556	834	988	1480	905	1360	823	1230
	32	679	1020	615	922	534	801	942	1420	862	1290	784	1180
	34	651	977	589	884	512	767	896	1350	818	1230	745	1120
	36	623	935	563	845	489	733	850	1280	774	1160	706	1060
	38	595	893	537	805	466	699	804	1210	730	1100	666	999
	40	567	850	510	765	443	664	757	1140	687	1030	627	941
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	358	538	305	459	239	360	590	886	533	801	474	712
$P_e(L_c)^2/10^4$, kip-in.^{2}		36000		31900		27600		42500		39500		36200	
r_m, in.		6.37		6.39		6.42		5.27		5.33		5.38	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS14–HSS12

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14×14×										HSS12×12×	
		5/8		1/2		3/8		5/16		1/4		1	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.930	
Steel, lb/ft		110.36		89.68		68.31		57.36		46.24		140.96	
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, L_c (ft), with respect to the least radius of gyration, r	0	1040	1560	905	1360	768	1150	698	1050	628	941	1170	1750
	1	1040	1560	905	1360	768	1150	698	1050	627	941	1170	1750
	2	1040	1550	904	1360	767	1150	697	1050	626	940	1170	1750
	3	1030	1550	902	1350	765	1150	696	1040	625	938	1160	1750
	4	1030	1550	900	1350	763	1140	694	1040	623	935	1160	1740
	5	1030	1540	896	1340	760	1140	691	1040	621	931	1150	1730
	6	1020	1530	893	1340	757	1140	688	1030	618	927	1150	1720
	7	1020	1530	888	1330	753	1130	684	1030	615	922	1140	1710
	8	1010	1520	883	1320	749	1120	680	1020	611	916	1130	1700
	9	1010	1510	877	1320	744	1120	676	1010	606	909	1120	1680
	10	998	1500	871	1310	738	1110	670	1010	601	902	1110	1660
	11	990	1490	864	1300	732	1100	665	997	596	894	1090	1650
	12	982	1470	856	1280	725	1090	658	987	590	885	1080	1630
	13	972	1460	848	1270	718	1080	652	977	584	875	1070	1600
	14	962	1440	839	1260	710	1070	644	966	577	865	1050	1580
	15	952	1430	830	1240	702	1050	637	955	570	855	1040	1560
	16	940	1410	820	1230	693	1040	629	943	562	843	1020	1530
	17	929	1390	809	1210	684	1030	620	930	554	831	1000	1510
	18	916	1370	798	1200	675	1010	611	917	546	819	983	1480
	19	903	1350	787	1180	665	997	602	903	537	806	964	1450
	20	890	1330	775	1160	655	982	592	889	529	793	944	1420
	21	876	1310	763	1140	644	966	582	874	519	779	924	1390
	22	862	1290	751	1130	633	949	572	858	510	765	903	1360
	23	847	1270	738	1110	622	932	562	843	500	750	881	1320
	24	832	1250	724	1090	610	915	551	826	490	735	860	1290
	25	816	1220	711	1070	598	897	540	810	480	720	838	1260
	26	801	1200	697	1050	586	879	529	793	469	704	815	1230
	27	785	1180	683	1020	574	861	517	776	459	688	792	1190
	28	768	1150	668	1000	561	842	506	759	448	672	770	1160
	29	752	1130	654	981	549	823	494	741	437	656	747	1120
	30	735	1100	639	958	536	804	482	723	426	640	724	1090
	32	701	1050	609	913	510	765	458	687	404	606	677	1020
	34	666	999	579	868	484	725	434	651	382	573	632	949
	36	631	947	548	822	457	686	410	614	360	540	586	881
	38	597	895	518	776	431	647	385	578	338	506	542	814
	40	562	843	487	731	405	607	361	542	316	474	499	750
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	409	615	341	513	268	403	230	345	187	281	413	620
$P_e(L_c)^2/10^4$, kip-in.^{2}		32600		28200		23100		20400		17600		24800	
r_m, in.		5.44		5.49		5.55		5.58		5.60		4.45	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS12

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12×12×											
		⅞		¾		⅝		½		⅜		5/16	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		125.79		109.91		93.34		76.07		58.10		48.86	
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, L_c (ft), with respect to the least radius of gyration, r	0	1050	1570	948	1420	842	1260	731	1100	617	925	557	835
	1	1050	1570	947	1420	841	1260	730	1100	617	925	556	834
	2	1050	1570	946	1420	840	1260	729	1090	616	923	555	833
	3	1040	1570	943	1420	838	1260	727	1090	614	921	554	831
	4	1040	1560	940	1410	835	1250	724	1090	612	918	552	827
	5	1040	1550	935	1400	831	1250	721	1080	609	913	549	823
	6	1030	1540	930	1390	826	1240	717	1080	605	908	546	818
	7	1020	1530	923	1390	820	1230	712	1070	601	901	542	813
	8	1010	1520	916	1370	814	1220	707	1060	596	894	537	806
	9	1000	1510	908	1360	806	1210	700	1050	591	886	532	799
	10	994	1490	898	1350	798	1200	693	1040	585	877	527	790
	11	982	1470	888	1330	790	1180	686	1030	578	867	521	781
	12	970	1460	877	1320	780	1170	678	1020	571	857	514	771
	13	957	1440	866	1300	770	1150	669	1000	564	845	507	761
	14	943	1410	853	1280	759	1140	660	989	556	833	500	750
	15	928	1390	840	1260	747	1120	650	975	547	820	492	738
	16	912	1370	826	1240	735	1100	639	959	538	807	484	726
	17	896	1340	812	1220	723	1080	628	943	529	793	475	713
	18	879	1320	797	1190	709	1060	617	926	519	778	466	699
	19	862	1300	781	1170	696	1040	605	908	509	763	457	685
	20	845	1270	765	1150	681	1020	593	890	498	747	447	670
	21	827	1240	748	1120	667	1000	581	871	487	731	437	656
	22	809	1220	731	1100	652	978	568	852	476	714	427	640
	23	790	1190	714	1070	637	955	555	832	465	697	416	625
	24	771	1160	696	1040	621	932	541	812	453	680	406	609
	25	752	1130	678	1020	605	908	527	791	442	662	395	593
	26	732	1100	659	989	589	884	514	770	430	644	384	576
	27	712	1070	641	961	573	859	500	750	418	626	373	560
	28	692	1040	622	933	556	835	486	728	405	608	362	543
	29	672	1010	604	905	540	810	471	707	393	590	351	527
	30	652	980	585	877	523	785	457	686	381	572	340	510
	32	611	919	547	821	490	735	428	643	357	535	318	476
	34	571	858	510	764	457	686	400	600	332	498	295	443
	36	531	798	473	709	425	637	372	558	308	462	274	410
	38	492	739	437	656	393	589	344	516	285	427	252	378
	40	454	682	404	606	362	543	317	476	262	393	232	347
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	376	565	337	506	292	439	244	367	192	289	165	248
$P_e(L_c)^2/10^4$, kip-in.^{2}		23200		21300		19200		16900		13900		12200	
r_m, in.		4.51		4.56		4.62		4.68		4.73		4.76	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS12–HSS10

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12×12×				HSS10×10×							
		¼		3/16		¾		⅝		½		3/8	
t_{des}, in.		0.233		0.174		0.698		0.581		0.465		0.349	
Steel, lb/ft		39.43		29.84		89.50		76.33		62.46		47.90	
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, L_c (ft), with respect to the least radius of gyration, r	0	496	744	417	626	743	1110	657	986	570	854	477	715
	1	496	744	417	626	742	1110	657	985	569	854	477	715
	2	495	742	416	625	740	1110	655	983	568	852	475	713
	3	494	740	415	623	737	1110	653	979	566	849	474	711
	4	492	737	413	620	733	1100	649	974	563	844	471	707
	5	489	734	411	617	728	1090	645	967	559	838	468	702
	6	486	729	409	613	722	1080	639	959	554	831	464	696
	7	482	724	406	609	714	1070	633	949	549	823	460	689
	8	478	718	402	603	706	1060	626	938	543	814	454	682
	9	474	711	398	597	697	1050	617	926	536	803	449	673
	10	469	703	394	591	686	1030	608	913	528	792	442	663
	11	463	695	389	584	675	1020	599	898	520	780	435	653
	12	457	686	384	576	664	998	588	882	511	766	428	642
	13	451	676	378	568	652	979	577	865	501	752	420	630
	14	444	666	373	559	639	960	565	847	491	736	411	617
	15	437	655	366	550	625	939	552	829	480	720	402	603
	16	429	643	360	540	611	918	539	809	469	704	393	589
	17	421	631	353	530	596	895	526	789	458	686	383	575
	18	413	619	346	519	580	872	512	768	446	668	373	560
	19	404	606	339	508	564	848	497	746	433	650	363	544
	20	395	593	331	497	548	824	483	724	421	631	352	529
	21	386	579	323	485	532	799	468	701	408	612	342	512
	22	377	565	315	473	515	774	452	679	395	592	331	496
	23	367	551	307	461	498	748	437	655	382	572	320	479
	24	358	536	299	449	480	722	421	632	368	552	308	463
	25	348	522	291	436	463	696	406	609	355	532	297	446
	26	338	507	282	423	446	670	390	585	341	512	286	429
	27	328	492	274	411	428	644	374	562	328	492	275	412
	28	318	476	265	398	411	618	359	538	315	472	264	395
	29	308	461	257	385	394	592	343	515	301	452	252	379
	30	297	446	248	372	377	567	328	492	288	432	241	362
	32	277	416	231	346	344	516	298	448	262	393	220	330
	34	257	386	214	321	311	468	271	407	237	356	199	298
	36	237	356	197	296	280	420	244	367	213	320	179	268
	38	218	327	181	272	251	377	219	329	191	287	160	240
	40	200	300	165	248	227	341	198	297	173	259	145	217
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	136	205	100	151	222	334	194	292	163	245	129	195
$P_e(L_c)^2/10^4$, kip-in.^{2}		10500		8700		11300		10300		9070		7600	
r_m, in.		4.79		4.82		3.75		3.80		3.86		3.92	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS10–HSS9

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS10×10×						HSS9×9×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		40.35		32.63		24.73		67.82		55.66		42.79	
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, L_c (ft), with respect to the least radius of gyration, r	0	428	642	378	568	327	491	571	857	493	739	412	618
	1	428	642	378	567	327	491	571	856	492	739	412	617
	2	427	640	377	566	326	489	569	854	491	737	410	616
	3	425	638	376	564	325	487	567	850	489	733	409	613
	4	423	634	374	560	323	484	563	844	486	728	406	609
	5	420	630	371	557	321	481	558	837	481	722	403	604
	6	416	625	368	552	318	476	552	828	477	715	398	598
	7	412	618	364	546	314	471	545	818	471	706	394	591
	8	408	611	360	540	310	465	537	806	464	696	388	582
	9	402	603	355	532	306	459	529	793	457	685	382	573
	10	396	595	350	524	301	452	519	778	449	673	376	563
	11	390	585	344	516	296	444	509	763	440	660	368	552
	12	383	575	338	506	290	435	497	746	431	646	361	541
	13	376	564	331	496	284	426	486	728	421	631	352	528
	14	368	552	324	486	278	417	473	710	410	615	344	515
	15	360	540	316	475	271	407	460	690	399	599	334	502
	16	351	527	309	463	264	396	446	670	388	581	325	487
	17	343	514	301	451	257	386	433	649	376	564	315	473
	18	333	500	293	439	250	374	418	627	364	545	305	458
	19	324	486	284	426	242	363	404	606	351	527	295	442
	20	314	472	275	413	234	351	389	585	339	508	284	427
	21	305	457	267	400	226	340	375	563	326	489	274	411
	22	295	442	258	386	218	328	360	542	313	469	263	395
	23	285	427	249	373	210	315	346	520	300	450	252	379
	24	275	412	239	359	202	303	331	498	287	430	242	362
	25	264	397	230	345	194	291	317	476	274	411	231	346
	26	254	381	221	332	186	279	302	455	261	392	220	330
	27	244	366	212	318	178	267	288	433	249	373	210	315
	28	234	351	203	304	170	255	274	412	236	354	199	299
	29	224	336	194	291	162	243	260	391	224	336	189	284
	30	214	321	185	278	154	231	247	371	212	317	179	268
	32	194	291	168	252	139	209	220	331	188	282	159	239
	34	175	263	151	227	124	186	195	293	167	250	141	212
	36	157	236	135	202	111	166	174	262	149	223	126	189
	38	141	212	121	182	99.5	149	156	235	133	200	113	170
	40	127	191	109	164	89.8	135	141	212	120	181	102	153
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	111	168	92.4	139	71.7	108	153	230	129	194	103	155
$P_e(L_c)^2/10^4$, kip-in.^{2}		6690		5740		4720		7150		6330		5360	
r_m, in.		3.94		3.97		4.00		3.40		3.45		3.51	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS9–HSS8

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS9×9×						HSS8×8×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		36.10		29.23		22.18		59.32		48.85		37.69	
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, L_c (ft), with respect to the least radius of gyration, r	0	368	553	324	487	279	418	491	738	422	633	350	526
	1	368	552	324	486	278	418	490	737	422	632	350	525
	2	367	550	323	485	278	416	489	735	420	630	349	523
	3	365	548	322	483	276	414	486	730	418	626	347	520
	4	363	544	320	479	274	411	482	724	414	621	344	516
	5	360	540	317	475	272	408	477	717	410	614	340	510
	6	356	534	313	470	269	403	471	707	404	606	336	504
	7	352	528	310	464	265	398	463	697	398	597	331	496
	8	347	520	305	458	261	392	455	684	391	586	325	488
	9	341	512	300	450	257	385	446	671	383	574	319	478
	10	335	503	295	442	252	378	436	656	374	561	312	467
	11	329	493	289	433	247	370	426	640	365	547	304	456
	12	322	483	282	424	241	361	414	623	355	532	296	444
	13	314	471	276	414	235	352	402	605	344	516	287	431
	14	306	460	269	403	229	343	390	586	333	500	278	418
	15	298	447	261	392	222	333	377	566	322	483	269	404
	16	290	434	253	380	215	323	363	546	310	465	259	389
	17	281	421	246	368	208	312	349	525	298	447	250	374
	18	272	407	237	356	201	301	335	504	286	428	239	359
	19	262	394	229	344	193	290	321	482	273	410	229	344
	20	253	379	221	331	186	279	307	461	261	391	219	328
	21	243	365	212	318	178	268	292	439	248	372	209	313
	22	234	351	203	305	171	256	278	417	235	353	198	298
	23	224	336	195	292	163	245	263	396	223	334	188	282
	24	214	322	186	279	156	234	249	374	211	316	178	267
	25	205	307	178	266	148	222	235	353	199	298	168	252
	26	195	293	169	254	141	211	221	333	187	281	158	237
	27	186	279	161	241	133	200	208	313	176	265	149	223
	28	176	264	152	229	126	189	195	293	165	249	139	209
	29	167	251	144	216	119	179	182	274	155	233	130	195
	30	158	237	136	204	112	168	170	256	145	217	122	182
	32	141	211	121	181	98.8	148	149	225	127	191	107	160
	34	124	187	107	160	87.6	131	132	199	113	169	94.7	142
	36	111	167	95.3	143	78.1	117	118	177	100	151	84.4	127
	38	99.6	149	85.5	128	70.1	105	106	159	90.2	136	75.8	114
	40	89.9	135	77.2	116	63.3	94.9	95.6	144	81.4	122	68.4	103
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	88.6	133	73.5	110	57.3	86.2	117	176	99.5	150	79.4	119
$P_e(L_c)^2/10^4$, kip-in.^{2}		4730		4060		3320		4740		4220		3590	
r_m, in.		3.54		3.56		3.59		2.99		3.04		3.10	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS8–HSS7

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS8×8×								HSS7×7×			
		5/16		1/4		3/16		1/8		5/8		1/2	
t_{des}, in.		0.291		0.233		0.174		0.116		0.581		0.465	
Steel, lb/ft		31.84		25.82		19.63		13.26		50.81		42.05	
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, L_c (ft), with respect to the least radius of gyration, r	0	312	469	274	411	234	351	185	278	419	630	352	528
	1	312	468	274	410	233	350	185	278	418	629	352	528
	2	311	466	273	409	233	349	184	277	417	626	350	525
	3	309	464	271	406	231	347	183	275	413	621	347	521
	4	307	460	269	403	229	344	182	272	409	614	343	515
	5	303	455	266	399	227	340	179	269	403	606	338	508
	6	299	449	262	393	223	335	177	265	396	595	333	499
	7	295	442	258	387	220	330	174	261	388	583	326	489
	8	290	435	254	380	216	324	171	256	379	569	318	477
	9	284	426	249	373	211	317	167	250	369	554	309	464
	10	278	417	243	364	206	309	163	244	358	538	300	450
	11	271	406	237	355	201	301	158	238	346	520	290	435
	12	264	396	230	346	195	293	154	231	334	502	280	420
	13	256	384	224	335	189	284	149	223	321	482	269	404
	14	248	372	216	325	183	274	144	216	307	462	258	387
	15	240	360	209	314	176	264	138	208	294	441	247	371
	16	231	347	201	302	170	254	133	199	280	420	235	354
	17	222	333	194	290	163	244	127	191	265	399	224	336
	18	213	320	186	278	156	234	122	182	251	377	212	319
	19	204	306	177	266	149	223	116	174	237	356	200	301
	20	195	293	169	254	142	212	110	165	223	335	189	284
	21	186	279	161	242	134	202	104	157	209	314	177	267
	22	177	265	153	230	127	191	98.8	148	195	293	166	250
	23	168	251	145	218	120	181	93.1	140	182	273	155	233
	24	159	238	137	206	113	170	87.6	131	169	253	145	217
	25	150	225	129	194	107	160	82.2	123	156	234	134	201
	26	141	211	122	182	100	150	76.9	115	144	216	124	186
	27	132	199	114	171	93.7	141	71.7	108	133	201	115	173
	28	124	186	107	160	87.2	131	66.7	100	124	186	107	161
	29	116	174	99.5	149	81.3	122	62.2	93.3	116	174	99.6	150
	30	108	162	92.9	139	76.0	114	58.1	87.2	108	162	93.1	140
	32	95.1	143	81.7	123	66.8	100	51.1	76.6	95.0	143	81.8	123
	34	84.3	126	72.4	109	59.2	88.8	45.2	67.9	84.1	126	72.4	109
	36	75.2	113	64.5	96.8	52.8	79.2	40.4	60.5	75.1	113	64.6	97.1
	38	67.5	101	57.9	86.9	47.4	71.1	36.2	54.3	67.4	101	58.0	87.2
	40	60.9	91.3	52.3	78.4	42.8	64.1	32.7	49.0	60.8	91.4	52.3	78.7
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	68.6	103	57.0	85.7	44.6	67.0	29.8	44.8	86.1	129	73.5	110
$P_e(L_c)^2/10^4$, kip-in.^{2}		3200		2750		2250		1720		2970		2650	
r_m, in.		3.13		3.15		3.18		3.21		2.58		2.63	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS7–HSS6

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS7×7×										HSS6×6×	
		3/8		5/16		1/4		3/16		1/8		5/8	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.581	
Steel, lb/ft		32.58		27.59		22.42		17.08		11.56		42.30	
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, L_c (ft), with respect to the least radius of gyration, r	0	292	437	260	389	227	340	192	288	156	235	350	526
	1	291	437	259	389	226	340	192	287	156	234	350	525
	2	290	435	258	387	225	338	191	286	155	233	347	522
	3	288	431	256	384	224	335	189	284	154	231	343	516
	4	284	427	253	380	221	332	187	281	152	228	338	508
	5	280	421	250	375	218	327	184	277	150	225	331	498
	6	276	414	246	369	214	322	181	272	147	221	323	486
	7	270	405	241	361	210	315	177	266	144	216	314	472
	8	264	396	235	353	205	308	173	260	140	210	304	456
	9	257	386	229	344	200	300	169	253	136	204	292	439
	10	250	375	223	334	194	291	164	245	132	198	280	421
	11	242	363	216	324	188	282	158	237	127	191	267	402
	12	233	350	208	312	181	272	152	229	122	183	254	382
	13	224	337	200	301	175	262	146	220	117	176	240	361
	14	215	323	192	288	167	251	140	210	112	168	226	340
	15	206	309	184	276	160	240	134	201	106	159	212	318
	16	196	294	175	263	153	229	127	191	101	151	198	297
	17	186	279	167	250	145	217	121	181	95.2	143	184	276
	18	176	265	158	237	137	206	114	171	89.7	135	170	255
	19	167	250	149	224	130	194	108	161	84.2	126	156	235
	20	157	235	141	211	122	183	101	152	78.7	118	143	215
	21	147	221	132	198	115	172	94.7	142	73.3	110	130	196
	22	138	206	124	186	107	161	88.4	133	68.1	102	119	179
	23	128	193	115	173	99.9	150	82.2	123	63.1	94.6	109	163
	24	119	179	107	161	92.9	139	76.3	114	58.0	87.1	99.8	150
	25	110	166	99.5	149	86.0	129	70.4	106	53.5	80.2	92.0	138
	26	102	153	92.0	138	79.5	119	65.0	97.6	49.5	74.2	85.1	128
	27	94.7	142	85.3	128	73.7	111	60.3	90.5	45.9	68.8	78.9	119
	28	88.0	132	79.3	119	68.6	103	56.1	84.1	42.6	64.0	73.4	110
	29	82.1	123	74.0	111	63.9	95.9	52.3	78.4	39.7	59.6	68.4	103
	30	76.7	115	69.1	104	59.7	89.6	48.9	73.3	37.1	55.7	63.9	96.0
	32	67.4	101	60.7	91.1	52.5	78.7	42.9	64.4	32.6	49.0	56.2	84.4
	34	59.7	89.6	53.8	80.7	46.5	69.7	38.0	57.1	28.9	43.4	49.7	74.8
	36	53.3	79.9	48.0	72.0	41.5	62.2	33.9	50.9	25.8	38.7	44.4	66.7
	38	47.8	71.7	43.1	64.6	37.2	55.8	30.4	45.7	23.2	34.7		
	40	43.1	64.7	38.9	58.3	33.6	50.4	27.5	41.2	20.9	31.3		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	59.2	88.9	51.2	77.0	42.7	64.1	33.5	50.3	23.3	35.0	59.9	90.1
$P_e(L_c)^2/10^4$, kip-in.^{2}		2270		2040		1770		1440		1100		1720	
r_m, in.		2.69		2.72		2.75		2.77		2.80		2.17	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS6

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS6×6×											
		½		⅜		5⁄16		¼		3⁄16		⅛	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174		0.116	
Steel, lb/ft		35.24		27.48		23.34		19.02		14.53		9.86	
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, L_c (ft), with respect to the least radius of gyration, r	0	292	438	237	356	211	316	183	274	154	231	124	186
	1	291	437	237	355	210	315	183	274	153	230	124	186
	2	289	435	235	353	209	313	181	272	152	229	123	184
	3	286	430	233	349	207	310	180	269	151	226	122	182
	4	282	424	229	344	204	305	177	265	149	223	120	179
	5	277	416	225	337	200	300	174	261	146	219	117	176
	6	270	406	219	329	195	293	170	255	142	214	114	171
	7	263	395	213	320	190	285	165	248	138	208	111	166
	8	255	383	207	310	184	276	160	240	134	201	107	161
	9	246	369	199	299	177	266	155	232	129	194	103	155
	10	236	355	191	287	170	256	149	223	124	186	98.8	148
	11	226	339	183	274	163	245	142	213	119	178	94.2	141
	12	215	323	174	261	155	233	135	203	113	170	89.4	134
	13	204	306	165	248	147	221	129	193	107	161	84.5	127
	14	193	289	156	234	139	209	122	182	101	152	79.5	119
	15	181	272	146	220	131	196	114	172	95.1	143	74.4	112
	16	170	255	137	205	123	184	107	161	89.0	133	69.3	104
	17	158	238	128	191	114	172	100	150	82.9	124	64.3	96.5
	18	147	221	118	178	106	159	93.1	140	76.9	115	59.4	89.1
	19	136	204	109	164	98.3	147	86.2	129	71.1	107	54.6	81.9
	20	125	188	101	152	90.5	136	79.4	119	65.4	98.1	50.0	75.0
	21	115	172	92.9	140	83.0	125	72.9	109	59.9	89.8	45.4	68.2
	22	104	157	85.0	128	75.7	114	66.5	99.8	54.6	81.8	41.4	62.1
	23	95.6	144	77.8	117	69.3	104	60.9	91.3	49.9	74.9	37.9	56.8
	24	87.8	132	71.4	107	63.6	95.4	55.9	83.8	45.8	68.8	34.8	52.2
	25	80.9	122	65.8	98.9	58.6	87.9	51.5	77.3	42.2	63.4	32.1	48.1
	26	74.8	112	60.8	91.4	54.2	81.3	47.6	71.4	39.1	58.6	29.6	44.5
	27	69.4	104	56.4	84.8	50.3	75.4	44.2	66.2	36.2	54.3	27.5	41.2
	28	64.5	96.9	52.5	78.8	46.7	70.1	41.1	61.6	33.7	50.5	25.6	38.3
	29	60.1	90.4	48.9	73.5	43.6	65.3	38.3	57.4	31.4	47.1	23.8	35.7
	30	56.2	84.4	45.7	68.7	40.7	61.1	35.8	53.6	29.3	44.0	22.3	33.4
	32	49.4	74.2	40.2	60.4	35.8	53.7	31.4	47.2	25.8	38.7	19.6	29.4
	34	43.7	65.7	35.6	53.5	31.7	47.5	27.8	41.8	22.8	34.3	17.3	26.0
	36	39.0	58.6	31.7	47.7	28.3	42.4	24.8	37.3	20.4	30.6	15.5	23.2
	38					25.4	38.1	22.3	33.4	18.3	27.4	13.9	20.8
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	51.7	77.7	41.9	63.0	36.5	54.8	30.5	45.8	24.0	36.1	17.0	25.5
$P_e(L_c)^2/10^4$, kip-in.^{2}		1550		1330		1200		1060		867		658	
r_m, in.		2.23		2.28		2.31		2.34		2.37		2.39	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS5½–HSS5

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS5½×5½×										HSS5×5×	
		⅜		5/16		¼		3/16		⅛		½	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.465	
Steel, lb/ft		24.93		21.21		17.32		13.25		9.01		28.43	
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, L_c (ft), with respect to the least radius of gyration, r	0	211	317	187	281	162	243	136	204	109	163	236	355
	1	210	316	187	280	162	243	135	203	108	163	235	353
	2	209	313	185	278	161	241	134	202	108	161	233	350
	3	206	309	183	275	159	238	133	199	106	159	229	345
	4	202	304	180	270	156	234	130	196	104	156	224	337
	5	198	297	176	264	152	229	128	191	102	152	218	328
	6	192	288	171	256	148	223	124	186	98.7	148	210	316
	7	186	279	165	248	144	215	120	180	95.3	143	202	303
	8	179	268	159	239	138	208	116	173	91.6	137	192	289
	9	171	257	153	229	133	199	111	166	87.5	131	182	274
	10	163	245	145	218	127	190	106	158	83.2	125	172	258
	11	154	232	138	207	120	180	100	150	78.7	118	161	241
	12	146	218	130	195	113	170	94.5	142	74.0	111	149	224
	13	137	205	122	183	107	160	88.8	133	69.2	104	138	207
	14	128	192	114	171	99.6	149	82.9	124	64.4	96.6	127	190
	15	119	179	106	159	92.7	139	77.1	116	59.6	89.4	115	173
	16	110	166	97.9	147	85.8	129	71.3	107	54.9	82.3	105	157
	17	102	153	90.1	135	79.1	119	65.6	98.4	50.3	75.4	94.2	142
	18	93.6	141	82.4	124	72.5	109	60.1	90.1	45.8	68.7	84.1	126
	19	85.6	129	75.1	113	66.1	99.2	54.7	82.1	41.4	62.1	75.5	113
	20	77.7	117	68.0	102	59.9	89.8	49.5	74.3	37.4	56.1	68.1	102
	21	70.5	106	61.6	92.7	54.3	81.4	44.9	67.4	33.9	50.9	61.8	92.9
	22	64.2	96.5	56.2	84.4	49.5	74.2	40.9	61.4	30.9	46.3	56.3	84.6
	23	58.7	88.3	51.4	77.2	45.3	67.9	37.4	56.2	28.3	42.4	51.5	77.4
	24	53.9	81.1	47.2	70.9	41.6	62.4	34.4	51.6	26.0	38.9	47.3	71.1
	25	49.7	74.7	43.5	65.4	38.3	57.5	31.7	47.5	23.9	35.9	43.6	65.5
	26	46.0	69.1	40.2	60.4	35.4	53.1	29.3	43.9	22.1	33.2	40.3	60.6
	27	42.6	64.1	37.3	56.0	32.8	49.3	27.2	40.7	20.5	30.8	37.4	56.2
	28	39.6	59.6	34.7	52.1	30.5	45.8	25.3	37.9	19.1	28.6	34.8	52.2
	29	36.9	55.5	32.3	48.6	28.5	42.7	23.5	35.3	17.8	26.7	32.4	48.7
	30	34.5	51.9	30.2	45.4	26.6	39.9	22.0	33.0	16.6	24.9	30.3	45.5
	32	30.3	45.6	26.5	39.9	23.4	35.1	19.3	29.0	14.6	21.9		
	34	26.9	40.4	23.5	35.3	20.7	31.1	17.1	25.7	12.9	19.4		
	36							15.3	22.9	11.5	17.3		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	34.6	52.0	30.1	45.3	25.2	37.9	19.9	29.9	14.1	21.2	33.9	51.0
$P_e(L_c)^2/10^4$, kip-in.^{2}		986		891		786		650		491		813	
r_m, in.		2.08		2.11		2.13		2.16		2.19		1.82	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS5–HSS4½

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS5×5×										HSS4½×4½×	
		3/8		5/16		1/4		3/16		1/8		1/2	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.465	
Steel, lb/ft		22.37		19.08		15.62		11.97		8.16		25.03	
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, L_c (ft), with respect to the least radius of gyration, r	0	186	279	165	247	142	214	119	178	94.4	142	208	313
	1	185	278	164	246	142	213	118	178	94.1	141	207	311
	2	183	275	163	244	141	211	117	176	93.2	140	205	308
	3	181	271	160	240	139	208	116	173	91.7	138	201	302
	4	177	265	157	235	136	203	113	170	89.7	135	195	293
	5	172	258	152	228	132	198	110	165	87.2	131	188	283
	6	166	250	147	221	128	191	107	160	84.2	126	180	270
	7	160	240	141	212	123	184	102	154	80.8	121	171	256
	8	153	229	135	203	117	176	97.9	147	77.0	116	160	241
	9	145	218	128	192	111	167	93.0	139	73.0	109	150	225
	10	137	206	121	181	105	158	87.8	132	68.7	103	139	208
	11	129	193	113	170	98.7	148	82.4	124	64.3	96.4	127	191
	12	120	180	105	158	92.0	138	76.9	115	59.7	89.6	116	174
	13	111	167	97.6	146	85.3	128	71.3	107	55.2	82.8	105	157
	14	103	154	89.8	135	78.6	118	65.7	98.5	50.6	76.0	93.9	141
	15	94.0	141	82.1	123	72.0	108	60.2	90.3	46.2	69.3	83.4	125
	16	85.6	129	74.6	112	65.6	98.3	54.8	82.2	41.9	62.8	73.5	110
	17	77.5	116	67.8	102	59.3	89.0	49.6	74.4	37.7	56.5	65.1	97.8
	18	69.6	105	61.2	91.9	53.2	79.9	44.5	66.8	33.7	50.5	58.0	87.2
	19	62.5	93.9	54.9	82.5	47.8	71.7	40.0	60.0	30.2	45.3	52.1	78.3
	20	56.4	84.8	49.6	74.5	43.1	64.7	36.1	54.1	27.3	40.9	47.0	70.7
	21	51.2	76.9	44.9	67.6	39.1	58.7	32.7	49.1	24.7	37.1	42.6	64.1
	22	46.6	70.0	41.0	61.5	35.6	53.5	29.8	44.7	22.5	33.8	38.9	58.4
	23	42.6	64.1	37.5	56.3	32.6	48.9	27.3	40.9	20.6	30.9	35.5	53.4
	24	39.2	58.9	34.4	51.7	29.9	44.9	25.1	37.6	18.9	28.4	32.6	49.1
	25	36.1	54.2	31.7	47.7	27.6	41.4	23.1	34.6	17.5	26.2	30.1	45.2
	26	33.4	50.2	29.3	44.1	25.5	38.3	21.3	32.0	16.1	24.2	27.8	41.8
	27	30.9	46.5	27.2	40.9	23.7	35.5	19.8	29.7	15.0	22.4		
	28	28.8	43.2	25.3	38.0	22.0	33.0	18.4	27.6	13.9	20.9		
	29	26.8	40.3	23.6	35.4	20.5	30.8	17.2	25.7	13.0	19.5		
	30	25.1	37.7	22.0	33.1	19.2	28.7	16.0	24.1	12.1	18.2		
	32					16.8	25.3	14.1	21.1	10.7	16.0		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	27.8	41.8	24.3	36.5	20.5	30.8	16.2	24.3	11.5	17.3	26.3	39.5
$P_e(L_c)^2/10^4$, kip-in.^{2}		709		641		566		474		358		559	
r_m, in.		1.87		1.90		1.93		1.96		1.99		1.61	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS4½–HSS4

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS4½×4½×										HSS4×4×	
		3/8		5/16		1/4		3/16		1/8		1/2	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.465	
Steel, lb/ft		19.82		16.96		13.91		10.70		7.31		21.63	
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, L_c (ft), with respect to the least radius of gyration, r	0	164	247	143	214	124	185	103	154	80.9	121	180	271
	1	163	246	142	214	123	185	102	153	80.6	121	179	269
	2	162	243	141	211	122	183	101	152	79.7	120	176	265
	3	159	238	138	207	119	179	99.2	149	78.2	117	172	258
	4	154	232	134	202	116	175	96.6	145	76.1	114	166	249
	5	149	224	130	195	112	169	93.4	140	73.5	110	158	237
	6	143	215	124	187	108	162	89.7	135	70.4	106	149	224
	7	136	205	118	178	103	154	85.5	128	67.0	100	139	209
	8	129	194	112	168	97.0	146	80.9	121	63.2	94.8	128	193
	9	121	182	105	157	91.0	136	75.9	114	59.2	88.8	117	176
	10	112	169	97.3	146	84.7	127	70.8	106	55.0	82.5	106	160
	11	104	156	90.2	136	78.2	117	65.5	98.2	50.7	76.1	95.0	143
	12	95.3	143	82.9	125	71.7	108	60.1	90.2	46.4	69.6	84.1	126
	13	86.7	130	75.7	114	65.3	97.9	54.8	82.2	42.2	63.2	73.6	111
	14	78.3	118	68.6	103	58.9	88.4	49.6	74.4	38.0	57.0	63.7	95.8
	15	70.2	105	61.7	92.8	52.8	79.2	44.5	66.8	34.0	50.9	55.5	83.5
	16	62.3	93.7	55.1	82.9	46.9	70.3	39.7	59.5	30.1	45.1	48.8	73.3
	17	55.2	83.0	48.8	73.4	41.5	62.4	35.1	52.7	26.6	39.9	43.2	65.0
	18	49.2	74.0	43.6	65.5	37.0	55.6	31.4	47.0	23.8	35.6	38.6	58.0
	19	44.2	66.4	39.1	58.8	33.3	49.9	28.1	42.2	21.3	32.0	34.6	52.0
	20	39.9	59.9	35.3	53.0	30.0	45.1	25.4	38.1	19.2	28.9	31.2	46.9
	21	36.2	54.4	32.0	48.1	27.2	40.9	23.0	34.6	17.5	26.2	28.3	42.6
	22	33.0	49.5	29.2	43.8	24.8	37.3	21.0	31.5	15.9	23.9	25.8	38.8
	23	30.2	45.3	26.7	40.1	22.7	34.1	19.2	28.8	14.5	21.8	23.6	35.5
	24	27.7	41.6	24.5	36.8	20.8	31.3	17.6	26.5	13.4	20.0		
	25	25.5	38.4	22.6	34.0	19.2	28.8	16.3	24.4	12.3	18.5		
	26	23.6	35.5	20.9	31.4	17.8	26.7	15.0	22.5	11.4	17.1		
	27	21.9	32.9	19.4	29.1	16.5	24.7	13.9	20.9	10.6	15.8		
	28			18.0	27.1	15.3	23.0	13.0	19.4	9.82	14.7		
	29							12.1	18.1	9.15	13.7		

Properties

M_n/Ω_b	$\phi_b M_n$	kip-ft	21.8	32.8	19.2	28.8	16.2	24.3	12.8	19.3	9.17	13.8	19.7	29.7
$P_e(L_c)^2/10^4$, kip-in.^{2}			491		447		394		334		253		363	
r_m, in.			1.67		1.70		1.73		1.75		1.78		1.41	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS4

Table 4-C (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS4×4×									
		3/8		5/16		1/4		3/16		1/8	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116	
Steel, lb/ft		17.27		14.83		12.21		9.42		6.46	
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	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r	0	143	215	123	184	105	158	87.1	131	68.4	103
	1	142	214	122	184	105	157	86.7	130	68.0	102
	2	140	211	120	181	103	155	85.5	128	67.1	101
	3	137	206	118	177	101	151	83.5	125	65.5	98.2
	4	132	199	114	171	97.6	146	80.8	121	63.3	94.9
	5	127	190	109	164	93.4	140	77.5	116	60.6	90.9
	6	120	180	103	156	88.6	133	73.6	110	57.5	86.2
	7	113	169	97.3	146	83.2	125	69.2	104	54.0	81.0
	8	105	157	90.6	136	77.4	116	64.5	96.8	50.2	75.4
	9	96.4	145	83.6	126	71.3	107	59.6	89.3	46.3	69.4
	10	87.9	132	76.4	115	65.0	97.6	54.5	81.7	42.3	63.4
	11	79.4	119	69.2	104	58.8	88.2	49.4	74.0	38.2	57.3
	12	71.0	107	62.0	93.2	52.6	78.9	44.3	66.5	34.2	51.3
	13	62.8	94.4	55.1	82.8	46.7	70.2	39.4	59.1	30.3	45.5
	14	55.0	82.7	48.5	72.8	41.3	62.1	34.7	52.1	26.6	39.9
	15	47.9	72.0	42.2	63.5	36.1	54.3	30.3	45.4	23.2	34.8
	16	42.1	63.3	37.1	55.8	31.7	47.7	26.6	39.9	20.4	30.6
	17	37.3	56.1	32.9	49.4	28.1	42.3	23.6	35.3	18.0	27.1
	18	33.3	50.0	29.3	44.1	25.1	37.7	21.0	31.5	16.1	24.1
	19	29.9	44.9	26.3	39.6	22.5	33.8	18.9	28.3	14.4	21.7
	20	27.0	40.5	23.8	35.7	20.3	30.5	17.0	25.5	13.0	19.6
	21	24.4	36.7	21.5	32.4	18.4	27.7	15.4	23.2	11.8	17.7
	22	22.3	33.5	19.6	29.5	16.8	25.2	14.1	21.1	10.8	16.2
	23	20.4	30.6	18.0	27.0	15.4	23.1	12.9	19.3	9.86	14.8
	24	18.7	28.1	16.5	24.8	14.1	21.2	11.8	17.7	9.05	13.6
	25					13.0	19.5	10.9	16.3	8.34	12.5
	26									7.71	11.6
Properties											
M_n/Ω_b	$\phi_b M_n$ kip-ft	16.6	24.9	14.6	22.0	12.4	18.7	9.92	14.9	7.12	10.7
$P_e(L_c)^2/10^4$, kip-in.^{2}		325		296		263		224		171	
r_m, in.		1.47		1.49		1.52		1.55		1.58	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS22–HSS20

Table 4-D
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS22×22×										HSS20×20×	
		1		⅞		¾		⅝		½		1	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.930	
Steel, lb/ft		277.07		244.88		212.00		178.41		144.13		249.85	
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, L_c (ft), with respect to the least radius of gyration, r	0	2770	4150	2560	3840	2360	3530	2140	3220	1930	2900	2420	3620
	1	2760	4150	2560	3840	2360	3530	2140	3220	1930	2900	2410	3620
	2	2760	4150	2560	3840	2350	3530	2140	3210	1930	2890	2410	3620
	3	2760	4140	2560	3840	2350	3530	2140	3210	1930	2890	2410	3620
	4	2760	4140	2560	3830	2350	3520	2140	3210	1920	2890	2410	3610
	5	2750	4130	2550	3830	2350	3520	2140	3200	1920	2880	2400	3610
	6	2750	4120	2550	3820	2340	3510	2130	3200	1920	2880	2400	3600
	7	2740	4120	2540	3810	2340	3510	2130	3190	1910	2870	2390	3590
	8	2740	4110	2540	3810	2330	3500	2120	3180	1910	2860	2390	3580
	9	2730	4090	2530	3790	2320	3490	2120	3170	1900	2850	2380	3570
	10	2720	4080	2520	3780	2320	3480	2110	3160	1900	2840	2370	3550
	11	2710	4070	2510	3770	2310	3460	2100	3150	1890	2830	2360	3540
	12	2700	4050	2500	3760	2300	3450	2090	3140	1880	2820	2350	3520
	13	2690	4040	2490	3740	2290	3440	2080	3130	1870	2810	2340	3500
	14	2680	4020	2480	3720	2280	3420	2070	3110	1860	2800	2320	3490
	15	2670	4000	2470	3710	2270	3400	2060	3100	1850	2780	2310	3470
	16	2650	3980	2460	3690	2260	3390	2050	3080	1840	2770	2300	3450
	17	2640	3960	2450	3670	2250	3370	2040	3060	1830	2750	2280	3420
	18	2620	3940	2430	3650	2230	3350	2030	3040	1820	2730	2270	3400
	19	2610	3910	2420	3630	2220	3330	2020	3030	1810	2720	2250	3380
	20	2590	3890	2400	3600	2210	3310	2000	3000	1800	2700	2230	3350
	21	2580	3860	2390	3580	2190	3290	1990	2980	1780	2680	2220	3320
	22	2560	3840	2370	3550	2170	3260	1970	2960	1770	2660	2200	3290
	23	2540	3810	2350	3530	2160	3240	1960	2940	1760	2640	2180	3270
	24	2520	3780	2330	3500	2140	3210	1940	2920	1740	2610	2160	3240
	25	2500	3750	2320	3470	2120	3190	1930	2890	1730	2590	2140	3200
	26	2480	3720	2300	3440	2110	3160	1910	2870	1710	2570	2120	3170
	27	2460	3690	2280	3420	2090	3130	1890	2840	1700	2540	2090	3140
	28	2440	3650	2260	3380	2070	3100	1880	2810	1680	2520	2070	3110
	29	2410	3620	2240	3350	2050	3070	1860	2790	1660	2490	2050	3070
	30	2390	3590	2210	3320	2030	3040	1840	2760	1640	2470	2020	3040
	32	2340	3520	2170	3260	1990	2980	1800	2700	1610	2410	1980	2960
	34	2290	3440	2120	3190	1950	2920	1760	2640	1570	2360	1930	2890
	36	2240	3360	2080	3110	1900	2850	1720	2580	1530	2300	1870	2810
	38	2190	3280	2030	3040	1850	2780	1680	2520	1490	2240	1820	2730
	40	2140	3200	1980	2960	1810	2710	1630	2450	1450	2180	1760	2650
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1630	2460	1470	2210	1290	1950	1110	1670	917	1380	1320	1990
$P_e(L_c)^2/10^4$, kip-in.^{2}		206000		190000		171000		152000		131000		148000	
r_m, in.		8.54		8.59		8.65		8.70		8.76		7.72	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS20

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS20×20×											
		⅞		¾		⅝		½		⅜		5/16	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		221.06		191.58		161.40		130.52		98.94		82.88	
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, L_c (ft), with respect to the least radius of gyration, r	0	2240	3350	2050	3070	1860	2790	1670	2500	1470	2200	1310	1970
	1	2240	3350	2050	3070	1860	2790	1670	2500	1470	2200	1310	1970
	2	2230	3350	2050	3070	1860	2790	1670	2500	1470	2200	1310	1970
	3	2230	3350	2050	3070	1860	2790	1660	2500	1470	2200	1310	1960
	4	2230	3340	2040	3060	1850	2780	1660	2490	1460	2200	1310	1960
	5	2230	3340	2040	3060	1850	2780	1660	2490	1460	2190	1300	1960
	6	2220	3330	2040	3050	1850	2770	1650	2480	1460	2190	1300	1950
	7	2210	3320	2030	3040	1840	2760	1650	2480	1450	2180	1300	1950
	8	2210	3310	2020	3040	1840	2760	1640	2470	1450	2170	1290	1940
	9	2200	3300	2020	3030	1830	2750	1640	2460	1440	2160	1290	1930
	10	2190	3290	2010	3010	1820	2740	1630	2450	1440	2150	1280	1920
	11	2180	3280	2000	3000	1820	2720	1630	2440	1430	2140	1280	1910
	12	2170	3260	1990	2990	1810	2710	1620	2430	1420	2130	1270	1910
	13	2160	3250	1980	2970	1800	2700	1610	2410	1410	2120	1260	1890
	14	2150	3230	1970	2960	1790	2680	1600	2400	1410	2110	1260	1880
	15	2140	3210	1960	2940	1780	2670	1590	2380	1400	2100	1250	1870
	16	2130	3190	1950	2920	1770	2650	1580	2370	1390	2080	1240	1860
	17	2110	3170	1940	2900	1750	2630	1570	2350	1380	2070	1230	1840
	18	2100	3150	1920	2880	1740	2610	1560	2340	1370	2050	1220	1830
	19	2080	3130	1910	2860	1730	2590	1540	2320	1350	2030	1210	1810
	20	2070	3100	1890	2840	1720	2570	1530	2300	1340	2010	1200	1800
	21	2050	3080	1880	2820	1700	2550	1520	2280	1330	2000	1190	1780
	22	2030	3050	1860	2790	1690	2530	1510	2260	1320	1980	1180	1760
	23	2020	3020	1850	2770	1670	2510	1490	2240	1300	1960	1160	1750
	24	2000	3000	1830	2740	1660	2480	1480	2210	1290	1940	1150	1730
	25	1980	2970	1810	2720	1640	2460	1460	2190	1280	1920	1140	1710
	26	1960	2940	1790	2690	1620	2430	1450	2170	1260	1890	1130	1690
	27	1940	2910	1770	2660	1600	2410	1430	2140	1250	1870	1110	1670
	28	1920	2880	1760	2630	1590	2380	1410	2120	1230	1850	1100	1650
	29	1900	2850	1740	2600	1570	2350	1400	2090	1220	1820	1080	1630
	30	1880	2810	1720	2570	1550	2320	1380	2070	1200	1800	1070	1610
	32	1830	2750	1670	2510	1510	2270	1340	2010	1170	1750	1040	1560
	34	1780	2680	1630	2450	1470	2210	1310	1960	1130	1700	1010	1520
	36	1740	2600	1590	2380	1430	2150	1270	1900	1100	1650	979	1470
	38	1690	2530	1540	2310	1390	2080	1230	1840	1060	1590	947	1420
	40	1640	2450	1490	2240	1340	2020	1190	1780	1030	1540	914	1370
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1190	1790	1050	1580	903	1360	749	1130	584	878	476	716
$P_e(L_c)^2/10^4$, kip-in.^{2}		138000		125000		110000		95100		79000		70000	
r_m, in.		7.77		7.84		7.88		7.95		8.00		8.03	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS18

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS18×18×											
		1		⅞		¾		⅝		½		⅜	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		222.63		197.24		171.16		144.39		116.91		88.73	
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, L_c (ft), with respect to the least radius of gyration, r	0	2080	3130	1930	2890	1760	2640	1590	2390	1420	2130	1240	1870
	1	2080	3130	1930	2890	1760	2640	1590	2390	1420	2130	1240	1860
	2	2080	3120	1920	2890	1760	2640	1590	2390	1420	2130	1240	1860
	3	2080	3120	1920	2880	1760	2640	1590	2380	1420	2130	1240	1860
	4	2080	3110	1920	2880	1760	2630	1590	2380	1420	2120	1240	1860
	5	2070	3110	1910	2870	1750	2630	1580	2370	1410	2120	1230	1850
	6	2070	3100	1910	2860	1750	2620	1580	2370	1410	2110	1230	1850
	7	2060	3090	1900	2850	1740	2610	1570	2360	1400	2110	1230	1840
	8	2050	3080	1900	2840	1740	2600	1570	2350	1400	2100	1220	1830
	9	2040	3070	1890	2830	1730	2590	1560	2340	1390	2090	1220	1820
	10	2030	3050	1880	2820	1720	2580	1550	2330	1390	2080	1210	1820
	11	2020	3040	1870	2810	1710	2570	1540	2320	1380	2070	1200	1800
	12	2010	3020	1860	2790	1700	2550	1540	2300	1370	2050	1200	1790
	13	2000	3000	1850	2770	1690	2540	1530	2290	1360	2040	1190	1780
	14	1990	2980	1840	2750	1680	2520	1520	2270	1350	2030	1180	1770
	15	1970	2960	1820	2740	1670	2500	1510	2260	1340	2010	1170	1750
	16	1960	2940	1810	2720	1660	2490	1490	2240	1330	2000	1160	1740
	17	1940	2910	1800	2690	1640	2470	1480	2220	1320	1980	1150	1720
	18	1930	2890	1780	2670	1630	2440	1470	2200	1310	1960	1140	1710
	19	1910	2860	1760	2650	1620	2420	1460	2180	1300	1940	1130	1690
	20	1890	2840	1750	2620	1600	2400	1440	2160	1280	1920	1120	1670
	21	1870	2810	1730	2600	1580	2380	1430	2140	1270	1900	1100	1650
	22	1850	2780	1710	2570	1570	2350	1410	2120	1260	1880	1090	1640
	23	1830	2750	1690	2540	1550	2330	1400	2100	1240	1860	1080	1620
	24	1810	2720	1680	2510	1530	2300	1380	2070	1230	1840	1060	1590
	25	1790	2680	1660	2480	1520	2270	1360	2050	1210	1820	1050	1570
	26	1770	2650	1640	2450	1500	2250	1350	2020	1200	1790	1030	1550
	27	1750	2620	1610	2420	1480	2220	1330	1990	1180	1770	1020	1530
	28	1720	2580	1590	2390	1460	2190	1310	1970	1160	1740	1000	1510
	29	1700	2550	1570	2360	1440	2160	1290	1940	1150	1720	989	1480
	30	1670	2510	1550	2320	1420	2130	1270	1910	1130	1690	974	1460
	32	1620	2440	1500	2250	1380	2060	1240	1850	1090	1640	941	1410
	34	1570	2360	1460	2180	1330	2000	1200	1790	1060	1590	908	1360
	36	1520	2280	1410	2110	1290	1930	1160	1730	1020	1530	874	1310
	38	1470	2200	1360	2040	1240	1870	1110	1670	983	1470	840	1260
	40	1410	2120	1310	1960	1200	1800	1070	1610	944	1420	805	1210
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1050	1570	944	1420	834	1250	719	1080	598	899	466	700
$P_e(L_c)^2/10^4$, kip-in.^{2}		103000		95900		88000		77700		67000		55200	
r_m, in.		6.90		6.96		7.02		7.07		7.13		7.18	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS18–HSS16

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS18×18×		HSS16×16×									
		5/16		1		7/8		3/4		5/8		1/2	
t_{des}, in.		0.291		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		74.38		195.40		173.43		150.75		127.37		103.30	
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, L_c (ft), with respect to the least radius of gyration, r	0	1150	1720	1770	2650	1630	2450	1490	2230	1340	2010	1190	1780
	1	1150	1720	1770	2650	1630	2440	1490	2230	1340	2010	1190	1780
	2	1150	1720	1770	2650	1630	2440	1490	2230	1340	2010	1190	1780
	3	1140	1720	1760	2650	1630	2440	1490	2230	1340	2010	1190	1780
	4	1140	1710	1760	2640	1620	2430	1480	2220	1340	2000	1180	1780
	5	1140	1710	1750	2630	1620	2430	1480	2220	1330	2000	1180	1770
	6	1140	1700	1750	2620	1610	2420	1470	2210	1330	1990	1180	1760
	7	1130	1700	1740	2610	1610	2410	1470	2200	1320	1980	1170	1760
	8	1130	1690	1730	2600	1600	2400	1460	2190	1320	1970	1170	1750
	9	1120	1680	1720	2590	1590	2390	1450	2180	1310	1960	1160	1740
	10	1120	1670	1710	2570	1580	2370	1440	2170	1300	1950	1150	1730
	11	1110	1660	1700	2550	1570	2360	1440	2150	1290	1940	1140	1720
	12	1100	1650	1690	2540	1560	2340	1430	2140	1280	1930	1140	1700
	13	1090	1640	1680	2520	1550	2320	1410	2120	1270	1910	1130	1690
	14	1090	1630	1660	2500	1530	2300	1400	2100	1260	1900	1120	1680
	15	1080	1620	1650	2470	1520	2280	1390	2090	1250	1880	1110	1660
	16	1070	1600	1630	2450	1510	2260	1380	2070	1240	1860	1100	1650
	17	1060	1590	1620	2420	1490	2240	1360	2050	1230	1840	1090	1630
	18	1050	1570	1600	2400	1480	2210	1350	2020	1210	1820	1070	1610
	19	1040	1560	1580	2370	1460	2190	1330	2000	1200	1800	1060	1590
	20	1030	1540	1560	2340	1440	2160	1320	1980	1190	1780	1050	1570
	21	1010	1520	1540	2310	1420	2130	1300	1950	1170	1760	1030	1550
	22	1000	1500	1520	2280	1400	2110	1280	1930	1160	1730	1020	1530
	23	989	1480	1500	2250	1380	2080	1270	1900	1140	1710	1010	1510
	24	976	1460	1480	2220	1370	2050	1250	1870	1120	1690	991	1490
	25	963	1440	1460	2180	1340	2020	1230	1850	1110	1660	976	1460
	26	949	1420	1430	2150	1320	1990	1210	1820	1090	1640	960	1440
	27	935	1400	1410	2110	1300	1950	1190	1790	1070	1610	944	1420
	28	920	1380	1380	2080	1280	1920	1170	1760	1050	1580	928	1390
	29	906	1360	1360	2040	1260	1890	1150	1730	1040	1550	911	1370
	30	891	1340	1340	2000	1240	1850	1130	1700	1020	1530	895	1340
	32	860	1290	1290	1930	1190	1780	1090	1630	979	1470	860	1290
	34	829	1240	1230	1850	1140	1710	1050	1570	940	1410	825	1240
	36	797	1200	1180	1770	1090	1640	1000	1500	901	1350	789	1180
	38	765	1150	1130	1690	1040	1570	957	1440	861	1290	753	1130
	40	732	1100	1070	1610	996	1490	912	1370	820	1230	717	1070
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	391	588	805	1210	726	1090	643	967	555	834	463	696
$P_e(L_c)^2/10^4$, kip-in.^{2}		49200		68400		63700		58600		52600		45300	
r_m, in.		7.21		6.09		6.14		6.19		6.25		6.31	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS16–HSS14

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS16×16×						HSS14×14×					
		3/8		5/16		1/4		1		7/8		3/4	
t_{des}, in.		0.349		0.291		0.233		0.930		0.814		0.698	
Steel, lb/ft		78.52		65.87		53.05		168.18		149.61		130.33	
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, L_c (ft), with respect to the least radius of gyration, r	0	1030	1550	957	1440	841	1260	1470	2210	1350	2030	1230	1850
	1	1030	1550	957	1440	841	1260	1470	2210	1350	2030	1230	1850
	2	1030	1550	956	1430	840	1260	1470	2200	1350	2030	1230	1850
	3	1030	1550	954	1430	839	1260	1470	2200	1350	2020	1230	1840
	4	1030	1540	952	1430	837	1260	1460	2190	1350	2020	1230	1840
	5	1030	1540	949	1420	834	1250	1460	2180	1340	2010	1220	1830
	6	1020	1530	946	1420	831	1250	1450	2170	1330	2000	1220	1820
	7	1020	1530	941	1410	827	1240	1440	2160	1330	1990	1210	1820
	8	1010	1520	936	1400	823	1230	1430	2150	1320	1980	1200	1800
	9	1010	1510	931	1400	818	1230	1420	2140	1310	1970	1190	1790
	10	1000	1500	925	1390	812	1220	1410	2120	1300	1950	1190	1780
	11	994	1490	918	1380	806	1210	1400	2100	1290	1930	1180	1760
	12	986	1480	911	1370	800	1200	1390	2080	1280	1920	1160	1750
	13	978	1470	903	1350	793	1190	1370	2060	1260	1900	1150	1730
	14	969	1450	894	1340	785	1180	1360	2040	1250	1880	1140	1710
	15	960	1440	885	1330	777	1170	1340	2010	1240	1850	1130	1690
	16	950	1420	876	1310	769	1150	1320	1990	1220	1830	1110	1670
	17	940	1410	866	1300	760	1140	1310	1960	1200	1810	1100	1650
	18	929	1390	855	1280	751	1130	1290	1930	1190	1780	1080	1630
	19	917	1380	844	1270	741	1110	1270	1900	1170	1750	1070	1600
	20	905	1360	833	1250	731	1100	1250	1870	1150	1730	1050	1580
	21	893	1340	821	1230	720	1080	1230	1840	1130	1700	1030	1550
	22	880	1320	809	1210	709	1060	1210	1810	1110	1670	1020	1520
	23	867	1300	796	1190	698	1050	1180	1780	1090	1640	998	1500
	24	854	1280	784	1180	687	1030	1160	1740	1070	1610	979	1470
	25	840	1260	770	1160	675	1010	1140	1710	1050	1580	960	1440
	26	826	1240	757	1140	663	995	1110	1670	1030	1540	940	1410
	27	811	1220	743	1110	651	976	1090	1640	1010	1510	921	1380
	28	796	1190	729	1090	638	957	1070	1600	985	1480	901	1350
	29	781	1170	715	1070	626	938	1040	1560	962	1440	880	1320
	30	766	1150	700	1050	613	919	1020	1520	940	1410	860	1290
	32	735	1100	670	1010	586	880	966	1450	894	1340	818	1230
	34	703	1050	640	960	560	840	915	1370	847	1270	775	1160
	36	671	1010	610	915	533	799	863	1300	800	1200	733	1100
	38	639	958	579	869	506	759	812	1220	753	1130	691	1040
	40	606	909	549	823	479	718	762	1140	707	1060	649	973
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	363	546	310	466	244	367	596	895	539	810	480	721
$P_e(L_c)^2/10^4$, kip-in.^{2}		37300		33200		28800		43100		40200		37000	
r_m, in.		6.37		6.39		6.42		5.27		5.33		5.38	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS14–HSS12

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14×14×										HSS12×12×	
		5/8		1/2		3/8		5/16		1/4		1	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.930	
Steel, lb/ft		110.36		89.68		68.31		57.36		46.24		140.96	
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, L_c (ft), with respect to the least radius of gyration, r	0	1110	1660	978	1470	843	1260	775	1160	705	1060	1190	1790
	1	1110	1660	977	1470	843	1260	775	1160	705	1060	1190	1790
	2	1110	1660	976	1460	842	1260	774	1160	704	1060	1190	1780
	3	1100	1650	974	1460	840	1260	772	1160	702	1050	1190	1780
	4	1100	1650	971	1460	838	1260	769	1150	700	1050	1180	1770
	5	1100	1640	968	1450	834	1250	766	1150	697	1050	1170	1760
	6	1090	1640	963	1450	830	1250	763	1140	693	1040	1170	1750
	7	1090	1630	958	1440	826	1240	758	1140	689	1030	1160	1740
	8	1080	1620	953	1430	821	1230	753	1130	684	1030	1150	1720
	9	1070	1610	946	1420	815	1220	748	1120	679	1020	1140	1710
	10	1060	1600	939	1410	808	1210	742	1110	673	1010	1130	1690
	11	1050	1580	931	1400	801	1200	735	1100	667	1000	1110	1670
	12	1050	1570	922	1380	793	1190	727	1090	660	989	1100	1650
	13	1030	1550	913	1370	785	1180	719	1080	652	978	1080	1620
	14	1020	1540	903	1350	776	1160	711	1070	644	966	1070	1600
	15	1010	1520	892	1340	766	1150	702	1050	635	953	1050	1570
	16	1000	1500	881	1320	756	1130	692	1040	626	939	1030	1540
	17	987	1480	869	1300	746	1120	682	1020	617	925	1010	1520
	18	973	1460	857	1290	735	1100	672	1010	607	910	990	1490
	19	959	1440	844	1270	723	1090	661	991	596	895	969	1450
	20	944	1420	831	1250	711	1070	650	975	586	879	948	1420
	21	929	1390	817	1230	699	1050	638	957	575	862	926	1390
	22	913	1370	803	1200	686	1030	626	939	563	845	903	1360
	23	897	1340	789	1180	673	1010	614	921	552	828	881	1320
	24	880	1320	774	1160	660	990	601	902	540	810	860	1290
	25	863	1290	758	1140	647	970	588	883	528	792	838	1260
	26	846	1270	743	1110	633	949	575	863	515	773	815	1230
	27	828	1240	727	1090	619	928	562	843	503	754	792	1190
	28	810	1210	711	1070	604	906	549	823	490	735	770	1160
	29	792	1190	695	1040	590	885	535	803	478	716	747	1120
	30	773	1160	678	1020	575	863	521	782	465	697	724	1090
	32	736	1100	645	967	546	819	494	740	439	658	677	1020
	34	698	1050	611	917	516	774	466	699	413	619	632	949
	36	660	990	577	866	486	729	438	657	387	580	586	881
	38	622	934	544	816	457	685	410	615	361	542	542	814
	40	585	877	510	766	427	641	383	574	336	504	499	750
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	415	623	346	521	272	410	233	350	190	286	416	626
$P_e(L_c)^2/10^4$, kip-in.^{2}		33500		29000		23900		21200		18300		25100	
r_m, in.		5.44		5.49		5.55		5.58		5.60		4.45	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS12

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12×12×											
		⅞		¾		⅝		½		⅜		5/16	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		125.79		109.91		93.34		76.07		58.10		48.86	
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, L_c (ft), with respect to the least radius of gyration, r	0	1090	1640	996	1490	891	1340	783	1170	671	1010	612	918
	1	1090	1640	995	1490	891	1340	782	1170	671	1010	612	917
	2	1090	1640	993	1490	890	1330	781	1170	670	1000	610	916
	3	1090	1630	991	1490	887	1330	779	1170	668	1000	609	913
	4	1090	1630	987	1480	884	1330	776	1160	665	998	606	909
	5	1080	1620	982	1470	879	1320	772	1160	662	993	603	905
	6	1070	1610	976	1460	874	1310	767	1150	658	987	599	899
	7	1070	1600	969	1450	868	1300	762	1140	653	979	595	892
	8	1060	1580	961	1440	861	1290	756	1130	647	971	589	884
	9	1050	1570	952	1430	853	1280	749	1120	641	962	584	876
	10	1040	1550	942	1410	844	1270	741	1110	634	952	577	866
	11	1020	1530	931	1400	834	1250	733	1100	627	940	570	855
	12	1010	1510	919	1380	824	1240	724	1090	619	928	563	844
	13	996	1490	907	1360	813	1220	714	1070	610	915	555	832
	14	981	1470	893	1340	801	1200	703	1060	601	901	546	819
	15	965	1450	879	1320	788	1180	692	1040	591	887	537	805
	16	948	1420	864	1300	775	1160	681	1020	581	871	527	791
	17	931	1400	848	1270	761	1140	669	1000	570	855	517	776
	18	913	1370	832	1250	747	1120	656	984	559	838	507	760
	19	894	1340	815	1220	732	1100	643	965	547	821	496	744
	20	875	1310	798	1200	716	1070	630	944	535	803	485	727
	21	855	1280	780	1170	700	1050	616	924	523	785	473	710
	22	834	1250	761	1140	684	1030	601	902	511	766	462	692
	23	814	1220	743	1110	667	1000	587	880	498	747	450	674
	24	792	1190	724	1090	650	976	572	858	485	727	437	656
	25	771	1160	704	1060	633	950	557	836	472	707	425	638
	26	749	1120	685	1030	616	924	542	813	458	687	413	619
	27	727	1090	665	997	598	897	526	790	445	667	400	600
	28	705	1060	645	967	580	871	511	766	431	647	388	581
	29	683	1020	625	937	563	844	495	743	417	626	375	562
	30	661	991	605	907	545	817	480	720	404	606	362	543
	32	616	924	565	847	509	763	448	673	376	565	337	505
	34	572	858	525	787	474	710	417	626	349	524	312	468
	36	531	798	486	728	439	658	387	580	323	484	288	431
	38	492	739	447	671	404	607	357	535	297	445	264	396
	40	454	682	410	615	371	557	328	492	272	408	241	361
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	380	571	341	512	296	445	247	372	195	294	168	252
$P_e(L_c)^2/10^4$, kip-in.^{2}		23500		21700		19600		17400		14300		12700	
r_m, in.		4.51		4.56		4.62		4.68		4.73		4.76	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS12–HSS10

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12×12×				HSS10×10×							
		¼		3/16		¾		⅝		½		3/8	
t_{des}, in.		0.233		0.174		0.698		0.581		0.465		0.349	
Steel, lb/ft		39.43		29.84		89.50		76.33		62.46		47.90	
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, L_c (ft), with respect to the least radius of gyration, r	0	553	829	471	706	774	1160	690	1040	604	907	514	770
	1	552	828	470	706	773	1160	690	1030	604	906	513	770
	2	551	827	470	704	771	1160	688	1030	603	904	512	768
	3	550	824	468	702	768	1150	685	1030	600	900	510	765
	4	547	821	466	699	764	1150	682	1020	597	895	507	761
	5	544	816	463	695	758	1140	677	1020	593	889	504	755
	6	541	811	460	690	752	1130	671	1010	588	881	499	749
	7	536	804	457	685	744	1120	664	996	582	872	494	741
	8	531	797	452	678	735	1100	656	984	575	862	488	732
	9	526	789	448	671	725	1090	647	971	567	851	482	723
	10	520	780	442	663	714	1070	638	956	559	838	475	712
	11	513	770	436	655	702	1050	627	940	550	824	467	700
	12	506	759	430	645	689	1030	616	923	540	810	458	687
	13	498	748	424	635	675	1010	603	905	529	794	449	674
	14	490	735	416	625	660	990	591	886	518	777	440	660
	15	482	723	409	614	645	967	577	866	506	760	430	645
	16	473	709	401	602	629	943	563	845	494	741	419	629
	17	463	695	393	589	612	918	548	823	482	722	408	613
	18	453	680	384	577	595	892	533	800	469	703	397	596
	19	443	665	376	564	577	866	518	777	455	683	386	579
	20	433	649	367	550	559	839	502	753	441	662	374	561
	21	422	633	357	536	541	812	486	729	427	641	362	543
	22	411	617	348	522	523	784	470	704	413	620	350	525
	23	400	600	338	507	504	756	453	679	399	598	338	507
	24	389	583	328	493	485	727	436	654	384	577	325	488
	25	377	566	319	478	466	699	420	629	370	555	313	469
	26	366	549	309	463	447	671	403	604	355	533	301	451
	27	354	531	299	448	428	644	386	579	341	511	288	432
	28	343	514	288	433	411	618	370	555	326	490	276	414
	29	331	496	278	418	394	592	353	530	312	468	264	396
	30	319	479	268	402	377	567	337	506	298	447	252	377
	32	296	444	248	372	344	516	305	458	270	405	228	342
	34	273	409	229	343	311	468	275	412	244	365	205	308
	36	251	376	210	314	280	420	245	368	218	327	184	275
	38	229	344	191	287	251	377	220	330	196	293	165	247
	40	208	312	173	259	227	341	199	298	176	265	149	223
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	139	208	102	154	225	338	196	295	165	249	131	197
$P_e(L_c)^2/10^4$, kip-in.^{2}		10900		9080		11500		10400		9270		7810	
r_m, in.		4.79		4.82		3.75		3.80		3.86		3.92	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS10–HSS9

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS10×10×						HSS9×9×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		40.35		32.63		24.73		67.82		55.66		42.79	
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, L_c (ft), with respect to the least radius of gyration, r	0	466	699	417	626	367	550	597	896	520	781	441	662
	1	465	698	417	625	367	550	597	895	520	780	441	661
	2	464	696	416	623	366	548	595	893	518	778	440	659
	3	462	694	414	621	364	546	592	888	516	774	437	656
	4	460	690	411	617	362	542	588	882	512	769	434	652
	5	456	685	408	612	359	538	583	874	508	762	431	646
	6	452	679	405	607	355	533	576	865	503	754	426	639
	7	448	671	400	600	351	527	569	854	496	744	421	631
	8	442	663	395	593	346	520	561	841	489	734	415	622
	9	436	654	389	584	341	512	551	827	481	722	408	612
	10	429	644	383	575	335	503	541	812	472	708	401	601
	11	422	633	376	565	329	494	530	795	463	694	393	589
	12	414	621	369	554	322	483	518	777	453	679	384	576
	13	406	609	361	542	315	473	505	758	442	662	375	562
	14	397	596	353	530	308	461	492	738	430	645	365	548
	15	388	582	345	517	300	449	478	717	418	627	355	532
	16	378	567	336	504	291	437	463	695	406	609	345	517
	17	368	552	327	490	283	424	449	673	393	590	334	501
	18	358	537	317	476	274	411	433	650	380	570	323	484
	19	347	521	307	461	265	398	418	626	366	550	311	467
	20	336	505	297	446	256	384	402	603	353	529	300	450
	21	325	488	287	431	247	370	386	579	339	509	288	432
	22	314	471	277	415	237	356	370	554	325	488	276	415
	23	303	454	267	400	228	342	353	530	311	467	265	397
	24	291	437	256	384	218	328	337	506	297	446	253	379
	25	280	420	246	369	209	313	321	482	283	425	241	362
	26	269	403	235	353	200	299	306	458	270	405	230	344
	27	257	386	225	338	190	285	290	435	256	384	218	327
	28	246	369	215	322	181	272	274	412	243	364	207	310
	29	235	352	205	307	172	258	260	391	230	345	196	294
	30	224	336	195	292	163	245	247	371	217	325	185	277
	32	202	304	175	263	146	219	220	331	192	288	164	245
	34	182	273	156	235	129	194	195	293	170	255	145	217
	36	162	243	140	209	115	173	174	262	152	227	129	194
	38	145	218	125	188	104	155	156	235	136	204	116	174
	40	131	197	113	170	93.4	140	141	212	123	184	105	157
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	113	170	93.9	141	72.8	109	155	233	131	197	104	157
$P_e(L_c)^2/10^4$, kip-in.^{2}		6900		5940		4910		7260		6450		5500	
r_m, in.		3.94		3.97		4.00		3.40		3.45		3.51	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS9–HSS8

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS9×9×						HSS8×8×					
		5/16		1/4		3/16		5/8		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		36.10		29.23		22.18		59.32		48.85		37.69	
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, L_c (ft), with respect to the least radius of gyration, r	0	398	598	355	533	311	466	509	763	443	665	373	560
	1	398	597	355	533	310	465	508	762	443	664	373	559
	2	397	595	354	531	309	464	506	759	441	662	371	557
	3	395	592	352	528	307	461	503	754	438	658	369	554
	4	392	588	350	524	305	458	498	748	435	652	366	549
	5	389	583	346	520	302	453	493	739	430	645	362	543
	6	385	577	343	514	299	448	486	729	424	636	357	536
	7	380	569	338	507	294	442	478	717	417	626	351	527
	8	374	561	333	499	290	435	469	703	409	614	345	518
	9	368	552	327	491	284	427	459	688	401	601	338	507
	10	361	541	321	481	279	418	448	672	391	587	330	495
	11	354	530	314	471	272	408	436	654	381	572	322	483
	12	346	518	307	460	266	398	423	635	371	556	313	469
	13	337	506	299	449	259	388	410	615	359	539	303	455
	14	328	492	291	436	251	377	396	594	347	521	294	440
	15	319	479	282	424	243	365	382	573	335	502	283	425
	16	309	464	274	410	235	353	367	550	322	483	273	409
	17	300	449	264	397	227	340	352	528	309	464	262	393
	18	289	434	255	383	219	328	336	505	296	444	251	377
	19	279	418	246	369	210	315	321	482	283	424	240	360
	20	268	403	236	354	201	302	307	461	269	404	229	343
	21	258	387	226	340	192	289	292	439	256	384	218	326
	22	247	371	217	325	184	276	278	417	243	364	206	310
	23	236	354	207	310	175	262	263	396	229	344	195	293
	24	226	338	197	296	166	249	249	374	216	325	185	277
	25	215	322	188	281	158	236	235	353	204	305	174	261
	26	204	307	178	267	149	224	221	333	191	287	163	245
	27	194	291	169	253	141	211	208	313	179	268	153	230
	28	184	276	159	239	133	199	195	293	167	250	143	214
	29	174	260	150	226	125	187	182	274	155	233	133	200
	30	164	246	142	212	117	175	170	256	145	218	125	187
	32	145	217	125	187	103	154	149	225	128	191	109	164
	34	128	192	110	166	90.9	136	132	199	113	170	96.9	145
	36	114	171	98.4	148	81.1	122	118	177	101	151	86.5	130
	38	103	154	88.3	133	72.8	109	106	159	90.5	136	77.6	116
	40	92.6	139	79.7	120	65.7	98.5	95.6	144	81.7	123	70.0	105
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	89.9	135	74.6	112	58.2	87.5	118	178	101	151	80.5	121
$P_e(L_c)^2/10^4$, kip-in.^{2}		4860		4190		3450		4800		4290		3680	
r_m, in.		3.54		3.56		3.59		2.99		3.04		3.10	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS8–HSS7

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS8×8×								HSS7×7×			
		5/16		1/4		3/16		1/8		5/8		1/2	
t_{des}, in.		0.291		0.233		0.174		0.116		0.581		0.465	
Steel, lb/ft		31.84		25.82		19.63		13.26		50.81		42.05	
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, L_c (ft), with respect to the least radius of gyration, r	0	336	504	298	447	259	388	209	314	422	633	368	552
	1	335	503	298	446	258	387	209	313	421	632	367	551
	2	334	501	297	445	257	386	208	312	419	628	365	548
	3	332	498	295	442	256	383	207	310	415	623	362	544
	4	329	494	292	438	253	380	205	307	411	616	358	537
	5	326	488	289	433	250	375	202	303	404	606	353	530
	6	321	482	285	427	246	370	199	298	397	595	347	520
	7	316	474	280	420	242	363	195	293	388	583	339	509
	8	310	465	275	412	237	356	191	287	379	569	331	497
	9	304	456	269	403	232	348	187	280	369	554	322	483
	10	297	445	263	394	226	339	182	273	358	538	312	468
	11	289	434	256	383	220	330	176	265	346	520	301	452
	12	281	422	248	372	213	320	171	256	334	502	290	435
	13	273	409	241	361	206	309	165	247	321	482	278	418
	14	264	396	232	349	199	298	159	238	307	462	266	400
	15	255	382	224	336	191	287	152	229	294	441	254	381
	16	245	367	215	323	184	275	146	219	280	420	241	362
	17	235	353	207	310	176	263	139	209	265	399	229	343
	18	225	338	198	296	168	251	133	199	251	377	216	324
	19	215	323	189	283	159	239	126	189	237	356	203	304
	20	205	308	179	269	151	227	119	179	223	335	190	286
	21	195	293	170	256	143	215	113	169	209	314	178	267
	22	185	278	161	242	135	203	106	159	195	293	166	250
	23	175	263	152	229	127	191	99.4	149	182	273	155	233
	24	165	248	144	215	120	179	93.1	140	169	253	145	217
	25	156	233	135	202	112	168	86.9	130	156	234	134	201
	26	146	219	126	190	105	157	80.8	121	144	216	124	186
	27	137	205	118	177	97.2	146	74.9	112	133	201	115	173
	28	128	191	110	165	90.4	136	69.7	104	124	186	107	161
	29	119	179	103	154	84.3	126	64.9	97.4	116	174	99.6	150
	30	111	167	95.8	144	78.7	118	60.7	91.0	108	162	93.1	140
	32	97.7	147	84.2	126	69.2	104	53.3	80.0	95.0	143	81.8	123
	34	86.6	130	74.6	112	61.3	92.0	47.2	70.9	84.1	126	72.4	109
	36	77.2	116	66.5	99.8	54.7	82.0	42.1	63.2	75.1	113	64.6	97.1
	38	69.3	104	59.7	89.6	49.1	73.6	37.8	56.7	67.4	101	58.0	87.2
	40	62.6	93.8	53.9	80.9	44.3	66.4	34.1	51.2	60.8	91.4	52.3	78.7
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	69.6	105	57.9	87.0	45.3	68.1	30.4	45.7	86.9	131	74.2	112
$P_e(L_c)^2/10^4$, kip-in.^{2}		3290		2830		2330		1790		3000		2690	
r_m, in.		3.13		3.15		3.18		3.21		2.58		2.63	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS7–HSS6

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS7×7×										HSS6×6×	
		3/8		5/16		1/4		3/16		1/8		5/8	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.581	
Steel, lb/ft		32.58		27.59		22.42		17.08		11.56		42.30	
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, L_c (ft), with respect to the least radius of gyration, r	0	308	463	277	416	245	367	211	316	176	264	350	526
	1	308	462	277	415	244	367	210	316	176	263	350	525
	2	306	460	275	413	243	365	209	314	175	262	347	522
	3	304	456	273	410	241	362	208	311	173	259	343	516
	4	301	451	270	405	239	358	205	308	171	256	338	508
	5	296	444	266	399	235	353	202	303	168	252	331	498
	6	291	437	262	392	231	346	198	297	165	247	323	486
	7	285	428	256	384	226	339	194	291	161	241	314	472
	8	278	417	250	375	221	331	189	283	156	234	304	456
	9	271	406	244	365	215	322	184	275	151	227	292	439
	10	263	394	236	354	208	312	178	267	146	219	280	421
	11	254	381	228	343	201	302	172	257	141	211	267	402
	12	245	367	220	330	194	291	165	247	135	202	254	382
	13	235	353	212	317	186	279	158	237	129	193	240	361
	14	225	338	203	304	178	267	151	226	122	183	226	340
	15	215	322	194	290	170	255	144	216	116	174	212	318
	16	204	307	184	276	162	242	136	204	109	164	198	297
	17	194	291	175	262	153	230	129	193	103	154	184	276
	18	183	275	165	248	145	217	121	182	96.4	145	170	255
	19	173	259	156	234	136	204	114	171	90.1	135	156	235
	20	162	243	146	220	128	192	107	160	83.8	126	143	215
	21	152	228	137	206	120	179	99.5	149	77.6	116	130	196
	22	142	213	128	192	112	167	92.5	139	71.7	108	119	179
	23	132	198	119	179	104	155	85.6	128	65.8	98.7	109	163
	24	122	183	111	166	96.0	144	78.9	118	60.4	90.7	99.8	150
	25	113	169	102	153	88.5	133	72.7	109	55.7	83.6	92.0	138
	26	104	156	94.3	142	81.8	123	67.2	101	51.5	77.3	85.1	128
	27	96.7	145	87.5	131	75.9	114	62.3	93.5	47.8	71.6	78.9	119
	28	89.9	135	81.3	122	70.5	106	58.0	87.0	44.4	66.6	73.4	110
	29	83.8	126	75.8	114	65.8	98.6	54.0	81.1	41.4	62.1	68.4	103
	30	78.3	117	70.9	106	61.4	92.2	50.5	75.7	38.7	58.0	63.9	96.0
	32	68.8	103	62.3	93.4	54.0	81.0	44.4	66.6	34.0	51.0	56.2	84.4
	34	61.0	91.4	55.2	82.7	47.8	71.8	39.3	59.0	30.1	45.2	49.7	74.8
	36	54.4	81.6	49.2	73.8	42.7	64.0	35.1	52.6	26.9	40.3	44.4	66.7
	38	48.8	73.2	44.2	66.2	38.3	57.4	31.5	47.2	24.1	36.2		
	40	44.0	66.1	39.9	59.8	34.6	51.8	28.4	42.6	21.8	32.6		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	59.9	90.0	51.9	78.0	43.3	65.1	34.0	51.1	23.7	35.6	60.4	90.7
$P_e(L_c)^2/10^4$, kip-in.^{2}		2310		2090		1820		1490		1140		1730	
r_m, in.		2.69		2.72		2.75		2.77		2.80		2.17	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS6

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS6×6×											
		½		⅜		5⁄16		¼		3⁄16		⅛	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174		0.116	
Steel, lb/ft		35.24		27.48		23.34		19.02		14.53		9.86	
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, L_c (ft), with respect to the least radius of gyration, r	0	298	447	249	374	223	334	196	294	167	251	138	207
	1	297	446	248	373	222	334	196	293	167	250	138	207
	2	295	443	247	370	221	332	194	291	166	249	137	205
	3	292	438	244	366	219	328	192	288	164	246	135	203
	4	287	431	240	361	215	323	189	284	161	242	133	199
	5	281	422	236	353	211	317	186	278	158	237	130	195
	6	274	411	230	345	206	309	181	272	154	231	127	190
	7	266	399	223	335	200	300	176	264	150	225	123	184
	8	257	386	216	324	194	291	170	256	145	217	118	177
	9	247	371	208	312	187	280	164	246	139	209	113	170
	10	237	355	200	299	179	269	158	236	134	200	108	162
	11	226	339	191	286	171	257	151	226	127	191	103	154
	12	215	323	181	272	163	244	143	215	121	181	97.3	146
	13	204	306	171	257	154	231	136	203	114	171	91.5	137
	14	193	289	161	242	145	218	128	192	108	161	85.7	129
	15	181	272	151	227	136	204	120	180	101	151	79.8	120
	16	170	255	141	212	127	191	112	168	93.9	141	74.0	111
	17	158	238	131	197	119	178	104	157	87.2	131	68.3	102
	18	147	221	122	182	110	165	96.8	145	80.6	121	62.7	94.1
	19	136	204	112	168	101	152	89.3	134	74.1	111	57.3	86.0
	20	125	188	103	154	93.0	139	82.0	123	67.9	102	52.0	78.0
	21	115	172	93.7	141	84.9	127	74.9	112	61.7	92.6	47.2	70.8
	22	104	157	85.4	128	77.3	116	68.3	102	56.2	84.4	43.0	64.5
	23	95.6	144	78.1	117	70.8	106	62.5	93.7	51.5	77.2	39.3	59.0
	24	87.8	132	71.7	108	65.0	97.5	57.4	86.1	47.3	70.9	36.1	54.2
	25	80.9	122	66.1	99.2	59.9	89.8	52.9	79.3	43.6	65.3	33.3	49.9
	26	74.8	112	61.1	91.7	55.4	83.0	48.9	73.3	40.3	60.4	30.8	46.2
	27	69.4	104	56.7	85.0	51.3	77.0	45.3	68.0	37.3	56.0	28.5	42.8
	28	64.5	96.9	52.7	79.0	47.7	71.6	42.1	63.2	34.7	52.1	26.5	39.8
	29	60.1	90.4	49.1	73.7	44.5	66.8	39.3	58.9	32.4	48.6	24.7	37.1
	30	56.2	84.4	45.9	68.9	41.6	62.4	36.7	55.1	30.2	45.4	23.1	34.7
	32	49.4	74.2	40.3	60.5	36.5	54.8	32.3	48.4	26.6	39.9	20.3	30.5
	34	43.7	65.7	35.7	53.6	32.4	48.6	28.6	42.9	23.6	35.3	18.0	27.0
	36	39.0	58.6	31.9	47.8	28.9	43.3	25.5	38.2	21.0	31.5	16.1	24.1
	38					25.9	38.9	22.9	34.3	18.9	28.3	14.4	21.6
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	52.2	78.4	42.4	63.7	36.9	55.5	30.9	46.5	24.4	36.6	17.2	25.9
$P_e(L_c)^2/10^4$, kip-in.^{2}		1570		1360		1230		1090		894		683	
r_m, in.		2.23		2.28		2.31		2.34		2.37		2.39	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS5½–HSS5

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS5½×5½×										HSS5×5×	
		⅜		5/16		¼		3/16		⅛		½	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.465	
Steel, lb/ft		24.93		21.21		17.32		13.25		9.01		28.43	
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, L_c (ft), with respect to the least radius of gyration, r	0	221	331	197	296	173	260	147	221	120	181	236	355
	1	220	330	197	295	173	259	147	220	120	180	235	353
	2	218	328	195	293	171	257	146	218	119	179	233	350
	3	216	323	193	289	169	254	144	215	117	176	229	345
	4	212	317	189	284	166	249	141	211	115	173	224	337
	5	207	310	185	277	162	243	138	207	112	168	218	328
	6	201	301	180	270	158	236	134	201	109	163	210	316
	7	194	291	174	261	152	229	129	194	105	157	202	303
	8	186	279	167	251	147	220	124	186	100	151	192	289
	9	178	267	160	240	140	210	119	178	95.6	143	182	274
	10	169	254	152	228	134	200	113	169	90.6	136	172	258
	11	160	240	144	216	126	190	107	160	85.3	128	161	241
	12	151	226	135	203	119	179	100	151	79.9	120	149	224
	13	141	211	127	190	112	168	94.0	141	74.4	112	138	207
	14	131	197	118	177	104	156	87.5	131	68.9	103	127	190
	15	121	182	110	164	96.6	145	81.1	122	63.4	95.1	115	173
	16	112	168	101	152	89.2	134	74.7	112	58.0	87.1	105	157
	17	102	154	92.6	139	81.9	123	68.4	103	52.8	79.2	94.2	142
	18	93.6	141	84.5	127	74.8	112	62.4	93.6	47.8	71.7	84.1	126
	19	85.6	129	76.7	115	68.0	102	56.5	84.7	42.9	64.4	75.5	113
	20	77.7	117	69.2	104	61.3	92.0	51.0	76.5	38.8	58.1	68.1	102
	21	70.5	106	62.8	94.1	55.6	83.5	46.2	69.3	35.2	52.7	61.8	92.9
	22	64.2	96.5	57.2	85.8	50.7	76.0	42.1	63.2	32.0	48.0	56.3	84.6
	23	58.7	88.3	52.3	78.5	46.4	69.6	38.5	57.8	29.3	44.0	51.5	77.4
	24	53.9	81.1	48.1	72.1	42.6	63.9	35.4	53.1	26.9	40.4	47.3	71.1
	25	49.7	74.7	44.3	66.4	39.3	58.9	32.6	48.9	24.8	37.2	43.6	65.5
	26	46.0	69.1	40.9	61.4	36.3	54.4	30.2	45.2	22.9	34.4	40.3	60.6
	27	42.6	64.1	38.0	57.0	33.7	50.5	28.0	42.0	21.3	31.9	37.4	56.2
	28	39.6	59.6	35.3	53.0	31.3	46.9	26.0	39.0	19.8	29.7	34.8	52.2
	29	36.9	55.5	32.9	49.4	29.2	43.8	24.2	36.4	18.4	27.6	32.4	48.7
	30	34.5	51.9	30.8	46.1	27.3	40.9	22.7	34.0	17.2	25.8	30.3	45.5
	32	30.3	45.6	27.0	40.5	24.0	35.9	19.9	29.9	15.1	22.7		
	34	26.9	40.4	23.9	35.9	21.2	31.8	17.6	26.5	13.4	20.1		
	36							15.7	23.6	12.0	17.9		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	34.9	52.5	30.5	45.8	25.6	38.4	20.2	30.3	14.3	21.5	34.2	51.3
$P_e(L_c)^2/10^4$, kip-in.^{2}		1000		909		806		670		509		821	
r_m, in.		2.08		2.11		2.13		2.16		2.19		1.82	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS5–HSS4½

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS5×5×										HSS4½×4½×	
		3/8		5/16		1/4		3/16		1/8		1/2	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.465	
Steel, lb/ft		22.37		19.08		15.62		11.97		8.16		25.03	
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, L_c (ft), with respect to the least radius of gyration, r	0	194	290	173	259	151	227	128	192	104	156	208	313
	1	193	289	172	258	151	226	128	191	104	156	207	311
	2	191	287	171	256	149	224	126	189	103	154	205	308
	3	188	282	168	252	147	220	124	187	101	151	201	302
	4	184	276	164	246	144	216	122	182	98.6	148	195	293
	5	179	268	160	239	140	209	118	177	95.6	143	188	283
	6	172	258	154	231	135	202	114	171	92.1	138	180	270
	7	165	248	148	222	130	194	110	164	88.1	132	171	256
	8	157	236	141	211	124	185	104	157	83.8	126	160	241
	9	149	223	133	200	117	176	99.0	148	79.1	119	150	225
	10	140	210	126	188	110	165	93.2	140	74.2	111	139	208
	11	131	196	117	176	103	155	87.2	131	69.1	104	127	191
	12	121	182	109	164	96.1	144	81.1	122	63.9	95.9	116	174
	13	112	168	101	151	88.8	133	74.9	112	58.7	88.1	105	157
	14	103	154	92.5	139	81.6	122	68.8	103	53.6	80.4	93.9	141
	15	94.0	141	84.3	126	74.5	112	62.8	94.1	48.6	72.9	83.4	125
	16	85.6	129	76.4	115	67.6	101	56.9	85.3	43.8	65.6	73.5	110
	17	77.5	116	68.7	103	60.9	91.3	51.3	76.9	39.1	58.6	65.1	97.8
	18	69.6	105	61.4	92.1	54.4	81.7	45.8	68.7	34.8	52.3	58.0	87.2
	19	62.5	93.9	55.1	82.6	48.9	73.3	41.1	61.6	31.3	46.9	52.1	78.3
	20	56.4	84.8	49.7	74.6	44.1	66.1	37.1	55.6	28.2	42.3	47.0	70.7
	21	51.2	76.9	45.1	67.6	40.0	60.0	33.6	50.5	25.6	38.4	42.6	64.1
	22	46.6	70.0	41.1	61.6	36.4	54.7	30.7	46.0	23.3	35.0	38.9	58.4
	23	42.6	64.1	37.6	56.4	33.3	50.0	28.0	42.1	21.3	32.0	35.5	53.4
	24	39.2	58.9	34.5	51.8	30.6	45.9	25.8	38.6	19.6	29.4	32.6	49.1
	25	36.1	54.2	31.8	47.7	28.2	42.3	23.7	35.6	18.1	27.1	30.1	45.2
	26	33.4	50.2	29.4	44.1	26.1	39.1	21.9	32.9	16.7	25.1	27.8	41.8
	27	30.9	46.5	27.3	40.9	24.2	36.3	20.4	30.5	15.5	23.2		
	28	28.8	43.2	25.4	38.0	22.5	33.7	18.9	28.4	14.4	21.6		
	29	26.8	40.3	23.6	35.5	21.0	31.5	17.6	26.5	13.4	20.1		
	30	25.1	37.7	22.1	33.1	19.6	29.4	16.5	24.7	12.5	18.8		
	32					17.2	25.8	14.5	21.7	11.0	16.5		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	28.1	42.2	24.6	36.9	20.7	31.2	16.4	24.6	11.7	17.6	26.5	39.8
$P_e(L_c)^2/10^4$, kip-in.^{2}		719		653		579		487		371		563	
r_m, in.		1.87		1.90		1.93		1.96		1.99		1.61	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS4½–HSS4

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS4½×4½×										HSS4×4×	
		3/8		5/16		1/4		3/16		1/8		1/2	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.465	
Steel, lb/ft		19.82		16.96		13.91		10.70		7.31		21.63	
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, L_c (ft), with respect to the least radius of gyration, r	0	167	251	149	224	130	196	110	165	88.7	133	180	271
	1	167	250	149	223	130	195	109	164	88.3	132	179	269
	2	165	247	147	221	128	193	108	162	87.2	131	176	265
	3	161	242	144	216	126	189	106	159	85.5	128	172	258
	4	157	235	140	210	123	184	103	155	83.1	125	166	249
	5	151	227	135	203	118	177	99.7	150	80.1	120	158	237
	6	145	217	130	194	113	170	95.6	143	76.5	115	149	224
	7	137	206	123	185	108	162	90.9	136	72.6	109	139	209
	8	129	194	116	174	102	152	85.8	129	68.2	102	128	193
	9	121	182	108	163	95.1	143	80.3	120	63.7	95.5	117	176
	10	112	169	100	151	88.2	132	74.6	112	58.9	88.3	106	160
	11	104	156	92.4	139	81.3	122	68.8	103	54.0	81.1	95.0	143
	12	95.3	143	84.4	127	74.3	111	62.9	94.4	49.2	73.8	84.1	126
	13	86.7	130	76.4	115	67.4	101	57.1	85.7	44.4	66.6	73.6	111
	14	78.3	118	68.6	103	60.6	90.9	51.5	77.2	39.8	59.6	63.7	95.8
	15	70.2	105	61.7	92.8	54.1	81.2	46.0	69.0	35.3	52.9	55.5	83.5
	16	62.3	93.7	55.1	82.9	47.8	71.8	40.7	61.1	31.1	46.6	48.8	73.3
	17	55.2	83.0	48.8	73.4	42.4	63.6	36.1	54.1	27.5	41.3	43.2	65.0
	18	49.2	74.0	43.6	65.5	37.8	56.7	32.2	48.3	24.5	36.8	38.6	58.0
	19	44.2	66.4	39.1	58.8	33.9	50.9	28.9	43.3	22.0	33.0	34.6	52.0
	20	39.9	59.9	35.3	53.0	30.6	45.9	26.1	39.1	19.9	29.8	31.2	46.9
	21	36.2	54.4	32.0	48.1	27.8	41.7	23.6	35.5	18.0	27.0	28.3	42.6
	22	33.0	49.5	29.2	43.8	25.3	38.0	21.5	32.3	16.4	24.6	25.8	38.8
	23	30.2	45.3	26.7	40.1	23.1	34.7	19.7	29.6	15.0	22.5	23.6	35.5
	24	27.7	41.6	24.5	36.8	21.3	31.9	18.1	27.2	13.8	20.7		
	25	25.5	38.4	22.6	34.0	19.6	29.4	16.7	25.0	12.7	19.1		
	26	23.6	35.5	20.9	31.4	18.1	27.2	15.4	23.1	11.8	17.6		
	27	21.9	32.9	19.4	29.1	16.8	25.2	14.3	21.5	10.9	16.4		
	28			18.0	27.1	15.6	23.4	13.3	20.0	10.1	15.2		
	29							12.4	18.6	9.45	14.2		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	22.0	33.1	19.4	29.1	16.4	24.6	13.0	19.5	9.31	14.0	19.9	29.8
$P_e(L_c)^2/10^4$, kip-in.^{2}		497		454		402		342		261		365	
r_m, in.		1.67		1.70		1.73		1.75		1.78		1.41	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS4

Table 4-D (continued)
Available Strength in Axial Compression, kips
Filled Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS4×4×									
		3/8		5/16		1/4		3/16		1/8	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116	
Steel, lb/ft		17.27		14.83		12.21		9.42		6.46	
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	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r	0	143	215	127	191	111	166	92.8	139	74.4	112
	1	142	214	127	190	110	165	92.3	139	74.0	111
	2	140	211	125	187	109	163	91.0	136	72.9	109
	3	137	206	121	182	106	159	88.8	133	71.1	107
	4	132	199	117	176	102	153	85.8	129	68.6	103
	5	127	190	112	168	97.7	147	82.1	123	65.5	98.3
	6	120	180	106	159	92.5	139	77.8	117	62.0	92.9
	7	113	169	99.0	149	86.7	130	73.0	110	58.0	87.0
	8	105	157	91.7	138	80.5	121	67.9	102	53.7	80.6
	9	96.4	145	84.1	126	73.9	111	62.5	93.7	49.3	74.0
	10	87.9	132	76.4	115	67.3	101	56.9	85.4	44.8	67.2
	11	79.4	119	69.2	104	60.6	90.9	51.4	77.1	40.2	60.4
	12	71.0	107	62.0	93.2	54.0	81.1	45.9	68.9	35.8	53.7
	13	62.8	94.4	55.1	82.8	47.7	71.6	40.6	61.0	31.5	47.3
	14	55.0	82.7	48.5	72.8	41.6	62.4	35.6	53.4	27.4	41.1
	15	47.9	72.0	42.2	63.5	36.3	54.4	31.0	46.5	23.9	35.8
	16	42.1	63.3	37.1	55.8	31.9	47.8	27.2	40.9	21.0	31.5
	17	37.3	56.1	32.9	49.4	28.2	42.3	24.1	36.2	18.6	27.9
	18	33.3	50.0	29.3	44.1	25.2	37.8	21.5	32.3	16.6	24.9
	19	29.9	44.9	26.3	39.6	22.6	33.9	19.3	29.0	14.9	22.3
	20	27.0	40.5	23.8	35.7	20.4	30.6	17.4	26.2	13.4	20.2
	21	24.4	36.7	21.5	32.4	18.5	27.8	15.8	23.7	12.2	18.3
	22	22.3	33.5	19.6	29.5	16.9	25.3	14.4	21.6	11.1	16.7
	23	20.4	30.6	18.0	27.0	15.4	23.1	13.2	19.8	10.2	15.2
	24	18.7	28.1	16.5	24.8	14.2	21.2	12.1	18.2	9.33	14.0
	25					13.1	19.6	11.2	16.7	8.60	12.9
	26									7.95	11.9
Properties											
M_n/Ω_b	$\phi_b M_n$ kip-ft	16.7	25.1	14.8	22.2	12.6	18.9	10.0	15.1	7.22	10.9
$P_e(L_c)^2/10^4$, kip-in.^{2}		328		300		268		229		177	
r_m, in.		1.47		1.49		1.52		1.55		1.58	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS28.000

Table 4-E
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS28.000×											
		1.000		0.875		0.750		0.625		0.500		0.375	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		288.63		253.72		218.48		182.90		146.99		110.74	
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, L_c (ft), with respect to the least radius of gyration, r	0	3000	4500	2780	4160	2550	3830	2330	3490	2100	3150	1870	2800
	1	3000	4500	2770	4160	2550	3830	2330	3490	2100	3150	1870	2800
	2	3000	4490	2770	4160	2550	3820	2330	3490	2100	3150	1870	2800
	3	2990	4490	2770	4160	2550	3820	2320	3490	2100	3140	1870	2800
	4	2990	4490	2770	4150	2550	3820	2320	3480	2090	3140	1860	2800
	5	2990	4480	2770	4150	2540	3810	2320	3480	2090	3140	1860	2790
	6	2980	4470	2760	4140	2540	3810	2320	3470	2090	3130	1860	2790
	7	2980	4470	2760	4140	2530	3800	2310	3470	2080	3120	1860	2780
	8	2970	4460	2750	4130	2530	3790	2310	3460	2080	3120	1850	2780
	9	2970	4450	2750	4120	2520	3780	2300	3450	2070	3110	1850	2770
	10	2960	4440	2740	4110	2520	3770	2290	3440	2070	3100	1840	2760
	11	2950	4420	2730	4100	2510	3760	2290	3430	2060	3090	1830	2750
	12	2940	4410	2720	4080	2500	3750	2280	3420	2050	3080	1830	2740
	13	2930	4400	2710	4070	2490	3740	2270	3410	2050	3070	1820	2730
	14	2920	4380	2700	4050	2480	3720	2260	3390	2040	3060	1810	2720
	15	2910	4360	2690	4040	2470	3710	2250	3380	2030	3040	1800	2700
	16	2900	4350	2680	4020	2460	3690	2240	3370	2020	3030	1790	2690
	17	2880	4330	2670	4000	2450	3680	2230	3350	2010	3010	1780	2680
	18	2870	4310	2660	3990	2440	3660	2220	3330	2000	3000	1770	2660
	19	2860	4290	2640	3970	2430	3640	2210	3310	1990	2980	1760	2650
	20	2840	4260	2630	3940	2410	3620	2200	3300	1980	2960	1750	2630
	21	2830	4240	2620	3920	2400	3600	2180	3280	1960	2950	1740	2610
	22	2810	4220	2600	3900	2390	3580	2170	3260	1950	2930	1730	2590
	23	2790	4190	2580	3880	2370	3560	2160	3240	1940	2910	1720	2570
	24	2780	4170	2570	3850	2360	3530	2140	3210	1920	2890	1700	2550
	25	2760	4140	2550	3830	2340	3510	2130	3190	1910	2860	1690	2530
	26	2740	4110	2530	3800	2320	3490	2110	3170	1900	2840	1680	2510
	27	2720	4080	2520	3770	2310	3460	2100	3140	1880	2820	1660	2490
	28	2700	4050	2500	3750	2290	3430	2080	3120	1860	2800	1650	2470
	29	2680	4020	2480	3720	2270	3410	2060	3090	1850	2770	1630	2450
	30	2660	3990	2460	3690	2250	3380	2050	3070	1830	2750	1620	2420
	32	2620	3930	2420	3630	2210	3320	2010	3010	1800	2700	1580	2380
	34	2570	3860	2380	3560	2170	3260	1970	2960	1760	2640	1550	2330
	36	2530	3790	2330	3500	2130	3200	1930	2900	1730	2590	1520	2270
	38	2480	3710	2290	3430	2090	3130	1890	2840	1690	2530	1480	2220
	40	2430	3640	2240	3360	2050	3070	1850	2780	1650	2470	1440	2160
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1910	2860	1700	2560	1500	2250	1280	1920	1050	1570	793	1190
$P_e(L_c)^2/10^4$, kip-in.^{2}		273000		249000		223000		196000		168000		139000	
r_m, in.		9.58		9.62		9.66		9.70		9.74		9.78	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS26.000–
HSS24.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS26.000×										HSS24.000×	
		0.750		0.625		0.500		0.375		0.313		1.000	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.930	
Steel, lb/ft		202.44		169.54		136.30		102.73		85.81		245.87	
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, L_c (ft), with respect to the least radius of gyration, r	0	2290	3430	2080	3120	1870	2810	1660	2490	1550	2320	2420	3620
	1	2290	3430	2080	3120	1870	2810	1660	2490	1550	2320	2420	3620
	2	2290	3430	2080	3120	1870	2800	1660	2480	1550	2320	2410	3620
	3	2290	3430	2080	3120	1870	2800	1660	2480	1550	2320	2410	3620
	4	2280	3420	2080	3110	1870	2800	1650	2480	1540	2320	2410	3610
	5	2280	3420	2070	3110	1860	2790	1650	2480	1540	2310	2410	3610
	6	2280	3410	2070	3100	1860	2790	1650	2470	1540	2310	2400	3600
	7	2270	3410	2060	3100	1850	2780	1640	2460	1530	2300	2400	3590
	8	2270	3400	2060	3090	1850	2770	1640	2460	1530	2290	2390	3580
	9	2260	3390	2050	3080	1840	2770	1630	2450	1520	2290	2380	3570
	10	2250	3380	2050	3070	1840	2760	1630	2440	1520	2280	2370	3560
	11	2240	3370	2040	3060	1830	2750	1620	2430	1510	2270	2370	3550
	12	2240	3360	2030	3050	1820	2740	1610	2420	1510	2260	2360	3530
	13	2230	3340	2020	3040	1820	2730	1610	2410	1500	2250	2350	3520
	14	2220	3330	2010	3020	1810	2710	1600	2400	1490	2240	2330	3500
	15	2210	3310	2010	3010	1800	2700	1590	2390	1480	2220	2320	3480
	16	2200	3300	2000	2990	1790	2680	1580	2370	1470	2210	2310	3460
	17	2190	3280	1980	2980	1780	2670	1570	2360	1460	2200	2300	3440
	18	2170	3260	1970	2960	1770	2650	1560	2340	1450	2180	2280	3420
	19	2160	3240	1960	2940	1760	2640	1550	2330	1440	2170	2270	3400
	20	2150	3220	1950	2920	1750	2620	1540	2310	1430	2150	2250	3380
	21	2130	3200	1940	2900	1730	2600	1530	2290	1420	2130	2240	3350
	22	2120	3180	1920	2880	1720	2580	1520	2270	1410	2120	2220	3330
	23	2100	3160	1910	2860	1710	2560	1500	2260	1400	2100	2200	3300
	24	2090	3130	1890	2840	1690	2540	1490	2240	1390	2080	2180	3270
	25	2070	3110	1880	2820	1680	2520	1480	2220	1370	2060	2160	3250
	26	2060	3080	1860	2790	1670	2500	1460	2200	1360	2040	2140	3220
	27	2040	3060	1850	2770	1650	2480	1450	2170	1350	2020	2120	3190
	28	2020	3030	1830	2740	1630	2450	1430	2150	1330	2000	2100	3160
	29	2000	3000	1810	2720	1620	2430	1420	2130	1320	1970	2080	3120
	30	1980	2980	1800	2690	1600	2400	1400	2110	1300	1950	2060	3090
	32	1950	2920	1760	2640	1570	2350	1370	2060	1270	1910	2020	3030
	34	1910	2860	1720	2580	1530	2300	1340	2010	1240	1860	1970	2960
	36	1860	2800	1680	2520	1500	2250	1310	1960	1210	1810	1920	2880
	38	1820	2730	1640	2460	1460	2190	1270	1910	1170	1760	1870	2810
	40	1780	2660	1600	2400	1420	2130	1230	1850	1140	1710	1820	2730
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1280	1920	1090	1640	898	1350	683	1030	571	859	1370	2050
$P_e(L_c)^2/10^4$, kip-in.^{2}		174000		153000		131000		108000		96700		165000	
r_m, in.		8.95		8.99		9.03		9.07		9.09		8.16	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS24.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS24.000×											
		0.875		0.750		0.625		0.500		0.375		0.313	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		216.31		186.41		156.18		125.61		94.71		79.13	
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, L_c (ft), with respect to the least radius of gyration, r	0	2230	3340	2040	3060	1850	2770	1650	2480	1460	2190	1360	2040
	1	2230	3340	2040	3060	1850	2770	1650	2480	1460	2190	1360	2040
	2	2230	3340	2040	3060	1850	2770	1650	2480	1460	2180	1360	2040
	3	2230	3340	2040	3050	1850	2770	1650	2480	1450	2180	1360	2030
	4	2220	3330	2030	3050	1840	2760	1650	2470	1450	2180	1350	2030
	5	2220	3330	2030	3050	1840	2760	1650	2470	1450	2180	1350	2030
	6	2220	3320	2030	3040	1840	2750	1640	2460	1450	2170	1350	2020
	7	2210	3310	2020	3030	1830	2750	1640	2460	1440	2160	1340	2020
	8	2200	3310	2020	3020	1830	2740	1630	2450	1440	2160	1340	2010
	9	2200	3300	2010	3010	1820	2730	1630	2440	1430	2150	1330	2000
	10	2190	3280	2000	3000	1810	2720	1620	2430	1430	2140	1330	1990
	11	2180	3270	2000	2990	1810	2710	1620	2420	1420	2130	1320	1980
	12	2170	3260	1990	2980	1800	2700	1610	2410	1410	2120	1320	1970
	13	2160	3240	1980	2970	1790	2690	1600	2400	1410	2110	1310	1960
	14	2150	3230	1970	2950	1780	2670	1590	2390	1400	2100	1300	1950
	15	2140	3210	1960	2940	1770	2660	1580	2370	1390	2080	1290	1940
	16	2130	3190	1950	2920	1760	2640	1570	2360	1380	2070	1280	1920
	17	2120	3180	1930	2900	1750	2620	1560	2340	1370	2060	1270	1910
	18	2100	3160	1920	2880	1740	2610	1550	2330	1360	2040	1260	1900
	19	2090	3130	1910	2860	1730	2590	1540	2310	1350	2030	1250	1880
	20	2080	3110	1900	2840	1710	2570	1530	2290	1340	2010	1240	1860
	21	2060	3090	1880	2820	1700	2550	1520	2270	1330	1990	1230	1850
	22	2040	3070	1870	2800	1690	2530	1500	2250	1320	1970	1220	1830
	23	2030	3040	1850	2780	1670	2510	1490	2230	1300	1950	1210	1810
	24	2010	3020	1840	2750	1660	2490	1480	2210	1290	1940	1200	1790
	25	1990	2990	1820	2730	1640	2460	1460	2190	1280	1920	1180	1770
	26	1970	2960	1800	2700	1630	2440	1450	2170	1260	1890	1170	1750
	27	1960	2930	1780	2680	1610	2410	1430	2150	1250	1870	1160	1730
	28	1940	2910	1770	2650	1590	2390	1420	2120	1230	1850	1140	1710
	29	1920	2880	1750	2620	1580	2360	1400	2100	1220	1830	1130	1690
	30	1900	2850	1730	2590	1560	2340	1380	2080	1200	1810	1110	1670
	32	1860	2780	1690	2540	1520	2280	1350	2030	1170	1760	1080	1620
	34	1810	2720	1650	2480	1480	2230	1320	1970	1140	1710	1050	1580
	36	1770	2650	1610	2410	1450	2170	1280	1920	1110	1660	1020	1530
	38	1720	2580	1570	2350	1410	2110	1240	1860	1070	1610	985	1480
	40	1670	2510	1520	2280	1370	2050	1200	1810	1040	1560	952	1430
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1220	1840	1070	1610	919	1380	760	1140	580	872	486	731
$P_e(L_c)^2/10^4$, kip-in.^{2}		150000		134000		118000		101000		82800		73700	
r_m, in.		8.20		8.24		8.28		8.32		8.36		8.38	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS22.000–
HSS20.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS22.000×										HSS20.000×	
		0.750		0.625		0.500		0.375		0.313		1.000	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.930	
Steel, lb/ft		170.37		142.81		114.92		86.69		72.45		203.11	
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, L_c (ft), with respect to the least radius of gyration, r	0	1800	2700	1630	2440	1450	2170	1270	1900	1180	1770	1880	2830
	1	1800	2700	1630	2440	1450	2170	1270	1900	1180	1770	1880	2820
	2	1800	2700	1620	2440	1450	2170	1270	1900	1180	1770	1880	2820
	3	1800	2700	1620	2430	1450	2170	1270	1900	1180	1770	1880	2820
	4	1790	2690	1620	2430	1440	2170	1260	1900	1170	1760	1880	2810
	5	1790	2690	1620	2420	1440	2160	1260	1890	1170	1760	1870	2810
	6	1790	2680	1610	2420	1440	2160	1260	1890	1170	1750	1870	2800
	7	1780	2670	1610	2410	1430	2150	1250	1880	1160	1750	1860	2790
	8	1780	2660	1600	2400	1430	2140	1250	1870	1160	1740	1850	2780
	9	1770	2650	1600	2390	1420	2130	1240	1870	1160	1730	1850	2770
	10	1760	2640	1590	2380	1420	2130	1240	1860	1150	1720	1840	2750
	11	1750	2630	1580	2370	1410	2110	1230	1850	1140	1710	1830	2740
	12	1750	2620	1570	2360	1400	2100	1230	1840	1140	1700	1820	2720
	13	1740	2600	1570	2350	1390	2090	1220	1830	1130	1690	1800	2710
	14	1730	2590	1560	2330	1390	2080	1210	1810	1120	1680	1790	2690
	15	1720	2570	1550	2320	1380	2060	1200	1800	1110	1670	1780	2670
	16	1700	2560	1540	2300	1370	2050	1190	1790	1100	1660	1760	2650
	17	1690	2540	1520	2290	1360	2030	1180	1770	1090	1640	1750	2620
	18	1680	2520	1510	2270	1350	2020	1170	1760	1080	1630	1730	2600
	19	1670	2500	1500	2250	1330	2000	1160	1740	1070	1610	1720	2580
	20	1650	2480	1490	2230	1320	1980	1150	1730	1060	1600	1700	2550
	21	1640	2460	1470	2210	1310	1960	1140	1710	1050	1580	1680	2530
	22	1620	2430	1460	2190	1300	1940	1130	1690	1040	1560	1670	2500
	23	1610	2410	1450	2170	1280	1920	1110	1670	1030	1540	1650	2470
	24	1590	2390	1430	2150	1270	1900	1100	1650	1020	1520	1630	2440
	25	1570	2360	1410	2120	1250	1880	1090	1630	1000	1510	1610	2410
	26	1560	2340	1400	2100	1240	1860	1070	1610	991	1490	1590	2380
	27	1540	2310	1380	2070	1220	1840	1060	1590	977	1470	1560	2350
	28	1520	2280	1370	2050	1210	1810	1050	1570	963	1450	1540	2310
	29	1500	2250	1350	2020	1190	1790	1030	1550	949	1420	1520	2280
	30	1480	2230	1330	2000	1180	1770	1020	1520	935	1400	1500	2250
	32	1440	2170	1300	1940	1140	1720	986	1480	905	1360	1450	2180
	34	1400	2110	1260	1890	1110	1660	954	1430	875	1310	1400	2100
	36	1360	2040	1220	1830	1070	1610	922	1380	844	1270	1350	2030
	38	1320	1980	1180	1770	1040	1560	889	1330	812	1220	1300	1960
	40	1280	1910	1140	1710	1000	1500	855	1280	780	1170	1250	1880
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	890	1340	762	1150	631	948	486	730	408	613	919	1380
$P_e(L_c)^2/10^4$, kip-in.^{2}		101000		88300		75400		62000		55100		89200	
r_m, in.		7.54		7.58		7.62		7.66		7.68		6.75	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS20.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS20.000×											
		0.875		0.750		0.625		0.500		0.375		0.313	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		178.89		154.34		129.45		104.00		78.67		65.77	
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, L_c (ft), with respect to the least radius of gyration, r	0	1730	2590	1570	2360	1420	2130	1260	1880	1090	1640	1010	1520
	1	1730	2590	1570	2360	1420	2130	1250	1880	1090	1640	1010	1520
	2	1730	2590	1570	2360	1420	2120	1250	1880	1090	1640	1010	1520
	3	1720	2590	1570	2360	1410	2120	1250	1880	1090	1640	1010	1510
	4	1720	2580	1570	2350	1410	2120	1250	1870	1090	1630	1010	1510
	5	1720	2580	1560	2350	1410	2110	1250	1870	1090	1630	1000	1510
	6	1710	2570	1560	2340	1400	2110	1240	1860	1080	1620	1000	1500
	7	1710	2560	1550	2330	1400	2100	1240	1860	1080	1620	998	1500
	8	1700	2550	1550	2320	1390	2090	1230	1850	1070	1610	993	1490
	9	1690	2540	1540	2310	1390	2080	1230	1840	1070	1600	988	1480
	10	1690	2530	1530	2300	1380	2070	1220	1830	1060	1590	982	1470
	11	1680	2510	1530	2290	1370	2060	1210	1820	1060	1580	976	1460
	12	1670	2500	1520	2280	1360	2050	1210	1810	1050	1570	969	1450
	13	1660	2480	1510	2260	1360	2030	1200	1800	1040	1560	962	1440
	14	1640	2470	1500	2240	1350	2020	1190	1780	1030	1550	954	1430
	15	1630	2450	1490	2230	1340	2000	1180	1770	1020	1540	945	1420
	16	1620	2430	1470	2210	1320	1990	1170	1750	1010	1520	937	1400
	17	1610	2410	1460	2190	1310	1970	1160	1740	1000	1510	927	1390
	18	1590	2390	1450	2170	1300	1950	1150	1720	995	1490	917	1380
	19	1580	2370	1430	2150	1290	1930	1140	1710	984	1480	907	1360
	20	1560	2340	1420	2130	1270	1910	1120	1690	973	1460	896	1340
	21	1550	2320	1410	2110	1260	1890	1110	1670	961	1440	885	1330
	22	1530	2290	1390	2080	1250	1870	1100	1650	949	1420	874	1310
	23	1510	2270	1370	2060	1230	1850	1090	1630	937	1410	862	1290
	24	1490	2240	1360	2040	1220	1830	1070	1610	924	1390	849	1270
	25	1470	2210	1340	2010	1200	1800	1060	1590	911	1370	837	1260
	26	1460	2180	1320	1980	1190	1780	1040	1560	898	1350	824	1240
	27	1440	2150	1300	1960	1170	1750	1030	1540	884	1330	811	1220
	28	1420	2120	1290	1930	1150	1730	1010	1520	870	1300	797	1200
	29	1400	2090	1270	1900	1130	1700	996	1490	855	1280	783	1170
	30	1380	2060	1250	1870	1120	1680	980	1470	841	1260	769	1150
	32	1330	2000	1210	1810	1080	1620	947	1420	811	1220	741	1110
	34	1290	1930	1170	1750	1040	1570	914	1370	780	1170	711	1070
	36	1240	1870	1130	1690	1010	1510	879	1320	749	1120	682	1020
	38	1200	1800	1090	1630	967	1450	844	1270	717	1080	652	977
	40	1150	1730	1040	1560	928	1390	809	1210	685	1030	621	932
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	823	1240	724	1090	621	933	514	772	399	600	336	505
$P_e(L_c)^2/10^4$, kip-in.^{2}		82000		73700		64600		55100		45100		40000	
r_m, in.		6.79		6.83		6.87		6.91		6.95		6.97	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS20.000–
HSS18.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS20.000×		HSS18.000×									
		0.250		1.000		0.875		0.750		0.625		0.500	
t_{des}, in.		0.233		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		52.78		181.73		160.19		138.30		116.09		93.54	
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, L_c (ft), with respect to the least radius of gyration, r	0	929	1390	1640	2450	1500	2250	1360	2040	1220	1830	1070	1610
	1	929	1390	1640	2450	1500	2250	1360	2040	1220	1830	1070	1610
	2	928	1390	1630	2450	1500	2240	1360	2040	1220	1820	1070	1610
	3	927	1390	1630	2450	1490	2240	1360	2030	1210	1820	1070	1610
	4	925	1390	1630	2440	1490	2230	1350	2030	1210	1820	1070	1600
	5	922	1380	1620	2440	1490	2230	1350	2020	1210	1810	1070	1600
	6	919	1380	1620	2430	1480	2220	1340	2020	1200	1810	1060	1590
	7	915	1370	1610	2420	1470	2210	1340	2010	1200	1800	1060	1590
	8	910	1370	1600	2410	1470	2200	1330	2000	1190	1790	1050	1580
	9	905	1360	1590	2390	1460	2190	1320	1990	1190	1780	1050	1570
	10	900	1350	1590	2380	1450	2180	1320	1980	1180	1770	1040	1560
	11	894	1340	1570	2360	1440	2160	1310	1960	1170	1760	1030	1550
	12	887	1330	1560	2350	1430	2150	1300	1950	1160	1740	1020	1540
	13	880	1320	1550	2330	1420	2130	1290	1930	1150	1730	1020	1520
	14	872	1310	1540	2310	1410	2110	1280	1920	1140	1720	1010	1510
	15	864	1300	1520	2290	1400	2090	1270	1900	1130	1700	997	1500
	16	856	1280	1510	2260	1380	2070	1250	1880	1120	1680	987	1480
	17	846	1270	1490	2240	1370	2050	1240	1860	1110	1670	976	1460
	18	837	1260	1480	2220	1350	2030	1230	1840	1100	1650	965	1450
	19	827	1240	1460	2190	1340	2010	1210	1820	1090	1630	953	1430
	20	817	1220	1440	2160	1320	1980	1200	1800	1070	1610	941	1410
	21	806	1210	1420	2140	1300	1960	1180	1770	1060	1590	928	1390
	22	795	1190	1400	2110	1290	1930	1170	1750	1040	1560	915	1370
	23	783	1170	1380	2080	1270	1900	1150	1730	1030	1540	902	1350
	24	771	1160	1360	2050	1250	1880	1130	1700	1010	1520	888	1330
	25	759	1140	1340	2010	1230	1850	1120	1680	997	1500	873	1310
	26	747	1120	1320	1980	1210	1820	1100	1650	981	1470	859	1290
	27	734	1100	1300	1950	1190	1790	1080	1620	964	1450	844	1270
	28	721	1080	1280	1920	1170	1760	1060	1590	948	1420	828	1240
	29	708	1060	1250	1880	1150	1730	1040	1570	930	1400	813	1220
	30	695	1040	1230	1850	1130	1690	1020	1540	913	1370	797	1200
	32	667	1000	1180	1780	1090	1630	985	1480	877	1320	765	1150
	34	640	959	1140	1700	1040	1560	945	1420	841	1260	732	1100
	36	611	917	1090	1630	998	1500	905	1360	804	1210	699	1050
	38	583	874	1040	1560	952	1430	864	1300	767	1150	665	998
	40	554	831	987	1480	907	1360	822	1230	730	1090	632	947
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	271	407	730	1100	655	984	576	866	494	743	410	616
$P_e(L_c)^2/10^4$, kip-in.^{2}		34600		62400		57600		52200		45800		39000	
r_m, in.		6.99		6.04		6.08		6.12		6.16		6.20	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS18.000–
HSS16.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS18.000×						HSS16.000×					
		0.375		0.313		0.250		1.000		0.875		0.750	
t_{des}, in.		0.349		0.291		0.233		0.930		0.814		0.698	
Steel, lb/ft		70.66		59.09		47.44		160.35		141.48		122.27	
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, L_c (ft), with respect to the least radius of gyration, r	0	932	1400	858	1290	784	1180	1400	2100	1280	1920	1160	1730
	1	931	1400	857	1290	783	1180	1400	2100	1280	1920	1160	1730
	2	930	1400	856	1280	783	1170	1400	2090	1280	1910	1150	1730
	3	929	1390	855	1280	781	1170	1390	2090	1270	1910	1150	1730
	4	926	1390	853	1280	779	1170	1390	2080	1270	1910	1150	1720
	5	924	1390	850	1270	776	1160	1380	2080	1270	1900	1140	1720
	6	920	1380	846	1270	773	1160	1380	2070	1260	1890	1140	1710
	7	916	1370	842	1260	769	1150	1370	2060	1250	1880	1130	1700
	8	911	1370	838	1260	765	1150	1360	2040	1250	1870	1130	1690
	9	905	1360	833	1250	759	1140	1350	2030	1240	1860	1120	1680
	10	899	1350	827	1240	754	1130	1340	2010	1230	1840	1110	1670
	11	893	1340	820	1230	748	1120	1330	2000	1220	1830	1100	1650
	12	886	1330	814	1220	741	1110	1320	1980	1210	1810	1090	1640
	13	878	1320	806	1210	734	1100	1310	1960	1190	1790	1080	1620
	14	870	1300	798	1200	726	1090	1290	1940	1180	1770	1070	1600
	15	861	1290	790	1180	718	1080	1280	1920	1170	1750	1060	1590
	16	851	1280	781	1170	710	1060	1260	1890	1150	1730	1040	1570
	17	841	1260	771	1160	700	1050	1240	1870	1140	1710	1030	1550
	18	831	1250	761	1140	691	1040	1230	1840	1120	1680	1020	1520
	19	820	1230	751	1130	681	1020	1210	1810	1110	1660	1000	1500
	20	809	1210	740	1110	671	1010	1190	1790	1090	1630	986	1480
	21	798	1200	729	1090	660	990	1170	1760	1070	1610	970	1460
	22	786	1180	718	1080	649	974	1150	1730	1050	1580	954	1430
	23	773	1160	706	1060	638	957	1130	1700	1030	1550	937	1410
	24	761	1140	694	1040	626	940	1110	1660	1020	1520	919	1380
	25	748	1120	682	1020	615	922	1090	1630	996	1490	902	1350
	26	734	1100	669	1000	603	904	1070	1600	976	1460	884	1330
	27	721	1080	656	984	590	885	1040	1560	955	1430	865	1300
	28	707	1060	643	964	578	867	1020	1530	934	1400	847	1270
	29	693	1040	630	944	565	848	997	1490	913	1370	828	1240
	30	678	1020	616	924	552	828	973	1460	892	1340	808	1210
	32	649	974	589	883	526	789	926	1390	849	1270	770	1150
	34	620	930	561	841	500	750	878	1320	805	1210	730	1100
	36	590	885	533	799	473	710	830	1240	761	1140	691	1040
	38	560	840	504	757	447	671	782	1170	718	1080	651	977
	40	530	795	476	714	421	631	734	1100	674	1010	612	918
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	321	482	271	407	219	329	565	849	507	761	446	671
$P_e(L_c)^2/10^4$, kip-in.^{2}		31900		28100		24300		41900		38500		35100	
r_m, in.		6.24		6.26		6.28		5.34		5.38		5.42	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS16.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS16.000×											
		0.625		0.500		0.438		0.375		0.312		0.250	
t_{des}, in.		0.581		0.465		0.407		0.349		0.291		0.233	
Steel, lb/ft		103.00		82.85		72.87		62.64		52.32		42.09	
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, L_c (ft), with respect to the least radius of gyration, r	0	1030	1550	906	1360	842	1260	779	1170	715	1070	648	971
	1	1030	1550	906	1360	841	1260	779	1170	714	1070	647	971
	2	1030	1540	905	1360	840	1260	778	1170	713	1070	646	970
	3	1030	1540	903	1350	838	1260	776	1160	712	1070	645	967
	4	1020	1540	900	1350	836	1250	774	1160	710	1060	643	964
	5	1020	1530	897	1350	833	1250	771	1160	707	1060	640	960
	6	1020	1520	893	1340	829	1240	767	1150	703	1050	637	955
	7	1010	1520	888	1330	824	1240	763	1140	699	1050	633	949
	8	1010	1510	883	1320	819	1230	758	1140	694	1040	628	942
	9	998	1500	877	1310	813	1220	752	1130	689	1030	623	935
	10	991	1490	870	1300	807	1210	746	1120	683	1020	617	926
	11	982	1470	862	1290	800	1200	739	1110	677	1010	611	917
	12	973	1460	854	1280	792	1190	732	1100	670	1000	605	907
	13	964	1450	845	1270	784	1180	724	1090	662	993	598	896
	14	953	1430	836	1250	775	1160	716	1070	654	981	590	885
	15	942	1410	826	1240	765	1150	707	1060	646	968	582	873
	16	931	1400	816	1220	756	1130	697	1050	637	955	573	860
	17	919	1380	805	1210	745	1120	687	1030	627	941	564	847
	18	906	1360	793	1190	734	1100	677	1020	617	926	555	833
	19	893	1340	781	1170	723	1080	666	999	607	910	545	818
	20	879	1320	769	1150	711	1070	655	982	596	895	535	803
	21	864	1300	756	1130	699	1050	643	965	585	878	525	787
	22	850	1270	742	1110	686	1030	631	947	574	861	514	771
	23	835	1250	729	1090	673	1010	619	929	563	844	503	755
	24	819	1230	715	1070	660	990	607	910	551	826	492	738
	25	803	1200	700	1050	647	970	594	891	539	808	481	721
	26	787	1180	686	1030	633	949	581	871	526	789	469	704
	27	771	1160	671	1010	619	928	568	851	514	771	458	687
	28	754	1130	656	984	605	907	554	831	501	752	446	669
	29	737	1110	641	961	590	886	541	811	488	733	434	651
	30	720	1080	625	938	576	864	527	790	476	713	422	633
	32	685	1030	594	891	547	820	499	749	450	674	398	597
	34	650	975	563	844	517	775	471	707	424	635	373	560
	36	614	922	531	797	487	731	444	665	398	596	349	524
	38	579	869	500	749	458	687	416	624	372	558	326	488
	40	544	816	468	703	429	643	389	583	346	520	302	453
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	383	576	318	478	284	427	249	375	212	319	172	259
$P_e(L_c)^2/10^4$, kip-in.^{2}		31100		26500		24100		21600		19000		16400	
r_m, in.		5.46		5.49		5.51		5.53		5.55		5.58	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS14.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14.000×											
		1.000		0.875		0.750		0.625		0.500		0.375	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		138.97		122.77		106.23		89.36		72.16		54.62	
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, L_c (ft), with respect to the least radius of gyration, r	0	1170	1760	1070	1610	965	1450	858	1290	750	1120	639	959
	1	1170	1760	1070	1610	964	1450	858	1290	750	1120	639	958
	2	1170	1760	1070	1600	963	1440	857	1280	748	1120	638	956
	3	1170	1750	1070	1600	960	1440	854	1280	746	1120	636	954
	4	1170	1750	1060	1590	957	1430	851	1280	744	1120	633	950
	5	1160	1740	1060	1590	952	1430	847	1270	740	1110	630	945
	6	1150	1730	1050	1580	947	1420	843	1260	736	1100	626	940
	7	1140	1720	1040	1570	940	1410	837	1260	731	1100	622	933
	8	1140	1700	1040	1550	933	1400	830	1250	725	1090	617	925
	9	1130	1690	1030	1540	925	1390	823	1230	718	1080	611	917
	10	1110	1670	1020	1520	916	1370	815	1220	711	1070	605	907
	11	1100	1650	1010	1510	906	1360	806	1210	703	1060	598	896
	12	1090	1630	993	1490	895	1340	797	1190	695	1040	590	885
	13	1070	1610	980	1470	883	1330	786	1180	686	1030	582	873
	14	1060	1590	966	1450	871	1310	775	1160	676	1010	573	860
	15	1040	1560	952	1430	858	1290	764	1150	666	999	564	846
	16	1030	1540	936	1400	844	1270	752	1130	655	982	555	832
	17	1010	1510	920	1380	830	1240	739	1110	644	965	545	817
	18	990	1480	903	1360	815	1220	726	1090	632	948	534	801
	19	971	1460	886	1330	799	1200	712	1070	620	929	523	785
	20	951	1430	868	1300	783	1180	697	1050	607	910	512	768
	21	930	1400	850	1270	767	1150	683	1020	594	891	501	751
	22	910	1360	831	1250	750	1120	668	1000	581	871	489	733
	23	888	1330	811	1220	733	1100	652	978	567	850	477	715
	24	866	1300	792	1190	715	1070	637	955	553	829	465	697
	25	844	1270	771	1160	697	1050	621	931	539	808	452	678
	26	822	1230	751	1130	679	1020	604	907	524	787	440	659
	27	799	1200	731	1100	660	990	588	882	510	765	427	640
	28	778	1170	710	1060	642	962	571	857	495	743	414	621
	29	757	1140	689	1030	623	934	555	832	481	721	401	602
	30	735	1100	668	1000	604	906	538	807	466	699	388	583
	32	692	1040	626	939	566	849	504	757	436	654	363	544
	34	648	974	584	876	529	793	471	707	407	610	337	506
	36	605	910	543	814	492	737	438	657	378	567	312	468
	38	563	846	502	755	455	683	406	608	349	524	287	431
	40	521	783	466	700	420	630	374	561	322	483	264	395
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	421	633	378	569	334	502	287	431	238	358	187	281
$P_e(L_c)^2/10^4$, kip-in.^{2}		26800		24600		22400		19900		17100		13900	
r_m, in.		4.63		4.67		4.71		4.75		4.79		4.83	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS14.000–
HSS13.375

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS14.000×						HSS13.375×					
		0.312		0.250		0.188		0.625		0.500		0.375	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		45.65		36.75		27.69		85.19		68.82		52.11	
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, L_c (ft), with respect to the least radius of gyration, r	0	581	872	526	789	467	701	808	1210	705	1060	598	897
	1	581	871	526	788	467	701	808	1210	704	1060	598	897
	2	580	870	525	787	466	699	807	1210	703	1050	597	895
	3	578	867	523	784	465	697	804	1210	701	1050	595	893
	4	576	864	521	781	463	694	801	1200	698	1050	593	889
	5	573	859	518	777	460	690	797	1200	694	1040	589	884
	6	569	854	515	772	457	685	792	1190	690	1040	585	878
	7	565	848	511	766	453	679	786	1180	685	1030	581	871
	8	560	840	506	759	448	673	780	1170	679	1020	576	864
	9	555	832	501	751	443	665	772	1160	672	1010	570	855
	10	549	823	495	743	438	657	764	1150	665	998	563	845
	11	542	813	489	733	432	648	755	1130	657	986	556	834
	12	535	803	482	723	426	639	745	1120	648	973	549	823
	13	528	791	475	712	419	628	734	1100	639	959	540	811
	14	520	779	467	701	412	617	723	1080	629	944	532	798
	15	511	766	459	689	404	606	711	1070	619	928	523	784
	16	502	753	451	676	396	594	699	1050	608	912	513	769
	17	493	739	442	663	388	581	686	1030	596	895	503	754
	18	483	724	432	649	379	568	672	1010	585	877	492	739
	19	473	709	423	634	370	555	658	987	572	858	482	722
	20	462	693	413	620	361	541	644	966	559	839	470	706
	21	452	677	403	605	351	527	629	944	546	820	459	688
	22	441	661	393	589	341	512	614	921	533	800	447	671
	23	429	644	382	573	332	498	598	897	519	779	435	653
	24	418	627	372	557	322	483	583	874	505	758	423	635
	25	406	610	361	541	312	467	566	850	491	737	411	616
	26	395	592	350	525	302	452	550	825	477	716	398	598
	27	383	574	339	508	291	437	534	801	463	694	386	579
	28	371	557	328	492	281	422	517	776	448	673	373	560
	29	359	539	317	475	271	406	501	751	434	651	361	541
	30	347	521	306	458	261	391	484	727	419	629	348	522
	32	324	485	284	425	241	361	451	677	390	586	323	485
	34	300	450	262	393	221	331	419	628	362	543	299	448
	36	277	415	241	361	202	303	387	580	334	501	274	412
	38	254	382	220	330	183	275	355	533	306	460	251	377
	40	233	349	200	300	165	248	325	488	280	420	228	342
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	160	241	131	197	98.9	149	261	392	217	326	170	256
$P_e(L_c)^2/10^4$, kip-in.^{2}		12200		10500		8690		17100		14700		12000	
r_m, in.		4.85		4.87		4.89		4.53		4.57		4.61	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS13.375–
HSS12.750

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS13.375×						HSS12.750×					
		0.313		0.250		0.188		0.750		0.625		0.500	
t_{des}, in.		0.291		0.233		0.174		0.698		0.581		0.465	
Steel, lb/ft		43.64		35.08		26.43		96.21		81.01		65.48	
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, L_c (ft), with respect to the least radius of gyration, r	0	543	814	490	734	435	652	854	1280	757	1140	658	987
	1	542	814	489	734	435	652	854	1280	757	1130	657	986
	2	541	812	488	733	434	651	852	1280	755	1130	656	984
	3	540	809	487	730	432	648	849	1270	753	1130	654	981
	4	537	806	485	727	430	645	846	1270	750	1120	651	977
	5	534	801	482	723	427	641	841	1260	745	1120	648	971
	6	531	796	478	717	424	636	835	1250	740	1110	643	965
	7	526	790	474	711	420	630	828	1240	734	1100	638	957
	8	522	782	470	704	416	624	820	1230	727	1090	632	948
	9	516	774	464	697	411	616	812	1220	720	1080	625	938
	10	510	765	459	688	406	608	802	1200	711	1070	618	927
	11	503	755	452	679	400	599	791	1190	702	1050	610	914
	12	496	744	446	668	393	590	780	1170	692	1040	601	901
	13	489	733	438	658	386	580	768	1150	681	1020	591	887
	14	481	721	431	646	379	569	755	1130	670	1000	582	872
	15	472	708	423	634	372	557	741	1110	658	987	571	857
	16	463	694	414	621	364	545	727	1090	645	968	560	840
	17	454	680	405	608	355	533	712	1070	632	948	549	823
	18	444	666	396	594	347	520	696	1040	618	927	537	805
	19	434	651	387	580	338	507	680	1020	604	906	524	786
	20	423	635	377	565	329	493	664	996	589	884	512	767
	21	413	619	367	550	319	479	647	970	575	862	499	748
	22	402	603	357	535	310	465	630	944	559	839	485	728
	23	391	586	346	520	300	450	612	918	544	816	472	708
	24	380	569	336	504	291	436	594	891	528	792	458	687
	25	368	552	325	488	281	421	576	864	512	768	444	666
	26	357	535	315	472	271	406	558	837	496	744	430	645
	27	345	518	304	456	261	392	540	809	480	720	416	624
	28	334	500	293	440	251	377	521	782	464	695	402	603
	29	322	483	282	424	241	362	503	754	447	671	388	582
	30	310	466	272	408	232	347	484	727	431	647	374	560
	32	287	431	251	376	212	318	448	672	399	598	346	518
	34	265	397	230	345	194	290	412	618	367	551	318	477
	36	243	364	210	315	175	263	377	566	336	505	291	437
	38	221	332	190	285	158	237	344	516	307	460	265	398
	40	201	301	172	258	142	214	314	472	278	416	240	360
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	146	219	120	180	90.6	136	274	413	236	355	196	295
$P_e(L_c)^2/10^4$, kip-in.^{2}		10500		9020		7490		16300		14600		12600	
r_m, in.		4.63		4.65		4.67		4.27		4.31		4.35	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS12.750–
HSS12.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12.750×						HSS12.000×					
		0.375		0.250		0.188		0.625		0.500		0.375	
t_{des}, in.		0.349		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		49.61		33.41		25.18		76.00		61.47		46.60	
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, L_c (ft), with respect to the least radius of gyration, r	0	559	838	456	684	404	605	698	1050	605	908	511	766
	1	558	837	456	684	403	605	697	1050	605	907	510	765
	2	557	836	455	682	402	604	696	1040	604	905	509	764
	3	555	833	453	680	401	601	693	1040	602	902	507	761
	4	553	829	451	676	399	598	690	1030	599	898	505	757
	5	549	824	448	672	396	594	686	1030	595	892	501	752
	6	546	818	445	667	393	589	680	1020	590	885	497	746
	7	541	811	440	661	389	583	674	1010	585	877	493	739
	8	536	803	436	654	384	577	667	1000	579	868	487	731
	9	530	795	431	646	379	569	659	988	572	858	481	722
	10	523	785	425	637	374	561	650	975	564	846	474	712
	11	516	774	419	628	368	552	640	961	556	834	467	701
	12	508	762	412	618	362	542	630	945	547	820	459	689
	13	500	750	404	607	355	532	619	928	537	806	451	677
	14	491	737	397	595	348	521	607	911	527	791	442	663
	15	482	723	389	583	340	510	595	892	516	775	433	649
	16	472	709	380	570	332	498	582	873	505	758	423	635
	17	462	693	371	557	324	486	568	853	494	740	413	620
	18	452	678	362	544	315	473	555	832	481	722	403	604
	19	441	661	353	529	306	460	540	810	469	704	392	588
	20	430	645	343	515	297	446	525	788	456	684	381	571
	21	418	628	334	500	288	432	510	766	443	665	369	554
	22	407	610	323	485	279	418	495	743	430	645	358	537
	23	395	593	313	470	270	404	479	719	417	625	346	520
	24	383	575	303	455	260	390	464	696	403	604	335	502
	25	371	556	293	439	251	376	448	672	389	584	323	484
	26	359	538	282	423	241	361	432	648	375	563	311	466
	27	347	520	272	408	231	347	416	624	362	542	299	449
	28	334	501	261	392	222	333	400	600	348	522	287	431
	29	322	483	251	377	212	319	384	576	334	501	275	413
	30	310	465	241	361	203	305	369	553	320	481	264	396
	32	286	428	221	331	185	277	338	506	294	440	241	361
	34	262	393	201	301	167	251	307	461	267	401	219	328
	36	239	359	182	273	150	225	278	417	242	363	197	296
	38	217	325	163	245	134	202	250	375	218	327	177	265
	40	196	294	147	221	121	182	226	339	196	295	160	239
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	154	232	109	164	82.5	124	205	308	171	257	134	202
$P_e(L_c)^2/10^4$, kip-in.^{2}		10300		7750		6370		11900		10300		8390	
r_m, in.		4.39		4.43		4.45		4.04		4.08		4.12	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

4

COMPOSITE
HSS12.000–
HSS11.750

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS12.000×		HSS11.750×									
		0.250		0.625		0.500		0.375		0.337		0.250	
t_{des}, in.		0.233		0.581		0.465		0.349		0.313		0.233	
Steel, lb/ft		31.40		74.33		60.13		45.60		41.12		30.73	
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, L_c (ft), with respect to the least radius of gyration, r	0	414	620	679	1020	589	883	496	745	469	703	402	603
	1	413	620	678	1020	588	883	496	744	468	703	402	602
	2	412	618	677	1020	587	881	495	742	467	701	401	601
	3	411	616	674	1010	585	877	493	740	466	698	399	598
	4	408	612	671	1010	582	873	490	736	463	695	397	595
	5	405	608	666	1000	578	867	487	731	460	690	394	591
	6	402	603	661	992	573	860	483	724	456	684	390	585
	7	398	597	655	982	568	852	478	717	451	677	386	579
	8	393	590	648	971	562	843	473	709	446	669	381	572
	9	388	582	639	959	555	832	467	700	440	660	376	564
	10	382	573	631	946	547	821	460	690	434	651	370	555
	11	376	564	621	931	539	808	453	679	427	640	364	546
	12	369	553	610	916	530	794	445	667	419	629	357	536
	13	362	543	599	899	520	780	436	655	411	617	350	525
	14	354	531	587	881	510	765	428	641	403	604	342	513
	15	346	519	575	862	499	749	418	627	394	590	334	501
	16	338	506	562	843	488	732	408	613	384	576	326	489
	17	329	493	548	823	476	714	398	597	374	562	317	476
	18	320	480	534	802	464	696	388	582	364	547	308	462
	19	311	466	520	780	452	677	377	565	354	531	299	448
	20	301	452	505	758	439	658	366	549	344	515	290	434
	21	292	437	490	735	426	639	355	532	333	499	280	420
	22	282	423	475	712	412	619	343	515	322	483	270	405
	23	272	408	459	689	399	599	332	497	311	466	260	391
	24	262	393	444	665	386	578	320	480	300	449	251	376
	25	252	378	428	642	372	558	308	462	288	433	241	361
	26	242	363	412	618	358	537	296	445	277	416	231	346
	27	232	348	396	594	344	517	285	427	266	399	221	332
	28	222	333	380	571	331	496	273	410	255	382	211	317
	29	212	319	365	547	317	476	261	392	244	366	202	302
	30	203	304	349	524	304	456	250	375	233	349	192	288
	32	184	276	319	478	277	416	227	341	211	317	174	260
	34	166	248	289	434	252	377	206	308	191	286	156	233
	36	148	222	260	390	227	340	184	277	171	256	139	208
	38	133	199	234	350	204	305	165	248	153	230	125	187
	40	120	180	211	316	184	276	149	224	138	208	112	169
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	95.2	143	198	297	165	247	129	194	118	177	91.8	138
$P_e(L_c)^2/10^4$, kip-in.^{2}		6290		11100		9650		7850		7270		5910	
r_m, in.		4.16		3.95		3.99		4.03		4.04		4.07	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

4

COMPOSITE
HSS10.750

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS10.750×											
		0.625		0.500		0.375		0.313		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		67.65		54.79		41.59		34.87		28.06		21.17	
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, L_c (ft), with respect to the least radius of gyration, r	0	604	905	520	781	437	656	395	592	352	528	308	462
	1	603	905	520	780	437	655	394	591	352	527	307	461
	2	601	902	519	778	436	654	393	590	351	526	307	460
	3	599	898	516	774	434	651	391	587	349	523	305	457
	4	595	893	513	770	431	647	389	583	346	520	303	454
	5	590	886	509	764	428	641	386	578	343	515	300	450
	6	585	877	504	756	423	635	382	572	340	510	297	445
	7	578	867	498	748	418	628	377	566	336	503	293	439
	8	570	856	492	738	413	619	372	558	331	496	288	432
	9	562	843	485	727	407	610	366	549	325	488	283	425
	10	552	829	477	715	400	599	360	540	319	479	278	417
	11	542	813	468	702	392	588	353	529	313	470	272	408
	12	531	797	459	688	384	576	345	518	306	459	265	398
	13	520	779	449	673	376	563	338	506	299	448	259	388
	14	507	761	438	657	367	550	329	494	291	437	252	377
	15	495	742	427	641	357	536	321	481	283	425	244	366
	16	481	722	416	623	347	521	312	467	275	412	237	355
	17	467	701	404	606	337	506	302	453	266	399	229	343
	18	453	679	391	587	327	490	293	439	257	386	221	331
	19	438	658	379	568	316	474	283	424	248	372	212	319
	20	423	635	366	549	305	458	273	409	239	359	204	306
	21	408	613	353	530	294	441	263	394	230	345	196	293
	22	393	590	340	510	283	424	252	379	220	331	187	281
	23	378	567	327	490	272	408	242	363	211	317	179	268
	24	362	543	314	471	260	391	232	348	202	302	170	255
	25	347	520	301	451	249	374	222	333	192	288	162	243
	26	332	497	287	431	238	357	211	317	183	275	154	230
	27	316	475	274	411	227	340	201	302	174	261	145	218
	28	301	452	261	392	216	324	191	287	165	247	137	206
	29	286	430	249	373	205	308	182	272	156	234	130	194
	30	272	408	236	354	195	292	172	258	147	221	122	183
	32	244	365	212	317	174	261	153	230	130	196	107	161
	34	218	327	188	282	154	231	136	204	116	173	95.1	143
	36	194	292	168	252	138	206	121	182	103	155	84.8	127
	38	174	262	151	226	124	185	109	163	92.5	139	76.1	114
	40	157	236	136	204	111	167	98.1	147	83.5	125	68.7	103
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	163	245	136	204	107	161	91.7	138	75.9	114	58.3	87.7
$P_e(L_c)^2/10^4$, kip-in.^{2}		8210		7140		5860		5160		4390		3610	
r_m, in.		3.60		3.64		3.68		3.70		3.72		3.74	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS10.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS10.000×											
		0.625		0.500		0.375		0.312		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		62.64		50.78		38.58		32.31		26.06		19.72	
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, L_c (ft), with respect to the least radius of gyration, r	0	547	820	470	705	394	591	354	532	314	472	273	410
	1	546	819	470	705	394	591	354	531	314	471	273	409
	2	544	816	468	703	392	589	353	529	313	470	272	408
	3	542	812	466	699	390	586	351	527	311	467	270	406
	4	538	806	463	694	388	581	348	523	309	463	268	402
	5	533	799	458	688	384	576	345	518	306	459	265	398
	6	527	790	453	680	380	570	341	512	302	453	262	393
	7	520	779	447	671	375	562	337	505	298	447	258	387
	8	512	768	441	661	369	553	331	497	293	440	254	380
	9	503	754	433	650	363	544	325	488	288	431	249	373
	10	493	740	425	637	355	533	319	478	282	423	243	365
	11	483	724	416	624	348	522	312	468	275	413	237	356
	12	471	707	406	609	340	510	304	457	268	403	231	346
	13	459	689	396	594	331	497	297	445	261	392	224	336
	14	447	670	385	578	322	483	288	432	254	380	217	326
	15	433	650	374	561	312	469	280	419	246	368	210	315
	16	420	630	363	544	303	454	271	406	237	356	203	304
	17	406	609	351	526	292	439	261	392	229	343	195	292
	18	391	587	338	508	282	423	252	378	220	330	187	281
	19	377	565	326	489	272	407	242	363	212	317	179	269
	20	362	543	313	470	261	391	233	349	203	304	171	257
	21	347	521	300	451	250	375	223	334	194	291	163	245
	22	332	498	288	431	239	359	213	319	185	277	155	233
	23	317	475	275	412	228	342	203	304	176	264	147	221
	24	302	453	262	393	217	326	193	290	167	251	139	209
	25	287	431	249	374	207	310	183	275	158	237	132	197
	26	272	409	237	355	196	294	174	261	150	225	124	186
	27	259	389	224	336	186	279	164	247	141	212	116	175
	28	246	369	212	318	175	263	155	233	133	199	109	164
	29	233	350	200	300	165	248	146	219	125	187	102	153
	30	220	331	189	283	156	233	137	206	117	175	95.3	143
	32	196	294	166	249	137	205	121	181	103	154	83.7	126
	34	173	260	147	221	121	182	107	160	90.9	136	74.2	111
	36	155	232	131	197	108	162	95.3	143	81.1	122	66.2	99.3
	38	139	208	118	177	97.1	146	85.5	128	72.8	109	59.4	89.1
	40	125	188	106	159	87.6	131	77.2	116	65.7	98.5	53.6	80.4
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	138	207	115	173	90.5	136	77.7	117	64.3	96.7	49.8	74.8
$P_e(L_c)^2/10^4$, kip-in.^{2}		6400		5580		4600		4060		3450		2820	
r_m, in.		3.34		3.38		3.41		3.43		3.45		3.47	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS9.625

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS9.625×											
		0.625		0.500		0.375		0.312		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		60.13		48.77		37.08		31.06		25.06		18.97	
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, L_c (ft), with respect to the least radius of gyration, r	0	520	779	448	672	374	561	335	503	297	446	258	387
	1	519	778	447	671	374	560	335	503	297	445	257	386
	2	517	776	446	669	372	559	334	501	296	444	257	385
	3	514	772	444	665	370	556	332	498	294	441	255	382
	4	510	766	440	660	368	551	329	494	292	437	253	379
	5	505	758	436	654	364	546	326	489	288	433	250	375
	6	499	749	431	646	359	539	322	483	285	427	246	370
	7	492	738	424	637	354	532	317	476	280	421	242	364
	8	484	726	417	626	349	523	312	468	276	413	238	357
	9	475	712	410	615	342	513	306	459	270	405	233	349
	10	465	697	401	602	335	502	299	449	264	396	227	341
	11	454	681	392	588	327	491	292	439	258	387	222	332
	12	443	664	382	573	319	479	285	427	251	376	215	323
	13	431	646	372	558	310	466	277	415	244	365	209	313
	14	418	627	361	542	301	452	269	403	236	354	202	303
	15	405	607	350	525	292	438	260	390	228	342	195	292
	16	391	587	338	507	282	423	251	376	220	330	187	281
	17	377	566	326	489	272	408	242	363	212	317	180	269
	18	363	544	314	470	262	392	232	349	203	304	172	258
	19	348	522	301	452	251	377	223	334	194	292	164	246
	20	333	500	288	433	241	361	213	320	186	278	156	234
	21	319	478	276	414	230	345	204	305	177	265	148	223
	22	304	456	263	394	219	329	194	291	168	252	141	211
	23	289	433	250	375	209	313	184	276	160	239	133	199
	24	274	411	238	357	198	297	175	262	151	226	125	188
	25	260	390	225	338	188	281	165	248	142	214	118	177
	26	247	371	213	319	177	266	156	234	134	201	111	166
	27	233	351	201	301	167	251	147	220	126	189	104	155
	28	221	332	189	284	157	236	138	207	118	177	96.5	145
	29	208	313	178	266	148	222	129	194	110	165	89.9	135
	30	196	294	166	249	138	207	121	181	103	155	84.0	126
	32	172	259	146	219	121	182	106	159	90.6	136	73.9	111
	34	153	229	129	194	108	161	94.0	141	80.2	120	65.4	98.1
	36	136	205	115	173	96.0	144	83.9	126	71.6	107	58.4	87.5
	38	122	184	103	155	86.1	129	75.3	113	64.2	96.4	52.4	78.6
	40	110	166	93.4	140	77.7	117	67.9	102	58.0	87.0	47.3	70.9
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	127	191	106	159	83.4	125	71.6	108	59.3	89.2	46.0	69.2
$P_e(L_c)^2/10^4$, kip-in.^{2}		5650		4910		4080		3570		3050		2480	
r_m, in.		3.20		3.24		3.28		3.30		3.32		3.34	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS8.625

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS8.625×											
		0.625		0.500		0.375		0.322		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.300		0.233		0.174	
Steel, lb/ft		53.45		43.43		33.07		28.58		22.38		16.96	
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, L_c (ft), with respect to the least radius of gyration, r	0	451	676	386	579	321	481	292	439	253	379	218	327
	1	450	675	385	578	320	480	292	438	253	379	218	326
	2	448	672	384	576	319	478	291	436	252	377	217	325
	3	445	668	381	572	317	475	289	433	250	375	215	322
	4	441	661	378	566	314	471	286	429	247	371	213	319
	5	435	653	373	559	310	465	283	424	244	366	210	315
	6	429	643	367	551	305	458	278	417	240	360	206	309
	7	421	631	361	541	300	450	273	410	236	354	202	303
	8	412	618	354	530	294	441	268	402	231	346	198	297
	9	402	604	345	518	287	431	261	392	225	338	193	289
	10	392	588	337	505	280	420	255	382	219	329	187	281
	11	380	571	327	491	272	408	247	371	213	319	181	272
	12	368	553	317	475	263	395	240	359	206	309	175	263
	13	356	534	306	459	255	382	232	347	198	298	169	253
	14	343	514	295	443	245	368	223	335	191	286	162	243
	15	329	494	284	425	236	354	214	321	183	275	155	232
	16	316	475	272	408	226	339	205	308	175	263	148	221
	17	303	455	260	390	216	324	196	294	167	251	140	211
	18	289	435	248	371	206	309	187	280	159	238	133	200
	19	276	414	235	353	196	294	178	266	151	226	126	189
	20	262	394	223	335	186	278	168	252	142	214	119	178
	21	248	373	211	316	176	263	159	238	134	201	111	167
	22	235	353	199	298	166	248	150	225	126	189	104	157
	23	222	333	187	281	156	233	141	211	118	177	97.5	146
	24	209	314	175	263	146	219	132	198	111	166	90.8	136
	25	196	294	164	246	137	205	123	185	103	155	84.2	126
	26	183	275	153	229	127	191	115	172	95.6	143	77.9	117
	27	171	257	142	214	118	177	106	160	88.7	133	72.2	108
	28	159	239	132	199	110	165	99.0	148	82.5	124	67.1	101
	29	148	223	123	185	102	154	92.3	138	76.9	115	62.6	93.9
	30	138	208	115	173	95.7	144	86.2	129	71.8	108	58.5	87.7
	32	122	183	101	152	84.1	126	75.8	114	63.1	94.7	51.4	77.1
	34	108	162	89.7	135	74.5	112	67.1	101	55.9	83.9	45.5	68.3
	36	96.2	145	80.0	120	66.5	99.7	59.9	89.8	49.9	74.8	40.6	60.9
	38	86.3	130	71.8	108	59.7	89.5	53.7	80.6	44.8	67.2	36.5	54.7
	40	77.9	117	64.8	97.5	53.8	80.8	48.5	72.8	40.4	60.6	32.9	49.3
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	99.7	150	83.3	125	65.8	98.9	58.0	87.1	46.9	70.4	36.6	55.0
$P_e(L_c)^2/10^4$, kip-in.^{2}		3880		3400		2830		2550		2120		1730	
r_m, in.		2.85		2.89		2.93		2.95		2.97		2.99	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS7.500–
HSS7.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS7.500×										HSS7.000×	
		0.500		0.375		0.312		0.250		0.188		0.500	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174		0.465	
Steel, lb/ft		37.42		28.56		23.97		19.38		14.70		34.74	
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, L_c (ft), with respect to the least radius of gyration, r	0	322	483	265	398	236	354	207	310	176	264	294	441
	1	321	482	265	397	236	354	206	310	176	264	293	440
	2	320	479	263	395	234	352	205	308	175	262	291	437
	3	317	475	261	391	232	349	203	305	173	260	288	432
	4	313	469	257	386	229	344	201	301	171	256	284	426
	5	307	461	253	380	226	339	197	296	168	252	279	418
	6	301	452	248	372	221	332	193	290	164	247	272	408
	7	294	441	243	364	216	324	189	283	160	240	265	397
	8	286	429	236	354	210	316	184	275	156	233	257	385
	9	277	416	229	343	204	306	178	267	151	226	247	371
	10	268	402	221	332	197	296	172	258	145	218	238	357
	11	258	387	213	319	190	285	165	248	139	209	227	341
	12	247	371	204	306	182	273	158	237	133	200	217	325
	13	236	354	195	293	174	261	151	227	127	190	205	309
	14	225	337	186	279	166	249	144	216	120	180	195	293
	15	213	319	176	264	157	236	136	204	114	171	184	277
	16	201	302	167	250	149	223	129	193	107	160	173	260
	17	189	284	157	235	140	210	121	181	100	150	162	244
	18	178	267	147	221	132	197	113	170	93.7	141	152	228
	19	167	251	138	207	123	185	106	159	87.2	131	141	212
	20	156	235	128	193	115	172	98.4	148	80.8	121	131	197
	21	146	219	119	179	106	160	91.2	137	74.6	112	121	181
	22	136	204	110	165	98.5	148	84.2	126	68.5	103	111	167
	23	126	189	101	152	90.7	136	77.3	116	62.7	94.0	101	152
	24	116	174	93.2	140	83.3	125	71.0	107	57.6	86.4	93.1	140
	25	107	160	85.9	129	76.8	115	65.4	98.2	53.1	79.6	85.8	129
	26	98.6	148	79.4	119	71.0	106	60.5	90.8	49.1	73.6	79.4	119
	27	91.4	137	73.6	110	65.8	98.7	56.1	84.2	45.5	68.2	73.6	111
	28	85.0	128	68.5	103	61.2	91.8	52.2	78.3	42.3	63.5	68.4	103
	29	79.3	119	63.8	95.7	57.0	85.6	48.6	73.0	39.4	59.2	63.8	95.9
	30	74.1	111	59.6	89.5	53.3	80.0	45.4	68.2	36.9	55.3	59.6	89.6
	32	65.1	97.8	52.4	78.6	46.9	70.3	39.9	59.9	32.4	48.6	52.4	78.8
	34	57.7	86.7	46.4	69.6	41.5	62.3	35.4	53.1	28.7	43.0	46.4	69.8
	36	51.4	77.3	41.4	62.1	37.0	55.5	31.6	47.3	25.6	38.4	41.4	62.2
	38	46.2	69.4	37.2	55.8	33.2	49.8	28.3	42.5	23.0	34.5	37.2	55.8
	40	41.7	62.6	33.5	50.3	30.0	45.0	25.6	38.3	20.7	31.1		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	61.3	92.1	48.5	72.9	41.7	62.7	34.6	52.0	27.0	40.7	52.6	79.1
$P_e(L_c)^2/10^4$, kip-in.^{2}		2110		1760		1580		1340		1090		1670	
r_m, in.		2.49		2.53		2.55		2.57		2.59		2.32	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS7.000–
HSS6.875

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS7.000×										HSS6.875×	
		0.375		0.312		0.250		0.188		0.125		0.375	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.349	
Steel, lb/ft		26.56		22.31		18.04		13.69		9.19		26.06	
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, L_c (ft), with respect to the least radius of gyration, r	0	242	362	215	322	187	281	159	239	131	197	236	354
	1	241	362	214	321	187	281	159	238	131	196	236	353
	2	240	359	213	319	186	279	158	237	130	195	234	351
	3	237	356	211	316	184	276	156	234	128	192	231	347
	4	234	350	208	312	181	272	154	231	126	189	228	342
	5	229	344	204	306	178	267	151	226	123	185	224	335
	6	224	336	199	299	174	261	147	221	120	180	218	328
	7	218	327	194	291	169	254	143	214	116	175	212	318
	8	211	317	188	282	164	246	138	207	112	169	206	308
	9	204	306	182	272	158	237	133	200	108	162	198	297
	10	196	294	175	262	152	228	128	191	103	155	190	285
	11	188	281	167	251	145	218	122	183	97.9	147	182	273
	12	179	268	159	239	138	207	116	174	92.6	139	173	259
	13	170	255	151	227	131	197	110	164	87.2	131	164	246
	14	160	241	143	215	124	186	103	155	81.7	123	154	232
	15	151	227	135	202	117	175	96.7	145	76.2	114	145	218
	16	142	212	126	189	109	164	90.3	135	70.7	106	136	204
	17	132	198	118	177	102	153	83.9	126	65.3	98.0	126	190
	18	123	184	110	165	94.6	142	77.7	117	60.0	90.0	117	176
	19	114	171	102	152	87.5	131	71.6	107	54.9	82.4	108	162
	20	105	157	93.7	141	80.6	121	65.6	98.5	49.9	74.9	99.4	149
	21	96.3	144	86.1	129	73.9	111	59.8	89.7	45.3	67.9	90.8	136
	22	87.9	132	78.6	118	67.4	101	54.5	81.8	41.2	61.9	82.8	124
	23	80.4	121	71.9	108	61.6	92.4	49.9	74.8	37.7	56.6	75.7	114
	24	73.8	111	66.0	99.0	56.6	84.9	45.8	68.7	34.7	52.0	69.6	104
	25	68.0	102	60.8	91.2	52.2	78.2	42.2	63.3	31.9	47.9	64.1	96.1
	26	62.9	94.4	56.2	84.4	48.2	72.3	39.0	58.5	29.5	44.3	59.3	88.9
	27	58.3	87.5	52.2	78.2	44.7	67.1	36.2	54.3	27.4	41.1	55.0	82.4
	28	54.2	81.4	48.5	72.7	41.6	62.4	33.6	50.5	25.5	38.2	51.1	76.6
	29	50.6	75.8	45.2	67.8	38.8	58.1	31.4	47.1	23.7	35.6	47.6	71.5
	30	47.2	70.9	42.2	63.4	36.2	54.3	29.3	44.0	22.2	33.3	44.5	66.8
	32	41.5	62.3	37.1	55.7	31.8	47.8	25.8	38.6	19.5	29.2	39.1	58.7
	34	36.8	55.2	32.9	49.3	28.2	42.3	22.8	34.2	17.3	25.9	34.7	52.0
	36	32.8	49.2	29.3	44.0	25.2	37.7	20.4	30.5	15.4	23.1	30.9	46.4
	38	29.4	44.2	26.3	39.5	22.6	33.9	18.3	27.4	13.8	20.7	27.7	41.6
	40							16.5	24.7	12.5	18.7		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	41.7	62.7	35.9	54.0	29.8	44.8	23.3	35.0	16.3	24.5	40.2	60.4
$P_e(L_c)^2/10^4$, kip-in.^{2}		1400		1250		1070		866		656		1320	
r_m, in.		2.35		2.37		2.39		2.41		2.43		2.31	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Heavy line indicates L_c/r_m equal to or greater than 200.

4

COMPOSITE
HSS6.875–
HSS6.625

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS6.875×						HSS6.625×					
		0.312		0.250		0.188		0.500		0.432		0.375	
t_{des}, in.		0.291		0.233		0.174		0.465		0.402		0.349	
Steel, lb/ft		21.89		17.71		13.44		32.74		28.60		25.06	
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, L_c (ft), with respect to the least radius of gyration, r	0	210	315	183	274	155	233	273	410	247	371	225	337
	1	209	314	182	274	155	232	273	409	247	370	224	336
	2	208	312	181	272	154	231	271	406	245	367	222	334
	3	206	309	179	269	152	228	268	402	242	363	220	330
	4	203	304	177	265	150	224	263	395	238	357	216	324
	5	199	298	173	260	147	220	258	387	233	350	212	318
	6	194	291	169	254	143	214	251	377	227	341	206	310
	7	189	283	164	246	139	208	243	365	220	330	200	300
	8	183	274	159	239	134	201	235	352	213	319	193	290
	9	176	264	153	230	129	193	226	338	204	307	186	279
	10	169	254	147	220	123	185	216	325	195	293	178	267
	11	162	242	140	211	118	177	206	310	186	279	169	254
	12	154	231	133	200	112	168	196	294	176	264	161	241
	13	146	219	126	190	105	158	185	279	166	249	151	227
	14	138	206	119	179	99.2	149	175	262	156	234	142	213
	15	129	194	112	168	92.8	139	164	246	146	219	133	199
	16	121	181	104	157	86.5	130	153	230	135	203	124	185
	17	113	169	97.2	146	80.2	120	142	213	125	189	115	172
	18	104	157	90.0	135	74.0	111	131	198	116	175	106	158
	19	96.5	145	83.0	125	68.0	102	121	182	107	161	96.8	145
	20	88.7	133	76.3	114	62.2	93.4	111	167	98.6	148	88.4	133
	21	81.2	122	69.6	104	56.6	84.8	101	152	90.0	135	80.3	121
	22	73.9	111	63.4	95.1	51.5	77.3	92.2	139	82.0	123	73.1	110
	23	67.7	101	58.0	87.0	47.1	70.7	84.4	127	75.1	113	66.9	101
	24	62.1	93.2	53.3	79.9	43.3	65.0	77.5	116	68.9	104	61.4	92.4
	25	57.3	85.9	49.1	73.7	39.9	59.9	71.4	107	63.5	95.5	56.6	85.1
	26	52.9	79.4	45.4	68.1	36.9	55.3	66.0	99.3	58.7	88.3	52.4	78.7
	27	49.1	73.6	42.1	63.2	34.2	51.3	61.2	92.0	54.5	81.9	48.5	73.0
	28	45.7	68.5	39.2	58.7	31.8	47.7	56.9	85.6	50.6	76.1	45.1	67.9
	29	42.6	63.8	36.5	54.8	29.7	44.5	53.1	79.8	47.2	71.0	42.1	63.3
	30	39.8	59.7	34.1	51.2	27.7	41.6	49.6	74.6	44.1	66.3	39.3	59.1
	32	35.0	52.4	30.0	45.0	24.4	36.5	43.6	65.5	38.8	58.3	34.6	51.9
	34	31.0	46.4	26.6	39.8	21.6	32.4	38.6	58.0	34.4	51.6	30.6	46.0
	36	27.6	41.4	23.7	35.5	19.2	28.9	34.4	51.8	30.6	46.1	27.3	41.0
	38	24.8	37.2	21.3	31.9	17.3	25.9						
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	34.6	52.0	28.7	43.2	22.5	33.8	46.7	70.2	41.6	62.5	37.1	55.7
$P_e(L_c)^2/10^4$, kip-in.^{2}		1180		1010		819		1390		1270		1160	
r_m, in.		2.33		2.35		2.37		2.18		2.20		2.22	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS6.625–
HSS6.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS6.625×										HSS6.000×	
		0.312		0.280		0.250		0.188		0.125		0.500	
t_{des}, in.		0.291		0.260		0.233		0.174		0.116		0.465	
Steel, lb/ft		21.06		18.99		17.04		12.94		8.69		29.40	
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, L_c (ft), with respect to the least radius of gyration, r	0	199	299	186	279	174	261	147	221	120	181	242	364
	1	199	298	185	278	173	260	147	220	120	180	242	363
	2	197	296	184	276	172	258	146	219	119	179	240	360
	3	195	293	182	273	170	255	144	216	117	176	236	355
	4	192	288	179	268	167	251	141	212	115	173	232	348
	5	188	282	175	263	164	246	138	208	113	169	226	340
	6	183	275	171	256	160	239	135	202	109	164	219	330
	7	178	267	166	249	155	232	131	196	106	158	212	318
	8	172	258	160	240	149	224	126	189	102	152	203	305
	9	165	248	154	231	144	215	121	181	97.1	146	194	292
	10	158	237	147	221	137	206	115	173	92.3	138	184	277
	11	151	226	140	211	131	196	109	164	87.3	131	174	261
	12	143	214	133	200	124	186	103	155	82.1	123	163	245
	13	135	202	126	188	117	175	97.4	146	76.8	115	152	229
	14	127	190	118	177	110	165	91.1	137	71.5	107	142	213
	15	118	177	110	166	103	154	84.9	127	66.2	99.3	131	196
	16	110	165	103	154	95.3	143	78.7	118	61.0	91.5	120	180
	17	102	153	95.2	143	88.2	132	72.6	109	55.9	83.8	110	165
	18	94.1	141	87.8	132	81.3	122	66.7	100	50.9	76.4	99.7	150
	19	86.3	129	80.6	121	74.5	112	60.9	91.4	46.1	69.1	89.9	135
	20	78.9	118	73.6	110	68.0	102	55.3	82.9	41.6	62.4	81.1	122
	21	71.6	107	66.8	100	61.7	92.5	50.1	75.2	37.7	56.6	73.6	111
	22	65.2	97.8	60.9	91.3	56.2	84.3	45.7	68.5	34.4	51.6	67.0	101
	23	59.7	89.5	55.7	83.6	51.4	77.1	41.8	62.7	31.5	47.2	61.3	92.2
	24	54.8	82.2	51.2	76.7	47.2	70.8	38.4	57.6	28.9	43.3	56.3	84.6
	25	50.5	75.8	47.1	70.7	43.5	65.3	35.4	53.1	26.6	39.9	51.9	78.0
	26	46.7	70.0	43.6	65.4	40.2	60.4	32.7	49.0	24.6	36.9	48.0	72.1
	27	43.3	64.9	40.4	60.6	37.3	56.0	30.3	45.5	22.8	34.2	44.5	66.9
	28	40.3	60.4	37.6	56.4	34.7	52.0	28.2	42.3	21.2	31.8	41.4	62.2
	29	37.5	56.3	35.0	52.6	32.3	48.5	26.3	39.4	19.8	29.7	38.6	58.0
	30	35.1	52.6	32.7	49.1	30.2	45.3	24.6	36.8	18.5	27.7	36.0	54.2
	32	30.8	46.2	28.8	43.2	26.6	39.8	21.6	32.4	16.3	24.4	31.7	47.6
	34	27.3	41.0	25.5	38.2	23.5	35.3	19.1	28.7	14.4	21.6		
	36	24.4	36.5	22.7	34.1	21.0	31.5	17.1	25.6	12.8	19.3		
	38									11.5	17.3		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	31.9	48.0	29.1	43.7	26.5	39.9	20.7	31.2	14.6	21.9	37.4	56.2
$P_e(L_c)^2/10^4$, kip-in.^{2}		1040		968		893		726		546		994	
r_m, in.		2.24		2.25		2.26		2.28		2.30		1.96	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS6.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS6.000×											
		0.375		0.312		0.280		0.250		0.188		0.125	
t_{des}, in.		0.349		0.291		0.260		0.233		0.174		0.116	
Steel, lb/ft		22.55		18.97		17.12		15.37		11.68		7.85	
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, L_c (ft), with respect to the least radius of gyration, r	0	197	295	174	261	162	243	151	227	127	191	103	155
	1	196	295	174	261	162	242	151	226	127	190	103	154
	2	195	292	172	259	160	240	150	224	126	189	102	153
	3	192	288	170	255	158	237	147	221	124	186	100	150
	4	188	282	167	250	155	232	145	217	121	182	98.0	147
	5	183	275	162	244	151	226	141	211	118	177	95.3	143
	6	178	267	157	236	146	220	137	205	114	172	92.0	138
	7	171	257	152	228	141	212	132	198	110	165	88.3	132
	8	164	246	145	218	135	203	126	189	105	158	84.2	126
	9	156	234	139	208	129	193	120	180	100	150	79.8	120
	10	148	222	131	197	122	183	114	171	94.8	142	75.1	113
	11	139	209	124	186	115	173	107	161	89.2	134	70.3	105
	12	130	196	116	174	108	162	101	151	83.3	125	65.4	98.0
	13	121	182	108	162	100	151	93.9	141	77.4	116	60.4	90.6
	14	112	169	100	150	93.0	140	87.0	130	71.5	107	55.4	83.1
	15	103	155	92.1	138	85.7	129	80.2	120	65.7	98.6	50.6	75.8
	16	94.7	142	84.3	126	78.5	118	73.4	110	60.0	90.0	45.8	68.7
	17	86.8	130	76.8	115	71.5	107	66.9	100	54.4	81.7	41.3	61.9
	18	79.1	119	69.5	104	64.7	97.1	60.6	90.9	49.1	73.6	36.9	55.3
	19	71.7	108	62.5	93.7	58.2	87.3	54.5	81.8	44.1	66.1	33.1	49.6
	20	64.7	97.3	56.4	84.6	52.5	78.8	49.2	73.8	39.8	59.6	29.9	44.8
	21	58.7	88.2	51.2	76.7	47.6	71.4	44.6	66.9	36.1	54.1	27.1	40.6
	22	53.5	80.4	46.6	69.9	43.4	65.1	40.7	61.0	32.9	49.3	24.7	37.0
	23	48.9	73.5	42.6	64.0	39.7	59.5	37.2	55.8	30.1	45.1	22.6	33.9
	24	44.9	67.5	39.2	58.7	36.5	54.7	34.2	51.2	27.6	41.4	20.7	31.1
	25	41.4	62.3	36.1	54.1	33.6	50.4	31.5	47.2	25.4	38.2	19.1	28.7
	26	38.3	57.6	33.4	50.1	31.1	46.6	29.1	43.7	23.5	35.3	17.7	26.5
	27	35.5	53.4	30.9	46.4	28.8	43.2	27.0	40.5	21.8	32.7	16.4	24.6
	28	33.0	49.6	28.8	43.2	26.8	40.2	25.1	37.6	20.3	30.4	15.2	22.9
	29	30.8	46.3	26.8	40.2	25.0	37.5	23.4	35.1	18.9	28.4	14.2	21.3
	30	28.8	43.2	25.1	37.6	23.3	35.0	21.9	32.8	17.7	26.5	13.3	19.9
	32	25.3	38.0	22.0	33.0	20.5	30.8	19.2	28.8	15.5	23.3	11.7	17.5
	34							17.0	25.5	13.8	20.6	10.3	15.5

Properties

M_n/Ω_b	$\phi_b M_n$	kip-ft	29.8	44.8	25.7	38.6	23.4	35.2	21.4	32.1	16.7	25.1	11.9	17.8
$P_e(L_c)^2/10^4$, kip-in.^{2}			830		741		690		646		522		392	
r_m, in.			2.00		2.02		2.03		2.04		2.06		2.08	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS5.563–
HSS5.500

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS5.563×										HSS5.500×	
		0.500		0.375		0.258		0.188		0.134		0.500	
t_{des}, in.		0.465		0.349		0.240		0.174		0.124		0.465	
Steel, lb/ft		27.06		20.80		14.63		10.80		7.78		26.73	
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, L_c (ft), with respect to the least radius of gyration, r	0	223	335	178	267	139	208	114	171	95.1	143	220	331
	1	222	334	178	267	138	207	114	171	94.8	142	220	330
	2	220	331	176	264	137	205	113	169	93.8	141	217	327
	3	217	326	173	259	135	202	111	166	92.1	138	214	322
	4	212	318	169	253	132	197	108	162	89.8	135	209	314
	5	206	309	164	246	128	192	105	158	87.0	130	203	305
	6	199	299	158	237	123	185	101	152	83.6	125	196	294
	7	191	286	151	227	118	177	96.9	145	79.8	120	188	282
	8	182	273	144	216	112	169	92.1	138	75.6	113	179	268
	9	172	258	136	204	106	159	86.9	130	71.2	107	169	254
	10	162	243	128	191	99.8	150	81.5	122	66.5	99.7	159	238
	11	151	227	119	178	93.1	140	75.9	114	61.7	92.5	148	223
	12	140	211	110	165	86.3	130	70.3	105	56.8	85.2	137	206
	13	130	195	102	153	79.5	119	64.6	96.9	51.9	77.9	126	190
	14	119	179	93.7	141	72.8	109	59.0	88.4	47.1	70.7	116	174
	15	108	163	85.7	129	66.1	99.2	53.4	80.2	42.5	63.8	105	158
	16	98.0	147	77.9	117	59.7	89.6	48.1	72.2	38.0	57.1	95.0	143
	17	88.1	132	70.4	106	53.5	80.3	43.0	64.5	33.7	50.6	85.2	128
	18	78.6	118	63.1	94.8	47.7	71.6	38.3	57.5	30.1	45.1	76.0	114
	19	70.6	106	56.6	85.1	42.8	64.2	34.4	51.6	27.0	40.5	68.2	102
	20	63.7	95.7	51.1	76.8	38.7	58.0	31.1	46.6	24.4	36.6	61.5	92.5
	21	57.8	86.8	46.3	69.6	35.1	52.6	28.2	42.2	22.1	33.2	55.8	83.9
	22	52.6	79.1	42.2	63.5	31.9	47.9	25.7	38.5	20.1	30.2	50.9	76.4
	23	48.2	72.4	38.6	58.1	29.2	43.8	23.5	35.2	18.4	27.7	46.5	69.9
	24	44.2	66.5	35.5	53.3	26.8	40.3	21.6	32.3	16.9	25.4	42.7	64.2
	25	40.8	61.3	32.7	49.1	24.7	37.1	19.9	29.8	15.6	23.4	39.4	59.2
	26	37.7	56.6	30.2	45.4	22.9	34.3	18.4	27.6	14.4	21.6	36.4	54.7
	27	34.9	52.5	28.0	42.1	21.2	31.8	17.0	25.6	13.4	20.1	33.8	50.7
	28	32.5	48.8	26.1	39.2	19.7	29.6	15.8	23.8	12.4	18.7	31.4	47.2
	29	30.3	45.5	24.3	36.5	18.4	27.6	14.8	22.2	11.6	17.4	29.3	44.0
	30	28.3	42.5	22.7	34.1	17.2	25.8	13.8	20.7	10.8	16.3		
	32									9.52	14.3		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	31.6	47.5	25.2	37.9	18.6	27.9	14.2	21.3	10.7	16.0	30.8	46.3
$P_e(L_c)^2/10^4$, kip-in.^{2}		768		643		508		408		320		739	
r_m, in.		1.81		1.85		1.88		1.91		1.92		1.79	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS5.500–
HSS5.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS5.500×				HSS5.000×							
		0.375		0.258		0.500		0.375		0.312		0.258	
t_{des}, in.		0.349		0.240		0.465		0.349		0.291		0.240	
Steel, lb/ft		20.55		14.46		24.05		18.54		15.64		13.08	
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, L_c (ft), with respect to the least radius of gyration, r	0	176	263	137	205	198	298	155	233	137	205	120	180
	1	175	263	136	205	197	297	154	232	136	204	120	180
	2	173	260	135	203	195	293	153	229	134	202	118	177
	3	170	256	133	199	191	287	149	224	132	198	116	174
	4	166	249	130	194	186	279	145	218	128	192	113	169
	5	161	242	126	189	179	269	140	210	123	185	109	163
	6	155	233	121	182	171	257	134	200	118	177	104	156
	7	149	223	116	174	162	244	127	190	112	168	98.5	148
	8	141	212	110	165	153	230	119	179	105	158	92.6	139
	9	133	200	104	156	143	214	112	168	98.0	147	86.4	130
	10	125	187	97.7	146	132	198	104	156	90.6	136	80.0	120
	11	116	174	91.0	136	121	182	95.6	144	83.2	125	73.4	110
	12	108	162	84.2	126	110	166	87.5	131	75.7	114	66.8	100
	13	99.4	149	77.4	116	99.8	150	79.4	119	68.3	102	60.4	90.5
	14	91.3	137	70.6	106	89.4	134	71.6	108	61.4	92.3	54.1	81.1
	15	83.4	125	64.0	96.1	79.5	119	64.0	96.1	55.1	82.8	48.0	72.1
	16	75.6	114	57.7	86.5	70.0	105	56.6	85.1	48.9	73.5	42.3	63.4
	17	68.2	102	51.5	77.2	62.0	93.2	50.1	75.4	43.3	65.1	37.5	56.2
	18	61.0	91.6	45.9	68.9	55.3	83.1	44.7	67.2	38.6	58.1	33.4	50.1
	19	54.7	82.2	41.2	61.8	49.6	74.6	40.1	60.3	34.7	52.1	30.0	45.0
	20	49.4	74.2	37.2	55.8	44.8	67.3	36.2	54.5	31.3	47.0	27.1	40.6
	21	44.8	67.3	33.7	50.6	40.6	61.0	32.9	49.4	28.4	42.7	24.5	36.8
	22	40.8	61.3	30.8	46.1	37.0	55.6	29.9	45.0	25.9	38.9	22.4	33.5
	23	37.3	56.1	28.1	42.2	33.9	50.9	27.4	41.2	23.7	35.6	20.5	30.7
	24	34.3	51.5	25.8	38.8	31.1	46.7	25.2	37.8	21.7	32.7	18.8	28.2
	25	31.6	47.5	23.8	35.7	28.7	43.1	23.2	34.9	20.0	30.1	17.3	26.0
	26	29.2	43.9	22.0	33.0	26.5	39.8	21.4	32.2	18.5	27.8	16.0	24.0
	27	27.1	40.7	20.4	30.6			19.9	29.9	17.2	25.8	14.8	22.3
	28	25.2	37.9	19.0	28.5							13.8	20.7
	29	23.5	35.3	17.7	26.5								
	30	21.9	33.0	16.5	24.8								
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	24.6	37.0	18.1	27.3	24.9	37.4	19.9	30.0	17.2	25.9	14.7	22.2
$P_e(L_c)^2/10^4$, kip-in.^{2}		619		489		534		450		401		355	
r_m, in.		1.83		1.86		1.61		1.65		1.67		1.69	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS5.000–
HSS4.500

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS5.000×						HSS4.500×					
		0.250		0.188		0.125		0.375		0.337		0.237	
t_{des}, in.		0.233		0.174		0.116		0.349		0.313		0.220	
Steel, lb/ft		12.69		9.67		6.51		16.54		15.00		10.80	
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, L_c (ft), with respect to the least radius of gyration, r	0	118	177	98.3	147	78.4	118	136	205	125	188	98.6	148
	1	117	176	97.9	147	78.1	117	136	204	125	187	98.1	147
	2	116	174	96.7	145	77.1	116	134	201	123	184	96.6	145
	3	114	171	94.7	142	75.4	113	130	196	120	180	94.2	141
	4	110	166	92.0	138	73.1	110	126	189	115	173	91.0	136
	5	107	160	88.7	133	70.3	105	121	181	110	165	86.9	130
	6	102	153	84.7	127	66.9	100	114	172	104	156	82.2	123
	7	96.6	145	80.3	120	63.2	94.8	107	161	97.5	146	77.0	116
	8	90.9	136	75.5	113	59.2	88.8	99.7	150	90.7	136	71.4	107
	9	84.8	127	70.4	106	54.9	82.4	91.8	138	83.6	126	65.5	98.3
	10	78.5	118	65.1	97.7	50.5	75.8	83.7	126	76.3	115	59.5	89.3
	11	72.0	108	59.7	89.6	46.1	69.1	75.5	114	69.0	104	53.6	80.3
	12	65.6	98.4	54.3	81.5	41.6	62.5	67.5	102	61.7	92.8	47.7	71.5
	13	59.2	88.8	49.0	73.5	37.3	56.0	59.8	89.9	54.7	82.3	42.0	63.1
	14	53.1	79.6	43.8	65.8	33.1	49.7	52.4	78.7	48.1	72.2	36.6	54.9
	15	47.1	70.7	38.9	58.4	29.1	43.7	45.6	68.6	41.9	62.9	31.9	47.8
	16	41.5	62.2	34.2	51.3	25.6	38.4	40.1	60.3	36.8	55.3	28.0	42.1
	17	36.8	55.1	30.3	45.5	22.7	34.0	35.5	53.4	32.6	49.0	24.8	37.3
	18	32.8	49.2	27.0	40.6	20.2	30.3	31.7	47.6	29.1	43.7	22.2	33.2
	19	29.4	44.1	24.3	36.4	18.1	27.2	28.4	42.7	26.1	39.2	19.9	29.8
	20	26.6	39.8	21.9	32.9	16.4	24.6	25.7	38.6	23.5	35.4	17.9	26.9
	21	24.1	36.1	19.9	29.8	14.9	22.3	23.3	35.0	21.4	32.1	16.3	24.4
	22	21.9	32.9	18.1	27.1	13.5	20.3	21.2	31.9	19.5	29.3	14.8	22.2
	23	20.1	30.1	16.6	24.8	12.4	18.6	19.4	29.2	17.8	26.8	13.6	20.4
	24	18.4	27.7	15.2	22.8	11.4	17.1	17.8	26.8	16.4	24.6	12.5	18.7
	25	17.0	25.5	14.0	21.0	10.5	15.7					11.5	17.2
	26	15.7	23.6	13.0	19.4	9.69	14.5						
	27	14.6	21.9	12.0	18.0	8.98	13.5						
	28	13.5	20.3	11.2	16.8	8.35	12.5						
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	14.4	21.6	11.3	17.0	8.01	12.0	15.8	23.7	14.5	21.8	10.9	16.4
$P_e(L_c)^2/10^4$, kip-in.^{2}		349		288		215		314		294		236	
r_m, in.		1.69		1.71		1.73		1.47		1.48		1.52	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS4.500–
HSS4.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS4.500×				HSS4.000×							
		0.188		0.125		0.313		0.250		0.237		0.226	
t_{des}, in.		0.174		0.116		0.291		0.233		0.220		0.210	
Steel, lb/ft		8.67		5.85		12.34		10.00		9.53		9.12	
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, L_c (ft), with respect to the least radius of gyration, r	0	84.7	127	67.2	101	102	153	87.6	131	84.2	126	81.6	122
	1	84.3	126	66.8	100	102	152	87.1	131	83.6	125	81.1	122
	2	83.0	125	65.8	98.7	99.6	149	85.4	128	82.0	123	79.6	119
	3	81.0	121	64.0	96.1	96.4	145	82.7	124	79.4	119	77.1	116
	4	78.2	117	61.7	92.5	92.1	138	79.1	119	76.0	114	73.7	111
	5	74.7	112	58.8	88.2	87.3	131	74.6	112	71.7	108	69.6	104
	6	70.7	106	55.5	83.2	81.7	123	69.5	104	66.8	100	64.8	97.3
	7	66.3	99.4	51.8	77.6	75.5	113	63.9	95.9	61.5	92.2	59.7	89.5
	8	61.5	92.2	47.8	71.7	68.9	104	58.1	87.1	55.9	83.8	54.2	81.3
	9	56.4	84.6	43.6	65.5	62.2	93.5	52.1	78.1	50.1	75.1	48.6	72.9
	10	51.3	76.9	39.4	59.2	55.5	83.4	46.1	69.1	44.4	66.5	43.1	64.6
	11	46.2	69.3	35.3	52.9	48.9	73.4	40.2	60.4	38.8	58.2	37.6	56.5
	12	41.1	61.7	31.2	46.8	42.5	63.9	35.1	52.7	33.6	50.5	32.5	48.7
	13	36.3	54.4	27.3	41.0	36.5	54.8	30.2	45.3	28.9	43.5	27.7	41.7
	14	31.6	47.4	23.6	35.4	31.5	47.3	26.0	39.1	25.0	37.5	23.9	35.9
	15	27.5	41.3	20.6	30.9	27.4	41.2	22.6	34.0	21.7	32.7	20.8	31.3
	16	24.2	36.3	18.1	27.1	24.1	36.2	19.9	29.9	19.1	28.7	18.3	27.5
	17	21.4	32.2	16.0	24.0	21.3	32.1	17.6	26.5	16.9	25.4	16.2	24.4
	18	19.1	28.7	14.3	21.4	19.0	28.6	15.7	23.6	15.1	22.7	14.5	21.7
	19	17.2	25.8	12.8	19.2	17.1	25.7	14.1	21.2	13.6	20.4	13.0	19.5
	20	15.5	23.2	11.6	17.4	15.4	23.2	12.7	19.1	12.2	18.4	11.7	17.6
	21	14.1	21.1	10.5	15.8	14.0	21.0	11.6	17.4	11.1	16.7	10.6	16.0
	22	12.8	19.2	9.57	14.4	12.7	19.1	10.5	15.8	10.1	15.2	9.68	14.6
	23	11.7	17.6	8.75	13.1								
	24	10.8	16.1	8.04	12.1								
	25	9.92	14.9	7.41	11.1								
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	8.98	13.5	6.39	9.60	10.6	15.9	8.84	13.3	8.43	12.7	8.12	12.2
$P_e(L_c)^2/10^4$, kip-in.^{2}		204		152		189		164		158		154	
r_m, in.		1.53		1.55		1.32		1.33		1.34		1.34	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
HSS4.000

Table 4-E (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 4 ksi

Shape		HSS4.000×					
		0.220		0.188		0.125	
t_{des}, in.		0.205		0.174		0.116	
Steel, lb/ft		8.89		7.66		5.18	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r	0	80.2	120	72.2	108	56.7	85.0
	1	79.7	120	71.7	108	56.3	84.5
	2	78.2	117	70.3	106	55.2	82.8
	3	75.8	114	68.1	102	53.4	80.1
	4	72.4	109	65.2	97.8	51.0	76.5
	5	68.4	103	61.5	92.3	48.0	72.1
	6	63.8	95.6	57.4	86.1	44.7	67.0
	7	58.7	88.0	52.8	79.2	41.0	61.5
	8	53.3	80.0	48.0	72.0	37.1	55.7
	9	47.8	71.8	43.1	64.6	33.2	49.8
	10	42.4	63.6	38.2	57.3	29.3	43.9
	11	37.1	55.6	33.4	50.1	25.5	38.2
	12	32.0	48.0	28.9	43.3	21.8	32.8
	13	27.3	40.9	24.6	36.9	18.6	27.9
	14	23.5	35.3	21.2	31.9	16.1	24.1
	15	20.5	30.8	18.5	27.7	14.0	21.0
	16	18.0	27.0	16.3	24.4	12.3	18.4
	17	16.0	23.9	14.4	21.6	10.9	16.3
	18	14.2	21.4	12.8	19.3	9.71	14.6
	19	12.8	19.2	11.5	17.3	8.71	13.1
	20	11.5	17.3	10.4	15.6	7.86	11.8
	21	10.5	15.7	9.44	14.2	7.13	10.7
	22	9.53	14.3	8.60	12.9	6.50	9.75

Properties								
M_n/Ω_b	$\phi_b M_n$	kip-ft	7.96	12.0	6.96	10.5	4.96	7.45
$P_e(L_c)^2/10^4$, kip-in.^{2}			151		137		103	
r_m, in.			1.34		1.35		1.37	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Heavy line indicates L_c/r_m equal to or greater than 200.

5

COMPOSITE
HSS28.000

Table 4-F
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS28.000×											
		1.000		0.875		0.750		0.625		0.500		0.375	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		288.63		253.72		218.48		182.90		146.99		110.74	
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, L_c (ft), with respect to the least radius of gyration, r	0	3250	4880	3030	4550	2820	4220	2600	3890	2370	3560	2150	3220
	1	3250	4880	3030	4550	2810	4220	2600	3890	2370	3560	2150	3220
	2	3250	4880	3030	4550	2810	4220	2590	3890	2370	3560	2150	3220
	3	3250	4870	3030	4550	2810	4220	2590	3890	2370	3550	2140	3220
	4	3240	4870	3030	4540	2810	4210	2590	3880	2370	3550	2140	3210
	5	3240	4860	3020	4540	2800	4210	2590	3880	2360	3540	2140	3210
	6	3240	4850	3020	4530	2800	4200	2580	3870	2360	3540	2130	3200
	7	3230	4840	3010	4520	2790	4190	2580	3860	2350	3530	2130	3190
	8	3220	4830	3010	4510	2790	4180	2570	3860	2350	3520	2120	3190
	9	3220	4820	3000	4500	2780	4170	2560	3850	2340	3510	2120	3180
	10	3210	4810	2990	4490	2770	4160	2560	3830	2330	3500	2110	3170
	11	3200	4800	2980	4470	2770	4150	2550	3820	2330	3490	2100	3150
	12	3190	4780	2970	4460	2760	4130	2540	3810	2320	3470	2090	3140
	13	3180	4760	2960	4440	2750	4120	2530	3790	2310	3460	2080	3130
	14	3160	4750	2950	4430	2730	4100	2520	3780	2300	3450	2070	3110
	15	3150	4730	2940	4410	2720	4080	2510	3760	2290	3430	2060	3100
	16	3140	4710	2930	4390	2710	4070	2500	3740	2270	3410	2050	3080
	17	3120	4690	2910	4370	2700	4050	2480	3720	2260	3390	2040	3060
	18	3110	4660	2900	4350	2680	4030	2470	3700	2250	3370	2030	3040
	19	3090	4640	2880	4320	2670	4000	2460	3680	2240	3350	2010	3020
	20	3080	4610	2870	4300	2650	3980	2440	3660	2220	3330	2000	3000
	21	3060	4590	2850	4270	2640	3960	2430	3640	2210	3310	1990	2980
	22	3040	4560	2830	4250	2620	3930	2410	3610	2190	3290	1970	2960
	23	3020	4530	2810	4220	2600	3910	2390	3590	2180	3260	1960	2930
	24	3000	4500	2800	4190	2590	3880	2380	3560	2160	3240	1940	2910
	25	2980	4470	2780	4160	2570	3850	2360	3540	2140	3210	1920	2880
	26	2960	4440	2760	4130	2550	3820	2340	3510	2120	3180	1900	2860
	27	2940	4410	2730	4100	2530	3790	2320	3480	2100	3160	1890	2830
	28	2920	4370	2710	4070	2510	3760	2300	3450	2090	3130	1870	2800
	29	2890	4340	2690	4040	2490	3730	2280	3420	2070	3100	1850	2770
	30	2870	4300	2670	4000	2460	3700	2260	3390	2050	3070	1830	2750
	32	2820	4230	2620	3930	2420	3630	2220	3330	2010	3010	1790	2690
	34	2770	4150	2570	3860	2370	3560	2170	3260	1960	2940	1750	2620
	36	2710	4070	2520	3780	2330	3490	2130	3190	1920	2880	1710	2560
	38	2660	3990	2470	3700	2270	3410	2080	3120	1870	2810	1660	2490
	40	2600	3900	2410	3620	2220	3330	2030	3040	1830	2740	1620	2420
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1940	2920	1740	2610	1530	2290	1310	1960	1070	1610	812	1220
$P_e(L_c)^2/10^4$, kip-in.^{2}		281000		256000		230000		203000		175000		146000	
r_m, in.		9.58		9.62		9.66		9.70		9.74		9.78	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS26.000–
HSS24.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS26.000×										HSS24.000×	
		0.750		0.625		0.500		0.375		0.313		1.000	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.930	
Steel, lb/ft		202.44		169.54		136.30		102.73		85.81		245.87	
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, L_c (ft), with respect to the least radius of gyration, r	0	2510	3770	2310	3470	2100	3160	1900	2840	1790	2680	2600	3900
	1	2510	3770	2310	3470	2100	3160	1900	2840	1790	2680	2600	3900
	2	2510	3770	2310	3460	2100	3150	1900	2840	1790	2680	2600	3900
	3	2510	3770	2310	3460	2100	3150	1890	2840	1790	2680	2600	3890
	4	2510	3760	2300	3460	2100	3150	1890	2840	1780	2670	2590	3890
	5	2500	3760	2300	3450	2100	3140	1890	2830	1780	2670	2590	3880
	6	2500	3750	2300	3440	2090	3140	1880	2820	1780	2660	2580	3870
	7	2490	3740	2290	3440	2090	3130	1880	2820	1770	2660	2580	3860
	8	2490	3730	2280	3430	2080	3120	1870	2810	1760	2650	2570	3850
	9	2480	3720	2280	3420	2070	3110	1870	2800	1760	2640	2560	3840
	10	2470	3710	2270	3410	2070	3100	1860	2790	1750	2630	2550	3830
	11	2460	3700	2260	3390	2060	3090	1850	2780	1740	2620	2540	3810
	12	2450	3680	2250	3380	2050	3070	1840	2760	1740	2600	2530	3800
	13	2440	3670	2240	3360	2040	3060	1830	2750	1730	2590	2520	3780
	14	2430	3650	2230	3350	2030	3040	1820	2730	1720	2570	2510	3760
	15	2420	3630	2220	3330	2020	3030	1810	2720	1710	2560	2490	3740
	16	2410	3610	2210	3310	2010	3010	1800	2700	1690	2540	2480	3720
	17	2390	3590	2200	3290	1990	2990	1790	2680	1680	2520	2460	3700
	18	2380	3570	2180	3270	1980	2970	1780	2660	1670	2500	2450	3670
	19	2370	3550	2170	3250	1970	2950	1760	2650	1660	2490	2430	3650
	20	2350	3530	2150	3230	1950	2930	1750	2620	1640	2460	2410	3620
	21	2330	3500	2140	3210	1940	2910	1740	2600	1630	2440	2400	3590
	22	2320	3480	2120	3180	1920	2890	1720	2580	1610	2420	2380	3560
	23	2300	3450	2110	3160	1910	2860	1700	2560	1600	2400	2360	3540
	24	2280	3420	2090	3130	1890	2840	1690	2530	1580	2370	2340	3500
	25	2260	3390	2070	3110	1870	2810	1670	2510	1570	2350	2320	3470
	26	2240	3370	2050	3080	1860	2780	1650	2480	1550	2320	2290	3440
	27	2220	3340	2030	3050	1840	2760	1640	2460	1530	2300	2270	3410
	28	2200	3300	2010	3020	1820	2730	1620	2430	1510	2270	2250	3370
	29	2180	3270	1990	2990	1800	2700	1600	2400	1500	2240	2220	3340
	30	2160	3240	1970	2960	1780	2670	1580	2370	1480	2220	2200	3300
	32	2120	3170	1930	2900	1740	2610	1540	2310	1440	2160	2150	3230
	34	2070	3100	1890	2830	1700	2550	1500	2250	1400	2100	2100	3150
	36	2020	3030	1840	2760	1650	2480	1460	2190	1360	2040	2040	3070
	38	1970	2960	1790	2690	1610	2410	1420	2130	1320	1970	1990	2980
	40	1920	2880	1740	2620	1560	2340	1370	2060	1270	1910	1930	2900
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1300	1960	1110	1680	917	1380	698	1050	585	879	1390	2090
$P_e(L_c)^2/10^4$, kip-in.^{2}		180000		159000		136000		113000		101000		169000	
r_m, in.		8.95		8.99		9.03		9.07		9.09		8.16	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS24.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS24.000×											
		0.875		0.750		0.625		0.500		0.375		0.313	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		216.31		186.41		156.18		125.61		94.71		79.13	
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, L_c (ft), with respect to the least radius of gyration, r	0	2420	3620	2230	3350	2040	3060	1850	2780	1660	2490	1560	2340
	1	2420	3620	2230	3350	2040	3060	1850	2780	1660	2490	1560	2340
	2	2410	3620	2230	3340	2040	3060	1850	2780	1660	2490	1560	2340
	3	2410	3620	2230	3340	2040	3060	1850	2770	1660	2490	1560	2340
	4	2410	3610	2220	3340	2040	3050	1850	2770	1650	2480	1560	2340
	5	2400	3610	2220	3330	2030	3050	1840	2760	1650	2480	1550	2330
	6	2400	3600	2220	3320	2030	3040	1840	2760	1650	2470	1550	2320
	7	2390	3590	2210	3310	2020	3030	1830	2750	1640	2460	1540	2320
	8	2390	3580	2200	3300	2020	3020	1830	2740	1640	2450	1540	2310
	9	2380	3570	2200	3290	2010	3010	1820	2730	1630	2440	1530	2300
	10	2370	3560	2190	3280	2000	3000	1810	2720	1620	2430	1530	2290
	11	2360	3540	2180	3270	1990	2990	1810	2710	1610	2420	1520	2280
	12	2350	3530	2170	3250	1980	2980	1800	2690	1610	2410	1510	2260
	13	2340	3510	2160	3240	1970	2960	1790	2680	1600	2390	1500	2250
	14	2330	3490	2150	3220	1960	2950	1780	2670	1590	2380	1490	2230
	15	2320	3470	2140	3200	1950	2930	1770	2650	1580	2360	1480	2220
	16	2300	3450	2120	3180	1940	2910	1750	2630	1560	2350	1470	2200
	17	2290	3430	2110	3160	1930	2890	1740	2610	1550	2330	1460	2180
	18	2270	3410	2090	3140	1910	2870	1730	2590	1540	2310	1440	2170
	19	2260	3390	2080	3120	1900	2850	1720	2570	1530	2290	1430	2150
	20	2240	3360	2060	3100	1880	2830	1700	2550	1510	2270	1420	2130
	21	2220	3330	2050	3070	1870	2800	1690	2530	1500	2250	1400	2110
	22	2200	3310	2030	3050	1850	2780	1670	2510	1480	2230	1390	2080
	23	2190	3280	2010	3020	1840	2750	1650	2480	1470	2200	1370	2060
	24	2170	3250	1990	2990	1820	2730	1640	2460	1450	2180	1360	2040
	25	2150	3220	1980	2960	1800	2700	1620	2430	1440	2150	1340	2010
	26	2130	3190	1960	2930	1780	2670	1600	2410	1420	2130	1330	1990
	27	2110	3160	1940	2900	1760	2640	1590	2380	1400	2100	1310	1960
	28	2080	3130	1920	2870	1740	2610	1570	2350	1380	2080	1290	1940
	29	2060	3090	1890	2840	1720	2580	1550	2320	1370	2050	1270	1910
	30	2040	3060	1870	2810	1700	2550	1530	2290	1350	2020	1250	1880
	32	1990	2990	1830	2740	1660	2490	1490	2230	1310	1960	1220	1830
	34	1940	2910	1780	2670	1620	2420	1450	2170	1270	1910	1180	1770
	36	1890	2840	1730	2600	1570	2360	1400	2110	1230	1840	1140	1710
	38	1840	2760	1680	2530	1520	2290	1360	2040	1190	1780	1100	1650
	40	1790	2680	1630	2450	1480	2220	1320	1970	1150	1720	1060	1590
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	1240	1870	1090	1640	938	1410	777	1170	593	892	498	748
$P_e(L_c)^2/10^4$, kip-in.^{2}		154000		138000		122000		104000		86400		77200	
r_m, in.		8.20		8.24		8.28		8.32		8.36		8.38	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS22.000–
HSS20.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS22.000×										HSS20.000×	
		0.750		0.625		0.500		0.375		0.313		1.000	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291		0.930	
Steel, lb/ft		170.37		142.81		114.92		86.69		72.45		203.11	
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, L_c (ft), with respect to the least radius of gyration, r	0	1960	2940	1790	2680	1620	2420	1440	2160	1350	2030	2010	3010
	1	1960	2940	1790	2680	1620	2420	1440	2160	1350	2030	2010	3010
	2	1960	2940	1790	2680	1610	2420	1440	2160	1350	2020	2000	3010
	3	1960	2930	1780	2680	1610	2420	1440	2150	1350	2020	2000	3000
	4	1950	2930	1780	2670	1610	2410	1430	2150	1340	2020	2000	3000
	5	1950	2920	1780	2670	1610	2410	1430	2140	1340	2010	1990	2990
	6	1940	2920	1770	2660	1600	2400	1430	2140	1340	2010	1990	2980
	7	1940	2910	1770	2650	1600	2390	1420	2130	1330	2000	1980	2970
	8	1930	2900	1760	2640	1590	2390	1410	2120	1330	1990	1970	2960
	9	1920	2890	1750	2630	1580	2370	1410	2110	1320	1980	1960	2950
	10	1920	2870	1750	2620	1580	2360	1400	2100	1310	1970	1950	2930
	11	1910	2860	1740	2610	1570	2350	1390	2090	1310	1960	1940	2910
	12	1900	2840	1730	2590	1560	2340	1380	2080	1300	1950	1930	2900
	13	1890	2830	1720	2580	1550	2320	1380	2060	1290	1930	1920	2880
	14	1870	2810	1710	2560	1540	2310	1370	2050	1280	1920	1900	2860
	15	1860	2790	1690	2540	1530	2290	1350	2030	1270	1900	1890	2830
	16	1850	2770	1680	2520	1520	2270	1340	2010	1260	1880	1870	2810
	17	1830	2750	1670	2500	1500	2250	1330	2000	1240	1870	1860	2790
	18	1820	2730	1660	2480	1490	2240	1320	1980	1230	1850	1840	2760
	19	1800	2710	1640	2460	1480	2210	1310	1960	1220	1830	1820	2730
	20	1790	2680	1630	2440	1460	2190	1290	1940	1210	1810	1800	2710
	21	1770	2660	1610	2420	1450	2170	1280	1920	1190	1790	1780	2680
	22	1750	2630	1590	2390	1430	2150	1260	1900	1180	1770	1760	2650
	23	1740	2610	1580	2370	1420	2120	1250	1870	1160	1740	1740	2620
	24	1720	2580	1560	2340	1400	2100	1230	1850	1150	1720	1720	2580
	25	1700	2550	1540	2310	1380	2070	1220	1820	1130	1700	1700	2550
	26	1680	2520	1520	2290	1360	2050	1200	1800	1120	1670	1680	2520
	27	1660	2490	1500	2260	1350	2020	1180	1770	1100	1650	1650	2480
	28	1640	2460	1490	2230	1330	1990	1170	1750	1080	1620	1630	2440
	29	1620	2430	1470	2200	1310	1960	1150	1720	1060	1600	1600	2410
	30	1600	2390	1440	2170	1290	1940	1130	1690	1050	1570	1580	2370
	32	1550	2330	1400	2100	1250	1880	1090	1640	1010	1520	1530	2290
	34	1510	2260	1360	2040	1210	1820	1050	1580	974	1460	1480	2210
	36	1460	2190	1320	1970	1170	1750	1020	1520	936	1400	1420	2130
	38	1410	2120	1270	1910	1130	1690	976	1460	898	1350	1370	2050
	40	1360	2040	1220	1840	1080	1630	936	1400	859	1290	1310	1970
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	906	1360	777	1170	644	968	496	746	417	627	933	1400
$P_e(L_c)^2/10^4$, kip-in.^{2}		104000		91100		78100		64600		57600		91100	
r_m, in.		7.54		7.58		7.62		7.66		7.68		6.75	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS20.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS20.000×											
		0.875		0.750		0.625		0.500		0.375		0.313	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349		0.291	
Steel, lb/ft		178.89		154.34		129.45		104.00		78.67		65.77	
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, L_c (ft), with respect to the least radius of gyration, r	0	1850	2780	1700	2550	1550	2320	1390	2090	1230	1850	1150	1730
	1	1850	2780	1700	2550	1550	2320	1390	2090	1230	1850	1150	1730
	2	1850	2780	1700	2550	1550	2320	1390	2080	1230	1850	1150	1730
	3	1850	2780	1700	2550	1550	2320	1390	2080	1230	1840	1150	1720
	4	1850	2770	1700	2540	1540	2310	1380	2080	1230	1840	1150	1720
	5	1840	2760	1690	2540	1540	2310	1380	2070	1220	1830	1140	1720
	6	1840	2760	1690	2530	1530	2300	1380	2060	1220	1830	1140	1710
	7	1830	2750	1680	2520	1530	2290	1370	2060	1210	1820	1130	1700
	8	1820	2730	1670	2510	1520	2280	1360	2050	1210	1810	1130	1690
	9	1820	2720	1670	2500	1510	2270	1360	2040	1200	1800	1120	1680
	10	1810	2710	1660	2490	1510	2260	1350	2030	1190	1790	1120	1670
	11	1800	2690	1650	2470	1500	2250	1340	2010	1190	1780	1110	1660
	12	1780	2680	1640	2460	1490	2230	1330	2000	1180	1770	1100	1650
	13	1770	2660	1630	2440	1480	2220	1320	1990	1170	1750	1090	1640
	14	1760	2640	1610	2420	1470	2200	1310	1970	1160	1740	1080	1620
	15	1750	2620	1600	2400	1450	2180	1300	1950	1150	1720	1070	1610
	16	1730	2600	1590	2380	1440	2160	1290	1930	1140	1700	1060	1590
	17	1720	2580	1570	2360	1430	2140	1280	1920	1120	1690	1050	1570
	18	1700	2550	1560	2340	1410	2120	1260	1900	1110	1670	1040	1550
	19	1680	2530	1540	2320	1400	2100	1250	1880	1100	1650	1020	1530
	20	1670	2500	1530	2290	1380	2080	1240	1850	1090	1630	1010	1510
	21	1650	2470	1510	2270	1370	2050	1220	1830	1070	1610	996	1490
	22	1630	2450	1490	2240	1350	2030	1210	1810	1060	1590	982	1470
	23	1610	2420	1480	2210	1340	2000	1190	1790	1040	1560	967	1450
	24	1590	2390	1460	2190	1320	1980	1170	1760	1030	1540	952	1430
	25	1570	2360	1440	2160	1300	1950	1160	1740	1010	1520	936	1400
	26	1550	2320	1420	2130	1280	1920	1140	1710	995	1490	921	1380
	27	1530	2290	1400	2100	1260	1890	1120	1680	979	1470	905	1360
	28	1510	2260	1380	2070	1240	1870	1100	1660	962	1440	888	1330
	29	1480	2220	1360	2030	1220	1840	1090	1630	945	1420	871	1310
	30	1460	2190	1330	2000	1200	1810	1070	1600	927	1390	854	1280
	32	1410	2120	1290	1940	1160	1740	1030	1540	891	1340	820	1230
	34	1360	2050	1240	1870	1120	1680	990	1480	855	1280	785	1180
	36	1310	1970	1200	1800	1080	1620	950	1420	818	1230	749	1120
	38	1260	1890	1150	1730	1030	1550	909	1360	780	1170	713	1070
	40	1210	1820	1100	1660	989	1480	869	1300	743	1110	677	1020
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	837	1260	737	1110	633	951	525	789	408	613	344	516
$P_e(L_c)^2/10^4$, kip-in.^{2}		84100		75700		66600		57000		47000		41700	
r_m, in.		6.79		6.83		6.87		6.91		6.95		6.97	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS20.000–
HSS18.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS20.000×		HSS18.000×									
		0.250		1.000		0.875		0.750		0.625		0.500	
t_{des}, in.		0.233		0.930		0.814		0.698		0.581		0.465	
Steel, lb/ft		52.78		181.73		160.19		138.30		116.09		93.54	
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, L_c (ft), with respect to the least radius of gyration, r	0	1070	1610	1730	2600	1600	2400	1460	2190	1320	1990	1180	1780
	1	1070	1610	1730	2600	1600	2400	1460	2190	1320	1990	1180	1770
	2	1070	1610	1730	2600	1600	2390	1460	2190	1320	1980	1180	1770
	3	1070	1600	1730	2590	1590	2390	1460	2190	1320	1980	1180	1770
	4	1070	1600	1720	2590	1590	2380	1450	2180	1320	1980	1180	1770
	5	1060	1590	1720	2580	1580	2380	1450	2170	1310	1970	1170	1760
	6	1060	1590	1710	2570	1580	2370	1440	2170	1310	1960	1170	1750
	7	1050	1580	1710	2560	1570	2360	1440	2160	1300	1950	1160	1740
	8	1050	1570	1700	2550	1560	2350	1430	2150	1300	1940	1160	1740
	9	1040	1560	1690	2530	1560	2330	1420	2130	1290	1930	1150	1730
	10	1030	1550	1680	2520	1550	2320	1410	2120	1280	1920	1140	1710
	11	1030	1540	1670	2500	1540	2300	1400	2110	1270	1910	1130	1700
	12	1020	1530	1650	2480	1520	2290	1390	2090	1260	1890	1120	1690
	13	1010	1510	1640	2460	1510	2270	1380	2070	1250	1880	1110	1670
	14	1000	1500	1630	2440	1500	2250	1370	2060	1240	1860	1100	1660
	15	989	1480	1610	2410	1480	2230	1360	2040	1230	1840	1090	1640
	16	979	1470	1590	2390	1470	2200	1340	2020	1210	1820	1080	1620
	17	967	1450	1580	2360	1450	2180	1330	1990	1200	1800	1070	1600
	18	955	1430	1560	2340	1440	2160	1310	1970	1190	1780	1060	1580
	19	943	1410	1540	2310	1420	2130	1300	1950	1170	1760	1040	1560
	20	930	1390	1520	2280	1400	2100	1280	1920	1160	1730	1030	1540
	21	916	1370	1500	2250	1380	2070	1260	1900	1140	1710	1010	1520
	22	902	1350	1480	2220	1360	2050	1250	1870	1120	1690	997	1500
	23	888	1330	1460	2190	1340	2020	1230	1840	1110	1660	981	1470
	24	873	1310	1430	2150	1320	1980	1210	1810	1090	1630	965	1450
	25	858	1290	1410	2120	1300	1950	1190	1780	1070	1610	948	1420
	26	843	1260	1390	2080	1280	1920	1170	1760	1050	1580	931	1400
	27	827	1240	1360	2050	1260	1890	1150	1720	1030	1550	914	1370
	28	811	1220	1340	2010	1240	1850	1130	1690	1020	1520	896	1340
	29	795	1190	1320	1970	1210	1820	1110	1660	996	1490	878	1320
	30	778	1170	1290	1930	1190	1790	1090	1630	976	1460	860	1290
	32	745	1120	1240	1860	1140	1710	1040	1570	936	1400	823	1230
	34	711	1070	1190	1780	1090	1640	999	1500	895	1340	786	1180
	36	676	1010	1130	1700	1050	1570	954	1430	854	1280	748	1120
	38	641	962	1080	1620	996	1490	909	1360	812	1220	709	1060
	40	607	910	1020	1540	947	1420	863	1290	770	1160	671	1010
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	277	416	741	1110	665	1000	586	881	504	757	418	628
$P_e(L_c)^2/10^4$, kip-in.^{2}		36300		63600		58900		53500		47200		40300	
r_m, in.		6.99		6.04		6.08		6.12		6.16		6.20	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS18.000–
HSS16.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS18.000×						HSS16.000×					
		0.375		0.313		0.250		1.000		0.875		0.750	
t_{des}, in.		0.349		0.291		0.233		0.930		0.814		0.698	
Steel, lb/ft		70.66		59.09		47.44		160.35		141.48		122.27	
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, L_c (ft), with respect to the least radius of gyration, r	0	1040	1570	971	1460	898	1350	1470	2210	1360	2030	1240	1850
	1	1040	1560	971	1460	898	1350	1470	2210	1350	2030	1230	1850
	2	1040	1560	969	1450	897	1350	1470	2210	1350	2030	1230	1850
	3	1040	1560	967	1450	895	1340	1470	2200	1350	2030	1230	1850
	4	1040	1560	965	1450	892	1340	1460	2190	1350	2020	1230	1840
	5	1030	1550	961	1440	889	1330	1460	2190	1340	2010	1220	1830
	6	1030	1540	957	1440	885	1330	1450	2180	1340	2000	1220	1830
	7	1020	1540	952	1430	880	1320	1440	2160	1330	1990	1210	1820
	8	1020	1530	946	1420	874	1310	1430	2150	1320	1980	1200	1800
	9	1010	1520	940	1410	868	1300	1420	2140	1310	1970	1190	1790
	10	1000	1510	933	1400	861	1290	1410	2120	1300	1950	1190	1780
	11	996	1490	925	1390	853	1280	1400	2100	1290	1930	1170	1760
	12	988	1480	917	1370	845	1270	1390	2080	1280	1910	1160	1750
	13	978	1470	908	1360	836	1250	1370	2060	1260	1900	1150	1730
	14	968	1450	898	1350	827	1240	1360	2040	1250	1870	1140	1710
	15	958	1440	887	1330	816	1220	1340	2010	1230	1850	1130	1690
	16	947	1420	877	1310	806	1210	1320	1990	1220	1830	1110	1670
	17	935	1400	865	1300	794	1190	1310	1960	1200	1800	1100	1640
	18	922	1380	853	1280	783	1170	1290	1930	1180	1780	1080	1620
	19	910	1360	841	1260	770	1160	1270	1900	1170	1750	1060	1600
	20	896	1340	828	1240	758	1140	1250	1870	1150	1720	1050	1570
	21	882	1320	814	1220	745	1120	1230	1840	1130	1690	1030	1540
	22	868	1300	800	1200	731	1100	1200	1810	1110	1660	1010	1520
	23	853	1280	786	1180	717	1080	1180	1770	1090	1630	992	1490
	24	838	1260	771	1160	703	1050	1160	1740	1070	1600	973	1460
	25	823	1230	756	1130	688	1030	1130	1700	1050	1570	953	1430
	26	807	1210	741	1110	674	1010	1110	1670	1020	1540	933	1400
	27	791	1190	726	1090	659	988	1090	1630	1000	1500	913	1370
	28	774	1160	710	1060	643	965	1060	1590	978	1470	892	1340
	29	758	1140	694	1040	628	942	1040	1560	956	1430	872	1310
	30	741	1110	678	1020	612	919	1010	1520	932	1400	850	1280
	32	707	1060	645	967	581	871	961	1440	886	1330	808	1210
	34	672	1010	612	918	549	824	910	1360	838	1260	765	1150
	36	637	956	579	868	517	776	858	1290	791	1190	722	1080
	38	603	904	545	818	486	729	807	1210	744	1120	679	1020
	40	568	852	512	769	455	682	756	1130	697	1050	636	954
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	328	493	277	416	224	336	572	860	514	772	454	682
$P_e(L_c)^2/10^4$, kip-in.^{2}		33100		29300		25400		42600		39300		35900	
r_m, in.		6.24		6.26		6.28		5.34		5.38		5.42	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS16.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS16.000×											
		0.625		0.500		0.438		0.375		0.312		0.250	
t_{des}, in.		0.581		0.465		0.407		0.349		0.291		0.233	
Steel, lb/ft		103.00		82.85		72.87		62.64		52.32		42.09	
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, L_c (ft), with respect to the least radius of gyration, r	0	1110	1670	991	1490	928	1390	867	1300	803	1210	738	1110
	1	1110	1670	991	1490	927	1390	866	1300	803	1200	737	1110
	2	1110	1670	989	1480	926	1390	865	1300	802	1200	736	1100
	3	1110	1660	987	1480	924	1390	863	1290	800	1200	734	1100
	4	1110	1660	984	1480	921	1380	860	1290	797	1200	732	1100
	5	1100	1650	980	1470	917	1380	857	1290	794	1190	728	1090
	6	1100	1640	976	1460	913	1370	852	1280	789	1180	724	1090
	7	1090	1640	970	1460	907	1360	847	1270	784	1180	719	1080
	8	1080	1630	964	1450	901	1350	841	1260	779	1170	713	1070
	9	1080	1610	957	1430	894	1340	835	1250	772	1160	707	1060
	10	1070	1600	949	1420	887	1330	827	1240	765	1150	700	1050
	11	1060	1590	940	1410	879	1320	819	1230	757	1140	693	1040
	12	1050	1570	931	1400	869	1300	810	1220	749	1120	684	1030
	13	1040	1560	920	1380	860	1290	801	1200	740	1110	676	1010
	14	1030	1540	910	1360	849	1270	791	1190	730	1090	666	999
	15	1010	1520	898	1350	838	1260	780	1170	720	1080	656	984
	16	1000	1500	886	1330	827	1240	769	1150	709	1060	646	969
	17	986	1480	873	1310	815	1220	757	1140	697	1050	635	952
	18	972	1460	860	1290	802	1200	745	1120	686	1030	623	935
	19	957	1430	846	1270	789	1180	732	1100	673	1010	611	917
	20	941	1410	832	1250	775	1160	719	1080	661	991	599	899
	21	925	1390	817	1230	761	1140	705	1060	647	971	587	880
	22	908	1360	802	1200	746	1120	691	1040	634	951	574	860
	23	891	1340	786	1180	731	1100	677	1020	620	930	560	841
	24	874	1310	770	1160	716	1070	662	994	606	909	547	820
	25	856	1280	754	1130	700	1050	647	971	592	887	533	800
	26	838	1260	737	1110	684	1030	632	948	577	866	519	779
	27	820	1230	720	1080	668	1000	617	925	562	843	505	758
	28	801	1200	703	1050	652	978	601	902	547	821	491	736
	29	782	1170	686	1030	635	953	585	878	532	798	477	715
	30	763	1140	668	1000	619	928	569	854	517	776	462	693
	32	724	1090	633	950	585	878	537	806	487	730	433	650
	34	685	1030	598	896	551	827	505	758	456	684	405	607
	36	646	969	562	843	518	777	473	710	426	639	376	564
	38	607	910	527	790	484	727	442	662	396	594	348	523
	40	568	853	492	738	452	677	411	616	367	551	321	482
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	390	586	324	487	290	436	254	382	217	326	176	265
$P_e(L_c)^2/10^4$, kip-in.^{2}		31900		27300		24900		22400		19800		17100	
r_m, in.		5.46		5.49		5.51		5.53		5.55		5.58	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS14.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14.000×											
		1.000		0.875		0.750		0.625		0.500		0.375	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465		0.349	
Steel, lb/ft		138.97		122.77		106.23		89.36		72.16		54.62	
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, L_c (ft), with respect to the least radius of gyration, r	0	1230	1840	1130	1690	1020	1540	920	1380	814	1220	705	1060
	1	1230	1840	1130	1690	1020	1530	919	1380	813	1220	705	1060
	2	1230	1840	1130	1690	1020	1530	918	1380	812	1220	703	1060
	3	1220	1840	1120	1680	1020	1530	915	1370	810	1210	701	1050
	4	1220	1830	1120	1680	1020	1520	912	1370	806	1210	698	1050
	5	1210	1820	1110	1670	1010	1520	908	1360	802	1200	695	1040
	6	1210	1810	1110	1660	1000	1510	902	1350	797	1200	690	1040
	7	1200	1800	1100	1650	997	1500	896	1340	792	1190	685	1030
	8	1190	1780	1090	1630	989	1480	889	1330	785	1180	679	1020
	9	1180	1770	1080	1620	980	1470	880	1320	778	1170	672	1010
	10	1160	1750	1070	1600	970	1450	871	1310	769	1150	665	997
	11	1150	1730	1060	1580	959	1440	861	1290	761	1140	656	985
	12	1140	1710	1040	1560	947	1420	851	1280	751	1130	648	971
	13	1120	1680	1030	1540	934	1400	839	1260	740	1110	638	957
	14	1110	1660	1010	1520	921	1380	827	1240	729	1090	628	942
	15	1090	1630	998	1500	906	1360	814	1220	718	1080	617	926
	16	1070	1600	982	1470	891	1340	801	1200	705	1060	606	909
	17	1050	1580	964	1450	876	1310	786	1180	692	1040	594	892
	18	1030	1550	946	1420	859	1290	772	1160	679	1020	582	873
	19	1010	1510	927	1390	842	1260	756	1130	665	998	570	854
	20	989	1480	908	1360	825	1240	740	1110	651	976	557	835
	21	967	1450	888	1330	806	1210	724	1090	636	954	543	815
	22	944	1420	867	1300	788	1180	707	1060	621	932	530	794
	23	921	1380	846	1270	769	1150	690	1040	606	908	516	774
	24	898	1350	825	1240	750	1120	673	1010	590	885	502	752
	25	874	1310	803	1200	730	1100	655	983	574	861	487	731
	26	850	1280	781	1170	710	1070	637	956	558	837	473	709
	27	826	1240	759	1140	690	1040	619	929	542	813	458	687
	28	802	1200	737	1110	670	1000	601	901	525	788	444	665
	29	777	1170	714	1070	650	974	583	874	509	763	429	643
	30	753	1130	692	1040	629	944	564	846	492	739	414	621
	32	703	1050	647	970	588	882	528	791	459	689	385	577
	34	654	982	602	903	548	822	491	737	427	640	356	534
	36	606	910	558	837	508	762	455	683	395	592	328	492
	38	563	846	515	772	469	703	420	630	363	545	300	450
	40	521	783	473	709	431	646	386	579	333	500	274	411
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	426	640	383	576	339	509	292	438	243	365	191	287
$P_e(L_c)^2/10^4$, kip-in.^{2}		27200		25000		22800		20400		17600		14400	
r_m, in.		4.63		4.67		4.71		4.75		4.79		4.83	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS14.000–
HSS13.375

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS14.000×						HSS13.375×					
		0.312		0.250		0.188		0.625		0.500		0.375	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		45.65		36.75		27.69		85.19		68.82		52.11	
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, L_c (ft), with respect to the least radius of gyration, r	0	648	973	594	891	537	805	864	1300	763	1140	658	988
	1	648	972	594	891	537	805	864	1300	762	1140	658	987
	2	647	970	593	889	535	803	862	1290	761	1140	657	985
	3	645	967	591	886	533	800	860	1290	758	1140	655	982
	4	642	963	588	882	531	796	856	1280	755	1130	652	978
	5	638	958	585	877	527	791	852	1280	751	1130	648	972
	6	634	951	580	870	523	785	846	1270	746	1120	643	965
	7	629	944	575	863	519	778	840	1260	740	1110	638	957
	8	623	935	570	855	513	770	832	1250	733	1100	632	948
	9	617	925	563	845	507	760	824	1240	726	1090	625	938
	10	610	914	557	835	500	750	814	1220	718	1080	618	926
	11	602	903	549	823	493	739	804	1210	709	1060	609	914
	12	593	890	541	811	485	727	793	1190	699	1050	600	901
	13	584	876	532	798	476	714	782	1170	688	1030	591	886
	14	575	862	523	784	467	701	769	1150	677	1020	581	871
	15	564	847	513	769	458	686	756	1130	665	998	570	855
	16	554	831	502	754	448	671	742	1110	653	979	559	838
	17	543	814	492	738	437	656	728	1090	640	960	547	821
	18	531	797	481	721	426	640	713	1070	626	940	535	802
	19	519	779	469	704	415	623	697	1050	612	919	522	784
	20	507	760	457	686	404	606	681	1020	598	897	510	764
	21	494	741	445	668	392	589	665	998	583	875	496	744
	22	481	722	433	649	381	571	648	972	568	853	483	724
	23	468	702	420	630	369	553	631	947	553	830	469	704
	24	455	682	408	611	356	535	614	921	538	806	455	683
	25	441	662	395	592	344	516	596	894	522	783	441	662
	26	428	641	382	573	332	498	578	867	506	759	427	640
	27	414	621	369	553	320	480	560	841	490	735	413	619
	28	400	600	356	533	307	461	542	813	474	711	398	598
	29	386	579	343	514	295	443	524	786	458	686	384	576
	30	372	559	330	494	283	425	506	759	442	662	370	555
	32	345	518	304	456	259	389	470	705	410	614	342	512
	34	318	477	279	418	236	354	435	652	378	567	314	471
	36	292	438	254	382	214	320	400	600	347	521	287	430
	38	266	400	231	346	192	288	366	549	317	476	261	391
	40	242	362	208	312	173	260	334	500	288	432	236	353
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	164	246	134	201	101	152	265	398	221	332	174	261
$P_e(L_c)^2/10^4$, kip-in.^{2}		12700		10900		9100		17500		15100		12400	
r_m, in.		4.85		4.87		4.89		4.53		4.57		4.61	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

5

COMPOSITE
HSS13.375–
HSS12.750

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS13.375×						HSS12.750×					
		0.313		0.250		0.188		0.750		0.625		0.500	
t_{des}, in.		0.291		0.233		0.174		0.698		0.581		0.465	
Steel, lb/ft		43.64		35.08		26.43		96.21		81.01		65.48	
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, L_c (ft), with respect to the least radius of gyration, r	0	604	906	552	828	499	748	903	1350	808	1210	710	1070
	1	604	905	552	827	498	747	902	1350	807	1210	710	1060
	2	602	904	550	826	497	745	900	1350	806	1210	708	1060
	3	600	901	549	823	495	743	897	1350	803	1200	706	1060
	4	598	896	546	819	492	739	893	1340	799	1200	703	1050
	5	594	891	542	814	489	734	888	1330	795	1190	699	1050
	6	590	884	538	807	485	727	882	1320	789	1180	694	1040
	7	585	877	533	800	480	720	874	1310	782	1170	688	1030
	8	579	868	528	791	475	712	866	1300	775	1160	681	1020
	9	572	858	521	782	468	703	856	1280	766	1150	673	1010
	10	565	848	514	771	462	693	845	1270	757	1130	665	997
	11	557	836	507	760	454	681	834	1250	746	1120	656	984
	12	549	823	498	748	446	670	821	1230	735	1100	646	969
	13	540	809	490	735	438	657	808	1210	723	1080	635	953
	14	530	795	480	721	429	643	794	1190	711	1070	624	936
	15	520	780	471	706	419	629	779	1170	697	1050	612	918
	16	509	764	460	691	410	614	763	1150	683	1030	600	900
	17	498	747	450	675	399	599	747	1120	669	1000	587	880
	18	487	730	439	658	389	583	730	1100	654	980	573	860
	19	475	712	427	641	378	567	713	1070	638	957	560	839
	20	463	694	416	624	367	550	695	1040	622	933	545	818
	21	450	675	404	606	355	533	677	1010	606	908	531	796
	22	437	656	392	588	344	516	658	987	589	883	516	774
	23	424	637	379	569	332	498	639	958	572	858	501	751
	24	411	617	367	550	320	481	619	929	554	832	485	728
	25	398	597	354	532	309	463	600	900	537	806	470	705
	26	385	577	342	513	297	445	580	870	519	779	454	682
	27	371	557	329	494	285	427	560	841	502	753	439	658
	28	358	537	317	475	273	410	541	811	484	726	423	635
	29	345	517	304	456	262	392	521	781	466	700	407	611
	30	331	497	292	437	250	375	501	752	449	673	392	588
	32	305	458	267	401	227	341	462	693	414	621	361	542
	34	279	419	243	365	205	308	424	636	380	570	331	496
	36	254	382	220	330	184	276	387	580	347	520	302	452
	38	230	345	198	297	165	248	351	526	314	472	273	410
	40	208	312	179	268	149	224	317	475	284	426	247	370
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	149	224	122	184	92.6	139	278	418	240	361	200	300
$P_e(L_c)^2/10^4$, kip-in.^{2}		10900		9380		7830		16600		14900		13000	
r_m, in.		4.63		4.65		4.67		4.27		4.31		4.35	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS12.750–
HSS12.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12.750×						HSS12.000×					
		0.375		0.250		0.188		0.625		0.500		0.375	
t_{des}, in.		0.349		0.233		0.174		0.581		0.465		0.349	
Steel, lb/ft		49.61		33.41		25.18		76.00		61.47		46.60	
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, L_c (ft), with respect to the least radius of gyration, r	0	613	920	513	769	461	692	742	1110	651	977	558	837
	1	613	919	512	769	461	692	741	1110	651	976	558	837
	2	611	917	511	767	460	690	739	1110	649	974	557	835
	3	609	914	509	764	458	687	737	1110	647	970	554	832
	4	606	910	507	760	455	683	733	1100	643	965	551	827
	5	603	904	503	755	452	678	728	1090	639	959	548	821
	6	598	897	499	748	448	672	722	1080	634	951	543	814
	7	593	889	494	741	443	664	715	1070	628	942	537	806
	8	586	880	488	732	437	656	707	1060	621	931	531	797
	9	580	869	482	723	431	647	699	1050	613	920	524	786
	10	572	858	475	712	425	637	689	1030	605	907	516	775
	11	564	845	467	701	417	626	678	1020	595	893	508	762
	12	555	832	459	689	409	614	667	1000	585	878	499	749
	13	545	818	450	676	401	601	655	982	574	862	489	734
	14	535	802	441	662	392	588	642	963	563	845	479	719
	15	524	786	431	647	382	574	628	942	551	827	469	703
	16	513	770	421	632	373	559	614	921	539	808	457	686
	17	501	752	411	616	363	544	599	899	526	788	446	669
	18	489	734	400	600	352	528	584	876	512	768	434	651
	19	477	715	389	583	341	512	568	852	498	747	421	632
	20	464	696	377	566	331	496	552	828	484	726	409	613
	21	451	676	366	548	319	479	535	803	470	704	396	594
	22	438	656	354	531	308	462	519	778	455	682	383	575
	23	424	636	342	512	297	445	502	753	440	660	370	555
	24	410	616	330	494	285	428	485	727	425	637	357	535
	25	397	595	317	476	274	411	467	701	410	615	343	515
	26	383	574	305	458	263	394	450	675	395	592	330	495
	27	369	553	293	440	251	377	433	649	379	569	317	475
	28	355	533	281	421	240	360	416	624	364	546	303	455
	29	341	512	269	403	229	343	399	598	349	524	290	435
	30	328	491	257	386	218	327	382	572	334	501	277	416
	32	300	451	234	351	196	295	348	522	305	457	252	377
	34	274	411	211	317	176	263	316	474	276	415	227	340
	36	249	373	189	284	157	235	284	427	249	373	203	305
	38	224	336	170	255	141	211	255	383	223	335	182	273
	40	202	303	153	230	127	190	230	346	202	302	165	247
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	157	236	111	167	84.4	127	208	313	174	261	137	206
$P_e(L_c)^2/10^4$, kip-in.^{2}		10600		8050		6670		12100		10600		8640	
r_m, in.		4.39		4.43		4.45		4.04		4.08		4.12	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS12.000–
HSS11.750

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS12.000×		HSS11.750×									
		0.250		0.625		0.500		0.375		0.337		0.250	
t_{des}, in.		0.233		0.581		0.465		0.349		0.313		0.233	
Steel, lb/ft		31.40		74.33		60.13		45.60		41.12		30.73	
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, L_c (ft), with respect to the least radius of gyration, r	0	463	695	721	1080	633	949	542	814	515	773	450	675
	1	463	694	721	1080	632	949	542	813	515	772	449	674
	2	462	692	719	1080	631	946	541	811	514	771	448	672
	3	460	689	716	1070	629	943	538	808	512	767	446	669
	4	457	685	712	1070	625	938	535	803	509	763	444	665
	5	453	680	707	1060	621	931	532	797	505	757	440	660
	6	449	674	701	1050	616	923	527	790	500	750	436	654
	7	444	666	694	1040	609	914	521	782	495	742	431	646
	8	438	658	686	1030	602	904	515	773	489	733	425	638
	9	432	648	678	1020	595	892	508	762	482	723	419	628
	10	425	638	668	1000	586	879	500	750	474	712	412	618
	11	418	626	657	986	577	865	492	738	466	699	404	606
	12	410	614	646	968	566	850	483	724	457	686	396	594
	13	401	601	633	950	556	833	473	710	448	672	387	581
	14	392	588	620	930	544	816	463	694	438	657	378	567
	15	382	573	607	910	532	798	452	678	428	642	369	553
	16	372	558	592	888	520	779	441	661	417	625	359	538
	17	362	543	577	866	507	760	429	644	406	609	348	523
	18	351	527	562	843	493	740	417	626	394	591	338	507
	19	340	510	546	820	479	719	405	608	382	573	327	490
	20	329	494	530	795	465	698	393	589	370	555	316	474
	21	318	477	514	771	451	676	380	570	358	537	305	457
	22	306	459	497	746	436	654	367	550	345	518	293	440
	23	295	442	480	720	421	632	354	530	333	499	282	423
	24	283	425	463	695	406	609	340	511	320	480	270	405
	25	271	407	446	669	391	587	327	491	307	461	259	388
	26	260	390	429	643	376	564	314	471	295	442	247	371
	27	248	373	412	618	361	541	301	451	282	423	236	354
	28	237	355	395	592	346	519	288	432	269	404	225	337
	29	226	339	378	567	331	497	275	412	257	385	214	321
	30	215	322	361	542	316	475	262	393	245	367	203	304
	32	193	290	328	492	288	431	237	356	221	331	182	273
	34	172	258	297	445	260	390	213	320	198	297	161	242
	36	153	230	266	399	233	349	190	285	176	265	144	216
	38	138	207	238	358	209	313	171	256	158	237	129	194
	40	124	186	215	323	188	283	154	231	143	214	117	175
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	97.2	146	201	302	167	252	132	198	120	181	93.8	141
$P_e(L_c)^2/10^4$, kip-in.^{2}		6530		11300		9900		8090		7500		6130	
r_m, in.		4.16		3.95		3.99		4.03		4.04		4.07	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS10.750

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS10.750×											
		0.625		0.500		0.375		0.313		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		67.65		54.79		41.59		34.87		28.06		21.17	
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, L_c (ft), with respect to the least radius of gyration, r	0	638	957	557	835	475	713	434	650	392	588	349	523
	1	638	957	556	834	475	712	433	650	391	587	348	522
	2	636	954	555	832	474	710	432	648	390	585	347	520
	3	633	950	552	828	471	707	430	645	388	582	345	518
	4	629	943	549	823	468	702	427	640	385	578	342	514
	5	624	936	544	816	464	696	423	634	382	572	339	508
	6	617	926	539	808	459	689	418	628	377	566	335	502
	7	610	915	532	798	454	681	413	620	372	558	330	495
	8	602	903	525	787	447	671	407	611	367	550	324	487
	9	592	889	517	775	440	660	400	601	360	540	318	478
	10	582	873	508	762	432	648	393	589	353	530	312	468
	11	571	857	498	747	424	636	385	577	345	518	304	457
	12	559	839	488	732	415	622	376	565	337	506	297	445
	13	546	820	477	715	405	607	367	551	329	493	289	433
	14	533	799	465	698	395	592	358	536	320	479	280	420
	15	519	778	453	679	384	576	348	521	310	465	271	407
	16	504	757	440	660	373	559	337	506	300	450	262	393
	17	489	734	427	640	361	542	326	490	290	435	252	379
	18	474	711	413	620	349	524	315	473	280	420	243	364
	19	458	687	400	599	337	506	304	456	269	404	233	349
	20	442	663	386	578	325	488	293	439	259	388	223	334
	21	425	638	371	557	313	469	281	422	248	372	213	319
	22	409	613	357	535	300	450	270	404	237	355	203	304
	23	392	589	343	514	288	431	258	387	226	339	193	290
	24	376	564	328	492	275	412	246	369	215	323	183	275
	25	359	539	314	470	262	394	235	352	205	307	173	260
	26	343	514	299	449	250	375	223	335	194	291	164	246
	27	326	490	285	428	238	357	212	318	184	276	154	232
	28	310	466	271	407	226	338	201	301	174	260	145	218
	29	294	442	257	386	214	321	190	285	164	245	136	204
	30	279	418	244	365	202	303	179	269	154	231	127	191
	32	249	373	217	326	179	269	158	237	135	203	112	168
	34	220	331	193	289	159	238	140	210	120	180	99.1	149
	36	197	295	172	258	142	212	125	188	107	160	88.4	133
	38	176	265	154	231	127	191	112	168	95.9	144	79.3	119
	40	159	239	139	209	115	172	101	152	86.5	130	71.6	107
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	165	248	138	207	109	164	93.5	141	77.5	117	59.6	89.6
$P_e(L_c)^2/10^4$, kip-in.^{2}		8370		7310		6030		5320		4550		3760	
r_m, in.		3.60		3.64		3.68		3.70		3.72		3.74	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

5

COMPOSITE
HSS10.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS10.000×											
		0.625		0.500		0.375		0.312		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		62.64		50.78		38.58		32.31		26.06		19.72	
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, L_c (ft), with respect to the least radius of gyration, r	0	576	864	501	751	426	640	387	581	348	522	308	462
	1	575	863	500	751	426	639	387	581	348	522	308	461
	2	573	860	499	748	425	637	386	579	347	520	306	460
	3	570	855	496	744	422	633	384	575	345	517	305	457
	4	566	849	493	739	419	629	381	571	342	513	302	453
	5	561	841	488	732	415	622	377	565	338	507	298	448
	6	554	831	482	723	410	615	372	558	334	501	294	441
	7	546	820	476	713	404	606	367	550	329	493	289	434
	8	538	807	468	702	398	597	361	541	323	485	284	426
	9	528	792	460	690	390	586	354	531	317	475	278	417
	10	517	776	451	676	382	574	346	520	310	464	271	407
	11	506	759	441	661	374	561	338	508	302	453	264	396
	12	494	741	430	645	365	547	330	495	294	441	257	385
	13	481	721	419	628	355	532	321	481	286	428	249	373
	14	467	701	407	611	345	517	311	467	277	415	240	360
	15	453	679	395	592	334	501	301	452	267	401	232	347
	16	438	657	382	573	323	484	291	437	258	387	223	334
	17	423	634	369	553	311	467	280	421	248	372	214	320
	18	407	611	355	533	300	450	270	405	238	357	204	306
	19	392	588	342	513	288	432	259	388	228	342	195	292
	20	376	564	328	492	276	414	248	372	218	326	186	278
	21	360	539	314	471	264	396	237	355	207	311	176	264
	22	344	515	300	450	252	378	226	338	197	296	167	250
	23	327	491	286	429	240	360	214	322	187	280	158	236
	24	311	467	272	408	228	342	204	305	177	265	148	223
	25	296	443	258	388	216	324	193	289	167	251	139	209
	26	280	420	245	367	205	307	182	273	157	236	131	196
	27	264	397	231	347	193	290	172	257	148	222	122	183
	28	249	374	218	328	182	273	161	242	139	208	114	171
	29	235	352	206	308	171	256	151	227	129	194	106	159
	30	220	331	193	289	160	240	141	212	121	181	99.1	149
	32	196	294	170	254	141	211	124	186	106	159	87.1	131
	34	173	260	150	225	125	187	110	165	94.0	141	77.2	116
	36	155	232	134	201	111	167	98.2	147	83.9	126	68.8	103
	38	139	208	120	180	99.7	150	88.1	132	75.3	113	61.8	92.7
	40	125	188	109	163	90.0	135	79.5	119	68.0	102	55.7	83.6
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	140	210	117	175	92.1	138	79.2	119	65.7	98.7	50.9	76.5
$P_e(L_c)^2/10^4$, kip-in.^{2}		6500		5700		4730		4180		3570		2930	
r_m, in.		3.34		3.38		3.41		3.43		3.45		3.47	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS9.625

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS9.625×											
		0.625		0.500		0.375		0.312		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233		0.174	
Steel, lb/ft		60.13		48.77		37.08		31.06		25.06		18.97	
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, L_c (ft), with respect to the least radius of gyration, r	0	546	819	476	714	404	606	366	549	328	493	290	435
	1	546	818	476	713	403	605	366	548	328	492	290	434
	2	544	816	474	711	402	603	364	546	327	490	288	433
	3	541	811	471	707	400	599	362	543	325	487	286	430
	4	536	804	468	701	396	595	359	538	322	483	284	426
	5	531	796	463	694	392	588	355	533	318	477	280	420
	6	524	786	457	685	387	581	350	526	314	471	276	414
	7	516	775	450	675	381	572	345	518	309	463	271	407
	8	508	761	443	664	375	562	339	508	303	455	266	399
	9	498	747	434	651	368	551	332	498	297	445	260	390
	10	487	731	425	637	360	539	325	487	290	434	253	380
	11	475	713	415	622	351	526	317	475	282	423	246	369
	12	463	695	404	606	342	513	308	462	274	411	239	358
	13	450	675	392	589	332	498	299	448	266	398	231	346
	14	436	654	380	571	322	482	289	434	257	385	222	334
	15	422	633	368	552	311	467	279	419	247	371	214	321
	16	407	611	355	533	300	450	269	404	238	357	205	308
	17	392	588	342	513	289	433	259	388	228	343	196	294
	18	377	565	329	493	277	416	248	372	219	328	187	280
	19	361	542	315	472	266	398	237	356	209	313	178	267
	20	345	518	301	452	254	381	226	340	199	298	169	253
	21	329	494	287	431	242	363	216	323	189	283	160	239
	22	314	470	273	410	230	345	205	307	179	268	151	226
	23	298	447	260	390	219	328	194	291	169	253	142	212
	24	282	423	246	369	207	310	183	275	159	239	133	199
	25	267	400	233	349	196	293	173	259	150	225	124	187
	26	252	377	219	329	184	276	163	244	140	211	116	174
	27	237	355	207	310	173	260	153	229	131	197	108	162
	28	222	333	194	291	163	244	143	214	122	183	100	150
	29	208	313	181	272	152	228	133	200	114	171	93.5	140
	30	196	294	170	254	142	213	124	187	107	160	87.3	131
	32	172	259	149	223	125	187	109	164	93.6	140	76.8	115
	34	153	229	132	198	110	166	96.9	145	83.0	124	68.0	102
	36	136	205	118	177	98.6	148	86.4	130	74.0	111	60.7	91.0
	38	122	184	106	158	88.5	133	77.5	116	66.4	99.6	54.4	81.7
	40	110	166	95.3	143	79.8	120	70.0	105	59.9	89.9	49.1	73.7
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	128	193	107	161	84.9	128	73.0	110	60.6	91.0	47.1	70.7
$P_e(L_c)^2/10^4$, kip-in.^{2}		5740		5010		4190		3680		3150		2580	
r_m, in.		3.20		3.24		3.28		3.30		3.32		3.34	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS8.625

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS8.625×											
		0.625		0.500		0.375		0.322		0.250		0.188	
t_{des}, in.		0.581		0.465		0.349		0.300		0.233		0.174	
Steel, lb/ft		53.45		43.43		33.07		28.58		22.38		16.96	
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, L_c (ft), with respect to the least radius of gyration, r	0	472	707	408	612	344	516	317	475	278	417	243	365
	1	471	706	408	611	344	515	316	474	277	416	243	365
	2	469	703	406	609	342	513	315	472	276	414	242	363
	3	465	698	403	604	340	510	312	469	274	411	240	360
	4	461	691	399	598	336	504	309	464	271	407	237	356
	5	455	682	394	591	332	498	305	458	267	401	234	351
	6	448	671	388	582	327	490	300	451	263	394	230	344
	7	439	659	381	571	321	481	295	442	258	387	225	337
	8	430	645	373	559	314	471	288	433	252	378	219	329
	9	419	629	364	546	306	460	281	422	245	368	213	320
	10	408	612	354	531	298	447	274	410	238	358	207	310
	11	396	594	344	515	289	434	265	398	231	346	200	300
	12	383	574	333	499	280	420	257	385	223	334	192	288
	13	369	554	321	481	270	405	247	371	215	322	185	277
	14	355	533	309	463	260	390	238	357	206	309	177	265
	15	341	511	296	445	249	374	228	342	197	295	168	253
	16	326	489	284	425	239	358	218	327	188	282	160	240
	17	311	466	271	406	228	341	208	312	179	268	152	228
	18	295	443	257	386	216	325	197	296	169	254	143	215
	19	280	420	244	366	205	308	187	281	160	240	135	202
	20	265	397	231	347	194	291	177	265	151	226	126	190
	21	249	374	218	327	183	275	166	250	142	212	118	177
	22	235	353	205	308	172	258	156	235	133	199	110	165
	23	222	333	192	289	161	242	146	220	124	186	102	154
	24	209	314	180	270	151	226	137	205	115	173	94.8	142
	25	196	294	168	252	141	211	127	191	107	160	87.3	131
	26	183	275	156	234	131	196	118	177	98.7	148	80.8	121
	27	171	257	145	217	121	182	109	164	91.5	137	74.9	112
	28	159	239	134	202	113	169	102	153	85.1	128	69.6	104
	29	148	223	125	188	105	158	94.8	142	79.3	119	64.9	97.4
	30	138	208	117	176	98.1	147	88.6	133	74.1	111	60.7	91.0
	32	122	183	103	154	86.2	129	77.9	117	65.1	97.7	53.3	80.0
	34	108	162	91.1	137	76.4	115	69.0	103	57.7	86.6	47.2	70.8
	36	96.2	145	81.3	122	68.1	102	61.5	92.3	51.5	77.2	42.1	63.2
	38	86.3	130	73.0	109	61.2	91.7	55.2	82.8	46.2	69.3	37.8	56.7
	40	77.9	117	65.9	98.8	55.2	82.8	49.8	74.8	41.7	62.5	34.1	51.2
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	101	152	84.5	127	66.9	101	59.0	88.7	47.8	71.9	37.4	56.1
$P_e(L_c)^2/10^4$, kip-in.^{2}		3930		3460		2900		2620		2190		1790	
r_m, in.		2.85		2.89		2.93		2.95		2.97		2.99	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS7.500–
HSS7.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS7.500×										HSS7.000×	
		0.500		0.375		0.312		0.250		0.188		0.500	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174		0.465	
Steel, lb/ft		37.42		28.56		23.97		19.38		14.70		34.74	
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, L_c (ft), with respect to the least radius of gyration, r	0	338	507	282	423	254	381	225	338	195	293	307	461
	1	337	506	282	423	254	380	225	337	195	293	307	460
	2	335	503	280	420	252	378	224	335	194	291	305	457
	3	332	498	278	416	250	375	221	332	192	288	301	452
	4	328	492	274	411	246	370	218	327	189	283	297	445
	5	322	484	269	404	242	363	214	322	185	278	291	437
	6	316	474	264	396	237	356	210	315	181	272	284	426
	7	308	462	257	386	232	347	205	307	176	265	276	414
	8	299	449	250	375	225	338	199	298	171	256	267	401
	9	290	435	242	363	218	327	192	288	165	247	258	386
	10	280	419	234	351	210	315	185	278	159	238	247	371
	11	269	403	225	337	202	303	178	266	152	228	236	354
	12	257	386	215	323	193	290	170	255	145	217	224	337
	13	245	368	205	308	184	277	162	242	137	206	213	319
	14	233	349	195	292	175	263	153	230	130	195	200	301
	15	220	331	185	277	166	249	145	217	122	183	188	282
	16	208	312	174	261	156	235	136	204	114	172	176	264
	17	195	293	164	245	147	220	128	192	107	160	164	245
	18	183	274	153	230	137	206	119	179	99.3	149	152	228
	19	170	255	143	214	128	192	111	166	91.9	138	141	212
	20	158	237	133	199	119	179	103	154	84.7	127	131	197
	21	146	219	123	184	110	165	94.8	142	77.7	117	121	181
	22	136	204	113	170	102	152	87.0	130	70.9	106	111	167
	23	126	189	104	155	93.0	140	79.6	119	64.9	97.3	101	152
	24	116	174	95.2	143	85.4	128	73.1	110	59.6	89.3	93.1	140
	25	107	160	87.7	132	78.7	118	67.4	101	54.9	82.3	85.8	129
	26	98.6	148	81.1	122	72.8	109	62.3	93.4	50.8	76.1	79.4	119
	27	91.4	137	75.2	113	67.5	101	57.8	86.6	47.1	70.6	73.6	111
	28	85.0	128	69.9	105	62.8	94.2	53.7	80.6	43.8	65.6	68.4	103
	29	79.3	119	65.2	97.8	58.5	87.8	50.1	75.1	40.8	61.2	63.8	95.9
	30	74.1	111	60.9	91.4	54.7	82.0	46.8	70.2	38.1	57.2	59.6	89.6
	32	65.1	97.8	53.6	80.3	48.1	72.1	41.1	61.7	33.5	50.3	52.4	78.8
	34	57.7	86.7	47.4	71.2	42.6	63.9	36.4	54.6	29.7	44.5	46.4	69.8
	36	51.4	77.3	42.3	63.5	38.0	57.0	32.5	48.7	26.5	39.7	41.4	62.2
	38	46.2	69.4	38.0	57.0	34.1	51.1	29.2	43.7	23.8	35.6	37.2	55.8
	40	41.7	62.6	34.3	51.4	30.8	46.1	26.3	39.5	21.4	32.2		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	62.0	93.2	49.2	74.0	42.4	63.8	35.3	53.0	27.6	41.5	53.2	80.0
$P_e(L_c)^2/10^4$, kip-in.^{2}		2150		1800		1620		1380		1130		1700	
r_m, in.		2.49		2.53		2.55		2.57		2.59		2.32	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS7.000–
HSS6.875

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS7.000×										HSS6.875×	
		0.375		0.312		0.250		0.188		0.125		0.375	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116		0.349	
Steel, lb/ft		26.56		22.31		18.04		13.69		9.19		26.06	
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, L_c (ft), with respect to the least radius of gyration, r	0	256	384	230	345	203	305	176	264	148	222	250	375
	1	256	384	230	344	203	304	175	263	148	222	250	375
	2	254	381	228	342	202	302	174	261	147	220	248	372
	3	251	377	226	338	199	299	172	258	145	217	245	368
	4	248	371	222	333	196	294	169	254	142	213	241	362
	5	243	364	218	327	192	289	166	249	139	208	237	355
	6	237	356	213	319	188	282	161	242	135	202	231	346
	7	230	346	207	310	182	274	157	235	130	196	224	336
	8	223	335	200	300	176	265	151	227	125	188	217	325
	9	215	323	193	290	170	255	145	218	120	180	209	313
	10	206	310	185	278	163	244	139	208	114	171	200	300
	11	197	296	177	265	155	233	132	198	108	162	191	286
	12	188	281	168	253	148	221	125	188	102	152	181	272
	13	178	266	159	239	140	209	118	177	95.2	143	171	257
	14	168	251	150	226	131	197	111	166	88.7	133	161	242
	15	157	236	141	212	123	185	103	155	82.2	123	151	226
	16	147	221	132	198	115	172	95.9	144	75.8	114	141	211
	17	137	205	123	184	107	160	88.7	133	69.5	104	131	196
	18	127	190	114	171	98.8	148	81.6	122	63.5	95.2	121	181
	19	117	176	105	158	91.0	137	74.8	112	57.6	86.3	111	167
	20	108	161	96.6	145	83.4	125	68.1	102	52.0	77.9	102	153
	21	98.4	148	88.3	132	76.0	114	61.8	92.7	47.1	70.7	92.6	139
	22	89.6	134	80.5	121	69.3	104	56.3	84.5	42.9	64.4	84.4	127
	23	82.0	123	73.6	110	63.4	95.0	51.5	77.3	39.3	58.9	77.2	116
	24	75.3	113	67.6	101	58.2	87.3	47.3	71.0	36.1	54.1	70.9	106
	25	69.4	104	62.3	93.5	53.6	80.4	43.6	65.4	33.2	49.9	65.4	98.1
	26	64.2	96.3	57.6	86.4	49.6	74.4	40.3	60.5	30.7	46.1	60.4	90.7
	27	59.5	89.3	53.4	80.1	46.0	69.0	37.4	56.1	28.5	42.8	56.0	84.1
	28	55.3	83.0	49.7	74.5	42.8	64.1	34.8	52.2	26.5	39.8	52.1	78.2
	29	51.6	77.4	46.3	69.5	39.9	59.8	32.4	48.6	24.7	37.1	48.6	72.9
	30	48.2	72.3	43.3	64.9	37.2	55.9	30.3	45.4	23.1	34.6	45.4	68.1
	32	42.4	63.5	38.0	57.0	32.7	49.1	26.6	39.9	20.3	30.4	39.9	59.8
	34	37.5	56.3	33.7	50.5	29.0	43.5	23.6	35.4	18.0	27.0	35.3	53.0
	36	33.5	50.2	30.0	45.1	25.9	38.8	21.0	31.5	16.0	24.1	31.5	47.3
	38	30.0	45.1	27.0	40.5	23.2	34.8	18.9	28.3	14.4	21.6	28.3	42.4
	40							17.0	25.6	13.0	19.5		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	42.3	63.6	36.5	54.9	30.4	45.7	23.8	35.8	16.7	25.1	40.8	61.3
$P_e(L_c)^2/10^4$, kip-in.^{2}		1420		1280		1100		895		682		1340	
r_m, in.		2.35		2.37		2.39		2.41		2.43		2.31	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Heavy line indicates L_c/r_m equal to or greater than 200.

5

COMPOSITE
HSS6.875–
HSS6.625

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS6.875×						HSS6.625×					
		0.312		0.250		0.188		0.500		0.432		0.375	
t_{des}, in.		0.291		0.233		0.174		0.465		0.402		0.349	
Steel, lb/ft		21.89		17.71		13.44		32.74		28.60		25.06	
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, L_c (ft), with respect to the least radius of gyration, r	0	224	337	198	297	171	257	286	428	260	390	238	356
	1	224	336	198	297	171	256	285	427	259	389	237	356
	2	222	334	196	295	169	254	283	424	257	386	235	353
	3	220	330	194	291	167	251	279	419	254	381	233	349
	4	217	325	191	287	165	247	275	412	250	375	229	343
	5	212	318	187	281	161	241	269	403	245	367	224	336
	6	207	311	182	274	157	235	262	392	238	357	218	327
	7	201	302	177	266	152	228	253	380	231	346	211	317
	8	194	292	171	257	146	220	244	366	222	334	204	305
	9	187	281	164	247	140	211	234	351	213	320	195	293
	10	179	269	157	236	134	201	224	335	204	306	187	280
	11	171	257	150	225	127	191	212	319	194	290	177	266
	12	162	244	142	213	120	181	201	301	183	275	168	252
	13	154	230	134	201	113	170	189	283	172	259	158	237
	14	144	217	126	189	106	159	177	265	161	242	148	222
	15	135	203	118	177	98.9	148	165	247	150	226	138	207
	16	126	189	110	165	91.7	137	153	230	140	209	128	192
	17	117	176	102	153	84.6	127	142	213	129	193	118	177
	18	108	163	93.9	141	77.7	116	131	198	118	177	108	163
	19	99.7	150	86.2	129	71.0	106	121	182	108	162	99.2	149
	20	91.3	137	78.8	118	64.4	96.6	111	167	98.6	148	90.1	135
	21	83.1	125	71.6	107	58.4	87.6	101	152	90.0	135	81.7	123
	22	75.7	114	65.2	97.8	53.2	79.8	92.2	139	82.0	123	74.5	112
	23	69.3	104	59.7	89.5	48.7	73.0	84.4	127	75.1	113	68.1	102
	24	63.6	95.4	54.8	82.2	44.7	67.1	77.5	116	68.9	104	62.6	93.9
	25	58.6	88.0	50.5	75.7	41.2	61.8	71.4	107	63.5	95.5	57.7	86.5
	26	54.2	81.3	46.7	70.0	38.1	57.2	66.0	99.3	58.7	88.3	53.3	80.0
	27	50.3	75.4	43.3	64.9	35.3	53.0	61.2	92.0	54.5	81.9	49.4	74.2
	28	46.7	70.1	40.3	60.4	32.9	49.3	56.9	85.6	50.6	76.1	46.0	69.0
	29	43.6	65.4	37.5	56.3	30.6	45.9	53.1	79.8	47.2	71.0	42.9	64.3
	30	40.7	61.1	35.1	52.6	28.6	42.9	49.6	74.6	44.1	66.3	40.1	60.1
	32	35.8	53.7	30.8	46.2	25.2	37.7	43.6	65.5	38.8	58.3	35.2	52.8
	34	31.7	47.6	27.3	41.0	22.3	33.4	38.6	58.0	34.4	51.6	31.2	46.8
	36	28.3	42.4	24.4	36.5	19.9	29.8	34.4	51.8	30.6	46.1	27.8	41.7
	38	25.4	38.1	21.9	32.8	17.8	26.8						
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	35.2	52.8	29.3	44.0	22.9	34.5	47.2	70.9	42.1	63.3	37.6	56.5
$P_e(L_c)^2/10^4$, kip-in.^{2}		1200		1040		846		1410		1290		1180	
r_m, in.		2.33		2.35		2.37		2.18		2.20		2.22	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS6.625–
HSS6.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS6.625×										HSS6.000×	
		0.312		0.280		0.250		0.188		0.125		0.500	
t_{des}, in.		0.291		0.260		0.233		0.174		0.116		0.465	
Steel, lb/ft		21.06		18.99		17.04		12.94		8.69		29.40	
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, L_c (ft), with respect to the least radius of gyration, r	0	213	319	200	299	188	282	162	243	136	203	250	375
	1	212	319	199	299	187	281	161	242	135	203	249	374
	2	211	316	198	297	186	279	160	240	134	201	247	371
	3	208	313	195	293	184	276	158	237	132	198	244	365
	4	205	307	192	288	181	271	155	233	130	194	238	358
	5	200	301	188	282	177	265	152	227	126	189	232	348
	6	195	293	183	274	172	258	147	221	122	183	225	337
	7	189	284	177	266	166	250	142	214	118	177	216	324
	8	182	274	171	256	160	241	137	206	113	169	206	310
	9	175	263	164	246	154	231	131	197	107	161	196	294
	10	167	251	157	235	147	220	125	187	102	153	185	278
	11	159	238	149	223	139	209	118	177	95.7	144	174	261
	12	150	225	141	211	132	198	111	167	89.6	134	163	245
	13	141	212	133	199	124	186	104	156	83.4	125	152	229
	14	133	199	124	186	116	174	97.2	146	77.2	116	142	213
	15	124	185	116	174	108	162	90.1	135	71.0	106	131	196
	16	115	172	107	161	99.9	150	83.1	125	64.9	97.4	120	180
	17	106	159	99.1	149	92.1	138	76.3	114	59.1	88.6	110	165
	18	97.2	146	91.0	137	84.5	127	69.6	104	53.4	80.1	99.7	150
	19	88.9	133	83.2	125	77.1	116	63.2	94.8	47.9	71.9	89.9	135
	20	80.7	121	75.6	113	69.9	105	57.0	85.6	43.3	64.9	81.1	122
	21	73.2	110	68.5	103	63.4	95.1	51.7	77.6	39.2	58.9	73.6	111
	22	66.7	100	62.5	93.7	57.7	86.6	47.1	70.7	35.8	53.6	67.0	101
	23	61.0	91.6	57.1	85.7	52.8	79.2	43.1	64.7	32.7	49.1	61.3	92.2
	24	56.1	84.1	52.5	78.7	48.5	72.8	39.6	59.4	30.0	45.1	56.3	84.6
	25	51.7	77.5	48.4	72.5	44.7	67.1	36.5	54.8	27.7	41.5	51.9	78.0
	26	47.8	71.7	44.7	67.1	41.3	62.0	33.8	50.6	25.6	38.4	48.0	72.1
	27	44.3	66.4	41.5	62.2	38.3	57.5	31.3	47.0	23.7	35.6	44.5	66.9
	28	41.2	61.8	38.6	57.8	35.6	53.5	29.1	43.7	22.1	33.1	41.4	62.2
	29	38.4	57.6	35.9	53.9	33.2	49.8	27.1	40.7	20.6	30.9	38.6	58.0
	30	35.9	53.8	33.6	50.4	31.1	46.6	25.4	38.0	19.2	28.8	36.0	54.2
	32	31.5	47.3	29.5	44.3	27.3	40.9	22.3	33.4	16.9	25.4	31.7	47.6
	34	27.9	41.9	26.1	39.2	24.2	36.3	19.7	29.6	15.0	22.5		
	36	24.9	37.4	23.3	35.0	21.6	32.3	17.6	26.4	13.4	20.0		
	38									12.0	18.0		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	32.4	48.7	29.6	44.4	27.0	40.6	21.2	31.8	14.9	22.4	37.8	56.8
$P_e(L_c)^2/10^4$, kip-in.^{2}		1060		993		918		749		568		1010	
r_m, in.		2.24		2.25		2.26		2.28		2.30		1.96	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS6.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS6.000×											
		0.375		0.312		0.280		0.250		0.188		0.125	
t_{des}, in.		0.349		0.291		0.260		0.233		0.174		0.116	
Steel, lb/ft		22.55		18.97		17.12		15.37		11.68		7.85	
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, L_c (ft), with respect to the least radius of gyration, r	0	207	311	185	278	173	260	163	244	139	209	116	173
	1	207	310	185	277	173	259	162	243	139	208	115	173
	2	205	307	183	275	171	257	161	241	137	206	114	171
	3	202	303	180	271	169	253	158	238	135	203	112	168
	4	198	297	177	265	165	248	155	233	132	198	109	164
	5	193	289	172	258	161	241	151	227	129	193	106	159
	6	186	280	167	250	156	234	146	219	124	186	102	153
	7	179	269	160	240	150	225	141	211	119	179	97.7	147
	8	172	257	153	230	143	215	135	202	114	171	92.8	139
	9	163	245	146	219	136	205	128	192	108	162	87.6	131
	10	154	231	138	207	129	193	121	181	102	153	82.1	123
	11	145	217	130	194	121	182	114	171	95.4	143	76.4	115
	12	135	203	121	182	113	170	106	159	88.8	133	70.6	106
	13	126	189	112	169	105	158	98.7	148	82.2	123	64.8	97.2
	14	116	174	104	156	97.0	146	91.1	137	75.5	113	59.1	88.7
	15	107	160	95.3	143	89.0	134	83.6	125	69.0	104	53.5	80.3
	16	97.2	146	87.0	130	81.2	122	76.3	114	62.7	94.0	48.1	72.2
	17	88.1	132	78.9	118	73.7	111	69.2	104	56.5	84.8	42.9	64.4
	18	79.3	119	71.1	107	66.3	99.5	62.3	93.4	50.6	75.9	38.3	57.4
	19	71.7	108	63.8	95.7	59.5	89.3	55.9	83.9	45.4	68.1	34.4	51.5
	20	64.7	97.3	57.6	86.3	53.7	80.6	50.5	75.7	41.0	61.5	31.0	46.5
	21	58.7	88.2	52.2	78.3	48.7	73.1	45.8	68.7	37.2	55.7	28.1	42.2
	22	53.5	80.4	47.6	71.4	44.4	66.6	41.7	62.6	33.9	50.8	25.6	38.4
	23	48.9	73.5	43.5	65.3	40.6	60.9	38.2	57.2	31.0	46.5	23.4	35.2
	24	44.9	67.5	40.0	60.0	37.3	56.0	35.0	52.6	28.5	42.7	21.5	32.3
	25	41.4	62.3	36.8	55.3	34.4	51.6	32.3	48.4	26.2	39.3	19.8	29.8
	26	38.3	57.6	34.1	51.1	31.8	47.7	29.9	44.8	24.2	36.4	18.3	27.5
	27	35.5	53.4	31.6	47.4	29.5	44.2	27.7	41.5	22.5	33.7	17.0	25.5
	28	33.0	49.6	29.4	44.1	27.4	41.1	25.7	38.6	20.9	31.4	15.8	23.7
	29	30.8	46.3	27.4	41.1	25.6	38.3	24.0	36.0	19.5	29.2	14.7	22.1
	30	28.8	43.2	25.6	38.4	23.9	35.8	22.4	33.6	18.2	27.3	13.8	20.7
	32	25.3	38.0	22.5	33.7	21.0	31.5	19.7	29.6	16.0	24.0	12.1	18.2
	34							17.5	26.2	14.2	21.3	10.7	16.1
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	30.2	45.4	26.1	39.2	23.8	35.8	21.7	32.7	17.1	25.6	12.1	18.2
$P_e(L_c)^2/10^4$, kip-in.^{2}		844		756		706		663		538		407	
r_m, in.		2.00		2.02		2.03		2.04		2.06		2.08	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS5.563–
HSS5.500

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS5.563×										HSS5.500×	
		0.500		0.375		0.258		0.188		0.134		0.500	
t_{des}, in.		0.465		0.349		0.240		0.174		0.124		0.465	
Steel, lb/ft		27.06		20.80		14.63		10.80		7.78		26.73	
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, L_c (ft), with respect to the least radius of gyration, r	0	226	339	187	281	148	223	124	187	106	158	223	334
	1	225	338	186	280	148	222	124	186	105	158	222	333
	2	223	335	185	277	146	220	123	184	104	156	220	330
	3	219	329	181	272	144	216	120	181	102	153	216	324
	4	214	321	177	266	140	211	118	176	99.3	149	210	316
	5	207	311	172	257	136	204	114	171	96.0	144	204	306
	6	199	299	165	248	131	197	109	164	92.0	138	196	294
	7	191	286	158	237	125	188	104	157	87.5	131	188	282
	8	182	273	150	225	119	179	99.0	148	82.6	124	179	268
	9	172	258	141	212	112	168	93.2	140	77.4	116	169	254
	10	162	243	132	199	105	158	87.0	131	71.9	108	159	238
	11	151	227	123	185	97.8	147	80.8	121	66.4	99.6	148	223
	12	140	211	114	171	90.4	136	74.4	112	60.8	91.1	137	206
	13	130	195	104	157	82.9	124	68.0	102	55.2	82.8	126	190
	14	119	179	95.1	143	75.6	113	61.8	92.7	49.8	74.6	116	174
	15	108	163	86.0	129	68.4	103	55.7	83.5	44.5	66.8	105	158
	16	98.0	147	77.9	117	61.5	92.2	49.9	74.8	39.4	59.1	95.0	143
	17	88.1	132	70.4	106	54.8	82.1	44.2	66.4	34.9	52.4	85.2	128
	18	78.6	118	63.1	94.8	48.8	73.3	39.5	59.2	31.2	46.7	76.0	114
	19	70.6	106	56.6	85.1	43.8	65.8	35.4	53.1	28.0	41.9	68.2	102
	20	63.7	95.7	51.1	76.8	39.6	59.3	32.0	47.9	25.2	37.9	61.5	92.5
	21	57.8	86.8	46.3	69.6	35.9	53.8	29.0	43.5	22.9	34.3	55.8	83.9
	22	52.6	79.1	42.2	63.5	32.7	49.0	26.4	39.6	20.9	31.3	50.9	76.4
	23	48.2	72.4	38.6	58.1	29.9	44.9	24.2	36.2	19.1	28.6	46.5	69.9
	24	44.2	66.5	35.5	53.3	27.5	41.2	22.2	33.3	17.5	26.3	42.7	64.2
	25	40.8	61.3	32.7	49.1	25.3	38.0	20.5	30.7	16.2	24.2	39.4	59.2
	26	37.7	56.6	30.2	45.4	23.4	35.1	18.9	28.4	14.9	22.4	36.4	54.7
	27	34.9	52.5	28.0	42.1	21.7	32.6	17.5	26.3	13.8	20.8	33.8	50.7
	28	32.5	48.8	26.1	39.2	20.2	30.3	16.3	24.5	12.9	19.3	31.4	47.2
	29	30.3	45.5	24.3	36.5	18.8	28.2	15.2	22.8	12.0	18.0	29.3	44.0
	30	28.3	42.5	22.7	34.1	17.6	26.4	14.2	21.3	11.2	16.8		
	32									9.86	14.8		
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	31.9	47.9	25.5	38.3	18.9	28.4	14.5	21.7	10.9	16.4	31.1	46.8
$P_e(L_c)^2/10^4$, kip-in.^{2}		777		653		520		420		331		747	
r_m, in.		1.81		1.85		1.88		1.91		1.92		1.79	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS5.500–
HSS5.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS5.500×				HSS5.000×							
		0.375		0.258		0.500		0.375		0.312		0.258	
t_{des}, in.		0.349		0.240		0.465		0.349		0.291		0.240	
Steel, lb/ft		20.55		14.46		24.05		18.54		15.64		13.08	
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, L_c (ft), with respect to the least radius of gyration, r	0	184	276	146	219	198	298	162	243	144	216	128	192
	1	184	275	146	219	197	297	161	242	143	215	127	191
	2	182	273	144	216	195	293	159	239	141	212	126	189
	3	178	268	142	213	191	287	156	234	139	208	123	185
	4	174	261	138	207	186	279	151	227	134	202	119	179
	5	169	253	134	201	179	269	146	218	129	194	115	172
	6	162	243	129	193	171	257	139	208	123	185	110	165
	7	155	232	123	185	162	244	131	197	117	175	104	156
	8	147	220	117	175	153	230	123	185	110	164	97.4	146
	9	138	208	110	165	143	214	115	172	102	153	90.6	136
	10	129	194	103	154	132	198	106	158	94.1	141	83.6	125
	11	120	180	95.5	143	121	182	96.5	145	86.1	129	76.5	115
	12	111	166	88.0	132	110	166	87.5	131	78.0	117	69.4	104
	13	101	152	80.6	121	99.8	150	79.4	119	70.2	105	62.4	93.6
	14	92.2	138	73.3	110	89.4	134	71.6	108	62.6	93.9	55.6	83.4
	15	83.4	125	66.2	99.3	79.5	119	64.0	96.1	55.3	82.9	49.1	73.7
	16	75.6	114	59.3	89.0	70.0	105	56.6	85.1	48.9	73.5	43.2	64.8
	17	68.2	102	52.7	79.0	62.0	93.2	50.1	75.4	43.3	65.1	38.2	57.4
	18	61.0	91.6	47.0	70.5	55.3	83.1	44.7	67.2	38.6	58.1	34.1	51.2
	19	54.7	82.2	42.2	63.3	49.6	74.6	40.1	60.3	34.7	52.1	30.6	45.9
	20	49.4	74.2	38.1	57.1	44.8	67.3	36.2	54.5	31.3	47.0	27.6	41.4
	21	44.8	67.3	34.5	51.8	40.6	61.0	32.9	49.4	28.4	42.7	25.1	37.6
	22	40.8	61.3	31.5	47.2	37.0	55.6	29.9	45.0	25.9	38.9	22.8	34.3
	23	37.3	56.1	28.8	43.2	33.9	50.9	27.4	41.2	23.7	35.6	20.9	31.3
	24	34.3	51.5	26.4	39.7	31.1	46.7	25.2	37.8	21.7	32.7	19.2	28.8
	25	31.6	47.5	24.4	36.5	28.7	43.1	23.2	34.9	20.0	30.1	17.7	26.5
	26	29.2	43.9	22.5	33.8	26.5	39.8	21.4	32.2	18.5	27.8	16.3	24.5
	27	27.1	40.7	20.9	31.3			19.9	29.9	17.2	25.8	15.2	22.7
	28	25.2	37.9	19.4	29.1							14.1	21.1
	29	23.5	35.3	18.1	27.2								
	30	21.9	33.0	16.9	25.4								
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	24.9	37.4	18.4	27.7	25.1	37.7	20.2	30.3	17.5	26.3	15.0	22.5
$P_e(L_c)^2/10^4$, kip-in.^{2}		629		500		539		456		408		363	
r_m, in.		1.83		1.86		1.61		1.65		1.67		1.69	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS5.000–
HSS4.500

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS5.000×						HSS4.500×					
		0.250		0.188		0.125		0.375		0.337		0.237	
t_{des}, in.		0.233		0.174		0.116		0.349		0.313		0.220	
Steel, lb/ft		12.69		9.67		6.51		16.54		15.00		10.80	
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, L_c (ft), with respect to the least radius of gyration, r	0	126	188	106	160	86.9	130	141	211	131	196	105	157
	1	125	188	106	159	86.5	130	140	210	130	195	104	156
	2	123	185	105	157	85.3	128	138	207	128	192	103	154
	3	121	181	102	153	83.3	125	134	201	125	187	99.9	150
	4	117	176	99.2	149	80.6	121	129	194	120	181	96.3	144
	5	113	169	95.4	143	77.3	116	123	185	115	172	91.9	138
	6	108	162	91.0	136	73.4	110	116	174	108	162	86.7	130
	7	102	153	86.0	129	69.0	103	108	163	101	152	81.0	121
	8	95.7	144	80.6	121	64.3	96.4	100	150	93.3	140	74.9	112
	9	89.0	134	74.9	112	59.3	89.0	91.8	138	85.3	128	68.5	103
	10	82.1	123	68.9	103	54.3	81.4	83.7	126	77.1	116	62.0	93.0
	11	75.1	113	62.9	94.4	49.2	73.7	75.5	114	69.0	104	55.5	83.3
	12	68.1	102	57.0	85.4	44.1	66.2	67.5	102	61.7	92.8	49.2	73.8
	13	61.3	91.9	51.1	76.7	39.2	58.8	59.8	89.9	54.7	82.3	43.1	64.7
	14	54.6	81.9	45.5	68.2	34.5	51.8	52.4	78.7	48.1	72.2	37.4	56.1
	15	48.2	72.3	40.0	60.0	30.1	45.2	45.6	68.6	41.9	62.9	32.6	48.8
	16	42.4	63.6	35.2	52.7	26.5	39.7	40.1	60.3	36.8	55.3	28.6	42.9
	17	37.5	56.3	31.1	46.7	23.4	35.2	35.5	53.4	32.6	49.0	25.3	38.0
	18	33.5	50.2	27.8	41.7	20.9	31.4	31.7	47.6	29.1	43.7	22.6	33.9
	19	30.1	45.1	24.9	37.4	18.8	28.2	28.4	42.7	26.1	39.2	20.3	30.4
	20	27.1	40.7	22.5	33.8	16.9	25.4	25.7	38.6	23.5	35.4	18.3	27.5
	21	24.6	36.9	20.4	30.6	15.4	23.0	23.3	35.0	21.4	32.1	16.6	24.9
	22	22.4	33.6	18.6	27.9	14.0	21.0	21.2	31.9	19.5	29.3	15.1	22.7
	23	20.5	30.8	17.0	25.5	12.8	19.2	19.4	29.2	17.8	26.8	13.8	20.8
	24	18.8	28.3	15.6	23.4	11.8	17.6	17.8	26.8	16.4	24.6	12.7	19.1
	25	17.4	26.0	14.4	21.6	10.8	16.3					11.7	17.6
	26	16.1	24.1	13.3	20.0	10.0	15.0						
	27	14.9	22.3	12.3	18.5	9.29	13.9						
	28	13.8	20.8	11.5	17.2	8.64	13.0						
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	14.6	22.0	11.5	17.3	8.18	12.3	16.0	24.0	14.7	22.0	11.1	16.6
$P_e(L_c)^2/10^4$, kip-in.^{2}		356		296		222		318		298		241	
r_m, in.		1.69		1.71		1.73		1.47		1.48		1.52	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS4.500–
HSS4.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS4.500×				HSS4.000×							
		0.188		0.125		0.313		0.250		0.237		0.226	
t_{des}, in.		0.174		0.116		0.291		0.233		0.220		0.210	
Steel, lb/ft		8.67		5.85		12.34		10.00		9.53		9.12	
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, L_c (ft), with respect to the least radius of gyration, r	0	91.2	137	74.0	111	107	160	92.3	138	88.9	133	86.4	130
	1	90.7	136	73.6	110	106	159	91.7	138	88.3	132	85.8	129
	2	89.3	134	72.3	108	104	156	89.9	135	86.6	130	84.1	126
	3	86.9	130	70.3	105	100	150	86.9	130	83.7	126	81.4	122
	4	83.8	126	67.6	101	95.7	144	83.0	124	79.9	120	77.7	117
	5	79.9	120	64.2	96.3	90.1	135	78.1	117	75.3	113	73.2	110
	6	75.4	113	60.3	90.5	83.7	125	72.6	109	70.0	105	68.0	102
	7	70.4	106	56.0	84.0	76.7	115	66.6	99.9	64.2	96.3	62.4	93.6
	8	65.1	97.6	51.4	77.2	69.3	104	60.3	90.4	58.1	87.1	56.5	84.7
	9	59.5	89.3	46.7	70.1	62.2	93.5	53.8	80.7	51.9	77.8	50.4	75.7
	10	53.9	80.8	41.9	62.9	55.5	83.4	47.4	71.1	45.7	68.6	44.5	66.7
	11	48.2	72.3	37.2	55.8	48.9	73.4	41.2	61.8	39.8	59.7	38.7	58.0
	12	42.7	64.1	32.7	49.0	42.5	63.9	35.3	53.0	34.1	51.2	33.1	49.7
	13	37.5	56.2	28.3	42.4	36.5	54.8	30.2	45.3	29.1	43.6	28.2	42.4
	14	32.4	48.7	24.4	36.6	31.5	47.3	26.0	39.1	25.1	37.6	24.4	36.5
	15	28.3	42.4	21.3	31.9	27.4	41.2	22.6	34.0	21.8	32.7	21.2	31.8
	16	24.8	37.3	18.7	28.0	24.1	36.2	19.9	29.9	19.2	28.8	18.6	28.0
	17	22.0	33.0	16.5	24.8	21.3	32.1	17.6	26.5	17.0	25.5	16.5	24.8
	18	19.6	29.4	14.8	22.1	19.0	28.6	15.7	23.6	15.2	22.7	14.7	22.1
	19	17.6	26.4	13.2	19.9	17.1	25.7	14.1	21.2	13.6	20.4	13.2	19.8
	20	15.9	23.8	12.0	17.9	15.4	23.2	12.7	19.1	12.3	18.4	11.9	17.9
	21	14.4	21.6	10.8	16.3	14.0	21.0	11.6	17.4	11.1	16.7	10.8	16.2
	22	13.1	19.7	9.88	14.8	12.7	19.1	10.5	15.8	10.1	15.2	9.86	14.8
	23	12.0	18.0	9.04	13.6								
	24	11.0	16.6	8.30	12.5								
	25	10.2	15.3	7.65	11.5								
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	9.14	13.7	6.52	9.80	10.7	16.0	8.95	13.5	8.55	12.9	8.24	12.4
$P_e(L_c)^2/10^4$, kip-in.^{2}		209		157		191		167		161		157	
r_m, in.		1.53		1.55		1.32		1.33		1.34		1.34	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r_m equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE
HSS4.000

Table 4-F (continued)
Available Strength in Axial Compression, kips
Filled Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
f'_c = 5 ksi

Shape		HSS4.000×					
		0.220		0.188		0.125	
t_{des}, in.		0.205		0.174		0.116	
Steel, lb/ft		8.89		7.66		5.18	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r	0	85.0	128	77.1	116	62.0	93.0
	1	84.5	127	76.6	115	61.6	92.3
	2	82.8	124	75.1	113	60.3	90.4
	3	80.1	120	72.6	109	58.2	87.3
	4	76.5	115	69.3	104	55.4	83.1
	5	72.0	108	65.3	98.0	52.0	78.0
	6	67.0	100	60.7	91.1	48.1	72.2
	7	61.4	92.1	55.7	83.5	43.9	65.9
	8	55.6	83.4	50.4	75.6	39.6	59.3
	9	49.7	74.5	45.0	67.5	35.1	52.7
	10	43.8	65.7	39.7	59.5	30.7	46.1
	11	38.1	57.1	34.5	51.8	26.5	39.8
	12	32.7	49.0	29.6	44.4	22.5	33.8
	13	27.8	41.7	25.2	37.8	19.2	28.8
	14	24.0	36.0	21.7	32.6	16.5	24.8
	15	20.9	31.4	18.9	28.4	14.4	21.6
	16	18.4	27.6	16.6	25.0	12.7	19.0
	17	16.3	24.4	14.7	22.1	11.2	16.8
	18	14.5	21.8	13.1	19.7	10.0	15.0
	19	13.0	19.5	11.8	17.7	8.98	13.5
	20	11.8	17.6	10.6	16.0	8.11	12.2
	21	10.7	16.0	9.66	14.5	7.35	11.0
	22	9.72	14.6	8.80	13.2	6.70	10.0

Properties								
M_n/Ω_b	$\phi_b M_n$	kip-ft	8.08	12.1	7.07	10.6	5.05	7.60
$P_e(L_c)^2/10^4$, kip-in.^{2}			154		140		106	
r_m, in.			1.34		1.35		1.37	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note:
Heavy line indicates L_c/r_m equal to or greater than 200.

4

COMPOSITE
PIPE 12–PIPE 8

Table 4-G
Available Strength in Axial Compression, kips
Filled Pipe

$F_y = 35$ ksi
$f'_c = 4$ ksi

Shape		Pipe 12				Pipe 10				Pipe 8			
		x-Strong		Std.		x-Strong		Std.		xx-Strong		x-Strong	
t_{des}, in.		0.465		0.349		0.465		0.340		0.816		0.465	
Steel, lb/ft		65.5		49.6		54.8		40.5		72.5		43.4	
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, L_c (ft), with respect to the least radius of gyration, r	0	515	772	457	685	408	612	353	529	423	634	297	445
	1	514	772	456	684	408	612	352	528	423	634	296	444
	2	514	771	456	683	407	611	352	527	421	632	295	443
	3	512	769	454	681	406	608	350	525	419	628	294	441
	4	511	766	453	679	404	605	348	523	416	624	292	437
	5	508	763	450	676	401	602	346	519	412	618	289	433
	6	506	758	448	672	398	597	343	515	407	611	286	428
	7	502	754	445	667	395	592	340	510	401	602	282	423
	8	499	748	441	662	390	586	336	504	395	593	277	416
	9	495	742	437	656	386	579	332	498	388	583	272	409
	10	490	735	433	649	381	571	328	491	381	573	267	400
	11	485	727	428	642	375	563	322	484	373	561	261	392
	12	479	719	423	634	369	554	317	476	365	549	255	382
	13	473	710	417	625	363	545	311	467	357	536	248	372
	14	467	701	411	616	356	535	305	458	348	523	241	362
	15	461	691	405	607	349	524	299	448	338	508	234	351
	16	454	680	398	597	342	513	292	438	328	494	227	340
	17	446	669	391	586	334	501	285	427	318	478	219	328
	18	439	658	384	575	326	489	278	417	308	463	211	316
	19	431	646	376	564	318	477	270	405	297	447	203	304
	20	422	634	368	552	309	464	263	394	286	430	195	292
	21	414	621	360	540	301	451	255	382	275	414	186	280
	22	405	608	352	528	292	438	247	370	264	397	178	267
	23	396	594	344	516	283	425	239	358	253	380	170	255
	24	387	581	335	503	274	411	231	346	242	364	162	243
	25	378	567	326	490	265	397	222	334	231	347	154	230
	26	368	553	318	476	256	384	214	321	220	331	146	218
	27	359	538	309	463	246	370	206	309	209	314	138	207
	28	349	524	300	450	237	356	198	297	198	298	130	195
	29	340	509	291	436	228	342	190	285	188	283	122	184
	30	330	495	282	422	219	328	182	272	178	267	115	172
	32	310	465	264	395	201	301	166	249	158	237	101	152
	34	291	436	245	368	183	275	150	226	140	210	89.7	135
	36	271	407	228	342	167	250	135	203	124	187	80.0	120
	38	252	378	210	315	150	225	122	182	112	168	71.8	108
	40	233	350	193	290	135	203	110	165	101	152	64.8	97.5
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	140	211	111	166	96.6	145	74.7	112	91.8	138	59.6	89.6
$P_e(L_c)^2/10^4$, kip-in.^{2}		12600		10300		7140		5790		4770		3400	
r_m, in.		4.35		4.39		3.64		3.68		2.78		2.89	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note: Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
PIPE 8–PIPE 5

Table 4-G (continued)
Available Strength in Axial Compression, kips
Filled Pipe

F_y = 35 ksi
f'_c = 4 ksi

Shape		Pipe 8		Pipe 6						Pipe 5			
		Std.		xx-Strong		x-Strong		Std.		xx-Strong		x-Strong	
t_{des}, in.		0.300		0.805		0.403		0.261		0.699		0.349	
Steel, lb/ft		28.6		53.2		28.6		19.0		38.6		20.8	
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, L_c (ft), with respect to the least radius of gyration, r	0	233	350	308	463	188	281	147	220	224	337	136	203
	1	233	350	308	462	187	281	146	219	224	336	135	203
	2	232	349	306	460	186	279	146	218	222	334	134	201
	3	231	347	303	456	185	277	144	216	219	330	133	199
	4	229	344	300	451	182	273	142	214	216	324	130	195
	5	227	341	295	444	179	269	140	210	211	317	127	191
	6	224	337	290	436	176	264	137	206	205	309	124	186
	7	221	332	283	426	172	258	134	201	199	299	120	180
	8	218	326	276	415	167	251	130	196	192	288	115	173
	9	213	320	268	403	162	244	126	190	184	277	110	166
	10	209	314	260	391	157	235	122	183	176	264	105	158
	11	204	306	251	377	151	227	118	176	167	251	99.7	150
	12	199	299	241	362	145	218	113	169	158	237	94.1	141
	13	194	291	231	347	139	208	108	162	149	223	88.3	132
	14	188	282	221	332	132	199	103	154	139	209	82.4	124
	15	182	273	210	316	126	189	97.3	146	130	195	76.6	115
	16	176	264	199	299	119	178	91.9	138	120	181	70.8	106
	17	170	254	188	283	112	168	86.6	130	111	167	65.1	97.6
	18	163	245	177	267	105	158	81.2	122	102	153	59.8	89.8
	19	157	235	167	250	98.7	148	75.9	114	93.1	140	55.2	83.0
	20	150	225	156	234	92.1	138	70.7	106	84.5	127	50.7	76.3
	21	143	215	145	218	85.6	128	65.6	98.4	76.7	115	46.4	69.8
	22	137	205	135	203	79.3	119	60.7	91.0	69.9	105	42.3	63.6
	23	130	195	125	188	73.3	110	55.8	83.7	63.9	96.1	38.7	58.2
	24	124	185	115	173	68.3	103	51.3	76.9	58.7	88.2	35.5	53.4
	25	117	176	106	160	63.3	95.1	47.2	70.9	54.1	81.3	32.8	49.2
	26	111	166	98.2	148	58.5	88.0	43.7	65.5	50.0	75.2	30.3	45.5
	27	104	157	91.1	137	54.3	81.6	40.5	60.8	46.4	69.7	28.1	42.2
	28	98.2	147	84.7	127	50.5	75.8	37.7	56.5	43.1	64.8	26.1	39.2
	29	92.2	138	78.9	119	47.0	70.7	35.1	52.7	40.2	60.4	24.3	36.6
	30	86.2	129	73.8	111	44.0	66.1	32.8	49.2			22.7	34.2
	32	75.8	114	64.8	97.4	38.6	58.1	28.8	43.3				
	34	67.1	101	57.4	86.3	34.2	51.4	25.5	38.3				
	36	59.9	89.8			30.5	45.9	22.8	34.2				
	38	53.7	80.6										
	40	48.5	72.7										
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	41.7	62.7	49.7	74.7	29.7	44.7	21.0	31.5	30.1	45.2	18.0	27.1
$P_e(L_c)^2/10^4$, kip-in.^{2}		2550		1910		1270		970		967		643	
r_m, in.		2.95		2.08		2.20		2.25		1.74		1.85	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

4

COMPOSITE
PIPE 5–PIPE 4

Table 4-G (continued)
Available Strength in Axial Compression, kips
Filled Pipe

F_y = 35 ksi
f'_c = 4 ksi

Shape		Pipe 5		Pipe 4					
		Std.		xx-Strong		x-Strong		Std.	
t_{des}, in.		0.241		0.628		0.315		0.221	
Steel, lb/ft		14.6		27.6		15.0		10.8	
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	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r	0	109	163	161	241	94.8	142	76.4	115
	1	108	163	160	240	94.4	142	76.1	114
	2	108	161	158	238	93.3	140	75.2	113
	3	106	159	155	233	91.6	137	73.7	111
	4	104	156	151	227	89.1	134	71.8	108
	5	102	153	146	219	86.1	129	69.3	104
	6	99.1	149	140	210	82.5	124	66.4	99.6
	7	95.9	144	133	200	78.4	118	63.1	94.7
	8	92.2	138	126	189	74.0	111	59.5	89.3
	9	88.3	132	118	177	69.3	104	55.7	83.6
	10	84.1	126	110	165	64.4	96.6	51.7	77.6
	11	79.7	120	101	152	59.3	89.0	47.7	71.5
	12	75.1	113	92.7	139	54.3	81.4	43.6	65.4
	13	70.5	106	84.3	127	49.3	73.9	39.6	59.3
	14	65.7	98.6	76.0	114	44.9	67.4	35.6	53.4
	15	61.0	91.5	68.1	102	40.7	61.2	31.8	47.7
	16	56.4	84.5	60.3	90.7	36.7	55.1	28.1	42.2
	17	51.8	77.7	53.5	80.3	32.8	49.2	24.9	37.4
	18	47.3	71.0	47.7	71.7	29.2	43.9	22.2	33.3
	19	43.1	64.6	42.8	64.3	26.2	39.4	19.9	29.9
	20	38.9	58.3	38.6	58.0	23.7	35.6	18.0	27.0
	21	35.3	52.9	35.0	52.6	21.5	32.3	16.3	24.5
	22	32.1	48.2	31.9	48.0	19.6	29.4	14.9	22.3
	23	29.4	44.1	29.2	43.9	17.9	26.9	13.6	20.4
	24	27.0	40.5			16.4	24.7	12.5	18.8
	25	24.9	37.3					11.5	17.3
	26	23.0	34.5						
	27	21.3	32.0						
	28	19.8	29.8						
	29	18.5	27.7						
	30	17.3	25.9						

Properties

M_n/Ω_b	$\phi_b M_n$	kip-ft	13.4	20.1	17.1	25.7	10.4	15.6	7.85	11.8
$P_e(L_c)^2/10^4$, kip-in.^{2}			511		438		295		236	
r_m, in.			1.88		1.39		1.48		1.51	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE PIPE 12–PIPE 8

Table 4-H
Available Strength in Axial Compression, kips
Filled Pipe

F_y = 35 ksi
f'_c = 5 ksi

Shape		Pipe 12				Pipe 10				Pipe 8			
		x-Strong		Std.		x-Strong		Std.		xx-Strong		x-Strong	
t_{des}, in,		0.465		0.349		0.465		0.340		0.816		0.465	
Steel, lb/ft		65.5		49.6		54.8		40.5		72.5		43.4	
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, L_c (ft), with respect to the least radius of gyration, r	0	567	850	511	766	444	666	390	586	441	662	319	478
	1	567	850	510	766	444	666	390	585	441	661	318	478
	2	566	848	510	764	443	664	389	584	439	659	317	476
	3	564	846	508	762	441	662	388	581	437	655	316	473
	4	562	843	506	759	439	658	385	578	433	650	313	470
	5	559	839	503	755	436	654	383	574	429	644	310	465
	6	556	834	500	750	433	649	379	569	424	636	306	459
	7	552	828	496	745	428	643	376	563	418	627	302	453
	8	548	822	492	738	424	636	371	557	411	617	297	445
	9	543	815	487	731	418	628	366	549	403	605	291	437
	10	538	806	482	723	413	619	361	541	395	593	285	428
	11	532	797	476	714	406	609	355	532	386	579	279	418
	12	525	788	470	704	399	599	348	522	376	564	272	407
	13	518	777	463	694	392	588	341	512	366	549	264	396
	14	511	766	456	683	385	577	334	501	355	533	256	385
	15	503	755	448	672	376	565	327	490	344	516	248	372
	16	495	742	440	660	368	552	319	478	333	499	240	360
	17	486	729	432	647	359	539	310	466	321	481	231	347
	18	477	716	423	634	350	525	302	453	308	463	222	334
	19	468	702	414	621	341	511	293	440	297	447	213	320
	20	458	688	405	607	331	496	284	426	286	430	204	307
	21	449	673	395	593	321	482	275	413	275	414	195	293
	22	439	658	385	578	311	467	266	399	264	397	186	279
	23	428	642	375	563	301	451	257	385	253	380	177	266
	24	418	626	365	548	291	436	247	371	242	364	168	252
	25	407	610	355	532	280	421	238	357	231	347	159	239
	26	396	594	345	517	270	405	228	343	220	331	150	226
	27	385	578	334	501	260	390	219	329	209	314	142	213
	28	374	561	324	485	250	374	210	315	198	298	133	200
	29	363	544	313	470	239	359	200	301	188	283	125	188
	30	352	528	302	454	229	344	191	287	178	267	117	176
	32	329	494	281	422	209	314	173	260	158	237	103	154
	34	307	461	261	391	190	285	156	234	140	210	91.1	137
	36	285	428	240	360	171	257	139	209	124	187	81.3	122
	38	264	395	220	331	153	230	125	188	112	168	72.9	109
	40	243	364	201	302	139	208	113	169	101	152	65.8	98.7
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	143	215	113	170	98.4	148	76.3	115	92.8	139	60.6	91.1
$P_e(L_c)^2/10^4$, kip-in.^{2}		12900		10600		7310		5960		4820		3460	
r_m, in.		4.35		4.39		3.64		3.68		2.78		2.89	

ASD	LRFD
$\Omega_b = 1.67$	$\phi_b = 0.90$
$\Omega_c = 2.00$	$\phi_c = 0.75$

Note: Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE PIPE 8–PIPE 5

Table 4-H (continued)
Available Strength in Axial Compression, kips
Filled Pipe

F_y = 35 ksi
f'_c = 5 ksi

Shape		Pipe 8		Pipe 6						Pipe 5			
		Std.		xx-Strong		x-Strong		Std.		xx-Strong		x-Strong	
t_{des}, in,		0.300		0.805		0.403		0.261		0.699		0.349	
Steel, lb/ft		28.6		53.2		28.6		19.0		38.6		20.8	
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, L_c (ft), with respect to the least radius of gyration, r	0	258	386	308	463	200	300	160	241	224	337	144	217
	1	257	386	308	462	200	300	160	240	224	336	144	216
	2	256	384	306	460	199	298	159	239	222	334	143	214
	3	255	382	303	456	197	295	158	237	219	330	141	212
	4	253	379	300	451	194	291	156	233	216	324	138	208
	5	250	375	295	444	191	287	153	229	211	317	135	203
	6	247	370	290	436	187	281	150	224	205	309	131	197
	7	243	364	283	426	183	274	146	219	199	299	127	190
	8	239	358	276	415	178	266	142	213	192	288	122	183
	9	234	351	268	403	172	258	137	206	184	277	116	175
	10	229	343	260	391	166	249	132	198	176	264	111	166
	11	223	335	251	377	160	240	127	190	167	251	105	157
	12	217	326	241	362	153	229	121	182	158	237	98.4	148
	13	211	316	231	347	146	219	116	173	149	223	92.1	138
	14	204	306	221	332	139	208	110	164	139	209	85.7	129
	15	197	296	210	316	131	197	104	155	130	195	79.3	119
	16	190	285	199	299	124	186	97.5	146	120	181	73.0	110
	17	183	274	188	283	117	175	91.5	137	111	167	66.9	100
	18	175	263	177	267	109	164	85.5	128	102	153	60.9	91.4
	19	168	252	167	250	102	153	79.5	119	93.1	140	55.2	83.0
	20	160	240	156	234	94.8	142	73.7	111	84.5	127	50.7	76.3
	21	153	229	145	218	87.8	132	68.1	102	76.7	115	46.4	69.8
	22	145	218	135	203	81.0	122	62.6	93.9	69.9	105	42.3	63.6
	23	138	206	125	188	74.3	112	57.3	85.9	63.9	96.1	38.7	58.2
	24	130	195	115	173	68.3	103	52.6	78.9	58.7	88.2	35.5	53.4
	25	123	184	106	160	63.3	95.1	48.5	72.7	54.1	81.3	32.8	49.2
	26	116	173	98.2	148	58.5	88.0	44.8	67.2	50.0	75.2	30.3	45.5
	27	109	163	91.1	137	54.3	81.6	41.5	62.3	46.4	69.7	28.1	42.2
	28	102	152	84.7	127	50.5	75.8	38.6	57.9	43.1	64.8	26.1	39.2
	29	94.8	142	78.9	119	47.0	70.7	36.0	54.0	40.2	60.4	24.3	36.6
	30	88.6	133	73.8	111	44.0	66.1	33.7	50.5			22.7	34.2
	32	77.9	117	64.8	97.4	38.6	58.1	29.6	44.4				
	34	69.0	103	57.4	86.3	34.2	51.4	26.2	39.3				
	36	61.5	92.3			30.5	45.9	23.4	35.1				
	38	55.2	82.8										
	40	49.8	74.7										
Properties													
M_n/Ω_b	$\phi_b M_n$ kip-ft	42.6	64.0	50.1	75.3	30.2	45.4	21.4	32.1	30.3	45.6	18.3	27.5
$P_e(L_c)^2/10^4$, kip-in.^{2}		2620		1930		1290		995		973		653	
r_m, in.		2.95		2.08		2.20		2.25		1.74		1.85	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

5

COMPOSITE PIPE 5–PIPE 4

Table 4-H (continued)
Available Strength in Axial Compression, kips
Filled Pipe

F_y = 35 ksi
f'_c = 5 ksi

Shape		Pipe 5		Pipe 4					
		Std.		xx-Strong		x-Strong		Std.	
t_{des}, in,		0.241		0.628		0.315		0.221	
Steel, lb/ft		14.6		27.6		15.0		10.8	
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	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r	0	118	177	161	241	100	151	82.5	124
	1	118	177	160	240	100	150	82.2	123
	2	117	176	158	238	98.8	148	81.2	122
	3	115	173	155	233	96.8	145	79.5	119
	4	113	170	151	227	94.1	141	77.3	116
	5	111	166	146	219	90.7	136	74.4	112
	6	107	161	140	210	86.8	130	71.1	107
	7	104	155	133	200	82.3	124	67.4	101
	8	99.4	149	126	189	77.5	116	63.4	95.1
	9	94.9	142	118	177	72.3	109	59.1	88.6
	10	90.1	135	110	165	67.0	100	54.6	82.0
	11	85.1	128	101	152	61.5	92.3	50.1	75.2
	12	79.9	120	92.7	139	56.1	84.1	45.6	68.4
	13	74.6	112	84.3	127	50.7	76.0	41.1	61.7
	14	69.3	104	76.0	114	45.4	68.2	36.8	55.2
	15	64.0	96.1	68.1	102	40.7	61.2	32.6	49.0
	16	58.8	88.3	60.3	90.7	36.7	55.1	28.7	43.1
	17	53.8	80.7	53.5	80.3	32.8	49.2	25.4	38.1
	18	48.9	73.3	47.7	71.7	29.2	43.9	22.7	34.0
	19	44.1	66.1	42.8	64.3	26.2	39.4	20.4	30.5
	20	39.8	59.7	38.6	58.0	23.7	35.6	18.4	27.6
	21	36.1	54.1	35.0	52.6	21.5	32.3	16.7	25.0
	22	32.9	49.3	31.9	48.0	19.6	29.4	15.2	22.8
	23	30.1	45.1	29.2	43.9	17.9	26.9	13.9	20.8
	24	27.6	41.5			16.4	24.7	12.8	19.1
	25	25.5	38.2					11.8	17.6
	26	23.5	35.3						
	27	21.8	32.8						
	28	20.3	30.5						
	29	18.9	28.4						
	30	17.7	26.5						

Properties

M_n/Ω_b	$\phi_b M_n$	kip-ft	13.7	20.5	17.2	25.8	10.5	15.8	7.99	12.0
$P_e(L_c)^2/10^4$, kip-in.^{2}			522		440		299		241	
r_m, in.			1.88		1.39		1.48		1.51	

ASD	LRFD
Ω_b = 1.67	ϕ_b = 0.90
Ω_c = 2.00	ϕ_c = 0.75

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Dashed line indicates the L_c beyond which the bare steel strength controls.

W44

Table 6-A
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W44×						Shape		W44×					
408[c],[h]		368[c]		335[c]		lb/ft		408[h]		368		335	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4660	7000	4070	6120	3630	5460	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	6490	9750	5840	8780	5250	7900
4490	6750	3940	5910	3510	5280		6	6490	9750	5840	8780	5250	7900
4430	6660	3890	5840	3470	5210		7	6490	9750	5840	8780	5250	7900
4360	6550	3830	5760	3420	5140		8	6490	9750	5840	8780	5250	7900
4280	6430	3770	5670	3360	5050		9	6490	9750	5840	8780	5250	7900
4190	6300	3710	5570	3300	4960		10	6490	9750	5840	8780	5250	7900
4100	6160	3630	5460	3230	4860		11	6490	9750	5830	8770	5240	7870
4000	6010	3560	5340	3160	4760		12	6390	9600	5740	8620	5140	7730
3890	5850	3470	5220	3090	4640		13	6280	9440	5640	8470	5050	7590
3780	5680	3390	5090	3010	4520		14	6180	9280	5540	8320	4950	7450
3660	5510	3290	4940	2930	4400		15	6070	9130	5440	8170	4860	7310
3540	5320	3180	4780	2840	4270		16	5970	8970	5340	8020	4770	7160
3420	5140	3070	4610	2750	4140		17	5860	8810	5240	7870	4670	7020
3290	4950	2950	4430	2660	4000		18	5760	8660	5140	7720	4580	6880
3160	4750	2830	4260	2560	3840		19	5660	8500	5040	7570	4480	6740
3030	4560	2720	4080	2450	3680		20	5550	8340	4940	7420	4390	6600
2770	4160	2480	3720	2230	3340		22	5340	8030	4740	7120	4200	6320
2510	3770	2240	3370	2010	3020		24	5130	7720	4540	6820	4010	6030
2250	3380	2010	3020	1790	2700		26	4920	7400	4340	6520	3830	5750
2000	3010	1790	2680	1590	2390		28	4720	7090	4140	6220	3640	5470
1760	2650	1570	2360	1390	2090		30	4510	6770	3940	5920	3450	5180
1550	2330	1380	2070	1220	1840		32	4300	6460	3740	5620	3260	4900
1370	2060	1220	1840	1080	1630		34	4090	6150	3530	5300	3000	4510
1220	1840	1090	1640	966	1450		36	3850	5790	3240	4880	2750	4140
1100	1650	978	1470	867	1300		38	3570	5370	3000	4510	2540	3820
992	1490	883	1330	783	1180		40	3330	5000	2790	4200	2360	3550
900	1350	801	1200	710	1070		42	3120	4690	2610	3920	2200	3310
820	1230	730	1100	647	972		44	2930	4400	2450	3680	2060	3100
750	1130	668	1000	592	890		46	2760	4150	2310	3460	1940	2910
689	1040	613	922	544	817		48	2620	3930	2180	3270	1830	2750
635	954	565	849	501	753		50	2480	3730	2060	3100	1730	2600
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4670	7020	4200	6320	3830	5760			11.0	35.6	11.0	33.9	10.8	32.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			120		108		98.5	
3600	5400	3240	4860	2960	4430			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			38700	1520	34700	1350	31100	1200
1420	2130	1270	1900	1180	1770			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.56		3.54		3.49	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
963	1450	860	1290	765	1150			5.06		5.06		5.10	

[c] Shape is slender for compression with F_y = 65 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W44

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W44×						Shape		W44×					
290[c]		262[c]		230[c]		lb/ft		290		262[v]		230[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3020	4530	2660	3990	2260	3400	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4570	6870	4120	6190	3570	5360
2910	4380	2560	3850	2180	3280		6	4570	6870	4120	6190	3570	5360
2880	4320	2530	3800	2150	3240		7	4570	6870	4120	6190	3570	5360
2830	4260	2490	3750	2120	3190		8	4570	6870	4120	6190	3570	5360
2790	4190	2450	3690	2090	3130		9	4570	6870	4120	6190	3570	5360
2740	4110	2410	3620	2050	3070		10	4570	6870	4120	6190	3570	5360
2680	4030	2360	3540	2000	3010		11	4560	6850	4100	6160	3540	5320
2620	3940	2300	3460	1960	2940		12	4470	6720	4020	6040	3470	5210
2560	3850	2250	3380	1910	2870		13	4390	6590	3940	5920	3400	5100
2490	3750	2190	3290	1860	2790		14	4300	6460	3850	5790	3320	5000
2420	3640	2130	3200	1800	2710		15	4210	6330	3770	5670	3250	4890
2350	3530	2060	3100	1750	2630		16	4130	6200	3690	5550	3180	4780
2280	3420	2000	3000	1690	2540		17	4040	6080	3610	5430	3110	4670
2200	3310	1930	2900	1630	2450		18	3960	5950	3530	5310	3030	4560
2120	3190	1860	2800	1570	2370		19	3870	5820	3450	5180	2960	4450
2050	3070	1790	2690	1510	2270		20	3780	5690	3370	5060	2890	4340
1890	2830	1650	2480	1390	2090		22	3610	5430	3200	4820	2740	4120
1720	2590	1510	2270	1270	1910		24	3440	5170	3040	4570	2600	3910
1560	2340	1370	2050	1150	1730		26	3270	4910	2880	4330	2450	3690
1380	2070	1230	1850	1030	1550		28	3100	4660	2720	4080	2310	3470
1210	1810	1080	1620	918	1380		30	2930	4400	2550	3840	2130	3200
1060	1590	948	1420	813	1220		32	2710	4070	2310	3480	1910	2870
939	1410	839	1260	720	1080		34	2460	3700	2090	3150	1720	2590
838	1260	749	1130	642	966		36	2250	3380	1910	2870	1570	2350
752	1130	672	1010	577	867		38	2070	3110	1750	2630	1430	2150
679	1020	606	911	520	782		40	1920	2880	1620	2430	1320	1980
616	925	550	827	472	709		42	1780	2680	1500	2260	1220	1830
561	843	501	753	430	646		44	1660	2500	1400	2100	1130	1700
513	771	459	689	393	591		46	1560	2350	1310	1970	1060	1590
471	708	421	633	361	543		48	1470	2210	1230	1850	991	1490
434	653	388	583	333	501		50	1390	2090	1160	1740	932	1400

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3320	5000	3000	4520	2640	3970	10.8	31.3	10.7	30.4	10.6	29.5
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	85.4		77.2		67.8	
2560	3840	2320	3470	2030	3050	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	27000	1040	24100	923	20800	796
981	1470	794	1190	697	1050	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.49		3.47		3.43	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
665	999	590	887	509	765	5.10		5.10		5.10	

[c] Shape is slender for compression with F_y = 65 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
655[h]		593[h]		503[h]		lb/ft		655[h]		593[h]		503[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
7510	11300	6770	10200	5760	8660	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	9990	15000	8950	13500	7520	11300
7270	10900	6550	9840	5560	8360		6	9990	15000	8950	13500	7520	11300
7180	10800	6470	9720	5490	8250		7	9990	15000	8950	13500	7520	11300
7080	10600	6370	9580	5410	8130		8	9990	15000	8950	13500	7520	11300
6970	10500	6270	9430	5320	7990		9	9990	15000	8950	13500	7520	11300
6850	10300	6160	9260	5220	7840		10	9990	15000	8950	13500	7520	11300
6720	10100	6040	9080	5110	7680		11	9990	15000	8950	13500	7520	11300
6580	9890	5910	8880	5000	7510		12	9990	15000	8930	13400	7480	11200
6430	9670	5770	8670	4870	7330		13	9890	14900	8840	13300	7390	11100
6270	9430	5620	8450	4750	7130		14	9790	14700	8740	13100	7300	11000
6110	9180	5470	8220	4610	6930		15	9700	14600	8650	13000	7200	10800
5940	8920	5310	7990	4470	6720		16	9600	14400	8550	12900	7110	10700
5760	8660	5150	7740	4330	6510		17	9510	14300	8460	12700	7020	10500
5580	8380	4980	7490	4180	6280		18	9410	14100	8370	12600	6920	10400
5390	8100	4810	7230	4030	6060		19	9320	14000	8270	12400	6830	10300
5200	7820	4640	6970	3880	5830		20	9220	13900	8180	12300	6740	10100
4820	7240	4280	6430	3570	5360		22	9030	13600	7990	12000	6550	9850
4430	6650	3920	5900	3260	4900		24	8840	13300	7800	11700	6370	9570
4040	6070	3570	5360	2950	4440		26	8650	13000	7610	11400	6180	9290
3660	5490	3220	4840	2650	3990		28	8450	12700	7420	11200	6000	9010
3290	4940	2890	4340	2370	3550		30	8260	12400	7240	10900	5810	8730
2930	4410	2560	3850	2090	3140		32	8070	12100	7050	10600	5620	8450
2600	3900	2270	3410	1850	2780		34	7880	11800	6860	10300	5440	8170
2320	3480	2020	3040	1650	2480		36	7690	11600	6670	10000	5250	7890
2080	3120	1820	2730	1480	2230		38	7500	11300	6480	9740	5070	7620
1880	2820	1640	2460	1340	2010		40	7310	11000	6290	9460	4880	7340
1700	2560	1490	2230	1210	1820		42	7110	10700	6110	9180	4700	7060
1550	2330	1350	2040	1100	1660		44	6920	10400	5920	8900	4510	6780
1420	2130	1240	1860	1010	1520		46	6730	10100	5730	8610	4280	6430
1300	1960	1140	1710	928	1390		48	6540	9830	5540	8330	4070	6110
1200	1800	1050	1580	855	1290		50	6350	9540	5350	8050	3880	5830

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
7510	11300	6770	10200	5760	8660	12.0	54.9	11.8	50.4	11.5	44.2
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	193		174		148	
5790	8690	5220	7830	4440	6660	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	56500	2870	50400	2520	41600	2040
2230	3350	2000	3000	1690	2530	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.86		3.80		3.72	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1760	2640	1560	2340	1280	1920	4.43		4.47		4.52	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
431[h]		397[h]		392[h]		lb/ft		431[h]		397[h]		392[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4940	7430	4550	6840	4510	6790	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	6360	9560	5840	8780	5550	8340
4760	7160	4390	6590	4210	6320		6	6360	9560	5840	8780	5550	8340
4700	7060	4330	6510	4100	6160		7	6360	9560	5840	8780	5550	8340
4630	6960	4260	6410	3980	5980		8	6360	9560	5840	8780	5550	8340
4550	6840	4190	6300	3850	5790		9	6360	9560	5840	8780	5460	8210
4460	6700	4110	6170	3710	5580		10	6360	9560	5840	8780	5360	8060
4370	6560	4020	6040	3560	5350		11	6360	9560	5840	8780	5260	7910
4260	6410	3920	5900	3400	5110		12	6300	9460	5780	8680	5160	7760
4160	6250	3820	5750	3240	4870		13	6210	9330	5690	8550	5060	7610
4040	6070	3720	5590	3070	4620		14	6120	9200	5610	8420	4960	7460
3920	5900	3610	5420	2900	4360		15	6030	9060	5520	8300	4860	7310
3800	5710	3500	5250	2730	4100		16	5940	8930	5430	8170	4760	7160
3670	5520	3380	5080	2560	3850		17	5850	8800	5350	8040	4660	7010
3540	5330	3260	4900	2390	3590		18	5760	8660	5260	7910	4560	6850
3410	5130	3140	4710	2220	3340		19	5680	8530	5180	7780	4460	6700
3280	4930	3010	4530	2060	3090		20	5590	8400	5090	7650	4360	6550
3010	4520	2760	4150	1740	2620		22	5410	8130	4920	7390	4160	6250
2740	4110	2510	3780	1470	2200		24	5230	7870	4750	7140	3960	5950
2470	3710	2270	3400	1250	1880		26	5060	7600	4580	6880	3760	5650
2210	3320	2030	3050	1080	1620		28	4880	7330	4410	6620	3560	5350
1960	2950	1800	2700	938	1410		30	4700	7070	4240	6370	3360	5040
1720	2590	1580	2380	824	1240		32	4520	6800	4060	6110	3120	4690
1530	2300	1400	2100	730	1100		34	4350	6530	3890	5850	2900	4360
1360	2050	1250	1880	651	979		36	4170	6270	3720	5590	2710	4070
1220	1840	1120	1680	584	878		38	3990	6000	3550	5340	2540	3810
1100	1660	1010	1520	527	793		40	3810	5720	3320	4990	2390	3590
1000	1500	917	1380	478	719		42	3580	5370	3110	4680	2260	3390
912	1370	836	1260	436	655		44	3370	5070	2930	4410	2140	3220
835	1250	765	1150				46	3190	4800	2770	4170	2040	3060
767	1150	702	1060				48	3030	4550	2630	3950	1940	2920
706	1060	647	973				50	2880	4330	2500	3760	1850	2790
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4940	7430	4550	6840	4510	6790			11.3	39.8	11.3	38.1	8.18	30.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			127		117		116	
3810	5720	3510	5270	3480	5220			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			34800	1690	32000	1540	29900	803
1440	2160	1300	1950	1540	2300			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.65		3.64		2.64	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
1060	1600	973	1460	675	1010			4.55		4.56		6.10	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
372[h]		362[h]		331[h]		lb/ft		372[h]		362[h]		331[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4280	6440	4130	6200	3800	5720	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	5450	8190	5320	8000	4640	6970
4120	6190	3970	5970	3530	5300		6	5450	8190	5320	8000	4640	6970
4070	6110	3920	5890	3440	5160		7	5450	8190	5320	8000	4640	6970
4000	6010	3860	5800	3330	5010		8	5450	8190	5320	8000	4630	6970
3930	5910	3790	5690	3220	4830		9	5450	8190	5320	8000	4540	6820
3850	5790	3710	5580	3090	4650		10	5450	8190	5320	8000	4440	6680
3770	5660	3630	5460	2960	4450		11	5450	8190	5320	8000	4350	6530
3680	5530	3540	5330	2820	4240		12	5380	8080	5250	7890	4250	6390
3580	5380	3450	5190	2680	4030		13	5290	7960	5170	7760	4150	6240
3480	5230	3350	5040	2530	3810		14	5210	7830	5080	7640	4060	6100
3380	5070	3250	4890	2390	3590		15	5130	7700	5000	7510	3960	5950
3270	4910	3150	4730	2240	3360		16	5040	7580	4910	7390	3860	5810
3160	4740	3040	4570	2090	3140		17	4960	7450	4830	7260	3770	5660
3040	4570	2930	4400	1940	2920		18	4870	7320	4750	7140	3670	5520
2920	4400	2820	4240	1800	2700		19	4790	7200	4660	7010	3580	5370
2810	4220	2700	4060	1660	2490		20	4700	7070	4580	6880	3480	5230
2570	3860	2470	3720	1390	2090		22	4540	6820	4410	6630	3290	4940
2330	3500	2250	3370	1170	1760		24	4370	6560	4250	6380	3090	4650
2100	3150	2020	3040	996	1500		26	4200	6310	4080	6130	2900	4360
1870	2810	1800	2710	859	1290		28	4030	6060	3910	5880	2690	4050
1650	2490	1590	2390	748	1120		30	3860	5810	3740	5630	2460	3690
1450	2180	1400	2100	658	989		32	3690	5550	3580	5380	2260	3400
1290	1930	1240	1860	583	876		34	3530	5300	3410	5130	2090	3140
1150	1730	1110	1660	520	781		36	3360	5050	3240	4870	1950	2930
1030	1550	993	1490	466	701		38	3140	4710	3020	4530	1820	2740
930	1400	896	1350	421	633		40	2930	4400	2810	4230	1710	2570
844	1270	813	1220	382	574		42	2740	4120	2640	3960	1620	2430
769	1160	741	1110				44	2580	3880	2480	3730	1530	2300
703	1060	678	1020				46	2440	3660	2340	3520	1450	2180
646	971	622	935				48	2310	3470	2220	3330	1380	2080
595	895	574	862				50	2190	3300	2110	3170	1320	1980
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4280	6440	4130	6200	3800	5720			11.2	36.5	11.2	36.2	7.96	27.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			110		106		97.7	
3300	4950	3180	4770	2930	4400			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			29600	1420	28900	1380	24700	644
1220	1840	1180	1770	1290	1940			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.60		3.60		2.57	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
898	1350	876	1320	550	827			4.58		4.58		6.19	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
327[h]		324[c]		297[c]		lb/ft		327[h]		324		297	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3730	5610	3630	5460	3270	4910	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4570	6870	4740	7120	4310	6480
3470	5210	3510	5280	3160	4740		6	4570	6870	4740	7120	4310	6480
3370	5070	3470	5220	3120	4690		7	4570	6870	4740	7120	4310	6480
3270	4920	3420	5150	3070	4620		8	4570	6870	4740	7120	4310	6480
3160	4750	3370	5060	3020	4550		9	4480	6730	4740	7120	4310	6480
3040	4570	3310	4980	2970	4460		10	4380	6590	4740	7120	4310	6480
2910	4370	3250	4880	2910	4380		11	4290	6450	4740	7120	4310	6480
2780	4170	3180	4770	2850	4280		12	4190	6300	4660	7010	4240	6370
2640	3960	3100	4650	2780	4180		13	4100	6160	4580	6890	4160	6250
2490	3750	3010	4520	2710	4070		14	4010	6020	4510	6770	4080	6140
2350	3530	2920	4380	2640	3960		15	3910	5880	4430	6650	4010	6030
2200	3310	2820	4240	2560	3850		16	3820	5740	4350	6540	3930	5910
2060	3100	2720	4090	2480	3720		17	3720	5590	4270	6420	3860	5800
1920	2880	2620	3940	2390	3580		18	3630	5450	4190	6300	3780	5690
1780	2670	2520	3790	2290	3440		19	3530	5310	4110	6180	3710	5570
1640	2460	2420	3640	2200	3300		20	3440	5170	4030	6060	3630	5460
1380	2070	2210	3320	2000	3010		22	3250	4880	3870	5820	3480	5230
1160	1740	2010	3010	1810	2720		24	3060	4600	3720	5590	3330	5000
986	1480	1800	2710	1620	2440		26	2870	4310	3560	5350	3180	4780
850	1280	1610	2410	1440	2170		28	2660	4000	3400	5110	3030	4550
740	1110	1420	2130	1270	1910		30	2430	3650	3240	4870	2880	4320
651	978	1250	1870	1120	1680		32	2230	3360	3080	4640	2730	4100
576	866	1100	1660	988	1480		34	2070	3110	2930	4400	2530	3800
514	773	984	1480	881	1320		36	1920	2890	2700	4060	2320	3490
461	694	883	1330	791	1190		38	1800	2710	2500	3760	2150	3220
416	626	797	1200	714	1070		40	1690	2540	2330	3500	1990	3000
378	568	723	1090	647	973		42	1600	2400	2180	3270	1860	2800
		659	990	590	887		44	1510	2270	2050	3070	1740	2620
		603	906	540	811		46	1430	2150	1930	2900	1640	2470
		553	832	496	745		48	1360	2050	1820	2740	1550	2330
		510	766	457	687		50	1300	1960	1730	2600	1470	2210

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3730	5610	3710	5580	3400	5110	7.99	27.5	11.1	34.3	11.0	32.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	95.9		95.3		87.3	
2880	4320	2860	4290	2620	3930	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	24500	640	25600	1220	23200	1090
1250	1880	1050	1570	962	1440	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.58		3.58		3.54	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
545	819	775	1170	697	1050	6.20		4.58		4.60	

[c] Shape is slender for compression with F_y = 65 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
294[c]		278[c]		277[c]		lb/ft		294		278		277	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3330	5010	3150	4740	2970	4470	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4120	6190	3860	5800	4050	6090
3110	4670	2950	4430	2870	4320		6	4120	6190	3860	5800	4050	6090
3030	4550	2880	4330	2840	4270		7	4120	6190	3860	5800	4050	6090
2930	4410	2790	4190	2800	4210		8	4110	6180	3840	5780	4050	6090
2830	4250	2690	4040	2760	4140		9	4020	6040	3750	5640	4050	6090
2720	4090	2580	3880	2710	4070		10	3930	5900	3670	5510	4050	6090
2600	3910	2470	3710	2650	3990		11	3830	5760	3580	5380	4050	6090
2480	3720	2350	3530	2600	3900		12	3740	5620	3490	5240	3990	5990
2350	3530	2230	3340	2540	3810		13	3650	5490	3400	5110	3920	5890
2220	3340	2100	3160	2470	3720		14	3560	5350	3310	4980	3840	5780
2090	3140	1970	2960	2410	3620		15	3470	5210	3220	4840	3770	5670
1960	2940	1840	2770	2340	3510		16	3370	5070	3130	4710	3700	5560
1830	2740	1720	2580	2270	3410		17	3280	4930	3050	4580	3630	5450
1700	2550	1590	2390	2190	3300		18	3190	4790	2960	4440	3550	5340
1570	2360	1470	2210	2120	3180		19	3100	4660	2870	4310	3480	5230
1450	2170	1350	2030	2040	3070		20	3010	4520	2780	4180	3410	5130
1210	1820	1130	1690	1890	2840		22	2820	4240	2600	3910	3270	4910
1020	1530	947	1420	1710	2580		24	2640	3960	2430	3650	3120	4690
865	1300	807	1210	1540	2320		26	2450	3690	2220	3330	2980	4470
746	1120	696	1050	1370	2060		28	2210	3320	2000	3000	2830	4260
650	977	606	911	1210	1820		30	2010	3020	1810	2730	2690	4040
571	859	533	801	1060	1600		32	1850	2770	1660	2500	2540	3820
506	761	472	709	943	1420		34	1710	2560	1530	2300	2340	3520
451	679	421	633	841	1260		36	1580	2380	1420	2140	2150	3220
405	609	378	568	755	1130		38	1480	2220	1330	2000	1980	2970
366	550	341	512	681	1020		40	1390	2090	1250	1870	1840	2760
332	499	309	465	618	929		42	1310	1970	1170	1760	1710	2570
				563	846		44	1240	1860	1110	1670	1600	2410
				515	774		46	1170	1760	1050	1580	1510	2260
				473	711		48	1120	1680	998	1500	1420	2140
				436	655		50	1060	1600	951	1430	1340	2020

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3360	5040	3200	4810	3170	4770	7.90	26.0	7.81	25.2	11.1	32.6
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	86.2		82.3		81.5	
2590	3880	2470	3700	2450	3670	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	21900	562	20500	521	21900	1040
1110	1670	1080	1610	857	1290	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.55		2.52		3.58	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
485	729	452	679	662	995	6.24		6.27		4.58	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
264[c]		249[c]		235[c]		lb/ft		264		249		235	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2910	4370	2620	3940	2490	3740	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3670	5510	3630	5460	3280	4920
2720	4090	2530	3800	2330	3510		6	3670	5510	3630	5460	3280	4920
2660	3990	2500	3750	2280	3420		7	3670	5510	3630	5460	3280	4920
2580	3880	2460	3700	2220	3330		8	3650	5480	3630	5460	3270	4910
2500	3760	2420	3640	2150	3230		9	3560	5350	3630	5460	3180	4790
2420	3640	2380	3580	2080	3120		10	3480	5220	3630	5460	3100	4670
2320	3490	2330	3500	2000	3000		11	3390	5090	3630	5460	3020	4550
2210	3320	2280	3430	1920	2880		12	3300	4960	3570	5360	2940	4420
2090	3150	2230	3350	1830	2750		13	3220	4840	3500	5260	2860	4300
1970	2970	2170	3260	1740	2620		14	3130	4710	3430	5160	2780	4180
1850	2790	2110	3170	1650	2490		15	3040	4580	3360	5060	2700	4060
1740	2610	2050	3080	1560	2350		16	2960	4450	3300	4950	2620	3940
1620	2430	1990	2980	1460	2190		17	2870	4320	3230	4850	2540	3820
1500	2250	1920	2890	1350	2030		18	2790	4190	3160	4750	2460	3700
1380	2080	1850	2790	1250	1880		19	2700	4060	3090	4650	2380	3580
1270	1910	1790	2680	1150	1730		20	2610	3930	3030	4550	2300	3460
1060	1590	1650	2480	961	1450		22	2440	3670	2890	4350	2140	3210
891	1340	1510	2270	808	1210		24	2270	3410	2760	4150	1970	2960
759	1140	1370	2060	688	1030		26	2050	3080	2620	3940	1740	2620
654	984	1220	1840	594	892		28	1840	2760	2490	3740	1560	2350
570	857	1070	1610	517	777		30	1670	2510	2350	3540	1410	2120
501	753	944	1420	454	683		32	1530	2300	2190	3300	1290	1940
444	667	836	1260	403	605		34	1410	2120	1990	2990	1180	1780
396	595	746	1120	359	540		36	1310	1960	1820	2740	1100	1650
355	534	670	1010	322	484		38	1220	1830	1680	2520	1020	1530
321	482	604	908	291	437		40	1140	1710	1550	2330	953	1430
291	437	548	824	264	396		42	1070	1610	1440	2170	895	1350
		499	751				44	1010	1520	1350	2030	844	1270
		457	687				46	959	1440	1270	1900	798	1200
		420	631				48	911	1370	1190	1790	757	1140
		387	581				50	867	1300	1130	1690	720	1080

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3010	4530	2860	4300	2690	4040	7.81	24.7	11.0	31.5	7.87	23.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	77.4		73.5		69.1	
2320	3480	2210	3310	2070	3110	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	19400	493	19600	926	17400	444
998	1500	768	1150	857	1290	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.52		3.55		2.54	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
428	644	590	887	383	575	6.27		4.59		6.26	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
215[c]		211[c]		199[c]		lb/ft		215[v]		211		199[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2190	3290	2170	3270	2010	3010	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3130	4700	2940	4420	2820	4240
2110	3180	2030	3060	1930	2910		6	3130	4700	2940	4420	2820	4240
2090	3140	1980	2980	1910	2870		7	3130	4700	2940	4420	2820	4240
2060	3090	1930	2900	1880	2830		8	3130	4700	2920	4390	2820	4240
2020	3040	1870	2810	1850	2780		9	3130	4700	2850	4280	2820	4240
1990	2990	1800	2710	1810	2730		10	3130	4700	2770	4160	2820	4240
1950	2930	1740	2610	1780	2670		11	3120	4700	2690	4050	2800	4210
1900	2860	1660	2500	1730	2610		12	3060	4610	2620	3930	2740	4120
1860	2790	1590	2390	1690	2540		13	3000	4510	2540	3820	2690	4040
1810	2720	1510	2270	1650	2470		14	2940	4420	2470	3710	2630	3950
1760	2650	1430	2150	1600	2400		15	2880	4330	2390	3590	2570	3870
1710	2570	1350	2030	1550	2330		16	2820	4240	2310	3480	2520	3780
1660	2490	1270	1910	1500	2250		17	2760	4150	2240	3360	2460	3690
1600	2400	1190	1790	1450	2180		18	2700	4060	2160	3250	2400	3610
1540	2320	1100	1660	1400	2100		19	2640	3970	2090	3140	2340	3520
1490	2240	1010	1520	1340	2020		20	2580	3880	2010	3020	2290	3440
1370	2060	844	1270	1230	1850		22	2460	3700	1860	2790	2170	3270
1260	1890	709	1070	1130	1690		24	2340	3510	1660	2500	2060	3090
1140	1710	604	908	1020	1530		26	2220	3330	1470	2200	1940	2920
1030	1550	521	783	914	1370		28	2100	3150	1310	1970	1830	2750
919	1380	454	682	812	1220		30	1980	2970	1180	1770	1690	2540
811	1220	399	599	713	1070		32	1790	2690	1070	1610	1510	2270
719	1080	353	531	632	950		34	1620	2430	985	1480	1370	2050
641	963	315	474	564	847		36	1470	2220	909	1370	1240	1870
575	865	283	425	506	760		38	1350	2030	844	1270	1140	1710
519	780	255	384	457	686		40	1250	1880	787	1180	1050	1570
471	708			414	622		42	1160	1740	738	1110	969	1460
429	645			377	567		44	1080	1620	694	1040	901	1350
393	590			345	519		46	1010	1520	656	986	841	1260
361	542			317	477		48	947	1420	621	934	788	1190
332	499			292	439		50	892	1340	590	887	742	1110

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2470	3710	2420	3630	2290	3440	11.0	30.4	7.78	23.0	10.7	29.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	63.5		62.1		58.8	
1910	2860	1860	2790	1760	2650	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	16700	803	15500	390	14900	695
592	890	768	1150	587	883	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.54		2.51		3.45	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
506	761	341	512	444	668	4.58		6.29		4.64	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W40×						Shape		W40×					
183[c]		167[c]		149[c]		lb/ft		183[v]		167[v]		149[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1790	2690	1640	2460	1420	2130	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2510	3770	2250	3380	1940	2920
1670	2510	1520	2290	1310	1970		6	2510	3770	2250	3380	1940	2920
1630	2450	1480	2230	1270	1910		7	2510	3770	2250	3380	1940	2920
1590	2380	1440	2160	1230	1850		8	2490	3740	2210	3320	1890	2840
1540	2310	1390	2090	1190	1780		9	2420	3640	2150	3230	1830	2750
1480	2230	1340	2010	1140	1710		10	2350	3540	2080	3130	1770	2660
1420	2140	1280	1930	1090	1640		11	2290	3440	2020	3040	1710	2570
1360	2050	1220	1840	1040	1560		12	2220	3330	1960	2940	1650	2480
1300	1950	1160	1750	981	1470		13	2150	3230	1890	2840	1590	2390
1240	1860	1100	1660	925	1390		14	2080	3130	1830	2750	1530	2310
1170	1760	1040	1560	869	1310		15	2010	3030	1760	2650	1480	2220
1100	1660	978	1470	813	1220		16	1950	2920	1700	2550	1420	2130
1040	1560	916	1380	757	1140		17	1880	2820	1640	2460	1360	2040
970	1460	854	1280	702	1060		18	1810	2720	1570	2360	1300	1950
905	1360	793	1190	648	974		19	1740	2620	1510	2270	1240	1860
841	1260	733	1100	595	894		20	1670	2510	1440	2170	1180	1780
713	1070	612	920	495	745		22	1540	2310	1280	1930	1010	1510
599	900	515	773	416	626		24	1330	2000	1110	1660	866	1300
510	767	438	659	355	533		26	1170	1750	967	1450	755	1140
440	661	378	568	306	460		28	1040	1560	857	1290	667	1000
383	576	329	495	266	400		30	929	1400	767	1150	595	895
337	506	289	435	234	352		32	842	1270	693	1040	537	806
298	448	256	385	207	312		34	769	1160	631	949	487	733
266	400	229	344	185	278		36	707	1060	579	870	446	670
239	359	205	309	166	250		38	654	982	535	803	411	617
216	324	185	278				40	608	914	496	746	380	572
							42	568	854	463	695	354	532
							44	533	801	433	651	331	497
							46	502	754	407	612	310	466
							48	474	713	384	578	292	439
							50	449	676	364	547	276	415

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2070	3120	1920	2880	1700	2560	7.71	22.1	7.44	21.3	7.09	20.3
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	53.3		49.3		43.8	
1600	2400	1480	2220	1310	1970	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	13200	331	11600	283	9800	229
592	890	586	881	556	835	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.49		2.40		2.29	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
286	430	247	371	201	303	6.31		6.38		6.55	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
925[h]		853[h]		802[h]		lb/ft		925[h]		853[h]		802[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
10600	15900	9770	14700	9190	13800	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	13400	20100	12700	19100	11900	17800
10300	15500	9510	14300	8930	13400		6	13400	20100	12700	19100	11900	17800
10200	15300	9420	14200	8850	13300		7	13400	20100	12700	19100	11900	17800
10100	15200	9310	14000	8740	13100		8	13400	20100	12700	19100	11900	17800
9960	15000	9200	13800	8630	13000		9	13400	20100	12700	19100	11900	17800
9820	14800	9070	13600	8510	12800		10	13400	20100	12700	19100	11900	17800
9660	14500	8920	13400	8370	12600		11	13400	20100	12700	19100	11900	17800
9500	14300	8770	13200	8220	12400		12	13400	20100	12700	19100	11900	17800
9320	14000	8610	12900	8070	12100		13	13400	20100	12700	19100	11900	17800
9130	13700	8440	12700	7900	11900		14	13300	20000	12700	19000	11800	17700
8930	13400	8260	12400	7730	11600		15	13200	19900	12600	18900	11700	17600
8730	13100	8070	12100	7540	11300		16	13200	19800	12500	18800	11600	17500
8510	12800	7870	11800	7360	11100		17	13100	19700	12400	18600	11500	17400
8290	12500	7670	11500	7160	10800		18	13000	19500	12300	18500	11500	17200
8060	12100	7460	11200	6960	10500		19	12900	19400	12200	18400	11400	17100
7830	11800	7250	10900	6750	10200		20	12800	19300	12200	18300	11300	17000
7350	11000	6800	10200	6330	9520		22	12700	19000	12000	18000	11100	16700
6860	10300	6350	9550	5900	8870		24	12500	18800	11800	17800	11000	16500
6360	9560	5900	8860	5460	8210		26	12300	18600	11700	17500	10800	16200
5860	8810	5440	8170	5030	7560		28	12200	18300	11500	17300	10600	16000
5370	8070	4990	7500	4600	6910		30	12000	18100	11300	17000	10500	15700
4890	7350	4550	6830	4180	6280		32	11800	17800	11200	16800	10300	15500
4430	6650	4120	6190	3780	5680		34	11700	17600	11000	16500	10100	15300
3980	5980	3700	5570	3380	5090		36	11500	17300	10800	16300	9980	15000
3570	5360	3320	5000	3040	4570		38	11400	17100	10700	16000	9820	14800
3220	4840	3000	4510	2740	4120		40	11200	16800	10500	15800	9650	14500
2920	4390	2720	4090	2490	3740		42	11000	16600	10300	15500	9490	14300
2660	4000	2480	3730	2270	3410		44	10900	16300	10200	15300	9320	14000
2430	3660	2270	3410	2070	3120		46	10700	16100	10000	15000	9160	13800
2240	3360	2080	3130	1900	2860		48	10500	15800	9830	14800	8990	13500
2060	3100	1920	2890	1750	2640		50	10400	15600	9670	14500	8830	13300

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
10600	15900	9770	14700	9190	13800	13.2	82.5	13.3	77.6	13.1	73.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	272		251		236	
8160	12200	7530	11300	7080	10600	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	73000	4940	70000	4600	64800	4210
3380	5080	2820	4240	2640	3950	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.26		4.28		4.22	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
2760	4140	2610	3920	2410	3630	3.85		3.90		3.93	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
723[h]		652[h]		529[h]		lb/ft		723[h]		652[h]		529[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
8290	12500	7470	11200	6070	9130	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	10600	15900	9440	14200	7560	11400
8060	12100	7260	10900	5890	8850		6	10600	15900	9440	14200	7560	11400
7980	12000	7180	10800	5820	8750		7	10600	15900	9440	14200	7560	11400
7880	11800	7090	10700	5750	8640		8	10600	15900	9440	14200	7560	11400
7780	11700	7000	10500	5670	8520		9	10600	15900	9440	14200	7560	11400
7660	11500	6890	10400	5570	8380		10	10600	15900	9440	14200	7560	11400
7540	11300	6770	10200	5470	8230		11	10600	15900	9440	14200	7560	11400
7400	11100	6650	9990	5370	8070		12	10600	15900	9440	14200	7560	11400
7260	10900	6510	9790	5250	7900		13	10600	15900	9410	14200	7510	11300
7110	10700	6370	9580	5130	7720		14	10500	15800	9330	14000	7430	11200
6940	10400	6220	9350	5010	7530		15	10400	15700	9250	13900	7350	11000
6780	10200	6070	9120	4880	7330		16	10400	15600	9170	13800	7270	10900
6600	9930	5910	8880	4740	7130		17	10300	15400	9090	13700	7190	10800
6420	9660	5740	8630	4600	6920		18	10200	15300	9010	13500	7120	10700
6240	9380	5570	8370	4460	6700		19	10100	15200	8930	13400	7040	10600
6050	9090	5400	8110	4310	6480		20	10000	15100	8850	13300	6960	10500
5660	8510	5040	7570	4010	6030		22	9860	14800	8690	13100	6800	10200
5270	7920	4680	7030	3710	5580		24	9700	14600	8530	12800	6640	9980
4870	7320	4310	6480	3410	5120		26	9540	14300	8370	12600	6480	9750
4470	6720	3950	5930	3100	4670		28	9370	14100	8210	12300	6330	9510
4080	6140	3590	5400	2810	4230		30	9210	13800	8050	12100	6170	9270
3700	5570	3250	4880	2530	3800		32	9050	13600	7890	11900	6010	9030
3340	5020	2920	4380	2250	3390		34	8880	13400	7730	11600	5850	8800
2980	4480	2600	3910	2010	3020		36	8720	13100	7570	11400	5700	8560
2680	4020	2330	3510	1800	2710		38	8560	12900	7410	11100	5540	8320
2420	3630	2110	3160	1630	2450		40	8390	12600	7250	10900	5380	8090
2190	3290	1910	2870	1480	2220		42	8230	12400	7090	10700	5220	7850
2000	3000	1740	2620	1350	2020		44	8070	12100	6930	10400	5060	7610
1830	2750	1590	2390	1230	1850		46	7900	11900	6770	10200	4910	7370
1680	2520	1460	2200	1130	1700		48	7740	11600	6610	9940	4750	7140
1550	2320	1350	2030	1040	1570		50	7580	11400	6450	9700	4590	6900
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
8290	12500	7470	11200	6070	9130			12.9	66.6	12.7	60.8	12.4	50.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			213		192		156	
6390	9590	5760	8640	4680	7020			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			57300	3700	50600	3230	39600	2490
2360	3540	2110	3160	1670	2500			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								4.17		4.10		4.00	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
2130	3210	1880	2830	1470	2210			3.93		3.95		4.00	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
487[h]		441[h]		395[h]		lb/ft		487[h]		441[h]		395[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
5570	8370	5060	7610	4510	6790	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	6910	10400	6200	9310	5550	8340
5390	8110	4900	7370	4370	6570		6	6910	10400	6200	9310	5550	8340
5330	8020	4840	7280	4320	6490		7	6910	10400	6200	9310	5550	8340
5260	7910	4780	7180	4260	6400		8	6910	10400	6200	9310	5550	8340
5190	7790	4710	7080	4190	6300		9	6910	10400	6200	9310	5550	8340
5100	7670	4630	6960	4120	6200		10	6910	10400	6200	9310	5550	8340
5010	7530	4540	6830	4040	6080		11	6910	10400	6200	9310	5550	8340
4910	7380	4450	6690	3960	5950		12	6910	10400	6200	9310	5550	8340
4800	7220	4350	6540	3870	5820		13	6850	10300	6130	9210	5470	8230
4690	7050	4250	6390	3780	5680		14	6770	10200	6050	9100	5400	8120
4570	6870	4140	6220	3680	5530		15	6700	10100	5980	8990	5330	8010
4450	6690	4030	6050	3580	5380		16	6620	9950	5900	8870	5250	7890
4320	6500	3910	5880	3470	5220		17	6540	9830	5830	8760	5180	7780
4190	6300	3790	5700	3360	5050		18	6460	9720	5750	8650	5100	7670
4060	6100	3670	5510	3250	4890		19	6390	9600	5680	8530	5030	7560
3930	5900	3540	5330	3140	4720		20	6310	9480	5600	8420	4960	7450
3650	5480	3290	4940	2910	4370		22	6150	9250	5450	8190	4810	7230
3370	5060	3030	4550	2670	4020		24	6000	9020	5300	7970	4660	7010
3090	4640	2770	4160	2440	3670		26	5840	8780	5150	7740	4510	6780
2810	4220	2520	3780	2210	3330		28	5690	8550	5000	7510	4370	6560
2540	3810	2270	3410	1990	2990		30	5530	8320	4850	7280	4220	6340
2280	3420	2030	3050	1780	2670		32	5380	8080	4700	7060	4070	6120
2020	3040	1800	2710	1580	2370		34	5220	7850	4540	6830	3920	5900
1810	2710	1610	2420	1410	2110		36	5070	7620	4390	6600	3780	5670
1620	2440	1440	2170	1260	1900		38	4910	7380	4240	6380	3630	5450
1460	2200	1300	1960	1140	1710		40	4760	7150	4090	6150	3480	5230
1330	1990	1180	1780	1030	1550		42	4600	6920	3940	5920	3310	4970
1210	1820	1080	1620	942	1420		44	4450	6680	3790	5700	3120	4690
1110	1660	985	1480	861	1290		46	4290	6450	3600	5410	2950	4430
1020	1530	905	1360	791	1190		48	4130	6200	3420	5140	2800	4200
936	1410	834	1250	729	1100		50	3930	5910	3260	4890	2660	4000

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
5570	8370	5060	7610	4510	6790	12.3	47.8	12.1	44.6	12.0	41.3
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	143		130		116	
4290	6440	3900	5850	3480	5220	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	36000	2250	32100	1990	28500	1750
1530	2300	1380	2060	1220	1830	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.96		3.92		3.88	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1340	2010	1190	1790	1050	1580	3.99		4.01		4.05	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
387[h]		361[h]		350[h]		lb/ft		387[h]		361[h]		350[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4440	6670	4130	6200	4010	6030	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	5220	7850	5030	7560	4670	7020
4160	6260	3990	6000	3760	5650		6	5220	7850	5030	7560	4670	7020
4070	6110	3940	5930	3670	5510		7	5220	7850	5030	7560	4670	7020
3960	5950	3890	5850	3570	5370		8	5220	7850	5030	7560	4670	7020
3840	5780	3830	5750	3460	5200		9	5190	7800	5030	7560	4630	6960
3720	5590	3760	5650	3350	5030		10	5100	7670	5030	7560	4550	6840
3580	5380	3690	5550	3220	4840		11	5020	7540	5030	7560	4460	6710
3440	5170	3610	5430	3090	4640		12	4930	7410	5020	7550	4380	6590
3290	4940	3530	5310	2950	4440		13	4850	7280	4950	7440	4300	6460
3140	4710	3440	5170	2810	4230		14	4760	7150	4880	7330	4220	6340
2980	4480	3350	5040	2670	4010		15	4670	7020	4810	7230	4130	6210
2820	4240	3260	4900	2520	3790		16	4590	6890	4740	7120	4050	6090
2660	4000	3160	4750	2380	3570		17	4500	6770	4670	7010	3970	5960
2500	3760	3060	4600	2230	3350		18	4420	6640	4590	6900	3880	5840
2340	3520	2960	4440	2090	3130		19	4330	6510	4520	6800	3800	5710
2180	3280	2850	4290	1940	2920		20	4240	6380	4450	6690	3720	5590
1880	2830	2640	3970	1670	2510		22	4070	6120	4310	6470	3550	5340
1600	2400	2420	3640	1410	2120		24	3900	5860	4170	6260	3390	5090
1360	2040	2210	3320	1200	1810		26	3730	5600	4020	6050	3220	4840
1170	1760	2000	3010	1040	1560		28	3560	5350	3880	5830	3060	4590
1020	1540	1800	2700	903	1360		30	3380	5090	3740	5620	2890	4340
898	1350	1600	2410	794	1190		32	3210	4830	3590	5400	2710	4070
796	1200	1420	2130	703	1060		34	3030	4550	3450	5190	2510	3770
710	1070	1270	1900	627	943		36	2830	4250	3310	4970	2340	3520
637	957	1140	1710	563	846		38	2650	3980	3160	4760	2190	3300
575	864	1030	1540	508	764		40	2500	3750	3000	4510	2060	3100
521	784	930	1400	461	693		42	2360	3550	2810	4230	1950	2930
475	714	847	1270	420	631		44	2240	3360	2650	3980	1850	2770
435	653	775	1160				46	2130	3200	2500	3750	1750	2640
		712	1070				48	2030	3050	2370	3560	1670	2510
		656	986				50	1940	2910	2250	3380	1600	2400
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4440	6670	4130	6200	4010	6030			8.61	33.5	11.9	39.4	8.52	31.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			114		106		103	
3420	5130	3180	4770	3090	4640			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			26500	882	25700	1570	23600	780
1440	2170	1110	1660	1300	1960			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.78		3.85		2.75	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
721	1080	950	1430	644	967			5.47		4.05		5.49	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
330		318[h]		302[c]		lb/ft		330		318[h]		302	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3770	5670	3640	5460	3410	5120	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4570	6870	4220	6340	4150	6240
3650	5480	3400	5110	3310	4970		6	4570	6870	4220	6340	4150	6240
3600	5420	3320	4980	3270	4910		7	4570	6870	4220	6340	4150	6240
3550	5340	3220	4850	3230	4850		8	4570	6870	4220	6340	4150	6240
3500	5260	3120	4690	3180	4790		9	4570	6870	4170	6260	4150	6240
3440	5160	3010	4530	3130	4710		10	4570	6870	4080	6140	4150	6240
3370	5060	2900	4350	3080	4630		11	4570	6870	4000	6020	4150	6240
3300	4960	2770	4170	3020	4540		12	4560	6860	3920	5890	4140	6220
3220	4840	2650	3980	2960	4440		13	4500	6760	3840	5770	4080	6130
3140	4720	2520	3780	2880	4330		14	4430	6650	3760	5650	4010	6030
3060	4600	2380	3580	2800	4220		15	4360	6550	3680	5530	3950	5930
2970	4460	2250	3380	2720	4100		16	4290	6450	3600	5410	3880	5830
2880	4330	2110	3180	2640	3970		17	4220	6340	3520	5290	3820	5740
2790	4190	1980	2970	2560	3840		18	4150	6240	3440	5160	3750	5640
2690	4050	1850	2770	2470	3710		19	4080	6140	3350	5040	3690	5540
2600	3900	1720	2580	2380	3580		20	4020	6040	3270	4920	3620	5440
2400	3610	1470	2200	2200	3310		22	3880	5830	3110	4680	3490	5250
2200	3310	1230	1850	2020	3030		24	3740	5620	2950	4430	3360	5050
2010	3020	1050	1580	1840	2760		26	3600	5420	2790	4190	3230	4860
1810	2730	907	1360	1660	2500		28	3470	5210	2620	3950	3100	4660
1630	2450	790	1190	1490	2240		30	3330	5010	2440	3670	2970	4470
1450	2180	694	1040	1320	1990		32	3190	4800	2240	3370	2840	4270
1280	1930	615	924	1170	1760		34	3060	4590	2080	3120	2710	4080
1140	1720	548	824	1050	1570		36	2920	4390	1940	2910	2580	3880
1030	1540	492	740	939	1410		38	2760	4150	1810	2720	2400	3600
927	1390	444	668	847	1270		40	2570	3870	1700	2560	2230	3350
841	1260	403	606	768	1160		42	2410	3620	1610	2410	2080	3130
766	1150	367	552	700	1050		44	2260	3400	1520	2280	1950	2930
701	1050			641	963		46	2130	3200	1440	2170	1840	2760
644	968			588	884		48	2020	3030	1370	2070	1730	2610
593	892			542	815		50	1910	2880	1310	1970	1640	2470

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3770	5670	3640	5460	3460	5210	11.9	37.5	8.36	29.3	11.8	36.3
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	96.9		93.4		89.0	
2910	4360	2800	4200	2670	4010	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	23300	1420	21200	682	21100	1300
1000	1500	1170	1760	916	1370	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.83		2.70		3.82	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
860	1290	571	858	782	1170	4.05		5.59		4.03	

[c] Shape is slender for compression with F_y = 65 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
286		282[c]		262[c]		lb/ft		286		282		262	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3270	4910	3120	4690	2870	4310	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3760	5660	3860	5800	3570	5360
3050	4580	3030	4550	2780	4180		6	3760	5660	3860	5800	3570	5360
2970	4470	3000	4500	2750	4130		7	3760	5660	3860	5800	3570	5360
2890	4340	2960	4450	2720	4080		8	3760	5660	3860	5800	3570	5360
2800	4210	2920	4390	2680	4020		9	3710	5570	3860	5800	3570	5360
2700	4060	2870	4320	2630	3960		10	3630	5460	3860	5800	3570	5360
2590	3900	2820	4240	2590	3890		11	3550	5340	3860	5800	3570	5360
2480	3730	2770	4160	2540	3810		12	3480	5230	3850	5780	3550	5330
2370	3560	2710	4080	2480	3730		13	3400	5110	3780	5690	3490	5240
2250	3380	2650	3980	2430	3650		14	3320	4990	3720	5590	3430	5150
2130	3200	2590	3890	2370	3560		15	3250	4880	3660	5500	3360	5060
2000	3010	2520	3790	2310	3470		16	3170	4760	3590	5400	3300	4970
1880	2830	2450	3690	2240	3370		17	3090	4650	3530	5310	3240	4880
1760	2650	2370	3570	2180	3270		18	3010	4530	3470	5210	3180	4780
1640	2470	2290	3440	2110	3170		19	2940	4410	3410	5120	3120	4690
1520	2290	2210	3320	2040	3070		20	2860	4300	3340	5030	3060	4600
1300	1950	2040	3070	1880	2830		22	2710	4070	3220	4840	2940	4420
1090	1640	1870	2810	1720	2590		24	2550	3840	3090	4650	2820	4240
930	1400	1700	2560	1560	2350		26	2400	3600	2970	4460	2700	4060
802	1210	1530	2310	1410	2110		28	2230	3350	2840	4270	2580	3870
699	1050	1370	2070	1260	1890		30	2030	3050	2720	4080	2460	3690
614	923	1220	1830	1110	1670		32	1860	2800	2590	3890	2340	3510
544	818	1080	1620	985	1480		34	1720	2590	2460	3700	2210	3330
485	729	964	1450	879	1320		36	1600	2400	2310	3470	2030	3050
436	655	865	1300	789	1190		38	1490	2250	2130	3210	1870	2810
393	591	781	1170	712	1070		40	1400	2110	1980	2970	1730	2600
357	536	708	1060	646	971		42	1320	1990	1850	2770	1610	2420
325	488	645	970	588	884		44	1250	1880	1730	2600	1510	2270
		591	888	538	809		46	1180	1780	1630	2440	1420	2130
		542	815	494	743		48	1130	1690	1530	2300	1330	2000
		500	751	456	685		50	1070	1610	1450	2180	1260	1900
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3270	4910	3230	4850	3000	4520			8.30	27.6	11.8	35.3	11.6	34.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			83.9		82.9		77.2	
2520	3780	2490	3730	2320	3470			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			18900	602	19600	1200	17900	1090
1040	1560	854	1280	806	1210			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.68		3.80		3.76	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
506	761	723	1090	662	995			5.60		4.05		4.07	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
256[c]		247[c]		232[c]		lb/ft		256		247		232	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2870	4320	2660	4000	2520	3790	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3370	5070	3340	5020	3040	4560
2710	4070	2580	3880	2370	3560		6	3370	5070	3340	5020	3040	4560
2650	3980	2550	3830	2320	3490		7	3370	5070	3340	5020	3040	4560
2580	3880	2520	3780	2260	3400		8	3370	5070	3340	5020	3040	4560
2500	3760	2480	3730	2200	3300		9	3310	4980	3340	5020	2970	4470
2410	3620	2440	3670	2130	3190		10	3240	4870	3340	5020	2900	4360
2320	3480	2400	3600	2050	3080		11	3160	4760	3340	5020	2830	4260
2210	3330	2350	3530	1970	2960		12	3090	4640	3320	4980	2760	4150
2110	3170	2300	3460	1890	2840		13	3010	4530	3260	4900	2690	4040
2000	3010	2250	3380	1790	2690		14	2940	4420	3200	4810	2620	3940
1890	2840	2190	3300	1690	2540		15	2860	4310	3140	4720	2550	3830
1780	2670	2140	3210	1590	2390		16	2790	4190	3080	4630	2480	3720
1670	2510	2080	3120	1490	2240		17	2710	4080	3020	4550	2410	3620
1560	2340	2010	3030	1390	2080		18	2640	3970	2970	4460	2340	3510
1450	2180	1950	2930	1290	1940		19	2570	3860	2910	4370	2270	3410
1340	2020	1890	2840	1190	1790		20	2490	3740	2850	4280	2200	3300
1140	1710	1760	2640	1010	1510		22	2340	3520	2730	4110	2050	3090
958	1440	1610	2410	846	1270		24	2190	3290	2620	3930	1910	2870
817	1230	1460	2190	721	1080		26	2040	3070	2500	3760	1740	2610
704	1060	1310	1970	621	934		28	1840	2760	2380	3580	1560	2340
613	922	1170	1760	541	814		30	1670	2510	2270	3410	1410	2120
539	810	1030	1550	476	715		32	1530	2290	2150	3230	1290	1930
477	718	916	1380	421	633		34	1410	2120	2000	3010	1180	1780
426	640	817	1230	376	565		36	1310	1960	1830	2750	1100	1650
382	575	733	1100	337	507		38	1220	1830	1680	2530	1020	1530
345	518	662	994	305	458		40	1140	1710	1560	2340	954	1430
313	470	600	902	276	415		42	1070	1610	1450	2180	896	1350
285	429	547	822				44	1010	1520	1350	2030	844	1270
		500	752				46	960	1440	1270	1910	799	1200
		459	691				48	912	1370	1200	1800	758	1140
		423	636				50	868	1310	1130	1700	721	1080

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2930	4410	2820	4240	2650	3980	8.21	26.1	11.6	33.3	8.12	25.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	75.3		72.5		68.0	
2260	3390	2180	3260	2040	3060	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	16800	528	16700	1010	15000	468
934	1400	763	1150	839	1260	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.65		3.74		2.62	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
444	668	616	926	396	595	5.62		4.06		5.65	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
231[c]		210[c]		194[c]		lb/ft		231		210		194	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2470	3710	2260	3390	2030	3050	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3120	4690	2700	4060	2490	3740
2390	3600	2120	3190	1900	2860		6	3120	4690	2700	4060	2490	3740
2370	3560	2070	3110	1860	2790		7	3120	4690	2700	4060	2490	3740
2340	3510	2020	3030	1810	2720		8	3120	4690	2700	4060	2480	3730
2300	3460	1960	2940	1760	2640		9	3120	4690	2630	3960	2420	3640
2260	3400	1900	2850	1700	2550		10	3120	4690	2570	3860	2360	3540
2220	3340	1830	2750	1640	2460		11	3120	4690	2500	3760	2290	3450
2180	3270	1760	2640	1570	2360		12	3100	4650	2430	3660	2230	3350
2130	3200	1680	2530	1500	2260		13	3040	4570	2370	3560	2170	3260
2080	3130	1600	2410	1430	2150		14	2980	4480	2300	3460	2100	3160
2030	3050	1520	2280	1360	2050		15	2930	4400	2230	3360	2040	3070
1980	2970	1420	2140	1290	1940		16	2870	4320	2170	3260	1980	2970
1920	2890	1330	2000	1210	1820		17	2820	4230	2100	3160	1910	2870
1860	2800	1240	1860	1130	1690		18	2760	4150	2040	3060	1850	2780
1800	2710	1150	1720	1040	1570		19	2700	4060	1970	2960	1790	2680
1740	2620	1060	1590	962	1450		20	2650	3980	1900	2860	1720	2590
1620	2430	889	1340	806	1210		22	2540	3810	1770	2660	1600	2400
1500	2250	747	1120	677	1020		24	2420	3640	1640	2460	1440	2170
1360	2040	636	956	577	867		26	2310	3480	1440	2170	1270	1910
1220	1830	549	825	497	748		28	2200	3310	1290	1940	1130	1700
1080	1630	478	718	433	651		30	2090	3140	1160	1750	1020	1530
957	1440	420	631	381	572		32	1980	2970	1060	1590	925	1390
848	1270	372	559	337	507		34	1820	2730	970	1460	847	1270
756	1140	332	499	301	452		36	1660	2490	895	1350	780	1170
679	1020	298	448	270	406		38	1520	2290	831	1250	723	1090
612	920	269	404	244	366		40	1410	2120	776	1170	674	1010
555	835	244	366	221	332		42	1310	1960	727	1090	630	948
506	761						44	1220	1830	684	1030	593	891
463	696						46	1140	1720	646	971	559	840
425	639						48	1070	1610	612	920	529	795
392	589						50	1010	1520	581	874	502	754

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2650	3990	2410	3620	2220	3330	11.5	32.7	7.99	24.0	7.93	23.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	68.2		61.9		57.0	
2050	3070	1860	2790	1710	2570	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	15600	940	13200	411	12100	375
721	1080	792	1190	726	1090	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.71		2.58		2.56	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
571	858	347	522	317	476	4.07		5.66		5.70	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×						Shape		W36×					
182[c]		170[c]		160[c]		lb/ft		182		170[v]		160[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1870	2820	1710	2580	1590	2380	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2330	3500	2170	3260	2020	3040
1760	2640	1610	2410	1480	2230		6	2330	3500	2170	3260	2020	3040
1720	2580	1570	2360	1450	2180		7	2330	3500	2170	3260	2020	3040
1670	2510	1530	2290	1410	2120		8	2320	3490	2160	3240	2010	3020
1620	2440	1480	2220	1360	2050		9	2260	3400	2100	3160	1950	2940
1570	2360	1430	2150	1320	1980		10	2200	3310	2040	3070	1900	2860
1510	2270	1380	2070	1270	1900		11	2140	3220	1980	2980	1840	2770
1450	2180	1320	1980	1210	1820		12	2080	3130	1930	2900	1790	2690
1390	2080	1260	1900	1160	1740		13	2020	3030	1870	2810	1730	2610
1320	1990	1200	1810	1100	1660		14	1960	2940	1810	2720	1680	2520
1250	1890	1140	1710	1050	1570		15	1900	2850	1750	2630	1620	2440
1190	1780	1080	1620	987	1480		16	1840	2760	1700	2550	1570	2360
1120	1680	1020	1530	929	1400		17	1780	2670	1640	2460	1510	2280
1050	1580	953	1430	871	1310		18	1720	2580	1580	2370	1460	2190
976	1470	892	1340	813	1220		19	1650	2490	1520	2290	1400	2110
899	1350	827	1240	757	1140		20	1590	2400	1460	2200	1350	2030
752	1130	690	1040	634	952		22	1470	2210	1350	2030	1240	1860
632	949	580	872	532	800		24	1310	1970	1180	1780	1070	1610
538	809	494	743	454	682		26	1150	1730	1040	1560	936	1410
464	697	426	640	391	588		28	1020	1540	920	1380	829	1250
404	608	371	558	341	512		30	921	1380	825	1240	742	1120
355	534	326	490	299	450		32	835	1250	746	1120	670	1010
315	473	289	434	265	399		34	763	1150	681	1020	610	917
281	422	258	387	237	356		36	702	1050	625	940	560	841
252	379	231	348	212	319		38	650	976	578	869	516	776
227	342	209	314	192	288		40	604	908	537	807	479	720
206	310	189	285				42	565	849	501	753	447	671
							44	530	797	470	706	418	629
							46	500	751	442	665	393	591
							48	473	710	418	628	371	557
							50	448	674	396	595	351	528

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2090	3140	1950	2930	1830	2750	7.90	23.0	7.84	22.5	7.74	22.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	53.6		50.0		47.0	
1610	2410	1500	2250	1410	2120	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	11300	347	10500	320	9760	295
684	1030	575	864	546	821	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.55		2.53		2.50	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
294	442	272	409	251	377	5.69		5.73		5.76	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36–W33

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W36×				W33×		Shape		W36×				W33×	
150[c]		135[c]		387[h]		lb/ft		150[v]		135[v]		387[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1470	2210	1290	1940	4440	6670	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1880	2830	1650	2480	5060	7610
1380	2070	1200	1810	4290	6440		6	1880	2830	1650	2480	5060	7610
1340	2020	1170	1760	4230	6360		7	1880	2830	1650	2480	5060	7610
1300	1960	1140	1710	4170	6270		8	1870	2800	1620	2440	5060	7610
1260	1900	1100	1650	4100	6170		9	1810	2730	1570	2360	5060	7610
1220	1830	1060	1590	4030	6060		10	1760	2650	1520	2290	5060	7610
1170	1760	1010	1520	3950	5940		11	1710	2570	1480	2220	5060	7610
1120	1680	968	1450	3860	5810		12	1660	2490	1430	2150	5040	7570
1070	1610	920	1380	3770	5670		13	1600	2410	1380	2070	4980	7480
1020	1530	872	1310	3670	5520		14	1550	2330	1330	2000	4910	7380
962	1450	822	1240	3570	5370		15	1500	2250	1280	1930	4850	7290
907	1360	773	1160	3470	5210		16	1440	2170	1230	1860	4780	7190
853	1280	724	1090	3360	5050		17	1390	2090	1190	1780	4720	7090
798	1200	675	1010	3250	4880		18	1340	2010	1140	1710	4650	7000
745	1120	627	942	3130	4710		19	1290	1930	1090	1640	4590	6900
692	1040	579	870	3020	4540		20	1230	1860	1040	1560	4530	6800
583	876	487	733	2780	4180		22	1120	1680	909	1370	4400	6610
490	736	410	616	2550	3830		24	960	1440	780	1170	4270	6420
417	627	349	525	2310	3480		26	838	1260	679	1020	4140	6230
360	541	301	452	2090	3130		28	741	1110	598	899	4010	6030
313	471	262	394	1870	2800		30	662	994	533	801	3890	5840
275	414	230	346	1650	2480		32	597	897	479	720	3760	5650
244	367	204	307	1460	2200		34	542	815	435	653	3630	5450
218	327	182	274	1300	1960		36	497	746	397	597	3500	5260
195	294	163	246	1170	1760		38	457	688	365	548	3370	5070
176	265			1060	1590		40	424	637	337	507	3240	4880
				959	1440		42	395	593	313	471	3120	4680
				874	1310		44	369	555	292	439	2960	4450
				799	1200		46	346	521	274	412	2810	4220
				734	1100		48	326	491	258	387	2670	4010
				676	1020		50	309	464	243	365	2540	3820

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1720	2590	1550	2330	4440	6670	7.65	21.7	7.37	20.9	11.7	42.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	44.3		39.9		114	
1330	1990	1200	1800	3420	5130	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	9040	270	7800	225	24300	1620
524	788	495	744	1180	1770	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.47		2.38		3.77	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
230	346	194	291	1010	1520	5.79		5.88		3.87	

[c] Shape is slender for compression with F_y = 65 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W33×						Shape		W33×					
354[h]		318		291		lb/ft		354[h]		318		291	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4050	6080	3650	5480	3330	5010	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4610	6920	4120	6190	3760	5660
3910	5870	3520	5290	3210	4830		6	4610	6920	4120	6190	3760	5660
3860	5800	3470	5220	3170	4770		7	4610	6920	4120	6190	3760	5660
3800	5710	3420	5140	3120	4690		8	4610	6920	4120	6190	3760	5660
3740	5620	3360	5060	3070	4610		9	4610	6920	4120	6190	3760	5660
3670	5520	3300	4960	3010	4530		10	4610	6920	4120	6190	3760	5660
3600	5400	3230	4860	2950	4430		11	4610	6920	4120	6190	3760	5660
3520	5280	3160	4750	2880	4330		12	4580	6880	4090	6150	3730	5600
3430	5160	3080	4630	2810	4220		13	4520	6790	4030	6050	3670	5510
3340	5020	3000	4510	2730	4110		14	4460	6700	3970	5960	3610	5430
3250	4880	2920	4380	2650	3990		15	4390	6600	3910	5870	3550	5340
3150	4740	2830	4250	2570	3870		16	4330	6510	3850	5780	3490	5250
3050	4590	2740	4110	2490	3740		17	4270	6420	3790	5690	3430	5160
2950	4430	2640	3970	2400	3610		18	4210	6320	3730	5600	3380	5070
2840	4270	2550	3830	2310	3480		19	4140	6230	3670	5510	3320	4990
2740	4110	2450	3680	2220	3340		20	4080	6140	3610	5420	3260	4900
2520	3790	2250	3390	2040	3070		22	3960	5950	3490	5240	3140	4720
2300	3460	2060	3090	1860	2800		24	3830	5760	3370	5060	3020	4540
2090	3140	1860	2800	1680	2530		26	3710	5570	3240	4880	2910	4370
1880	2820	1670	2510	1510	2270		28	3580	5390	3120	4700	2790	4190
1680	2520	1490	2240	1340	2020		30	3460	5200	3000	4510	2670	4020
1480	2230	1310	1980	1180	1780		32	3340	5010	2880	4330	2550	3840
1310	1970	1160	1750	1050	1570		34	3210	4830	2760	4150	2440	3660
1170	1760	1040	1560	934	1400		36	3090	4640	2640	3970	2320	3490
1050	1580	932	1400	838	1260		38	2960	4450	2520	3790	2150	3240
949	1430	841	1260	756	1140		40	2840	4260	2350	3540	2010	3020
861	1290	763	1150	686	1030		42	2670	4020	2210	3320	1880	2830
784	1180	695	1050	625	939		44	2520	3790	2080	3120	1770	2660
718	1080	636	956	572	859		46	2390	3590	1960	2950	1670	2510
659	991	584	878	525	789		48	2270	3400	1860	2800	1580	2370
607	913	538	809	484	727		50	2160	3240	1770	2660	1500	2260

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4050	6080	3650	5480	3330	5010	11.6	40.3	11.5	38.0	11.4	36.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	104		93.7		85.6	
3120	4680	2810	4220	2570	3850	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	22000	1460	19500	1290	17700	1160
1070	1610	952	1430	869	1300	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.74		3.71		3.68	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
915	1370	811	1220	733	1100	3.88		3.91		3.91	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W33×						Shape		W33×					
263[c]		241[c]		221[c]		lb/ft		263		241		221	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2950	4440	2680	4030	2420	3640	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3370	5070	3050	4580	2780	4180
2860	4300	2590	3900	2340	3520		6	3370	5070	3050	4580	2780	4180
2830	4250	2560	3850	2310	3470		7	3370	5070	3050	4580	2780	4180
2790	4190	2530	3800	2280	3430		8	3370	5070	3050	4580	2780	4180
2750	4130	2490	3740	2240	3370		9	3370	5070	3050	4580	2780	4180
2700	4060	2450	3680	2200	3310		10	3370	5070	3050	4580	2780	4180
2650	3980	2400	3610	2160	3250		11	3370	5070	3050	4580	2780	4180
2590	3900	2350	3530	2120	3180		12	3340	5010	3010	4520	2740	4110
2530	3810	2300	3450	2070	3110		13	3280	4930	2950	4440	2690	4040
2470	3710	2240	3370	2020	3030		14	3230	4850	2900	4360	2640	3960
2390	3600	2180	3280	1960	2950		15	3170	4770	2850	4280	2590	3890
2320	3490	2120	3180	1910	2870		16	3120	4680	2800	4200	2540	3810
2240	3370	2050	3080	1850	2780		17	3060	4600	2740	4130	2490	3740
2160	3250	1970	2970	1790	2690		18	3000	4520	2690	4050	2440	3660
2080	3130	1900	2850	1730	2600		19	2950	4430	2640	3970	2390	3580
2000	3010	1820	2740	1660	2500		20	2890	4350	2590	3890	2330	3510
1840	2760	1670	2510	1520	2280		22	2780	4180	2480	3730	2230	3360
1670	2510	1520	2280	1380	2070		24	2670	4020	2380	3570	2130	3210
1510	2270	1370	2050	1240	1860		26	2560	3850	2270	3410	2030	3060
1350	2030	1220	1830	1110	1660		28	2450	3680	2170	3260	1930	2910
1200	1810	1080	1620	976	1470		30	2340	3520	2060	3100	1830	2760
1060	1590	950	1430	858	1290		32	2230	3350	1960	2940	1730	2610
936	1410	841	1260	760	1140		34	2120	3180	1830	2740	1580	2380
835	1260	750	1130	678	1020		36	1970	2950	1680	2520	1450	2180
749	1130	674	1010	608	914		38	1820	2730	1550	2330	1330	2010
676	1020	608	914	549	825		40	1690	2540	1440	2160	1240	1860
614	922	551	829	498	748		42	1580	2380	1340	2010	1150	1730
559	840	502	755	454	682		44	1490	2230	1260	1890	1080	1620
511	769	460	691	415	624		46	1400	2100	1180	1780	1010	1520
470	706	422	634	381	573		48	1320	1990	1110	1680	953	1430
433	651	389	585	351	528		50	1260	1890	1060	1590	901	1350
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3010	4530	2770	4160	2540	3820			11.3	34.6	11.2	33.3	11.1	32.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			77.4		71.1		65.3	
2320	3480	2130	3200	1960	2940			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			15900	1040	14200	933	12900	840
780	1170	738	1110	683	1020			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.66		3.62		3.59	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
655	985	590	887	532	800			3.91		3.90		3.93	

[c] Shape is slender for compression with F_y = 65 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W33×						Shape		W33×					
201[c]		169[c]		152[c]		lb/ft		201		169		152	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2140	3220	1750	2620	1550	2330	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2510	3770	2040	3070	1810	2730
2070	3120	1630	2450	1450	2180		6	2510	3770	2040	3070	1810	2730
2050	3080	1590	2390	1410	2120		7	2510	3770	2040	3070	1810	2730
2020	3030	1550	2330	1370	2060		8	2510	3770	2030	3050	1800	2700
1990	2990	1500	2250	1330	2000		9	2510	3770	1970	2970	1750	2620
1950	2930	1450	2170	1280	1930		10	2510	3770	1920	2890	1700	2550
1910	2880	1390	2090	1230	1850		11	2510	3770	1870	2800	1650	2480
1870	2810	1330	2000	1180	1770		12	2460	3700	1810	2720	1600	2400
1830	2750	1270	1910	1120	1690		13	2410	3630	1760	2640	1550	2330
1780	2680	1210	1810	1070	1600		14	2370	3560	1710	2560	1500	2250
1730	2610	1140	1720	1010	1520		15	2320	3490	1650	2480	1450	2180
1680	2530	1080	1620	951	1430		16	2270	3420	1600	2400	1400	2100
1630	2450	1010	1520	893	1340		17	2230	3350	1550	2320	1350	2030
1580	2370	948	1420	835	1250		18	2180	3270	1490	2240	1300	1950
1520	2290	874	1310	778	1170		19	2130	3200	1440	2160	1250	1880
1470	2210	802	1210	712	1070		20	2080	3130	1390	2080	1200	1800
1360	2040	667	1000	591	888		22	1990	2990	1280	1920	1100	1650
1230	1860	561	843	496	746		24	1900	2850	1130	1700	949	1430
1110	1670	478	718	423	636		26	1800	2710	997	1500	834	1250
986	1480	412	619	365	548		28	1710	2570	890	1340	741	1110
869	1310	359	539	318	478		30	1610	2420	803	1210	666	1000
763	1150	315	474	279	420		32	1490	2240	730	1100	604	908
676	1020	279	420	247	372		34	1350	2030	670	1010	552	830
603	907	249	375	221	332		36	1240	1860	618	929	508	763
541	814	224	336	198	298		38	1140	1710	574	862	470	707
489	734	202	303	179	269		40	1050	1580	535	805	438	658
443	666						42	976	1470	502	754	409	615
404	607						44	911	1370	472	710	384	577
369	555						46	854	1280	446	670	362	544
339	510						48	804	1210	422	635	342	514
313	470						50	759	1140	401	603	324	488

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2300	3460	1930	2900	1750	2630	11.0	31.2	7.74	22.6	7.65	21.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	59.1		49.5		44.9	
1770	2660	1490	2230	1350	2020	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	11600	749	9290	310	8160	273
626	940	589	883	553	830	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.56		2.50		2.47	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
477	717	274	411	240	360	3.93		5.48		5.47	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W33×						Shape		W33×					
141[c]		130[c]		118[c]		lb/ft		141[v]		130[v]		118[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1410	2120	1280	1920	1130	1700	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1670	2510	1510	2280	1350	2020
1310	1970	1190	1780	1040	1570		6	1670	2510	1510	2280	1350	2020
1280	1920	1160	1740	1020	1530		7	1670	2510	1510	2280	1350	2020
1240	1870	1120	1680	984	1480		8	1650	2470	1490	2240	1310	1970
1200	1800	1080	1630	949	1430		9	1600	2400	1440	2170	1270	1910
1160	1740	1040	1570	911	1370		10	1550	2330	1400	2100	1230	1850
1110	1670	998	1500	871	1310		11	1500	2260	1360	2040	1190	1790
1060	1590	953	1430	830	1250		12	1460	2190	1310	1970	1150	1730
1010	1520	906	1360	787	1180		13	1410	2120	1270	1910	1110	1670
957	1440	858	1290	743	1120		14	1360	2050	1220	1840	1070	1610
904	1360	809	1220	699	1050		15	1320	1980	1180	1770	1030	1540
851	1280	760	1140	654	983		16	1270	1910	1140	1710	987	1480
797	1200	711	1070	610	917		17	1220	1840	1090	1640	946	1420
744	1120	663	997	566	851		18	1180	1770	1050	1570	906	1360
692	1040	615	925	524	787		19	1130	1700	1000	1510	865	1300
639	961	568	854	481	723		20	1080	1630	959	1440	824	1240
528	794	472	709	403	605		22	968	1460	837	1260	700	1050
444	667	396	596	338	509		24	836	1260	721	1080	601	903
378	569	338	508	288	433		26	732	1100	630	946	524	787
326	490	291	438	249	374		28	649	976	557	837	462	694
284	427	254	381	217	326		30	582	875	498	749	412	619
250	375	223	335	190	286		32	527	792	450	676	371	558
221	333	198	297	169	253		34	480	722	409	615	337	506
197	297	176	265	150	226		36	441	663	375	564	308	463
177	266	158	238	135	203		38	408	613	346	520	283	426
160	240						40	379	569	321	482	262	394
							42	353	531	299	449	244	366
							44	331	498	280	420	228	342
							46	312	468	263	395	213	321
							48	294	442	248	372	201	302
							50	279	419	234	352	190	285

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1620	2430	1490	2240	1350	2030	7.53	21.4	7.40	20.8	7.19	20.2
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	41.5		38.3		34.7	
1250	1870	1150	1720	1040	1560	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	7450	246	6710	218	5900	187
470	707	448	674	416	626	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.43		2.39		2.32	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
217	326	193	290	166	250	5.51		5.52		5.60	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W30×						Shape		W30×					
391[h]		357[h]		326[h]		lb/ft		391[h]		357[h]		326[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4480	6730	4090	6140	3730	5610	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4700	7070	4280	6440	3860	5800
4320	6490	3940	5920	3590	5400		6	4700	7070	4280	6440	3860	5800
4260	6400	3890	5840	3540	5330		7	4700	7070	4280	6440	3860	5800
4190	6300	3830	5750	3490	5240		8	4700	7070	4280	6440	3860	5800
4120	6200	3760	5650	3430	5150		9	4700	7070	4280	6440	3860	5800
4040	6080	3690	5540	3360	5050		10	4700	7070	4280	6440	3860	5800
3960	5950	3610	5420	3280	4940		11	4700	7070	4280	6440	3860	5800
3870	5810	3520	5290	3210	4820		12	4670	7020	4240	6380	3820	5740
3770	5670	3430	5160	3120	4690		13	4620	6940	4190	6300	3770	5660
3670	5510	3340	5020	3030	4560		14	4560	6860	4140	6220	3720	5580
3560	5350	3240	4870	2940	4420		15	4510	6780	4090	6140	3660	5510
3450	5190	3140	4720	2850	4280		16	4460	6700	4030	6060	3610	5430
3340	5020	3030	4560	2750	4130		17	4400	6620	3980	5980	3560	5350
3220	4840	2920	4400	2650	3980		18	4350	6540	3930	5900	3510	5280
3100	4660	2810	4230	2550	3830		19	4300	6460	3870	5820	3460	5200
2980	4480	2700	4060	2450	3680		20	4250	6380	3820	5740	3410	5130
2740	4110	2480	3730	2240	3360		22	4140	6220	3720	5590	3310	4970
2490	3750	2250	3390	2030	3050		24	4030	6060	3610	5430	3210	4820
2250	3380	2030	3060	1830	2750		26	3930	5900	3500	5270	3100	4670
2020	3030	1820	2730	1630	2450		28	3820	5740	3400	5110	3000	4510
1790	2700	1610	2420	1440	2170		30	3710	5580	3290	4950	2900	4360
1580	2370	1420	2130	1270	1900		32	3610	5420	3190	4790	2800	4210
1400	2100	1260	1890	1120	1690		34	3500	5260	3080	4630	2700	4060
1250	1880	1120	1680	1000	1500		36	3400	5100	2980	4480	2600	3900
1120	1680	1010	1510	898	1350		38	3290	4940	2870	4320	2490	3750
1010	1520	908	1360	811	1220		40	3180	4790	2770	4160	2390	3600
917	1380	823	1240	735	1110		42	3080	4630	2660	4000	2270	3400
835	1260	750	1130	670	1010		44	2970	4470	2540	3820	2140	3220
764	1150	686	1030	613	921		46	2870	4310	2410	3630	2030	3050
702	1050	630	947	563	846		48	2740	4110	2300	3450	1930	2900
647	972	581	873	519	780		50	2610	3930	2190	3290	1840	2770

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4480	6730	4090	6140	3730	5610	11.4	46.5	11.3	43.4	11.2	40.6
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	115		105		95.9	
3450	5180	3150	4730	2880	4320	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	20700	1550	18700	1390	16800	1240
1170	1760	1060	1590	960	1440	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.67		3.64		3.60	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1010	1510	905	1360	817	1230	3.65		3.65		3.67	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W30×						Shape		W30×					
292		261		235[c]		lb/ft		292		261		235	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3350	5030	3000	4500	2680	4030	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3440	5170	3060	4600	2750	4130
3220	4840	2880	4330	2590	3890		6	3440	5170	3060	4600	2750	4130
3180	4770	2840	4270	2550	3840		7	3440	5170	3060	4600	2750	4130
3130	4700	2790	4200	2510	3780		8	3440	5170	3060	4600	2750	4130
3070	4610	2740	4120	2470	3710		9	3440	5170	3060	4600	2750	4130
3010	4520	2690	4040	2410	3630		10	3440	5170	3060	4600	2750	4130
2940	4420	2620	3940	2360	3540		11	3440	5170	3060	4590	2740	4120
2870	4310	2560	3850	2300	3450		12	3390	5100	3010	4520	2700	4050
2790	4200	2490	3740	2240	3360		13	3340	5030	2960	4450	2650	3980
2720	4080	2420	3630	2170	3260		14	3290	4950	2910	4380	2600	3910
2630	3960	2340	3520	2100	3160		15	3250	4880	2860	4300	2560	3850
2550	3830	2260	3400	2030	3050		16	3200	4800	2820	4230	2510	3780
2460	3690	2180	3280	1960	2940		17	3150	4730	2770	4160	2470	3710
2370	3560	2100	3160	1880	2830		18	3100	4660	2720	4090	2420	3640
2280	3420	2020	3030	1810	2710		19	3050	4580	2670	4020	2380	3570
2180	3280	1930	2900	1730	2600		20	3000	4510	2620	3950	2330	3500
2000	3000	1760	2650	1580	2370		22	2900	4360	2530	3800	2240	3370
1810	2720	1590	2390	1420	2140		24	2800	4210	2430	3660	2150	3230
1630	2440	1430	2140	1270	1910		26	2700	4060	2340	3510	2060	3090
1450	2180	1270	1900	1130	1700		28	2600	3910	2240	3370	1970	2960
1280	1920	1110	1670	990	1490		30	2510	3770	2150	3230	1870	2820
1120	1690	978	1470	870	1310		32	2410	3620	2050	3080	1780	2680
995	1500	866	1300	771	1160		34	2310	3470	1960	2940	1690	2540
888	1330	773	1160	688	1030		36	2210	3320	1850	2780	1560	2340
797	1200	694	1040	617	928		38	2110	3170	1720	2580	1450	2170
719	1080	626	941	557	837		40	1980	2970	1610	2410	1350	2030
652	980	568	853	505	759		42	1860	2790	1510	2270	1260	1900
594	893	517	778	460	692		44	1750	2640	1420	2130	1190	1790
544	817	473	711	421	633		46	1660	2500	1340	2020	1120	1690
499	751	435	653	387	581		48	1580	2370	1270	1910	1060	1600
460	692	401	602	356	536		50	1500	2260	1210	1820	1010	1520
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3350	5030	3000	4500	2700	4050			11.1	38.0	10.9	35.5	10.9	33.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			86.0		77.0		69.3	
2580	3870	2310	3470	2080	3120			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			14900	1100	13100	959	11700	855
849	1270	764	1150	675	1010			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.58		3.53		3.51	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
723	1090	636	956	568	853			3.69		3.71		3.70	

[c] Shape is slender for compression with F_y = 65 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W30×						Shape		W30×					
211[c]		191[c]		173[c]		lb/ft		211		191		173	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2370	3570	2090	3150	1860	2800	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2440	3660	2190	3290	1970	2960
2290	3440	2020	3030	1800	2700		6	2440	3660	2190	3290	1970	2960
2260	3400	1990	2990	1770	2660		7	2440	3660	2190	3290	1970	2960
2230	3350	1960	2950	1740	2620		8	2440	3660	2190	3290	1970	2960
2190	3290	1930	2900	1710	2580		9	2440	3660	2190	3290	1970	2960
2150	3230	1890	2840	1680	2530		10	2440	3660	2190	3290	1970	2960
2110	3160	1850	2780	1640	2470		11	2430	3650	2180	3270	1950	2940
2060	3090	1810	2720	1610	2410		12	2380	3580	2140	3210	1920	2880
2010	3010	1770	2650	1570	2350		13	2340	3520	2100	3150	1880	2820
1950	2920	1720	2580	1520	2290		14	2300	3450	2060	3090	1840	2760
1880	2830	1670	2510	1480	2220		15	2260	3390	2010	3030	1800	2710
1820	2730	1620	2430	1430	2150		16	2210	3330	1970	2970	1760	2650
1750	2630	1560	2350	1380	2080		17	2170	3260	1930	2910	1720	2590
1680	2530	1510	2270	1330	2010		18	2130	3200	1890	2840	1690	2540
1620	2430	1450	2170	1280	1930		19	2080	3130	1850	2780	1650	2480
1550	2330	1380	2080	1230	1850		20	2040	3070	1810	2720	1610	2420
1410	2120	1260	1890	1120	1690		22	1950	2940	1730	2600	1530	2310
1270	1910	1130	1700	1010	1520		24	1870	2810	1650	2480	1460	2190
1130	1710	1010	1520	898	1350		26	1780	2680	1570	2350	1380	2080
1000	1510	891	1340	792	1190		28	1700	2550	1480	2230	1310	1960
880	1320	779	1170	690	1040		30	1610	2420	1400	2110	1230	1850
773	1160	685	1030	607	912		32	1520	2290	1300	1950	1110	1670
685	1030	606	911	538	808		34	1400	2100	1180	1770	1010	1510
611	919	541	813	479	721		36	1290	1940	1080	1630	922	1390
549	824	485	730	430	647		38	1190	1790	1000	1500	850	1280
495	744	438	659	388	584		40	1110	1670	928	1400	787	1180
449	675	397	597	352	529		42	1040	1560	866	1300	733	1100
409	615	362	544	321	482		44	973	1460	812	1220	685	1030
374	563	331	498	294	441		46	917	1380	763	1150	643	967
344	517	304	457	270	405		48	866	1300	720	1080	606	911
317	476	280	421	249	374		50	822	1230	682	1030	573	861
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2420	3640	2180	3280	1980	2980			10.8	32.3	10.7	31.0	10.6	30.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			62.3		56.1		50.9	
1870	2800	1680	2520	1530	2290			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			10300	757	9200	673	8230	598
623	934	567	850	518	777			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.49		3.46		3.42	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
503	756	448	673	399	600			3.70		3.70		3.71	

[c] Shape is slender for compression with F_y = 65 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W30×						Shape		W30×					
148[c]		132[c]		124[c]		lb/ft		148		132		124	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1570	2360	1370	2060	1270	1900	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1620	2440	1420	2130	1320	1990
1450	2170	1260	1890	1160	1750		6	1620	2440	1420	2130	1320	1990
1400	2110	1220	1840	1130	1700		7	1620	2440	1420	2130	1320	1980
1360	2040	1180	1770	1090	1640		8	1580	2370	1370	2070	1280	1920
1310	1960	1140	1710	1050	1570		9	1530	2310	1330	2000	1240	1860
1250	1880	1090	1630	1000	1510		10	1490	2240	1290	1940	1200	1800
1190	1790	1040	1560	954	1430		11	1440	2170	1250	1880	1160	1740
1130	1700	982	1480	904	1360		12	1400	2100	1210	1810	1120	1680
1070	1610	927	1390	853	1280		13	1350	2030	1170	1750	1080	1620
1010	1510	872	1310	801	1200		14	1310	1960	1120	1690	1040	1560
938	1410	815	1230	748	1120		15	1260	1900	1080	1630	999	1500
865	1300	756	1140	696	1050		16	1220	1830	1040	1560	959	1440
793	1190	691	1040	641	964		17	1170	1760	998	1500	919	1380
723	1090	629	945	582	875		18	1130	1690	956	1440	879	1320
655	985	568	854	525	789		19	1080	1620	914	1370	839	1260
591	889	513	770	474	712		20	1040	1560	872	1310	794	1190
489	735	424	637	391	588		22	919	1380	751	1130	677	1020
411	617	356	535	329	494		24	805	1210	654	983	588	884
350	526	303	456	280	421		26	714	1070	578	868	518	779
302	454	262	393	242	363		28	641	963	516	776	462	695
263	395	228	342	211	316		30	581	874	466	701	417	626
231	347	200	301	185	278		32	531	799	425	638	379	569
205	308	177	267	164	246		34	489	736	390	586	347	522
183	274	158	238	146	220		36	454	682	360	541	320	481
							38	423	635	335	503	297	446
							40	396	595	312	469	277	416
							42	372	559	293	440	259	390
							44	351	528	276	415	244	367
							46	332	500	261	392	230	346
							48	316	474	247	371	218	328
							50	300	452	235	353	207	311
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1700	2550	1510	2270	1420	2140			7.06	21.0	6.97	20.2	6.91	19.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			43.6		38.8		36.5	
1310	1960	1160	1750	1100	1640			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			6680	227	5770	196	5360	181
519	778	484	727	459	689			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.28		2.25		2.23	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
221	332	189	285	175	263			5.44		5.42		5.43	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W30×						Shape		W30×					
116[c]		108[c]		99[c]		lb/ft		116[v]		108[v]		99[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1170	1760	1070	1600	954	1430	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1230	1840	1120	1690	1010	1520
1070	1610	974	1460	869	1310		6	1230	1840	1120	1690	1010	1520
1040	1560	943	1420	840	1260		7	1220	1830	1110	1670	995	1500
1000	1510	909	1370	808	1220		8	1180	1770	1070	1610	962	1450
962	1450	871	1310	774	1160		9	1140	1720	1040	1560	928	1390
919	1380	831	1250	737	1110		10	1100	1660	1000	1510	894	1340
873	1310	789	1190	698	1050		11	1070	1600	966	1450	860	1290
826	1240	745	1120	658	988		12	1030	1540	930	1400	826	1240
778	1170	700	1050	617	927		13	990	1490	894	1340	793	1190
729	1100	655	984	575	864		14	952	1430	857	1290	759	1140
680	1020	609	916	534	802		15	914	1370	821	1230	725	1090
631	948	564	848	493	741		16	876	1320	785	1180	691	1040
583	876	520	782	453	680		17	838	1260	749	1130	658	988
528	794	472	710	412	619		18	799	1200	713	1070	624	938
474	713	424	637	370	556		19	761	1140	675	1010	575	865
428	643	382	575	334	502		20	707	1060	617	927	525	790
354	532	316	475	276	415		22	602	904	524	788	445	669
297	447	266	399	232	348		24	521	784	453	681	384	577
253	381	226	340	197	297		26	458	689	397	597	336	504
218	328	195	293	170	256		28	408	613	353	530	297	447
190	286	170	255	148	223		30	367	552	317	476	266	400
167	251	149	224	130	196		32	333	501	287	431	241	362
148	223	132	199	115	174		34	305	458	262	393	219	329
132	199						36	281	422	241	362	201	302
							38	260	391	222	334	186	279
							40	242	364	207	311	172	259
							42	226	340	193	290	161	241
							44	213	320	181	272	150	226
							46	201	301	171	257	142	213
							48	190	285	161	242	134	201
							50	180	271	153	230	126	190

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1330	2000	1230	1850	1130	1700	6.78	19.4	6.66	18.9	6.51	18.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	34.2		31.7		29.0	
1030	1540	951	1430	870	1310	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	4930	164	4470	146	3990	128
396	595	379	570	361	542	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.19		2.15		2.10	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
160	240	142	214	125	188	5.48		5.53		5.57	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W30–W27

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W30×		W27×				Shape		W30×		W27×			
90[c]		539[h]		368[h]		lb/ft		90[f], [v]		539[h]		368[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
838	1260	6190	9300	4240	6380	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	904	1360	6130	9210	4020	6050
762	1150	5960	8960	4070	6120		6	904	1360	6130	9210	4020	6050
736	1110	5880	8840	4010	6030		7	902	1350	6130	9210	4020	6050
708	1060	5790	8710	3950	5930		8	870	1310	6130	9210	4020	6050
677	1020	5690	8560	3870	5820		9	839	1260	6130	9210	4020	6050
644	968	5580	8390	3790	5700		10	808	1210	6130	9210	4020	6050
610	916	5470	8210	3700	5560		11	777	1170	6130	9210	4010	6030
574	863	5340	8020	3610	5420		12	745	1120	6100	9170	3970	5970
538	809	5200	7820	3500	5270		13	714	1070	6050	9100	3930	5900
501	754	5060	7600	3400	5110		14	683	1030	6010	9030	3880	5840
465	699	4910	7380	3290	4940		15	652	980	5960	8970	3840	5770
429	645	4760	7150	3180	4770		16	621	933	5920	8900	3800	5710
394	592	4600	6910	3060	4600		17	589	886	5880	8830	3760	5650
359	539	4440	6670	2940	4420		18	558	839	5830	8760	3710	5580
328	493	4270	6420	2820	4240		19	507	762	5790	8700	3670	5520
300	451	4100	6170	2700	4060		20	462	695	5740	8630	3630	5450
248	372	3760	5660	2450	3690		22	390	587	5650	8490	3540	5330
208	313	3420	5150	2210	3330		24	335	504	5560	8360	3460	5200
177	267	3090	4640	1980	2970		26	293	440	5470	8220	3370	5070
153	230	2770	4160	1750	2630		28	259	389	5380	8090	3290	4940
133	200	2450	3690	1530	2300		30	231	347	5290	7950	3200	4810
117	176	2160	3250	1350	2020		32	208	313	5200	7820	3120	4680
104	156	1910	2870	1190	1790		34	189	284	5110	7690	3030	4560
		1710	2560	1060	1600		36	173	260	5020	7550	2950	4430
		1530	2300	954	1430		38	159	240	4930	7420	2860	4300
		1380	2080	861	1290		40	148	222	4840	7280	2770	4170
		1250	1880	781	1170		42	137	206	4750	7150	2690	4040
		1140	1720	712	1070		44	128	193	4670	7010	2600	3910
		1040	1570	651	979		46	121	181	4580	6880	2520	3790
		960	1440	598	899		48	114	171	4490	6740	2430	3660
		884	1330	551	828		50	107	161	4400	6610	2330	3510

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1020	1540	6190	9300	4240	6380	6.91	18.1	11.3	68.6	10.8	48.6
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	26.3		159		109	
789	1180	4770	7160	3270	4910	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	3610	115	25600	2110	16200	1310
302	454	1660	2500	1090	1640	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.09		3.65		3.48	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
110	166	1420	2130	905	1360	5.60		3.48		3.51	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W27×						Shape		W27×					
336[h]		307[h]		281		lb/ft		336[h]		307[h]		281	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3860	5800	3510	5280	3230	4860	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3670	5510	3340	5020	3040	4560
3700	5570	3370	5060	3100	4660		6	3670	5510	3340	5020	3040	4560
3650	5490	3310	4980	3050	4590		7	3670	5510	3340	5020	3040	4560
3590	5390	3260	4890	3000	4500		8	3670	5510	3340	5020	3040	4560
3520	5290	3190	4800	2940	4410		9	3670	5510	3340	5020	3040	4560
3440	5170	3120	4690	2870	4320		10	3670	5510	3340	5020	3040	4560
3360	5050	3040	4580	2800	4210		11	3650	5490	3320	4990	3020	4530
3270	4920	2960	4450	2720	4100		12	3610	5420	3280	4930	2970	4470
3180	4780	2880	4320	2640	3980		13	3570	5360	3240	4870	2930	4410
3080	4630	2790	4190	2560	3850		14	3520	5300	3190	4800	2890	4350
2980	4480	2690	4050	2470	3720		15	3480	5230	3150	4740	2850	4280
2880	4320	2600	3900	2380	3580		16	3440	5170	3110	4670	2810	4220
2770	4160	2500	3760	2290	3450		17	3400	5110	3070	4610	2770	4160
2660	4000	2400	3600	2200	3300		18	3350	5040	3020	4550	2730	4100
2550	3830	2300	3450	2100	3160		19	3310	4980	2980	4480	2680	4040
2440	3660	2190	3300	2010	3020		20	3270	4910	2940	4420	2640	3970
2210	3330	1990	2980	1820	2730		22	3180	4790	2850	4290	2560	3850
1990	2990	1780	2680	1630	2450		24	3100	4660	2770	4160	2480	3730
1770	2670	1580	2380	1450	2170		26	3010	4530	2680	4030	2400	3600
1570	2360	1400	2100	1270	1910		28	2930	4400	2600	3910	2310	3480
1370	2060	1220	1830	1110	1660		30	2840	4270	2510	3780	2230	3350
1200	1810	1070	1610	973	1460		32	2760	4150	2430	3650	2150	3230
1070	1600	947	1420	862	1300		34	2670	4020	2340	3520	2070	3100
951	1430	845	1270	769	1160		36	2590	3890	2260	3390	1980	2980
853	1280	758	1140	690	1040		38	2500	3760	2170	3270	1900	2860
770	1160	684	1030	623	936		40	2420	3630	2090	3140	1810	2710
699	1050	621	933	565	849		42	2330	3510	2000	3000	1700	2560
637	957	565	850	515	774		44	2250	3380	1890	2850	1610	2420
582	875	517	778	471	708		46	2150	3230	1800	2700	1530	2300
535	804	475	714	433	650		48	2050	3080	1710	2580	1460	2190
493	741	438	658	399	599		50	1960	2940	1640	2460	1390	2090
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3860	5800	3510	5280	3230	4860			10.7	45.0	10.6	41.7	10.5	39.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			99.2		90.2		83.1	
2980	4460	2710	4060	2490	3740			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			14600	1180	13100	1050	11900	953
983	1470	893	1340	808	1210			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.45		3.41		3.39	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
817	1230	736	1110	668	1000			3.51		3.52		3.54	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Notes: Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W27×						Shape		W27×					
258		235		217		lb/ft		258		235		217	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2960	4450	2700	4060	2490	3740	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2760	4150	2500	3760	2310	3470
2840	4260	2580	3880	2380	3570		6	2760	4150	2500	3760	2310	3470
2790	4200	2540	3820	2340	3520		7	2760	4150	2500	3760	2310	3470
2740	4120	2500	3750	2300	3450		8	2760	4150	2500	3760	2310	3470
2680	4040	2440	3670	2250	3380		9	2760	4150	2500	3760	2310	3470
2620	3940	2390	3590	2200	3300		10	2760	4150	2500	3760	2310	3470
2560	3840	2330	3500	2140	3220		11	2740	4120	2480	3720	2280	3430
2490	3740	2260	3400	2080	3130		12	2700	4060	2440	3660	2240	3370
2410	3630	2190	3300	2020	3030		13	2660	4000	2400	3600	2200	3310
2340	3510	2120	3190	1950	2930		14	2620	3940	2360	3550	2160	3250
2250	3390	2050	3080	1880	2830		15	2580	3880	2320	3490	2130	3200
2170	3260	1970	2960	1810	2720		16	2540	3810	2280	3430	2090	3140
2090	3140	1890	2840	1740	2610		17	2500	3750	2240	3370	2050	3080
2000	3010	1810	2720	1660	2500		18	2460	3690	2200	3310	2010	3020
1910	2870	1730	2600	1590	2390		19	2420	3630	2160	3250	1970	2970
1820	2740	1650	2480	1510	2270		20	2380	3570	2120	3190	1940	2910
1650	2480	1490	2230	1360	2050		22	2300	3450	2040	3070	1860	2790
1470	2210	1330	1990	1220	1830		24	2220	3330	1970	2950	1780	2680
1310	1960	1170	1760	1070	1610		26	2130	3210	1890	2840	1710	2560
1140	1720	1020	1540	938	1410		28	2050	3090	1810	2720	1630	2450
996	1500	893	1340	817	1230		30	1970	2970	1730	2600	1550	2340
876	1320	784	1180	718	1080		32	1890	2840	1650	2480	1480	2220
776	1170	695	1040	636	956		34	1810	2720	1570	2360	1390	2090
692	1040	620	932	567	853		36	1730	2600	1470	2220	1290	1940
621	933	556	836	509	765		38	1630	2460	1380	2070	1200	1800
560	842	502	755	459	691		40	1530	2300	1290	1940	1120	1690
508	764	455	684	417	626		42	1450	2170	1210	1820	1060	1590
463	696	415	624	380	571		44	1370	2050	1150	1720	997	1500
424	637	380	571	347	522		46	1300	1950	1090	1630	944	1420
389	585	349	524	319	480		48	1230	1850	1030	1550	896	1350
359	539	321	483	294	442		50	1180	1770	984	1480	853	1280
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2960	4450	2700	4060	2490	3740			10.4	37.0	10.3	34.9	10.3	33.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			76.1		69.4		63.9	
2280	3420	2080	3120	1920	2880			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			10800	859	9700	769	8910	704
739	1110	679	1020	613	919			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.36		3.33		3.32	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
607	912	545	819	500	751			3.54		3.54		3.55	

Note: Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W27×						Shape		W27×					
194[c]		178[c]		161[c]		lb/ft		194		178		161	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2220	3330	2020	3040	1800	2700	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2050	3080	1850	2780	1670	2510
2120	3190	1940	2920	1720	2590		6	2050	3080	1850	2780	1670	2510
2090	3140	1910	2880	1700	2550		7	2050	3080	1850	2780	1670	2510
2050	3080	1880	2830	1670	2510		8	2050	3080	1850	2780	1670	2510
2010	3020	1840	2770	1630	2460		9	2050	3080	1850	2780	1670	2510
1960	2940	1800	2700	1600	2400		10	2050	3080	1850	2780	1670	2510
1910	2870	1750	2630	1560	2350		11	2020	3030	1820	2730	1640	2460
1850	2780	1700	2550	1520	2280		12	1980	2980	1780	2680	1600	2410
1790	2700	1640	2470	1480	2220		13	1940	2920	1750	2630	1570	2360
1730	2610	1590	2380	1430	2150		14	1910	2870	1710	2570	1540	2310
1670	2510	1530	2290	1380	2070		15	1870	2810	1680	2520	1510	2260
1610	2420	1470	2200	1320	1990		16	1840	2760	1640	2470	1470	2210
1540	2320	1410	2110	1270	1910		17	1800	2700	1610	2420	1440	2160
1480	2220	1340	2020	1210	1820		18	1760	2650	1570	2370	1410	2110
1410	2120	1280	1920	1150	1730		19	1730	2590	1540	2310	1370	2070
1340	2010	1220	1830	1100	1650		20	1690	2540	1500	2260	1340	2020
1210	1810	1090	1640	982	1480		22	1620	2430	1440	2160	1280	1920
1070	1610	969	1460	870	1310		24	1540	2320	1370	2050	1210	1820
945	1420	851	1280	763	1150		26	1470	2210	1300	1950	1140	1720
823	1240	738	1110	661	994		28	1400	2100	1230	1840	1080	1620
717	1080	643	967	576	866		30	1330	1990	1160	1740	993	1490
630	947	565	850	506	761		32	1240	1870	1060	1590	900	1350
558	839	501	753	448	674		34	1140	1720	969	1460	823	1240
498	748	447	671	400	601		36	1060	1590	894	1340	757	1140
447	671	401	602	359	540		38	982	1480	829	1250	701	1050
403	606	362	544	324	487		40	918	1380	773	1160	652	980
366	550	328	493	294	442		42	861	1290	724	1090	610	916
333	501	299	449	268	402		44	811	1220	681	1020	572	860
305	458	274	411	245	368		46	767	1150	643	966	539	811
280	421	251	378	225	338		48	727	1090	608	914	510	766
258	388	232	348	207	312		50	692	1040	578	868	484	727
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2220	3340	2040	3070	1850	2780			10.2	31.6	10.1	30.3	10.0	29.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			57.1		52.5		47.6	
1710	2570	1580	2360	1430	2140			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			7860	619	7020	555	6310	497
548	822	524	786	474	710			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.29		3.25		3.23	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
441	663	396	595	354	531			3.56		3.57		3.56	

[c] Shape is slender for compression with F_y = 65 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W27×						Shape		W27×					
146[c]		129[c]		114[c]		lb/ft		146		129		114	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1600	2400	1380	2080	1200	1800	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1500	2260	1280	1930	1110	1670
1530	2300	1270	1900	1100	1650		6	1500	2260	1280	1930	1110	1670
1510	2260	1230	1840	1060	1600		7	1500	2260	1280	1920	1100	1660
1480	2230	1180	1780	1030	1540		8	1500	2260	1240	1860	1070	1610
1450	2180	1140	1710	983	1480		9	1500	2260	1200	1810	1040	1560
1420	2130	1080	1630	938	1410		10	1500	2260	1170	1750	1000	1510
1380	2080	1030	1550	891	1340		11	1470	2210	1130	1700	969	1460
1350	2020	975	1470	842	1260		12	1440	2170	1090	1640	936	1410
1310	1970	916	1380	791	1190		13	1410	2120	1050	1590	902	1360
1270	1900	849	1280	740	1110		14	1380	2070	1020	1530	868	1310
1220	1840	783	1180	684	1030		15	1350	2030	981	1470	835	1250
1180	1770	718	1080	626	940		16	1320	1980	944	1420	801	1200
1130	1710	655	984	569	855		17	1290	1930	908	1360	767	1150
1090	1640	593	892	514	773		18	1260	1890	871	1310	734	1100
1040	1560	534	802	462	694		19	1220	1840	834	1250	700	1050
985	1480	482	724	417	626		20	1190	1790	797	1200	657	988
880	1320	398	598	344	518		22	1130	1700	695	1050	564	848
779	1170	335	503	289	435		24	1070	1610	611	918	493	740
681	1020	285	428	247	371		26	1010	1510	544	817	436	655
589	885	246	369	213	320		28	946	1420	489	736	391	587
513	771	214	322	185	278		30	851	1280	445	669	354	532
451	678	188	283	163	245		32	769	1160	408	613	323	485
399	600	167	251	144	217		34	701	1050	376	566	297	446
356	535	149	223	129	193		36	644	967	349	525	275	413
320	481						38	594	893	326	490	256	384
289	434						40	552	830	306	460	239	359
262	393						42	515	774	288	433	225	338
239	358						44	483	725	272	409	212	318
218	328						46	454	682	258	388	200	301
200	301						48	429	644	245	368	190	286
185	278						50	406	610	234	351	181	272
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1680	2530	1470	2210	1310	1970			9.91	28.2	6.85	20.4	6.75	19.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			43.2		37.8		33.6	
1300	1940	1130	1700	1010	1510			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			5660	443	4760	184	4080	159
431	647	438	657	405	607			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.20		2.21		2.18	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
317	476	187	281	160	240			3.59		5.07		5.05	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W27×						Shape		W27×					
102[c]		94[c]		84[c]		lb/ft		102		94[v]		84[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1040	1560	939	1410	819	1230	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	989	1490	902	1360	791	1190
949	1430	855	1290	743	1120		6	989	1490	902	1360	791	1190
918	1380	827	1240	717	1080		7	979	1470	889	1340	776	1170
884	1330	795	1200	689	1030		8	948	1420	860	1290	749	1130
847	1270	761	1140	658	988		9	917	1380	830	1250	722	1090
807	1210	724	1090	625	939		10	886	1330	801	1200	695	1040
765	1150	686	1030	590	887		11	855	1280	772	1160	668	1000
722	1080	646	971	555	834		12	823	1240	742	1120	641	964
677	1020	606	910	519	780		13	792	1190	713	1070	614	924
633	951	565	849	482	725		14	761	1140	684	1030	588	883
588	884	524	788	446	671		15	730	1100	655	984	561	843
544	817	484	727	411	617		16	699	1050	625	940	534	802
496	746	444	667	376	565		17	668	1000	596	896	507	762
447	671	400	601	341	512		18	637	958	567	852	477	717
401	603	359	539	306	460		19	605	910	527	791	433	651
362	544	324	487	276	415		20	555	834	482	725	396	595
299	450	268	402	228	343		22	474	713	411	618	336	505
251	378	225	338	192	288		24	413	620	356	535	290	437
214	322	192	288	163	246		26	364	547	313	471	255	383
185	277	165	248	141	212		28	325	488	279	419	226	340
161	242	144	216	123	184		30	293	441	251	377	203	305
141	212	126	190	108	162		32	267	401	228	343	184	276
125	188	112	168	95.6	144		34	245	368	209	314	167	252
							36	226	340	192	289	154	231
							38	210	315	178	268	142	214
							40	196	294	166	249	132	199
							42	183	276	155	233	123	186
							44	173	260	146	219	116	174
							46	163	245	138	207	109	164
							48	155	232	130	196	103	155
							50	147	221	124	186	97.5	147
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1170	1760	1070	1610	961	1440			6.66	19.0	6.57	18.5	6.41	17.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			30.0		27.6		24.7	
900	1350	828	1240	741	1110			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3620	139	3270	124	2850	106
363	544	308	463	287	431			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.15		2.12		2.07	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
141	212	126	189	108	162			5.12		5.14		5.17	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Note:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W24×						Shape		W24×					
370[h]		335[h]		306[h]		lb/ft		370[h]		335[h]		306[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4240	6380	3830	5750	3490	5250	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3670	5510	3310	4970	2990	4490
4050	6090	3650	5490	3330	5000		6	3670	5510	3310	4970	2990	4490
3980	5990	3590	5390	3270	4910		7	3670	5510	3310	4970	2990	4490
3910	5870	3520	5290	3210	4820		8	3670	5510	3310	4970	2990	4490
3820	5750	3440	5170	3130	4710		9	3670	5510	3310	4970	2990	4490
3730	5610	3360	5040	3050	4590		10	3670	5510	3310	4970	2990	4490
3630	5460	3260	4910	2970	4460		11	3640	5460	3270	4920	2950	4440
3530	5300	3170	4760	2880	4330		12	3600	5410	3240	4870	2920	4390
3420	5140	3070	4610	2790	4190		13	3570	5360	3210	4820	2890	4340
3300	4960	2960	4450	2690	4040		14	3530	5310	3170	4770	2850	4290
3180	4780	2850	4280	2580	3880		15	3500	5260	3140	4710	2820	4240
3060	4590	2730	4110	2480	3730		16	3460	5210	3100	4660	2780	4190
2930	4400	2620	3940	2370	3570		17	3430	5160	3070	4610	2750	4130
2800	4210	2500	3760	2260	3400		18	3400	5100	3030	4560	2720	4080
2670	4020	2380	3580	2150	3240		19	3360	5050	3000	4510	2680	4030
2540	3820	2260	3400	2050	3070		20	3330	5000	2970	4460	2650	3980
2280	3430	2030	3050	1830	2750		22	3260	4900	2900	4350	2580	3880
2030	3050	1800	2700	1620	2430		24	3190	4800	2830	4250	2510	3780
1790	2680	1580	2370	1410	2130		26	3120	4690	2760	4150	2450	3680
1550	2330	1370	2050	1220	1840		28	3050	4590	2690	4040	2380	3580
1350	2030	1190	1790	1070	1600		30	2990	4490	2620	3940	2310	3470
1190	1790	1050	1570	936	1410		32	2920	4390	2550	3840	2240	3370
1050	1580	926	1390	829	1250		34	2850	4280	2480	3730	2180	3270
939	1410	826	1240	740	1110		36	2780	4180	2420	3630	2110	3170
843	1270	741	1110	664	998		38	2710	4080	2350	3530	2040	3070
760	1140	669	1010	599	901		40	2640	3970	2280	3430	1970	2970
690	1040	607	912	544	817		42	2580	3870	2210	3320	1910	2860
628	944	553	831	495	744		44	2510	3770	2140	3220	1840	2760
575	864	506	760	453	681		46	2440	3670	2070	3120	1760	2650
528	794	465	698	416	625		48	2370	3560	2000	3010	1680	2530
487	731	428	644	384	576		50	2300	3460	1930	2900	1610	2420
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4240	6380	3830	5750	3490	5250			10.1	53.8	10.0	49.2	9.91	45.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			109		98.3		89.7	
3270	4910	2950	4420	2690	4040			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			13400	1160	11900	1030	10700	919
1110	1660	987	1480	888	1330			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.27		3.23		3.20	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
866	1300	772	1160	694	1040			3.39		3.41		3.41	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W24×						Shape		W24×					
279[h]		250		229		lb/ft		279[h]		250		229	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3190	4790	2860	4300	2620	3930	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2710	4070	2410	3630	2190	3290
3040	4560	2720	4090	2490	3740		6	2710	4070	2410	3630	2190	3290
2980	4480	2670	4020	2440	3670		7	2710	4070	2410	3630	2190	3290
2920	4390	2620	3930	2390	3590		8	2710	4070	2410	3630	2190	3290
2850	4290	2560	3840	2330	3510		9	2710	4070	2410	3630	2190	3290
2780	4180	2490	3740	2270	3410		10	2700	4060	2400	3610	2180	3270
2700	4060	2420	3630	2200	3310		11	2670	4010	2370	3560	2150	3220
2620	3940	2340	3520	2130	3210		12	2640	3960	2340	3510	2110	3180
2530	3810	2260	3400	2060	3090		13	2600	3910	2310	3470	2080	3130
2440	3670	2180	3280	1980	2980		14	2570	3860	2270	3420	2050	3080
2350	3530	2090	3150	1900	2860		15	2540	3810	2240	3370	2020	3030
2250	3380	2010	3010	1820	2740		16	2500	3760	2210	3320	1980	2980
2150	3230	1920	2880	1740	2610		17	2470	3710	2170	3270	1950	2930
2050	3080	1820	2740	1650	2490		18	2430	3660	2140	3220	1920	2880
1950	2930	1730	2600	1570	2360		19	2400	3610	2110	3170	1890	2840
1850	2780	1640	2470	1490	2230		20	2370	3560	2080	3120	1850	2790
1650	2480	1460	2200	1320	1980		22	2300	3460	2010	3020	1790	2690
1450	2190	1290	1930	1160	1740		24	2230	3360	1940	2920	1730	2590
1270	1910	1120	1680	1000	1510		26	2170	3260	1880	2820	1660	2500
1100	1650	965	1450	865	1300		28	2100	3160	1810	2720	1600	2400
955	1430	840	1260	754	1130		30	2030	3060	1750	2630	1530	2300
839	1260	739	1110	663	996		32	1970	2960	1680	2530	1470	2210
743	1120	654	983	587	882		34	1900	2860	1620	2430	1400	2110
663	996	584	877	523	787		36	1830	2760	1550	2330	1340	2010
595	894	524	787	470	706		38	1770	2650	1480	2230	1260	1890
537	807	473	711	424	637		40	1700	2550	1400	2110	1180	1780
487	732	429	645	385	578		42	1630	2450	1330	2000	1120	1680
444	667	391	587	350	527		44	1550	2330	1260	1890	1060	1590
406	610	357	537	321	482		46	1480	2220	1200	1800	1010	1510
373	560	328	493	294	443		48	1410	2120	1140	1720	958	1440
344	516	303	455	271	408		50	1350	2020	1090	1640	915	1380

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3190	4790	2860	4300	2620	3930	9.82	42.1	9.73	38.7	9.63	36.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	81.9		73.5		67.2	
2460	3690	2210	3310	2020	3020	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	9600	823	8490	724	7650	651
805	1210	711	1070	649	973	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.17		3.14		3.11	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
626	941	555	834	500	751	3.41		3.41		3.44	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W24×						Shape		W24×					
207		192		176		lb/ft		207		192		176	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2360	3550	2200	3310	2010	3020	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1970	2950	1810	2730	1660	2490
2240	3370	2090	3140	1910	2870		6	1970	2950	1810	2730	1660	2490
2200	3310	2050	3080	1870	2810		7	1970	2950	1810	2730	1660	2490
2150	3240	2000	3010	1830	2750		8	1970	2950	1810	2730	1660	2490
2100	3160	1960	2940	1780	2680		9	1970	2950	1810	2730	1660	2490
2050	3070	1900	2860	1740	2610		10	1950	2930	1800	2700	1640	2460
1980	2980	1840	2770	1680	2530		11	1920	2890	1770	2660	1610	2420
1920	2880	1780	2680	1630	2440		12	1890	2840	1740	2610	1580	2370
1850	2780	1720	2590	1570	2350		13	1860	2790	1710	2560	1550	2330
1780	2680	1650	2490	1510	2260		14	1820	2740	1670	2520	1520	2280
1710	2570	1590	2380	1440	2170		15	1790	2700	1640	2470	1490	2240
1630	2450	1520	2280	1380	2070		16	1760	2650	1610	2420	1460	2190
1560	2340	1450	2170	1310	1970		17	1730	2600	1580	2380	1430	2150
1480	2220	1370	2060	1250	1870		18	1700	2550	1550	2330	1400	2100
1400	2110	1300	1960	1180	1770		19	1670	2510	1520	2290	1370	2060
1330	1990	1230	1850	1110	1670		20	1640	2460	1490	2240	1340	2010
1180	1770	1090	1640	983	1480		22	1570	2360	1430	2150	1280	1920
1030	1550	953	1430	857	1290		24	1510	2270	1370	2050	1220	1830
889	1340	822	1240	738	1110		26	1450	2170	1310	1960	1160	1740
767	1150	709	1070	636	956		28	1380	2080	1240	1870	1100	1650
668	1000	618	928	554	833		30	1320	1980	1180	1780	1040	1560
587	882	543	816	487	732		32	1260	1890	1120	1680	963	1450
520	781	481	723	431	648		34	1190	1790	1040	1560	889	1340
464	697	429	645	385	578		36	1110	1660	966	1450	826	1240
416	626	385	579	345	519		38	1040	1560	903	1360	771	1160
376	565	347	522	312	468		40	975	1460	848	1270	723	1090
341	512	315	474	283	425		42	920	1380	800	1200	681	1020
310	467	287	432	258	387		44	871	1310	757	1140	643	967
284	427	263	395	236	354		46	827	1240	718	1080	610	916
261	392	241	363	216	325		48	787	1180	683	1030	580	871
240	361	222	334	199	300		50	752	1130	652	979	552	830
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2360	3550	2200	3310	2010	3020			9.54	33.6	9.51	32.2	9.42	30.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			60.7		56.5		51.7	
1820	2730	1700	2540	1550	2330			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			6820	578	6260	530	5680	479
581	872	537	806	491	737			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.08		3.07		3.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
444	668	409	614	373	561			3.44		3.42		3.45	

Note: Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W24×						Shape		W24×					
162		146[c]		131[c]		lb/ft		162		146		131	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1860	2800	1650	2490	1460	2190	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1520	2280	1360	2040	1200	1800
1760	2650	1580	2370	1390	2090		6	1520	2280	1360	2040	1200	1800
1730	2600	1550	2330	1370	2050		7	1520	2280	1360	2040	1200	1800
1690	2540	1520	2280	1340	2010		8	1520	2280	1360	2040	1200	1800
1650	2480	1480	2230	1310	1960		9	1520	2280	1360	2040	1200	1800
1610	2410	1440	2160	1270	1910		10	1500	2260	1340	2010	1180	1770
1560	2340	1390	2100	1240	1860		11	1470	2210	1310	1970	1150	1730
1510	2260	1350	2020	1200	1800		12	1440	2170	1280	1930	1130	1700
1450	2180	1300	1950	1160	1740		13	1420	2130	1260	1890	1100	1660
1390	2100	1240	1870	1110	1670		14	1390	2080	1230	1850	1080	1620
1340	2010	1190	1790	1060	1590		15	1360	2040	1200	1800	1050	1580
1280	1920	1140	1710	1010	1520		16	1330	2000	1170	1760	1020	1540
1220	1830	1080	1630	959	1440		17	1300	1950	1150	1720	999	1500
1160	1740	1030	1540	909	1370		18	1270	1910	1120	1680	973	1460
1090	1640	970	1460	858	1290		19	1240	1870	1090	1640	948	1420
1030	1550	915	1370	808	1210		20	1210	1820	1060	1600	922	1390
913	1370	806	1210	709	1070		22	1160	1740	1010	1520	870	1310
797	1200	701	1050	615	924		24	1100	1650	953	1430	819	1230
687	1030	602	904	526	790		26	1040	1560	899	1350	767	1150
592	890	519	780	453	681		28	983	1480	844	1270	697	1050
516	775	452	679	395	594		30	917	1380	763	1150	628	943
453	681	397	597	347	522		32	839	1260	696	1050	570	857
402	603	352	529	307	462		34	773	1160	639	960	523	785
358	538	314	472	274	412		36	716	1080	591	888	482	724
321	483	282	423	246	370		38	667	1000	549	826	447	672
290	436	254	382	222	334		40	625	939	513	771	417	626
263	395	231	346	201	303		42	587	883	482	724	390	586
240	360	210	316	184	276		44	554	833	454	682	367	551
219	330	192	289	168	252		46	525	789	429	645	346	520
201	303	176	265	154	232		48	498	749	407	611	328	493
186	279	163	244				50	474	713	387	581	311	468
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1860	2800	1670	2520	1500	2260			9.45	29.5	9.32	28.1	9.20	26.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			47.8		43.0		38.6	
1430	2150	1290	1940	1160	1740			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			5170	443	4580	391	4020	340
458	687	417	626	385	578			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.05		3.01		2.97	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
341	512	302	454	264	397			3.41		3.42		3.43	

[c] Shape is slender for compression with F_y = 65 ksi.

Note:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W24×						Shape		W24×					
117[c]		104[c]		103[c]		lb/ft		117		104[f]		103	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1270	1910	1110	1660	1110	1670	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1060	1590	925	1390	908	1370
1210	1820	1050	1580	998	1500		6	1060	1590	925	1390	908	1370
1190	1780	1030	1550	960	1440		7	1060	1590	925	1390	884	1330
1160	1750	1010	1520	918	1380		8	1060	1590	925	1390	855	1290
1140	1710	987	1480	873	1310		9	1060	1590	925	1390	827	1240
1110	1660	961	1440	825	1240		10	1040	1560	916	1380	798	1200
1070	1610	932	1400	774	1160		11	1020	1530	893	1340	769	1160
1040	1560	903	1360	717	1080		12	991	1490	871	1310	741	1110
1000	1510	871	1310	658	988		13	967	1450	849	1280	712	1070
967	1450	838	1260	599	900		14	943	1420	827	1240	683	1030
929	1400	804	1210	542	814		15	919	1380	805	1210	654	984
889	1340	770	1160	487	732		16	895	1350	783	1180	626	940
847	1270	735	1100	433	651		17	871	1310	760	1140	597	897
802	1200	699	1050	387	581		18	847	1270	738	1110	568	854
756	1140	663	997	347	521		19	823	1240	716	1080	529	796
711	1070	626	941	313	471		20	799	1200	694	1040	490	736
622	935	546	821	259	389		22	752	1130	650	976	425	639
538	808	471	708	217	327		24	704	1060	605	910	375	563
459	690	401	603	185	278		26	651	979	544	817	335	504
396	595	346	520	160	240		28	578	869	481	723	303	455
345	518	302	453	139	209		30	519	781	430	647	276	415
303	456	265	398	122	184		32	470	707	389	584	254	382
268	404	235	353				34	430	646	354	532	235	353
239	360	209	315				36	395	594	324	488	219	329
215	323	188	282				38	365	549	299	450	205	308
194	292	170	255				40	340	511	278	417	192	289
176	264	154	231				42	317	477	259	389	181	273
160	241	140	211				44	298	448	242	364	172	258
147	220	128	193				46	281	422	228	342	163	245
135	202	118	177				48	265	398	215	323	155	233
							50	251	378	203	305	148	222
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1340	2010	1190	1800	1180	1770			9.11	25.8	9.59	24.9	6.16	18.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			34.4		30.7		30.3	
1030	1550	921	1380	909	1360			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3540	297	3100	259	3000	119
347	521	313	470	350	526			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.94		2.91		1.99	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
232	348	198	298	135	202			3.44		3.47		5.03	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W24×						Shape		W24×					
94[c]		84[c]		76[c]		lb/ft		94		84		76[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
996	1500	864	1300	766	1150	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	824	1240	727	1090	649	975
894	1340	773	1160	683	1030		6	824	1240	727	1090	647	973
859	1290	742	1120	656	985		7	800	1200	703	1060	624	938
822	1230	709	1070	625	940		8	773	1160	678	1020	601	904
781	1170	672	1010	592	890		9	746	1120	653	981	578	869
737	1110	634	953	558	838		10	719	1080	628	943	555	834
692	1040	594	893	522	784		11	692	1040	603	906	532	799
646	971	554	832	485	729		12	665	1000	578	868	508	764
598	898	513	771	448	674		13	638	959	553	831	485	729
544	817	472	709	412	619		14	611	918	528	793	462	695
491	739	428	643	376	564		15	584	878	503	755	439	660
441	663	383	575	337	506		16	557	837	478	718	416	625
392	590	339	510	298	448		17	530	796	453	680	387	582
350	526	303	455	266	400		18	501	753	416	626	351	528
314	472	272	408	239	359		19	460	691	381	572	320	482
283	426	245	368	215	324		20	424	638	350	527	294	442
234	352	203	304	178	268		22	366	551	301	453	252	379
197	296	170	256	150	225		24	322	484	264	396	220	330
168	252	145	218	128	192		26	287	431	234	351	194	292
145	217	125	188	110	165		28	258	388	210	315	174	261
126	189	109	164	95.8	144		30	235	353	190	286	157	236
111	166	95.7	144	84.2	127		32	215	324	174	261	143	215
							34	199	299	160	241	131	198
							36	185	277	148	223	121	183
							38	172	259	138	208	113	170
							40	162	243	129	194	106	159
							42	152	229	122	183	99.0	149
							44	144	216	115	172	93.2	140
							46	136	205	109	163	88.1	132
							48	130	195	103	155	83.6	126
							50	124	186	98.2	148	79.5	119
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1080	1620	961	1440	872	1310			6.13	18.0	6.04	17.3	5.95	16.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			27.7		24.7		22.4	
831	1250	741	1110	672	1010			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			2700	109	2370	94.4	2100	82.5
325	488	295	442	246	369			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.98		1.95		1.92	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
122	183	106	159	92.8	139			4.98		5.02		5.05	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W24×						Shape		W24×					
68[c]		62[c]		55[c]		lb/ft		68[v]		62[v]		55[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
671	1010	601	903	515	775	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	574	863	496	746	435	653
595	894	485	729	411	618		6	570	856	454	682	393	591
570	856	449	675	379	570		7	548	824	430	646	371	558
542	815	411	618	346	520		8	527	792	405	609	349	524
512	770	372	559	311	468		9	505	759	381	572	326	490
481	723	333	500	276	416		10	484	727	356	535	304	457
449	675	294	442	243	365		11	462	694	332	499	282	423
416	625	251	378	211	317		12	441	662	307	462	259	390
383	576	214	322	180	270		13	419	630	274	411	225	338
350	526	185	277	155	233		14	398	597	241	362	197	296
318	478	161	242	135	203		15	376	565	214	322	175	263
287	431	141	212	119	178		16	354	533	192	289	157	235
254	382	125	188	105	158		17	322	483	174	262	141	212
226	340	112	168	93.7	141		18	291	437	159	239	129	193
203	305	100	151	84.1	126		19	265	398	146	219	118	177
183	276	90.4	136	75.9	114		20	243	365	135	202	108	163
152	228	74.7	112	62.7	94.3		22	207	311	116	175	93.3	140
127	191						24	180	270	102	154	81.7	123
109	163						26	158	238	91.2	137	72.6	109
93.6	141						28	141	212	82.2	124	65.2	98.0
81.5	123						30	127	191	74.8	112	59.1	88.9
							32	116	174	68.7	103	54.1	81.3
							34	106	159	63.4	95.3	49.8	74.9
							36	97.5	147	58.9	88.6	46.2	69.4
							38	90.4	136	55.1	82.8	43.1	64.7
							40	84.3	127	51.7	77.7	40.3	60.6
							42	78.9	119	48.7	73.2	37.9	57.0
							44	74.2	112	46.0	69.2	35.8	53.8
							46	70.0	105	43.6	65.6	33.9	51.0
							48	66.3	99.6	41.5	62.4	32.2	48.4
							50	62.9	94.6	39.6	59.5	30.7	46.1
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
782	1180	708	1060	631	948			5.79	16.2	4.28	12.4	4.15	12.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			20.1		18.2		16.2	
603	905	546	819	486	729			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1830	70.4	1550	34.5	1350	29.1
230	345	238	358	214	322			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.87		1.38		1.34	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
79.5	119	50.9	76.4	43.1	64.7			5.11		6.69		6.80	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W21×						Shape		W21×					
275[h]		248		223		lb/ft		275[h]		248		223	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3180	4790	2870	4320	2590	3890	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2430	3650	2180	3270	1950	2930
3020	4550	2730	4100	2450	3690		6	2430	3650	2180	3270	1950	2930
2970	4460	2680	4020	2410	3620		7	2430	3650	2180	3270	1950	2930
2910	4370	2620	3940	2350	3540		8	2430	3650	2180	3270	1950	2930
2840	4260	2560	3840	2300	3450		9	2430	3650	2180	3270	1950	2930
2760	4150	2490	3740	2230	3350		10	2420	3640	2170	3250	1930	2910
2680	4030	2410	3630	2160	3250		11	2390	3600	2140	3220	1910	2870
2590	3900	2330	3510	2090	3140		12	2370	3560	2120	3180	1890	2830
2500	3760	2250	3380	2020	3030		13	2340	3520	2090	3140	1860	2800
2410	3620	2160	3250	1940	2910		14	2320	3490	2070	3110	1840	2760
2310	3470	2080	3120	1850	2790		15	2290	3450	2040	3070	1810	2720
2210	3320	1990	2980	1770	2660		16	2270	3410	2020	3030	1790	2690
2110	3170	1890	2850	1690	2540		17	2240	3370	1990	2990	1760	2650
2010	3020	1800	2710	1600	2410		18	2220	3330	1970	2960	1740	2610
1900	2860	1710	2560	1520	2280		19	2190	3300	1940	2920	1710	2570
1800	2710	1610	2420	1430	2150		20	2170	3260	1920	2880	1690	2540
1600	2400	1430	2150	1260	1900		22	2120	3180	1870	2810	1640	2460
1400	2110	1250	1880	1100	1660		24	2070	3110	1820	2730	1590	2390
1210	1820	1080	1620	949	1430		26	2020	3030	1770	2660	1540	2310
1050	1570	932	1400	818	1230		28	1970	2960	1720	2580	1490	2240
912	1370	812	1220	713	1070		30	1920	2880	1670	2510	1440	2160
801	1200	714	1070	626	942		32	1870	2810	1620	2440	1390	2090
710	1070	632	950	555	834		34	1820	2730	1570	2360	1340	2020
633	952	564	847	495	744		36	1770	2660	1520	2290	1290	1940
568	854	506	761	444	668		38	1720	2580	1470	2210	1240	1870
513	771	457	686	401	603		40	1670	2510	1420	2140	1190	1790
465	699	414	623	364	547		42	1620	2430	1370	2060	1130	1700
424	637	377	567	331	498		44	1570	2350	1320	1990	1080	1620
388	583	345	519	303	456		46	1520	2280	1270	1900	1020	1540
356	535	317	477	278	418		48	1470	2200	1210	1820	978	1470
328	493	292	439	257	386		50	1410	2120	1160	1740	936	1410

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3180	4790	2870	4320	2590	3890	9.60	48.7	9.54	44.6	9.42	40.5
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	81.8		73.8		66.5	
2450	3680	2210	3320	2000	2990	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	7690	787	6830	699	6080	614
764	1150	678	1020	608	913	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.10		3.08		3.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
620	931	551	829	487	731	3.13		3.12		3.14	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W21×						Shape		W21×					
201		182		166		lb/ft		201		182		166	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2310	3470	2090	3140	1900	2850	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1720	2580	1540	2320	1400	2110
2190	3290	1980	2970	1800	2700		6	1720	2580	1540	2320	1400	2110
2140	3220	1940	2910	1760	2650		7	1720	2580	1540	2320	1400	2110
2100	3150	1890	2840	1720	2590		8	1720	2580	1540	2320	1400	2110
2040	3070	1840	2770	1680	2520		9	1720	2580	1540	2320	1400	2110
1990	2990	1790	2690	1630	2450		10	1700	2560	1530	2300	1380	2080
1920	2890	1740	2610	1580	2370		11	1680	2520	1500	2260	1360	2040
1860	2790	1680	2520	1520	2290		12	1650	2490	1480	2220	1340	2010
1790	2690	1610	2420	1470	2200		13	1630	2450	1450	2190	1310	1970
1720	2590	1550	2330	1410	2110		14	1600	2410	1430	2150	1290	1940
1650	2470	1480	2230	1350	2020		15	1580	2380	1410	2110	1270	1900
1570	2360	1410	2120	1280	1930		16	1560	2340	1380	2080	1240	1870
1500	2250	1340	2020	1220	1830		17	1530	2300	1360	2040	1220	1830
1420	2130	1270	1920	1160	1740		18	1510	2260	1330	2010	1200	1800
1340	2020	1200	1810	1090	1640		19	1480	2230	1310	1970	1170	1760
1270	1900	1140	1710	1030	1550		20	1460	2190	1290	1930	1150	1730
1120	1680	999	1500	905	1360		22	1410	2120	1240	1860	1100	1660
972	1460	869	1310	786	1180		24	1360	2040	1190	1790	1060	1590
835	1260	745	1120	674	1010		26	1310	1970	1140	1720	1010	1520
720	1080	642	965	581	873		28	1260	1890	1090	1650	961	1440
627	943	559	841	506	760		30	1210	1820	1050	1570	914	1370
551	829	492	739	445	668		32	1160	1750	999	1500	867	1300
488	734	436	655	394	592		34	1110	1670	951	1430	805	1210
436	655	389	584	351	528		36	1060	1600	888	1330	750	1130
391	588	349	524	315	474		38	1000	1510	833	1250	703	1060
353	530	315	473	285	428		40	947	1420	784	1180	661	993
320	481	285	429	258	388		42	896	1350	741	1110	624	938
292	438	260	391	235	354		44	850	1280	703	1060	591	888
267	401	238	358	215	323		46	809	1220	668	1000	562	844
245	368	219	328	198	297		48	771	1160	637	957	535	804
226	339	201	303				50	737	1110	609	915	511	768
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2310	3470	2090	3140	1900	2850			9.36	36.7	9.29	34.2	9.26	32.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			59.3		53.6		48.8	
1780	2670	1610	2410	1460	2200			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			5310	542	4730	483	4280	435
544	816	490	735	439	658			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.02		3.00		2.99	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
431	648	386	580	350	527			3.14		3.13		3.13	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W21×						Shape		W21×					
147		132		122		lb/ft		147		132		122	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1680	2530	1510	2270	1400	2100	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1210	1820	1080	1620	996	1500
1590	2390	1430	2140	1320	1980		6	1210	1820	1080	1620	996	1500
1560	2340	1400	2100	1290	1940		7	1210	1820	1080	1620	996	1500
1520	2290	1360	2050	1260	1900		8	1210	1820	1080	1620	996	1500
1480	2220	1330	1990	1230	1840		9	1210	1820	1080	1620	996	1500
1440	2160	1290	1940	1190	1790		10	1190	1790	1060	1590	976	1470
1390	2090	1250	1870	1150	1730		11	1170	1760	1040	1560	955	1440
1340	2020	1200	1800	1110	1670		12	1150	1720	1020	1530	935	1400
1290	1940	1150	1730	1070	1600		13	1120	1690	996	1500	914	1370
1240	1860	1100	1660	1020	1530		14	1100	1650	975	1460	893	1340
1180	1770	1050	1590	974	1460		15	1080	1620	953	1430	872	1310
1120	1690	1000	1510	926	1390		16	1060	1590	932	1400	852	1280
1070	1600	953	1430	879	1320		17	1030	1550	910	1370	831	1250
1010	1520	901	1350	831	1250		18	1010	1520	889	1340	810	1220
953	1430	849	1280	783	1180		19	988	1490	868	1300	790	1190
896	1350	798	1200	735	1110		20	966	1450	846	1270	769	1160
785	1180	698	1050	642	966		22	921	1380	803	1210	728	1090
680	1020	603	906	554	833		24	876	1320	760	1140	686	1030
580	872	514	773	473	710		26	831	1250	718	1080	645	969
501	752	443	667	408	613		28	786	1180	675	1010	594	892
436	655	386	581	355	534		30	737	1110	615	924	538	808
383	576	340	510	312	469		32	676	1020	563	846	491	738
339	510	301	452	276	415		34	625	939	519	779	452	679
303	455	268	403	247	371		36	581	873	481	723	418	629
272	408	241	362	221	333		38	542	815	448	674	390	585
245	369	217	327	200	300		40	509	765	420	631	364	548
222	334	197	296	181	272		42	480	721	395	594	342	515
203	305	180	270	165	248		44	453	681	373	561	323	485
185	279	164	247	151	227		46	430	646	353	531	306	459
170	256	151	227	139	208		48	409	615	336	505	290	436
							50	390	586	320	481	276	415
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1680	2530	1510	2270	1400	2100			9.14	29.7	9.08	28.2	9.05	27.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			43.2		38.8		35.9	
1300	1940	1160	1750	1080	1620			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3630	376	3220	333	2960	305
414	621	368	553	339	508			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.95		2.93		2.92	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
300	451	267	401	245	369			3.11		3.11		3.11	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W21×						Shape		W21×					
111[c]		101[c]		93[c]		lb/ft		111		101		93	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1250	1870	1120	1680	1060	1590	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	905	1360	821	1230	717	1080
1180	1780	1060	1590	919	1380		6	905	1360	821	1230	710	1070
1160	1750	1040	1560	872	1310		7	905	1360	821	1230	687	1030
1140	1710	1020	1530	820	1230		8	905	1360	821	1230	663	997
1110	1670	992	1490	766	1150		9	905	1360	820	1230	640	962
1080	1620	965	1450	709	1070		10	885	1330	801	1200	617	927
1040	1570	936	1410	651	979		11	865	1300	783	1180	594	892
1000	1510	905	1360	594	892		12	845	1270	764	1150	570	857
964	1450	873	1310	537	806		13	826	1240	745	1120	547	822
922	1390	839	1260	481	723		14	806	1210	727	1090	524	787
880	1320	802	1210	428	643		15	786	1180	708	1060	500	752
837	1260	762	1150	377	566		16	766	1150	690	1040	477	717
793	1190	722	1090	334	502		17	747	1120	671	1010	454	682
749	1130	682	1030	298	448		18	727	1090	652	980	427	642
705	1060	642	965	267	402		19	707	1060	634	952	395	594
662	995	602	905	241	363		20	687	1030	615	925	367	551
577	867	525	789	199	300		22	648	974	578	869	321	482
497	747	451	678	167	252		24	608	914	541	813	285	429
423	636	384	578	143	215		26	569	855	495	744	257	386
365	549	331	498	123	185		28	510	767	441	663	233	351
318	478	289	434	107	161		30	461	692	397	597	214	321
279	420	254	381				32	420	631	361	543	197	297
248	372	225	338				34	385	579	331	497	183	276
221	332	200	301				36	356	535	305	458	171	258
198	298	180	270				38	331	497	283	425	161	242
179	269	162	244				40	309	464	263	396	151	228
162	244	147	221				42	290	436	247	371	143	215
148	222	134	202				44	273	410	232	349	136	204
135	203	123	185				46	258	388	219	329	129	194
124	187	113	169				48	245	367	207	311	123	185
							50	232	349	197	296	118	177
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1270	1910	1160	1740	1060	1600			8.98	26.2	8.95	25.4	5.70	17.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			32.6		29.8		27.3	
978	1470	894	1340	819	1230			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			2670	274	2420	248	2070	92.9
307	461	278	417	326	489			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.90		2.89		1.84	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
221	332	200	301	113	169			3.12		3.12		4.73	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W21×						Shape		W21×					
83[c]		73[c]		68[c]		lb/ft		83		73		68	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
913	1370	777	1170	711	1070	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	636	956	558	839	519	780
804	1210	683	1030	624	937		6	628	945	550	827	511	768
768	1150	651	979	595	894		7	607	912	530	796	491	738
728	1090	617	928	563	847		8	585	879	510	766	472	709
682	1030	581	873	530	796		9	563	846	490	736	452	680
631	949	542	815	494	743		10	541	813	470	706	433	651
579	870	503	756	458	688		11	519	780	450	676	414	622
527	792	459	689	421	633		12	497	747	429	645	394	593
476	715	413	621	381	573		13	475	714	409	615	375	563
426	641	369	555	340	511		14	453	681	389	585	355	534
379	569	327	491	301	452		15	431	648	369	555	336	505
333	501	287	432	264	397		16	409	615	349	525	315	474
295	444	254	382	234	352		17	387	581	320	481	285	429
263	396	227	341	209	314		18	354	532	292	440	260	391
236	355	204	306	187	282		19	326	491	269	404	239	359
213	320	184	276	169	254		20	302	455	248	373	220	331
176	265	152	228	140	210		22	264	396	215	324	191	286
148	223	128	192	117	176		24	233	351	190	285	168	252
126	190	109	163	100	150		26	209	314	169	255	149	224
109	164	93.8	141	86.3	130		28	190	285	153	230	135	202
94.8	142	81.7	123	75.2	113		30	173	261	140	210	122	184
							32	160	240	128	193	112	169
							34	148	223	119	178	104	156
							36	138	208	110	166	96.4	145
							38	129	195	103	155	90.0	135
							40	122	183	96.9	146	84.5	127
							42	115	173	91.3	137	79.6	120
							44	109	164	86.4	130	75.2	113
							46	104	156	82.0	123	71.3	107
							48	98.6	148	78.0	117	67.8	102
							50	94.2	142	74.4	112	64.7	97.2
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
950	1430	837	1260	778	1170			5.67	17.0	5.61	16.3	5.58	15.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			24.4		21.5		20.0	
732	1100	645	968	600	900			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1830	81.4	1600	70.6	1480	64.7
287	430	251	376	236	354			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.83		1.81		1.80	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
98.9	149	86.3	130	79.1	119			4.74		4.77		4.78	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W21×						Shape		W21×					
62[c]		57[c]		55[c]		lb/ft		62		57		55[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
636	956	575	865	549	825	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	467	702	418	629	409	614
556	835	458	689	477	717		6	458	688	381	572	398	598
529	796	422	634	453	682		7	440	661	360	541	381	573
500	752	384	577	428	643		8	422	635	339	510	365	548
469	706	345	518	400	602		9	404	608	319	479	348	523
437	657	306	460	372	559		10	386	581	298	448	332	499
404	607	262	394	343	515		11	369	554	277	417	315	474
371	557	221	332	314	471		12	351	527	257	386	298	449
338	508	188	283	285	428		13	333	500	227	341	282	424
303	455	162	244	256	385		14	315	474	201	302	265	399
266	400	141	212	225	338		15	297	447	180	270	248	372
234	351	124	187	198	297		16	273	410	163	244	221	332
207	311	110	165	175	263		17	246	370	148	222	199	299
185	278	98.1	147	156	235		18	224	337	136	204	181	272
166	249	88.0	132	140	211		19	205	309	125	188	165	248
150	225	79.4	119	127	190		20	189	284	116	175	152	228
124	186	65.6	98.7	105	157		22	163	245	101	153	130	195
104	156			87.9	132		24	143	214	90.0	135	113	170
88.5	133			74.9	113		26	127	190	80.8	121	100	151
76.3	115			64.6	97.0		28	114	171	73.4	110	89.7	135
							30	103	155	67.2	101	81.2	122
							32	94.4	142	62.0	93.1	74.0	111
							34	87.0	131	57.5	86.4	68.0	102
							36	80.7	121	53.7	80.7	62.9	94.5
							38	75.2	113	50.3	75.6	58.5	87.9
							40	70.4	106	47.4	71.2	54.7	82.2
							42	66.2	99.6	44.8	67.3	51.3	77.1
							44	62.5	94.0	42.4	63.8	48.3	72.7
							46	59.2	89.0	40.3	60.6	45.7	68.7
							48	56.3	84.5	38.5	57.8	43.3	65.2
							50	53.6	80.5	36.7	55.2	41.2	62.0
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
712	1070	650	977	631	948			5.48	15.5	4.18	12.2	5.36	14.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			18.3		16.7		16.2	
549	824	501	752	486	729			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1330	57.5	1170	30.6	1140	48.4
218	328	222	333	182	274			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.77		1.35		1.73	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
70.4	106	48.0	72.2	59.7	89.7			4.82		6.19		4.86	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W21×						Shape		W21×					
50[c]		48[c]		44[c]		lb/ft		50[v]		48[f], [v]		44[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
491	739	463	695	420	631	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	357	536	332	499	309	465
386	579	398	598	325	488		6	320	481	332	499	274	411
353	531	377	566	296	445		7	301	453	319	480	257	386
319	480	354	532	266	400		8	283	425	305	458	240	360
285	428	330	495	236	355		9	264	397	290	435	223	335
251	377	305	458	206	310		10	246	369	275	413	206	309
214	322	279	419	178	267		11	227	341	260	391	189	284
180	271	254	381	150	225		12	204	307	245	368	164	246
153	231	229	344	127	192		13	178	267	230	346	142	214
132	199	204	307	110	165		14	157	236	215	324	125	188
115	173	180	271	95.7	144		15	140	210	193	290	111	167
101	152	158	238	84.2	126		16	126	189	172	259	99.9	150
89.7	135	140	211	74.5	112		17	114	172	155	233	90.4	136
80.0	120	125	188	66.5	99.9		18	105	157	140	210	82.4	124
71.8	108	112	169	59.7	89.7		19	96.2	145	128	192	75.6	114
64.8	97.4	101	152	53.9	80.9		20	89.0	134	117	176	69.8	105
		83.8	126				22	77.3	116	99.8	150	60.3	90.7
		70.4	106				24	68.2	103	86.7	130	53.0	79.7
		60.0	90.2				26	61.0	91.7	76.3	115	47.3	71.0
							28	55.2	82.9	68.1	102	42.6	64.0
							30	50.4	75.7	61.3	92.2	38.8	58.3
							32	46.3	69.6	55.8	83.8	35.6	53.4
							34	42.9	64.5	51.1	76.8	32.8	49.4
							36	39.9	60.0	47.1	70.8	30.5	45.9
							38	37.4	56.2	43.7	65.7	28.5	42.8
							40	35.1	52.8	40.7	61.2	26.7	40.2
							42	33.1	49.8	38.2	57.4	25.2	37.9
							44	31.4	47.2	35.9	53.9	23.8	35.8
							46	29.8	44.8	33.9	50.9	22.6	33.9
							48	28.4	42.6	32.1	48.2	21.5	32.3
							50	27.1	40.7	30.4	45.8	20.5	30.8

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
572	860	549	825	506	761	4.03	11.7	6.15	14.3	3.90	11.2
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	14.7		14.1		13.0	
441	662	423	635	390	585	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	984	24.9	959	38.7	843	20.7
185	277	168	253	169	254	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						1.30		1.66		1.26	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
39.6	59.5	45.4	68.2	33.1	49.7	6.29		4.96		6.40	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18×						Shape		W18×					
311[h]		283[h]		258[h]		lb/ft		311[h]		283[h]		258[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3570	5360	3240	4870	2960	4450	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2450	3680	2190	3300	1980	2980
3370	5060	3060	4600	2790	4190		6	2450	3680	2190	3300	1980	2980
3300	4960	3000	4500	2730	4100		7	2450	3680	2190	3300	1980	2980
3220	4850	2920	4390	2660	4000		8	2450	3680	2190	3300	1980	2980
3140	4720	2840	4280	2590	3890		9	2450	3680	2190	3300	1980	2980
3050	4580	2760	4150	2510	3770		10	2430	3650	2170	3270	1960	2950
2950	4430	2670	4010	2420	3640		11	2410	3620	2150	3240	1940	2920
2840	4270	2570	3860	2330	3510		12	2390	3590	2140	3210	1920	2890
2730	4110	2470	3710	2240	3360		13	2370	3560	2120	3180	1900	2860
2620	3940	2360	3550	2140	3220		14	2350	3540	2100	3150	1890	2830
2500	3760	2250	3390	2040	3070		15	2330	3510	2080	3120	1870	2810
2380	3580	2140	3220	1940	2910		16	2310	3480	2060	3100	1850	2780
2260	3400	2030	3050	1840	2760		17	2290	3450	2040	3070	1830	2750
2140	3220	1920	2890	1730	2600		18	2280	3420	2020	3040	1810	2720
2020	3040	1810	2720	1630	2450		19	2260	3390	2000	3010	1790	2690
1900	2860	1700	2550	1530	2300		20	2240	3360	1980	2980	1770	2660
1670	2500	1480	2230	1330	2000		22	2200	3300	1950	2930	1740	2610
1440	2170	1280	1920	1140	1720		24	2160	3250	1910	2870	1700	2550
1230	1850	1090	1640	973	1460		26	2120	3190	1870	2810	1660	2490
1060	1600	939	1410	839	1260		28	2080	3130	1830	2750	1620	2440
925	1390	818	1230	731	1100		30	2040	3070	1790	2700	1580	2380
813	1220	719	1080	643	966		32	2010	3010	1760	2640	1550	2320
720	1080	637	957	569	855		34	1970	2960	1720	2580	1510	2270
642	965	568	854	508	763		36	1930	2900	1680	2530	1470	2210
576	866	510	766	456	685		38	1890	2840	1640	2470	1430	2150
520	782	460	692	411	618		40	1850	2780	1600	2410	1400	2100
472	709	417	627	373	561		42	1810	2730	1570	2350	1360	2040
430	646	380	572	340	511		44	1780	2670	1530	2300	1320	1980
393	591	348	523	311	467		46	1740	2610	1490	2240	1280	1930
361	543	320	480	286	429		48	1700	2550	1450	2180	1240	1870
							50	1660	2490	1410	2130	1210	1810

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3570	5360	3240	4870	2960	4450	9.14	62.6	9.02	57.0	8.92	52.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	91.6		83.3		76.0	
2750	4120	2500	3750	2280	3420	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	6970	795	6170	704	5510	628
881	1320	797	1200	716	1070	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.95		2.91		2.88	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
671	1010	600	902	538	809	2.96		2.96		2.96	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18×						Shape		W18×					
234[h]		211		192		lb/ft		234[h]		211		192	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2670	4010	2420	3640	2190	3290	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1780	2680	1590	2390	1430	2150
2510	3780	2280	3430	2050	3090		6	1780	2680	1590	2390	1430	2150
2460	3700	2230	3350	2010	3020		7	1780	2680	1590	2390	1430	2150
2400	3600	2170	3260	1950	2940		8	1780	2680	1590	2390	1430	2150
2330	3500	2110	3170	1900	2850		9	1780	2670	1580	2380	1430	2140
2260	3390	2040	3070	1830	2760		10	1760	2640	1570	2350	1410	2120
2180	3270	1970	2960	1770	2660		11	1740	2620	1550	2330	1390	2090
2090	3150	1890	2840	1700	2550		12	1720	2590	1530	2300	1370	2060
2010	3020	1810	2720	1630	2440		13	1700	2560	1510	2270	1350	2040
1920	2880	1730	2600	1550	2330		14	1680	2530	1490	2240	1340	2010
1830	2750	1650	2470	1470	2210		15	1670	2500	1470	2220	1320	1980
1730	2610	1560	2350	1390	2100		16	1650	2480	1460	2190	1300	1950
1640	2470	1470	2220	1320	1980		17	1630	2450	1440	2160	1280	1930
1550	2320	1390	2090	1240	1860		18	1610	2420	1420	2130	1260	1900
1450	2180	1300	1960	1160	1740		19	1590	2390	1400	2100	1240	1870
1360	2050	1220	1830	1080	1630		20	1570	2360	1380	2080	1230	1840
1180	1780	1050	1580	934	1400		22	1540	2310	1350	2020	1190	1790
1010	1520	898	1350	793	1190		24	1500	2250	1310	1970	1150	1730
860	1290	765	1150	675	1020		26	1460	2200	1270	1910	1120	1680
742	1120	660	991	582	875		28	1420	2140	1230	1860	1080	1620
646	971	575	864	507	763		30	1390	2080	1200	1800	1040	1570
568	854	505	759	446	670		32	1350	2030	1160	1750	1010	1510
503	756	447	672	395	594		34	1310	1970	1120	1690	970	1460
449	675	399	600	352	530		36	1280	1920	1090	1630	934	1400
403	605	358	538	316	475		38	1240	1860	1050	1580	897	1350
364	546	323	486	285	429		40	1200	1810	1010	1520	860	1290
330	496	293	441	259	389		42	1160	1750	977	1470	815	1230
300	452	267	401	236	355		44	1130	1690	937	1410	776	1170
275	413	244	367	216	324		46	1090	1640	894	1340	740	1110
							48	1050	1580	854	1280	707	1060
							50	1010	1510	818	1230	677	1020

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2670	4010	2420	3640	2190	3290	8.83	47.7	8.74	43.4	8.64	39.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	68.6		62.3		56.2	
2060	3090	1870	2800	1690	2530	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	4900	558	4330	493	3870	440
636	955	570	856	509	764	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.85		2.82		2.79	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
483	726	428	644	386	580	2.96		2.96		2.97	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18×						Shape		W18×					
175		158		143		lb/ft		175		158		143	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2000	3010	1800	2710	1630	2460	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1290	1940	1150	1740	1040	1570
1880	2820	1690	2540	1530	2300		6	1290	1940	1150	1740	1040	1570
1830	2750	1650	2480	1490	2240		7	1290	1940	1150	1740	1040	1570
1780	2680	1600	2410	1450	2180		8	1290	1940	1150	1740	1040	1570
1730	2600	1550	2340	1410	2120		9	1280	1930	1150	1720	1030	1550
1670	2510	1500	2260	1360	2040		10	1260	1900	1130	1700	1020	1530
1610	2420	1450	2170	1310	1960		11	1250	1870	1110	1670	1000	1500
1540	2320	1390	2080	1250	1880		12	1230	1850	1090	1640	982	1480
1480	2220	1320	1990	1200	1800		13	1210	1820	1070	1620	965	1450
1410	2110	1260	1890	1140	1710		14	1190	1790	1060	1590	947	1420
1340	2010	1200	1800	1080	1620		15	1170	1770	1040	1560	930	1400
1260	1900	1130	1700	1020	1530		16	1160	1740	1020	1540	912	1370
1190	1790	1060	1600	958	1440		17	1140	1710	1000	1510	895	1350
1120	1680	998	1500	898	1350		18	1120	1680	986	1480	878	1320
1050	1570	933	1400	838	1260		19	1100	1660	968	1460	860	1290
975	1470	869	1310	780	1170		20	1080	1630	951	1430	843	1270
838	1260	746	1120	668	1000		22	1050	1580	915	1380	808	1210
710	1070	630	947	563	846		24	1010	1520	880	1320	773	1160
605	909	537	807	480	721		26	977	1470	844	1270	738	1110
521	784	463	696	414	622		28	941	1410	809	1220	703	1060
454	683	403	606	360	542		30	904	1360	773	1160	669	1000
399	600	354	533	317	476		32	868	1310	738	1110	631	948
354	531	314	472	281	422		34	832	1250	701	1050	587	883
315	474	280	421	250	376		36	796	1200	657	988	549	826
283	425	251	378	225	338		38	754	1130	618	929	516	776
255	384	227	341	203	305		40	713	1070	584	877	487	732
232	348	206	309	184	276		42	676	1020	553	831	461	693
211	317	187	282	168	252		44	643	966	525	790	438	658
							46	612	920	500	752	417	626
							48	585	879	478	718	398	598
							50	560	842	457	687	380	572
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2000	3010	1800	2710	1630	2460			8.55	36.9	8.49	33.9	8.43	31.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			51.4		46.3		42.0	
1540	2310	1390	2080	1260	1890			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3450	391	3060	347	2750	311
463	694	415	622	370	555			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.76		2.74		2.72	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
344	517	307	462	277	416			2.97		2.96		2.97	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18×						Shape		W18×					
130		119		106		lb/ft		130		119		106	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1490	2240	1370	2050	1210	1820	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	941	1410	850	1280	746	1120
1390	2090	1280	1920	1130	1700		6	941	1410	850	1280	746	1120
1360	2040	1250	1870	1100	1650		7	941	1410	850	1280	746	1120
1320	1990	1210	1820	1070	1610		8	941	1410	850	1280	746	1120
1280	1920	1170	1760	1030	1560		9	930	1400	839	1260	734	1100
1240	1860	1130	1700	998	1500		10	913	1370	822	1240	718	1080
1190	1790	1090	1630	958	1440		11	896	1350	805	1210	702	1060
1140	1710	1040	1560	916	1380		12	879	1320	789	1190	687	1030
1090	1630	992	1490	873	1310		13	862	1300	772	1160	671	1010
1030	1550	943	1420	828	1250		14	845	1270	755	1140	655	984
977	1470	893	1340	783	1180		15	828	1240	739	1110	639	961
922	1390	842	1270	738	1110		16	811	1220	722	1090	623	937
866	1300	791	1190	692	1040		17	794	1190	705	1060	608	913
811	1220	740	1110	647	972		18	777	1170	689	1040	592	890
757	1140	690	1040	602	905		19	760	1140	672	1010	576	866
703	1060	641	964	558	839		20	743	1120	655	985	560	842
601	903	547	822	475	713		22	709	1060	622	935	529	795
506	760	460	692	399	599		24	675	1010	589	885	497	747
431	648	392	589	340	511		26	640	963	555	835	465	700
372	559	338	508	293	440		28	606	912	520	782	421	633
324	487	295	443	255	384		30	568	854	476	716	384	578
285	428	259	389	224	337		32	525	789	439	660	353	531
252	379	229	345	199	299		34	488	734	407	612	327	492
225	338	205	307	177	266		36	456	686	380	571	305	458
202	303	184	276	159	239		38	428	644	356	535	285	428
182	274	166	249	144	216		40	404	607	335	504	268	402
165	248	150	226	130	196		42	382	574	316	476	252	379
151	226	137	206	119	178		44	362	544	300	451	239	359
							46	345	518	285	428	227	341
							48	329	494	272	408	216	325
							50	314	472	259	390	206	310
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1490	2240	1370	2050	1210	1820			8.36	29.5	8.33	27.9	8.24	26.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			38.3		35.1		31.1	
1150	1720	1050	1580	933	1400			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			2460	278	2190	253	1910	220
336	504	324	485	287	430			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.70		2.69		2.66	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
249	374	224	337	196	295			2.97		2.94		2.95	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18×						Shape		W18×					
97		86[c]		76[c]		lb/ft		97		86		76[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1110	1670	973	1460	835	1260	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	684	1030	603	907	527	793
1030	1550	913	1370	783	1180		6	684	1030	603	907	527	793
1010	1520	892	1340	765	1150		7	684	1030	603	907	527	793
979	1470	868	1300	744	1120		8	684	1030	603	907	527	793
947	1420	839	1260	722	1090		9	672	1010	591	888	516	776
913	1370	808	1210	698	1050		10	657	988	577	867	503	756
876	1320	775	1160	672	1010		11	642	965	562	845	490	736
838	1260	741	1110	645	969		12	627	942	548	823	476	716
798	1200	705	1060	617	927		13	611	919	533	802	463	696
757	1140	668	1000	585	880		14	596	896	519	780	450	676
715	1080	631	948	552	830		15	581	873	505	759	436	656
674	1010	593	892	519	780		16	566	850	490	737	423	636
632	949	556	835	486	730		17	551	827	476	715	410	616
590	887	519	780	453	680		18	535	805	462	694	396	596
549	825	482	724	420	632		19	520	782	447	672	383	575
509	765	446	671	389	584		20	505	759	433	650	370	555
432	649	377	567	328	492		22	474	713	404	607	343	515
363	545	317	477	275	414		24	444	667	374	562	306	461
309	464	270	406	235	353		26	406	610	332	499	271	407
266	400	233	350	202	304		28	366	550	298	448	242	364
232	349	203	305	176	265		30	333	501	270	406	219	329
204	307	178	268	155	233		32	306	460	247	372	200	300
181	272	158	237	137	206		34	283	425	228	343	183	276
161	242	141	212	122	184		36	263	395	211	318	170	255
145	217	126	190	110	165		38	245	369	197	296	158	237
131	196	114	172	99.1	149		40	230	346	184	277	147	221
118	178	104	156	89.9	135		42	217	326	173	261	138	208
108	162						44	205	308	164	246	130	196
							46	194	292	155	233	123	185
							48	185	278	147	221	117	175
							50	176	265	140	211	111	167

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1110	1670	985	1480	868	1300	8.21	25.1	8.15	23.9	8.18	22.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	28.5		25.3		22.3	
855	1280	759	1140	669	1000	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1750	201	1530	175	1330	152
259	388	230	344	201	302	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.65		2.63		2.61	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
179	270	157	236	136	205	2.95		2.95		2.96	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18×						Shape		W18×					
71[c]		65[c]		60[c]		lb/ft		71		65		60	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
808	1210	719	1080	649	975	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	474	712	431	648	399	600
686	1030	619	931	558	838		6	461	693	419	630	387	582
645	969	587	882	528	794		7	445	668	404	607	372	559
601	903	547	822	496	745		8	428	643	388	583	357	536
554	833	504	758	461	694		9	411	618	372	559	341	513
507	761	460	692	422	634		10	394	593	356	535	326	490
459	689	416	626	381	573		11	378	568	340	512	311	468
411	618	373	560	341	512		12	361	542	325	488	296	445
365	549	331	497	302	454		13	344	517	309	464	281	422
322	483	291	437	265	398		14	327	492	293	441	266	399
280	421	253	380	230	346		15	311	467	277	417	251	377
246	370	222	334	203	304		16	294	442	259	389	230	345
218	328	197	296	179	270		17	272	408	236	355	209	314
195	292	176	264	160	241		18	250	376	217	326	192	288
175	262	158	237	144	216		19	232	348	201	302	177	266
158	237	142	214	130	195		20	216	324	187	281	164	247
130	196	118	177	107	161		22	190	285	164	246	144	216
109	165	98.9	149	90.0	135		24	169	254	145	219	127	192
93.3	140	84.2	127	76.7	115		26	153	230	131	197	115	172
80.4	121	72.6	109	66.1	99.4		28	139	209	119	179	104	156
							30	128	192	109	164	95.2	143
							32	118	178	101	152	87.9	132
							34	110	166	93.9	141	81.6	123
							36	103	155	87.8	132	76.1	114
							38	96.9	146	82.4	124	71.4	107
							40	91.4	137	77.6	117	67.2	101
							42	86.6	130	73.4	110	63.5	95.5
							44	82.2	124	69.7	105	60.2	90.5
							46	78.2	118	66.3	99.6	57.3	86.1
							48	74.7	112	63.2	95.0	54.6	82.1
							50	71.4	107	60.4	90.8	52.2	78.4
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
813	1220	743	1120	685	1030			5.27	16.3	5.24	15.7	5.20	15.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			20.9		19.1		17.6	
627	941	573	860	528	792			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1170	60.3	1070	54.8	984	50.1
238	357	215	323	196	295			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.70		1.69		1.68	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
80.1	120	73.0	110	66.8	100			4.41		4.43		4.45	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18×						Shape		W18×					
55[c]		50[c]		46[c]		lb/ft		55		50		46	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
587	883	519	781	474	712	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	363	546	328	492	294	442
504	757	444	667	368	553		6	351	528	316	474	264	397
477	717	420	631	336	505		7	337	506	302	454	249	374
447	672	393	591	303	455		8	322	485	289	434	234	351
416	626	365	549	269	404		9	308	463	275	414	219	329
384	577	336	505	231	347		10	294	441	262	393	204	306
348	523	307	461	194	291		11	279	420	248	373	189	283
311	467	278	417	163	245		12	265	398	235	353	170	255
275	413	245	368	139	209		13	250	376	221	333	149	224
241	362	213	320	120	180		14	236	354	208	312	133	200
210	315	186	279	104	157		15	220	331	189	284	119	179
184	277	163	245	91.6	138		16	198	298	170	256	108	163
163	245	145	217	81.1	122		17	180	271	154	232	99.0	149
146	219	129	194	72.4	109		18	165	248	141	212	91.1	137
131	196	116	174	65.0	97.6		19	152	228	130	195	84.4	127
118	177	104	157	58.6	88.1		20	141	212	120	180	78.5	118
97.4	146	86.3	130				22	123	184	104	156	69.0	104
81.9	123	72.5	109				24	108	163	91.5	137	61.5	92.4
69.8	105	61.8	92.9				26	97.1	146	81.7	123	55.4	83.3
							28	87.9	132	73.8	111	50.5	75.9
							30	80.4	121	67.3	101	46.4	69.7
							32	74.0	111	61.8	92.9	42.9	64.5
							34	68.6	103	57.2	85.9	39.9	60.0
							36	63.9	96.1	53.2	79.9	37.4	56.2
							38	59.9	90.0	49.7	74.8	35.1	52.8
							40	56.3	84.6	46.7	70.2	33.1	49.8
							42	53.2	79.9	44.0	66.2	31.3	47.1
							44	50.3	75.7	41.7	62.6	29.7	44.7
							46	47.8	71.9	39.5	59.4	28.3	42.5
							48	45.6	68.5	37.6	56.6	27.0	40.6
							50	43.5	65.4	35.9	54.0	25.8	38.8
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
631	948	572	860	525	790			5.17	14.9	5.11	14.4	4.00	11.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			16.2		14.7		13.5	
486	729	441	662	405	608			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			890	44.9	800	40.1	712	22.5
184	275	166	249	169	254			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.67		1.65		1.29	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
60.0	90.2	53.8	80.9	37.9	57.0			4.44		4.47		5.62	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18–W16

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W18× 40[c]		W18× 35[c]		W16× 100		Shape lb/ft		W18× 40[v]		W18× 35[v]		W16× 100	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
399	599	338	508	1140	1720	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	254	382	216	324	642	965
307	461	256	384	1060	1590		6	226	340	188	283	642	965
279	420	231	348	1030	1550		7	213	320	176	264	642	965
251	377	206	310	996	1500		8	199	299	163	246	639	961
222	333	181	272	960	1440		9	185	279	151	227	626	941
193	291	156	235	921	1380		10	172	258	139	208	613	922
164	247	132	199	880	1320		11	158	238	123	185	600	902
138	207	111	167	837	1260		12	138	208	106	159	587	882
118	177	94.7	142	793	1190		13	121	182	91.9	138	574	863
101	152	81.6	123	747	1120		14	107	161	81.1	122	561	843
88.3	133	71.1	107	702	1050		15	95.9	144	72.4	109	548	823
77.6	117	62.5	93.9	656	986		16	86.6	130	65.2	97.9	535	804
68.7	103	55.4	83.2	611	918		17	78.9	119	59.2	88.9	522	784
61.3	92.2	49.4	74.2	566	851		18	72.4	109	54.1	81.3	509	764
55.0	82.7	44.3	66.6	522	785		19	66.8	100	49.8	74.8	496	745
49.7	74.6	40.0	60.1	480	721		20	62.0	93.2	46.1	69.2	482	725
				399	600		22	54.2	81.4	40.0	60.1	456	686
				336	504		24	48.0	72.2	35.3	53.1	430	647
				286	430		26	43.2	64.9	31.6	47.5	404	607
				247	371		28	39.2	58.9	28.6	43.0	370	557
				215	323		30	35.9	53.9	26.1	39.2	340	511
				189	284		32	33.1	49.8	24.0	36.1	314	472
				167	251		34	30.7	46.2	22.2	33.4	292	439
				149	224		36	28.7	43.1	20.7	31.1	273	410
				134	201		38	26.9	40.4	19.4	29.1	256	385
				121	182		40	25.3	38.1	18.2	27.4	242	363
							42	23.9	36.0	17.2	25.8	228	343
							44	22.7	34.1	16.3	24.4	217	326
							46	21.6	32.4	15.4	23.2	206	310
							48	20.6	30.9	14.7	22.1	197	296
							50	19.6	29.5	14.0	21.1	188	283
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
459	690	401	603	1140	1720			3.93	11.2	3.78	10.6	7.78	26.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			11.8		10.3		29.4	
354	531	309	464	882	1320			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			612	19.1	510	15.3	1490	186
132	198	124	186	259	388			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.27		1.22		2.51	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
32.4	48.8	26.1	39.3	178	268			5.68		5.77		2.83	

[c] Shape is slender for compression with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W16×						Shape		W16×					
89		77		67[c]		lb/ft		89		77		67	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1020	1530	880	1320	743	1120	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	568	853	487	731	422	634
942	1420	811	1220	691	1040		6	568	853	487	731	422	634
915	1380	788	1180	673	1010		7	568	853	487	731	422	634
885	1330	762	1150	653	981		8	564	848	482	725	417	628
853	1280	733	1100	630	947		9	551	829	471	707	407	611
818	1230	703	1060	606	911		10	539	809	459	690	396	595
781	1170	671	1010	580	872		11	526	790	447	672	385	578
742	1120	637	957	551	828		12	513	771	435	654	374	562
702	1060	602	905	521	782		13	500	752	423	636	363	545
662	994	567	852	490	736		14	488	733	412	619	352	529
621	933	531	798	459	689		15	475	714	400	601	341	512
580	871	495	744	428	643		16	462	695	388	583	330	496
539	810	460	691	397	596		17	450	676	376	565	319	479
499	750	425	639	367	551		18	437	657	364	548	308	463
460	691	391	588	337	507		19	424	638	352	530	297	446
422	634	359	539	309	464		20	412	619	341	512	286	430
350	527	297	447	256	384		22	386	580	317	476	262	395
294	442	250	376	215	323		24	361	542	287	432	230	346
251	377	213	320	183	275		26	328	493	257	386	205	308
216	325	184	276	158	237		28	298	447	232	349	184	277
188	283	160	240	138	207		30	272	409	212	318	167	252
166	249	141	211	121	182		32	251	377	194	292	153	230
147	220	124	187	107	161		34	233	350	180	270	141	213
131	197	111	167	95.5	144		36	217	327	167	252	131	197
117	176	99.7	150	85.7	129		38	204	306	157	235	122	184
106	159	89.9	135	77.4	116		40	192	288	147	221	115	172
							42	181	272	139	209	108	162
							44	172	258	131	197	102	153
							46	163	245	125	187	96.7	145
							48	156	234	119	178	91.9	138
							50	149	223	113	170	87.5	132

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1020	1530	880	1320	763	1150	7.71	24.7	7.65	23.1	7.62	21.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	26.2		22.6		19.6	
786	1180	678	1020	588	882	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1300	163	1110	138	954	119
229	344	195	293	167	251	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.49		2.47		2.46	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
156	234	133	200	115	173	2.83		2.83		2.83	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W16×						Shape		W16×					
57[c]		50[c]		45[c]		lb/ft		57		50		45	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
646	972	548	823	484	727	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	341	512	298	449	267	401
539	811	462	695	406	611		6	327	492	285	429	254	382
503	756	435	653	382	573		7	315	473	273	411	243	365
464	698	405	608	355	533		8	302	454	261	393	232	348
424	637	369	555	327	491		9	289	435	249	375	221	331
383	576	333	500	297	447		10	276	415	237	357	209	315
342	515	297	447	264	397		11	264	396	225	339	198	298
303	455	262	394	233	350		12	251	377	213	321	187	281
265	398	229	344	203	304		13	238	358	201	303	176	264
229	344	198	297	175	262		14	225	339	189	284	164	246
200	300	172	259	152	229		15	213	320	173	260	147	220
175	264	152	228	134	201		16	195	293	157	236	133	199
155	233	134	202	118	178		17	179	269	143	216	121	181
139	208	120	180	106	159		18	165	248	132	198	111	166
124	187	107	162	94.8	142		19	153	230	122	183	102	154
112	169	97.0	146	85.5	129		20	143	215	114	171	94.9	143
92.8	139	80.1	120	70.7	106		22	126	189	99.6	150	82.9	125
77.9	117	67.3	101	59.4	89.3		24	112	169	88.6	133	73.5	111
66.4	99.8	57.4	86.2	50.6	76.1		26	102	153	79.9	120	66.1	99.3
							28	92.9	140	72.7	109	60.0	90.2
							30	85.5	128	66.8	100	55.0	82.6
							32	79.2	119	61.7	92.7	50.7	76.2
							34	73.8	111	57.4	86.3	47.1	70.8
							36	69.1	104	53.7	80.6	43.9	66.0
							38	65.0	97.7	50.4	75.7	41.2	61.9
							40	61.3	92.2	47.5	71.4	38.8	58.3
							42	58.1	87.3	44.9	67.5	36.7	55.1
							44	55.2	83.0	42.6	64.1	34.8	52.3
							46	52.6	79.0	40.6	61.0	33.1	49.7
							48	50.2	75.4	38.7	58.2	31.5	47.4
							50	48.0	72.2	37.0	55.6	30.1	45.2
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
654	983	572	860	518	778			4.96	15.3	4.93	14.4	4.86	13.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			16.8		14.7		13.3	
504	756	441	662	399	599			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			758	43.1	659	37.2	586	32.8
183	275	161	242	144	217			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.60		1.59		1.57	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
61.3	92.1	52.9	79.5	47.0	70.7			4.20		4.20		4.24	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W16×						Shape		W16×					
40[c]		36[c]		31[c]		lb/ft		40		36[f], [v]		31[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
416	626	368	553	307	462	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	237	356	207	311	175	263
349	525	306	459	226	339		6	225	338	195	294	150	226
328	493	286	430	202	304		7	215	323	186	279	140	210
305	458	265	398	178	267		8	204	307	176	265	130	195
281	422	243	365	154	231		9	194	292	167	251	119	179
256	385	220	331	130	196		10	184	276	157	236	109	163
231	348	198	298	108	162		11	173	260	148	222	93.1	140
206	310	176	264	90.6	136		12	163	245	138	208	80.4	121
180	270	151	227	77.2	116		13	153	229	129	194	70.5	106
155	233	130	196	66.6	100		14	139	209	114	171	62.6	94.0
135	203	114	171	58.0	87.1		15	124	186	101	152	56.1	84.4
119	178	99.9	150	51.0	76.6		16	112	168	90.8	136	50.8	76.4
105	158	88.5	133	45.1	67.8		17	101	152	82.2	124	46.4	69.7
93.7	141	78.9	119	40.3	60.5		18	92.8	139	75.0	113	42.6	64.0
84.1	126	70.8	106	36.1	54.3		19	85.4	128	68.8	103	39.4	59.2
75.9	114	63.9	96.1				20	79.0	119	63.6	95.5	36.6	55.0
62.7	94.3	52.8	79.4				22	68.7	103	55.0	82.6	32.0	48.2
52.7	79.2	44.4	66.7				24	60.7	91.2	48.4	72.7	28.5	42.8
44.9	67.5						26	54.3	81.7	43.1	64.8	25.6	38.5
							28	49.2	73.9	38.9	58.4	23.3	35.1
							30	44.9	67.5	35.4	53.2	21.4	32.1
							32	41.3	62.1	32.5	48.8	19.8	29.7
							34	38.3	57.5	30.0	45.1	18.4	27.6
							36	35.7	53.6	27.9	41.9	17.2	25.8
							38	33.4	50.2	26.0	39.1	16.1	24.2
							40	31.4	47.2	24.4	36.7	15.2	22.8
							42	29.6	44.5	23.0	34.6	14.4	21.6
							44	28.0	42.1	21.8	32.7	13.6	20.5
							46	26.6	40.0	20.6	31.0	13.0	19.5
							48	25.4	38.1	19.6	29.5	12.4	18.6
							50	24.2	36.4	18.7	28.1	11.8	17.7
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
459	690	413	620	355	534			4.86	13.5	4.77	13.1	3.62	10.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			11.8		10.6		9.13	
354	531	318	477	274	411			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			518	28.9	448	24.5	375	12.4
127	190	110	165	102	153			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.57		1.52		1.17	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
41.2	61.9	34.9	52.4	22.8	34.3			4.22		4.28		5.48	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16–W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W16×		W14×				Shape		W16×		W14×			
26[c]		873[h]		808[h]		lb/ft		26[v]		873[h]		808[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
248	373	10000	15000	9260	13900	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	143	215	6580	9900	5940	8920
178	267	9800	14700	9070	13600		6	120	181	6580	9900	5940	8920
158	237	9730	14600	9000	13500		7	111	167	6580	9900	5940	8920
138	207	9640	14500	8920	13400		8	102	153	6580	9900	5940	8920
118	177	9550	14400	8830	13300		9	93.0	140	6580	9900	5940	8920
99.1	149	9450	14200	8740	13100		10	81.5	122	6580	9900	5940	8920
83.1	125	9340	14000	8630	13000		11	68.8	103	6580	9900	5940	8920
69.8	105	9210	13800	8510	12800		12	59.1	88.8	6580	9900	5940	8920
59.5	89.4	9080	13700	8390	12600		13	51.5	77.5	6580	9900	5940	8920
51.3	77.1	8950	13400	8260	12400		14	45.5	68.4	6580	9900	5940	8920
44.7	67.2	8800	13200	8120	12200		15	40.6	61.1	6580	9900	5940	8920
39.3	59.0	8640	13000	7970	12000		16	36.6	55.0	6570	9880	5920	8900
34.8	52.3	8480	12800	7820	11800		17	33.2	50.0	6560	9860	5910	8880
31.0	46.6	8320	12500	7660	11500		18	30.4	45.7	6550	9840	5900	8860
		8140	12200	7500	11300		19	28.0	42.1	6530	9820	5890	8850
		7960	12000	7330	11000		20	25.9	39.0	6520	9800	5870	8830
		7590	11400	6970	10500		22	22.6	33.9	6500	9760	5850	8790
		7200	10800	6610	9930		24	19.9	30.0	6470	9720	5820	8750
		6800	10200	6230	9360		26	17.8	26.8	6440	9680	5800	8710
		6400	9620	5850	8790		28	16.2	24.3	6420	9640	5770	8680
		5990	9000	5460	8210		30	14.8	22.2	6390	9610	5750	8640
		5580	8390	5080	7630		32	13.6	20.4	6360	9570	5720	8600
		5180	7780	4700	7070		34	12.6	18.9	6340	9530	5700	8560
		4780	7180	4330	6510		36	11.7	17.6	6310	9490	5670	8530
		4390	6600	3970	5970		38	11.0	16.5	6290	9450	5650	8490
		4020	6040	3620	5450		40	10.3	15.5	6260	9410	5620	8450
		3650	5490	3290	4940		42	9.74	14.6	6230	9370	5600	8410
		3330	5000	2990	4500		44	9.22	13.9	6210	9330	5570	8380
		3040	4570	2740	4120		46	8.76	13.2	6180	9290	5550	8340
		2800	4200	2520	3780		48	8.34	12.5	6160	9250	5520	8300
		2580	3870	2320	3480		50	7.96	12.0	6130	9210	5500	8270

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
299	449	10000	15000	9260	13900	3.47	9.64	15.2	253	15.0	238
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	7.68		257		238	
230	346	7710	11600	7140	10700	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	301	9.59	18100	6170	15900	5550
86.6	130	2420	3630	2220	3330	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						1.12		4.90		4.83	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
17.8	26.7	3310	4970	3020	4530	5.59		1.71		1.69	

[c] Shape is slender for compression with F_y = 65 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
730[h]		665[h]		605[h]		lb/ft		730[h]		665[h]		605[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
8370	12600	7630	11500	6930	10400	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	5380	8090	4800	7220	4280	6440
8180	12300	7450	11200	6770	10200		6	5380	8090	4800	7220	4280	6440
8120	12200	7390	11100	6710	10100		7	5380	8090	4800	7220	4280	6440
8040	12100	7320	11000	6640	9980		8	5380	8090	4800	7220	4280	6440
7960	12000	7240	10900	6570	9870		9	5380	8090	4800	7220	4280	6440
7860	11800	7150	10800	6480	9750		10	5380	8090	4800	7220	4280	6440
7760	11700	7060	10600	6400	9610		11	5380	8090	4800	7220	4280	6440
7650	11500	6960	10500	6300	9470		12	5380	8090	4800	7220	4280	6440
7530	11300	6850	10300	6200	9310		13	5380	8090	4800	7220	4280	6440
7410	11100	6730	10100	6090	9150		14	5380	8090	4800	7220	4280	6440
7270	10900	6600	9930	5970	8970		15	5380	8080	4790	7200	4270	6420
7140	10700	6470	9730	5850	8790		16	5370	8060	4780	7180	4260	6400
6990	10500	6340	9530	5720	8600		17	5350	8050	4770	7170	4250	6380
6840	10300	6200	9310	5590	8410		18	5340	8030	4760	7150	4240	6370
6680	10000	6050	9100	5460	8200		19	5330	8010	4740	7130	4220	6350
6520	9810	5900	8870	5320	7990		20	5320	7990	4730	7110	4210	6330
6190	9310	5590	8410	5030	7560		22	5290	7950	4710	7070	4190	6300
5850	8790	5270	7920	4730	7120		24	5270	7910	4680	7040	4170	6260
5490	8260	4950	7430	4430	6660		26	5240	7880	4660	7000	4140	6230
5140	7720	4610	6940	4130	6200		28	5210	7840	4630	6970	4120	6190
4780	7180	4280	6440	3820	5740		30	5190	7800	4610	6930	4100	6160
4420	6650	3960	5950	3520	5290		32	5160	7760	4590	6890	4070	6120
4080	6130	3640	5460	3230	4850		34	5140	7720	4560	6860	4050	6090
3740	5620	3320	4990	2940	4420		36	5110	7690	4540	6820	4030	6050
3410	5120	3020	4540	2660	4000		38	5090	7650	4510	6780	4000	6020
3090	4640	2730	4100	2400	3610		40	5060	7610	4490	6750	3980	5980
2800	4210	2480	3720	2180	3280		42	5040	7570	4460	6710	3960	5940
2550	3830	2260	3390	1990	2990		44	5010	7540	4440	6670	3930	5910
2330	3510	2060	3100	1820	2730		46	4990	7500	4420	6640	3910	5870
2140	3220	1900	2850	1670	2510		48	4960	7460	4390	6600	3890	5840
1970	2970	1750	2630	1540	2310		50	4940	7420	4370	6560	3860	5800

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
8370	12600	7630	11500	6930	10400	14.5	212	14.3	195	14.1	178
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	215		196		178	
6450	9680	5880	8820	5340	8010	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	14300	4720	12400	4170	10800	3680
1790	2680	1590	2380	1410	2120	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.69		4.62		4.55	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
2650	3980	2370	3560	2110	3180	1.74		1.73		1.71	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
550[h]		500[h]		455[h]		lb/ft		550[h]		500[h]		455[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
6310	9480	5720	8600	5220	7840	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3830	5750	3410	5120	3040	4560
6150	9250	5580	8390	5080	7640		6	3830	5750	3410	5120	3040	4560
6100	9170	5530	8310	5040	7570		7	3830	5750	3410	5120	3040	4560
6040	9070	5470	8220	4980	7490		8	3830	5750	3410	5120	3040	4560
5970	8970	5410	8130	4920	7400		9	3830	5750	3410	5120	3040	4560
5890	8850	5340	8020	4860	7300		10	3830	5750	3410	5120	3040	4560
5810	8730	5260	7900	4780	7190		11	3830	5750	3410	5120	3040	4560
5720	8590	5170	7780	4710	7070		12	3830	5750	3410	5120	3040	4560
5620	8450	5090	7640	4620	6950		13	3830	5750	3410	5120	3040	4560
5520	8300	4990	7500	4530	6820		14	3830	5750	3400	5110	3030	4560
5410	8130	4890	7350	4440	6680		15	3810	5730	3390	5100	3020	4540
5300	7970	4790	7190	4340	6530		16	3800	5720	3380	5080	3010	4520
5180	7790	4680	7030	4240	6380		17	3790	5700	3370	5060	3000	4510
5060	7610	4560	6860	4140	6220		18	3780	5680	3360	5050	2990	4490
4930	7420	4450	6690	4030	6060		19	3770	5670	3350	5030	2980	4480
4810	7220	4330	6510	3920	5890		20	3760	5650	3340	5020	2970	4460
4540	6820	4080	6140	3690	5550		22	3740	5610	3310	4980	2950	4430
4260	6410	3830	5750	3460	5200		24	3710	5580	3290	4950	2930	4400
3980	5990	3570	5370	3220	4840		26	3690	5550	3270	4920	2900	4360
3700	5570	3310	4980	2980	4480		28	3670	5510	3250	4880	2880	4330
3420	5140	3050	4590	2740	4120		30	3640	5480	3230	4850	2860	4300
3150	4730	2800	4210	2510	3780		32	3620	5440	3200	4820	2840	4270
2880	4320	2550	3840	2290	3440		34	3600	5410	3180	4780	2820	4240
2620	3930	2320	3480	2070	3110		36	3580	5370	3160	4750	2800	4210
2360	3550	2090	3130	1860	2790		38	3550	5340	3140	4720	2780	4170
2130	3200	1880	2830	1680	2520		40	3530	5310	3120	4690	2760	4140
1930	2900	1710	2570	1520	2290		42	3510	5270	3100	4650	2730	4110
1760	2650	1560	2340	1390	2080		44	3480	5240	3070	4620	2710	4080
1610	2420	1420	2140	1270	1910		46	3460	5200	3050	4590	2690	4050
1480	2220	1310	1960	1160	1750		48	3440	5170	3030	4550	2670	4010
1360	2050	1200	1810	1070	1610		50	3420	5130	3010	4520	2650	3980
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
6310	9480	5720	8600	5220	7840			13.9	164	13.7	151	13.6	138
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			162		147		134	
4860	7290	4410	6620	4020	6030			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			9430	3250	8210	2880	7190	2560
1250	1870	1120	1670	998	1500			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								4.49		4.43		4.38	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
1890	2840	1690	2540	1520	2280			1.70		1.69		1.67	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
426[h]		398[h]		370[h]		lb/ft		426[h]		398[h]		370[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4870	7310	4550	6840	4240	6380	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2820	4240	2600	3900	2390	3590
4740	7120	4430	6670	4130	6210		6	2820	4240	2600	3900	2390	3590
4700	7060	4390	6600	4090	6150		7	2820	4240	2600	3900	2390	3590
4640	6980	4340	6530	4040	6080		8	2820	4240	2600	3900	2390	3590
4590	6890	4290	6450	3990	6000		9	2820	4240	2600	3900	2390	3590
4520	6800	4230	6360	3940	5920		10	2820	4240	2600	3900	2390	3590
4460	6700	4170	6260	3870	5820		11	2820	4240	2600	3900	2390	3590
4380	6590	4100	6160	3810	5720		12	2820	4240	2600	3900	2390	3590
4300	6470	4020	6040	3740	5620		13	2820	4240	2600	3900	2390	3590
4220	6340	3940	5920	3660	5500		14	2810	4230	2590	3890	2380	3580
4130	6210	3860	5800	3580	5390		15	2800	4210	2580	3880	2370	3560
4040	6070	3770	5670	3500	5260		16	2790	4200	2570	3860	2360	3550
3940	5930	3680	5530	3420	5130		17	2780	4180	2560	3850	2350	3530
3840	5780	3590	5390	3330	5000		18	2770	4160	2550	3830	2340	3520
3740	5630	3490	5250	3240	4860		19	2760	4150	2540	3820	2330	3500
3640	5470	3390	5100	3140	4720		20	2750	4130	2530	3800	2320	3490
3420	5140	3190	4790	2950	4430		22	2730	4100	2510	3770	2300	3460
3200	4810	2980	4480	2750	4140		24	2710	4070	2490	3740	2280	3430
2980	4470	2770	4160	2550	3840		26	2690	4040	2470	3710	2260	3400
2750	4140	2560	3840	2360	3540		28	2670	4010	2450	3680	2240	3370
2530	3800	2350	3530	2160	3240		30	2650	3980	2430	3650	2220	3340
2310	3470	2140	3220	1970	2960		32	2620	3940	2410	3620	2200	3310
2100	3160	1940	2920	1780	2680		34	2600	3910	2390	3590	2180	3280
1900	2850	1750	2630	1600	2410		36	2580	3880	2370	3560	2160	3250
1700	2560	1570	2360	1440	2160		38	2560	3850	2350	3530	2140	3220
1540	2310	1420	2130	1300	1950		40	2540	3820	2330	3490	2120	3190
1390	2090	1290	1930	1180	1770		42	2520	3790	2300	3460	2100	3160
1270	1910	1170	1760	1070	1610		44	2500	3760	2280	3430	2080	3120
1160	1750	1070	1610	980	1470		46	2480	3720	2260	3400	2060	3090
1070	1600	985	1480	900	1350		48	2460	3690	2240	3370	2040	3060
983	1480	907	1360	830	1250		50	2440	3660	2220	3340	2020	3030

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4870	7310	4550	6840	4240	6380	13.4	130	13.4	122	13.2	114
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	125		117		109	
3750	5630	3510	5270	3270	4910	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	6600	2360	6000	2170	5440	1990
914	1370	842	1260	773	1160	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.34		4.31		4.27	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1410	2120	1300	1960	1200	1800	1.67		1.66		1.66	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
342[h]		311[h]		283[h]		lb/ft		342[h]		311[h]		283[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3930	5910	3560	5350	3240	4870	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2180	3280	1960	2940	1760	2640
3820	5750	3460	5200	3150	4740		6	2180	3280	1960	2940	1760	2640
3790	5690	3420	5150	3120	4690		7	2180	3280	1960	2940	1760	2640
3740	5630	3390	5090	3080	4630		8	2180	3280	1960	2940	1760	2640
3700	5560	3340	5020	3040	4570		9	2180	3280	1960	2940	1760	2640
3640	5480	3290	4950	3000	4500		10	2180	3280	1960	2940	1760	2640
3590	5390	3240	4870	2950	4430		11	2180	3280	1960	2940	1760	2640
3520	5290	3180	4780	2890	4350		12	2180	3280	1960	2940	1760	2640
3460	5200	3120	4690	2840	4270		13	2180	3280	1960	2940	1760	2640
3390	5090	3060	4590	2780	4180		14	2170	3260	1950	2930	1750	2630
3310	4980	2990	4490	2720	4080		15	2160	3250	1940	2910	1740	2610
3230	4860	2920	4380	2650	3980		16	2150	3230	1930	2900	1730	2600
3150	4740	2840	4270	2580	3880		17	2140	3220	1920	2880	1720	2580
3070	4620	2770	4160	2510	3780		18	2130	3200	1910	2870	1710	2570
2990	4490	2690	4040	2440	3670		19	2120	3190	1900	2850	1700	2560
2900	4360	2610	3920	2370	3560		20	2110	3170	1890	2840	1690	2540
2720	4090	2440	3670	2220	3330		22	2090	3150	1870	2810	1670	2510
2540	3810	2280	3420	2060	3100		24	2070	3120	1850	2780	1650	2480
2350	3530	2110	3160	1900	2860		26	2050	3090	1830	2750	1630	2460
2160	3250	1940	2910	1750	2630		28	2030	3060	1810	2720	1610	2430
1980	2980	1770	2660	1600	2400		30	2010	3030	1790	2690	1600	2400
1800	2710	1610	2420	1450	2180		32	1990	3000	1770	2660	1580	2370
1630	2450	1450	2180	1310	1960		34	1980	2970	1750	2640	1560	2340
1460	2200	1300	1950	1170	1750		36	1960	2940	1730	2610	1540	2310
1310	1970	1170	1750	1050	1570		38	1940	2910	1710	2580	1520	2280
1180	1780	1050	1580	945	1420		40	1920	2880	1700	2550	1500	2260
1070	1610	954	1430	857	1290		42	1900	2850	1680	2520	1480	2230
979	1470	869	1310	781	1170		44	1880	2820	1660	2490	1460	2200
896	1350	795	1200	715	1070		46	1860	2790	1640	2460	1440	2170
823	1240	730	1100	656	986		48	1840	2760	1620	2430	1420	2140
758	1140	673	1010	605	909		50	1820	2730	1600	2400	1410	2110
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3930	5910	3560	5350	3240	4870			13.1	106	13.0	96.7	12.9	88.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			101		91.4		83.3	
3030	4550	2740	4110	2500	3750			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			4900	1810	4330	1610	3840	1440
701	1050	627	940	560	840			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								4.24		4.20		4.17	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
1100	1650	986	1480	889	1340			1.65		1.64		1.63	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
257		233		211		lb/ft		257		233		211	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2940	4420	2670	4010	2410	3630	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1580	2370	1410	2130	1260	1900
2860	4300	2590	3890	2340	3520		6	1580	2370	1410	2130	1260	1900
2830	4250	2560	3850	2320	3480		7	1580	2370	1410	2130	1260	1900
2800	4200	2530	3800	2290	3440		8	1580	2370	1410	2130	1260	1900
2760	4140	2500	3750	2260	3390		9	1580	2370	1410	2130	1260	1900
2720	4080	2460	3690	2220	3340		10	1580	2370	1410	2130	1260	1900
2670	4010	2420	3630	2180	3280		11	1580	2370	1410	2130	1260	1900
2620	3940	2370	3560	2140	3220		12	1580	2370	1410	2130	1260	1900
2570	3860	2320	3490	2100	3150		13	1580	2370	1410	2120	1260	1900
2510	3780	2270	3420	2050	3080		14	1570	2360	1400	2110	1250	1880
2460	3690	2220	3340	2000	3010		15	1560	2340	1390	2090	1240	1870
2400	3600	2160	3250	1950	2940		16	1550	2330	1380	2080	1230	1850
2330	3510	2110	3170	1900	2860		17	1540	2310	1370	2070	1220	1840
2270	3410	2050	3080	1850	2780		18	1530	2300	1370	2050	1220	1830
2200	3310	1990	2990	1790	2690		19	1520	2290	1360	2040	1210	1810
2130	3210	1930	2890	1730	2610		20	1510	2270	1350	2020	1200	1800
2000	3000	1800	2700	1620	2430		22	1490	2240	1330	2000	1180	1770
1850	2790	1670	2510	1500	2250		24	1470	2220	1310	1970	1160	1750
1710	2570	1540	2310	1380	2070		26	1460	2190	1290	1940	1140	1720
1570	2360	1410	2120	1260	1900		28	1440	2160	1270	1910	1120	1690
1430	2150	1280	1930	1150	1720		30	1420	2130	1250	1880	1110	1660
1290	1940	1160	1740	1040	1560		32	1400	2100	1240	1860	1090	1640
1160	1750	1040	1560	927	1390		34	1380	2070	1220	1830	1070	1610
1040	1560	927	1390	827	1240		36	1360	2050	1200	1800	1050	1580
932	1400	832	1250	742	1120		38	1340	2020	1180	1770	1030	1550
841	1260	751	1130	670	1010		40	1320	1990	1160	1750	1020	1530
763	1150	681	1020	608	913		42	1310	1960	1140	1720	997	1500
695	1040	621	933	554	832		44	1290	1930	1120	1690	979	1470
636	956	568	854	507	761		46	1270	1910	1110	1660	961	1440
584	878	522	784	465	699		48	1250	1880	1090	1630	943	1420
538	809	481	723	429	644		50	1230	1850	1070	1610	924	1390
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2940	4420	2670	4010	2410	3630			12.8	80.7	12.7	73.5	12.6	67.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			75.6		68.5		62.0	
2270	3400	2060	3080	1860	2790			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3400	1290	3010	1150	2660	1030
503	755	445	668	400	600			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								4.13		4.10		4.07	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
798	1200	717	1080	642	965			1.62		1.62		1.61	

Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
193		176		159		lb/ft		193		176		159	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2210	3320	2020	3030	1820	2730	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1150	1730	1040	1560	931	1400
2150	3220	1960	2940	1760	2650		6	1150	1730	1040	1560	931	1400
2120	3190	1930	2910	1740	2620		7	1150	1730	1040	1560	931	1400
2100	3150	1910	2870	1720	2590		8	1150	1730	1040	1560	931	1400
2070	3110	1880	2830	1700	2550		9	1150	1730	1040	1560	931	1400
2030	3060	1850	2780	1670	2510		10	1150	1730	1040	1560	931	1400
2000	3000	1820	2740	1640	2460		11	1150	1730	1040	1560	931	1400
1960	2950	1780	2680	1610	2420		12	1150	1730	1040	1560	931	1400
1920	2890	1750	2630	1570	2360		13	1150	1720	1030	1550	925	1390
1880	2820	1710	2570	1540	2310		14	1140	1710	1020	1540	917	1380
1830	2750	1670	2500	1500	2250		15	1130	1700	1020	1530	908	1360
1790	2680	1620	2440	1460	2190		16	1120	1680	1010	1510	899	1350
1740	2610	1580	2370	1420	2130		17	1110	1670	997	1500	890	1340
1690	2540	1530	2300	1380	2070		18	1100	1660	988	1490	881	1320
1640	2460	1490	2230	1330	2010		19	1090	1640	979	1470	872	1310
1580	2380	1440	2160	1290	1940		20	1080	1630	970	1460	863	1300
1480	2220	1340	2010	1200	1810		22	1070	1600	952	1430	846	1270
1370	2050	1240	1860	1110	1670		24	1050	1570	935	1400	828	1240
1260	1890	1140	1710	1020	1530		26	1030	1550	917	1380	810	1220
1150	1730	1040	1560	929	1400		28	1010	1520	899	1350	793	1190
1040	1570	941	1410	842	1270		30	993	1490	881	1320	775	1160
941	1410	847	1270	757	1140		32	975	1460	863	1300	757	1140
841	1260	756	1140	675	1010		34	957	1440	845	1270	739	1110
750	1130	674	1010	602	905		36	938	1410	827	1240	722	1080
673	1010	605	909	540	812		38	920	1380	809	1220	704	1060
608	914	546	821	487	733		40	902	1360	791	1190	686	1030
551	829	495	744	442	665		42	884	1330	773	1160	669	1000
502	755	451	678	403	605		44	866	1300	756	1140	651	978
460	691	413	621	369	554		46	848	1270	738	1110	633	951
422	634	379	570	339	509		48	829	1250	720	1080	615	925
389	585	350	525	312	469		50	811	1220	702	1050	598	898

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2210	3320	2020	3030	1820	2730	12.5	61.8	12.5	57.1	12.4	52.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	56.8		51.8		46.7	
1700	2560	1550	2330	1400	2100	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	2400	931	2140	838	1900	748
359	538	328	492	291	436	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.05		4.02		4.00	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
584	878	529	795	474	712	1.60		1.60		1.60	

Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
145		132		120		lb/ft		145		132		120	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1660	2500	1510	2270	1370	2070	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	843	1270	759	1140	688	1030
1610	2420	1460	2190	1330	1990		6	843	1270	759	1140	688	1030
1590	2390	1440	2160	1310	1970		7	843	1270	759	1140	688	1030
1570	2360	1420	2130	1290	1940		8	843	1270	759	1140	688	1030
1550	2330	1400	2100	1270	1910		9	843	1270	759	1140	688	1030
1520	2290	1370	2060	1250	1870		10	843	1270	759	1140	688	1030
1500	2250	1340	2020	1220	1830		11	843	1270	759	1140	688	1030
1470	2210	1310	1970	1190	1790		12	843	1270	756	1140	684	1030
1440	2160	1280	1930	1160	1750		13	837	1260	747	1120	675	1020
1400	2110	1250	1880	1130	1700		14	829	1250	738	1110	667	1000
1370	2060	1210	1830	1100	1660		15	820	1230	730	1100	658	989
1330	2000	1180	1770	1070	1610		16	811	1220	721	1080	650	977
1290	1950	1140	1720	1040	1560		17	803	1210	712	1070	641	964
1260	1890	1100	1660	1000	1500		18	794	1190	704	1060	633	951
1220	1830	1060	1600	965	1450		19	785	1180	695	1040	624	938
1180	1770	1030	1540	929	1400		20	777	1170	686	1030	615	925
1090	1640	945	1420	856	1290		22	759	1140	669	1010	598	899
1010	1520	865	1300	782	1180		24	742	1110	651	979	581	873
927	1390	785	1180	709	1070		26	724	1090	634	953	564	848
844	1270	707	1060	638	959		28	707	1060	616	927	547	822
764	1150	632	950	569	856		30	690	1040	599	900	530	796
686	1030	559	840	503	756		32	672	1010	582	874	513	770
611	918	495	744	446	670		34	655	984	564	848	495	745
545	819	442	664	398	598		36	637	958	547	822	478	719
489	735	397	596	357	536		38	620	932	529	796	461	693
441	663	358	538	322	484		40	603	906	512	769	444	667
400	602	325	488	292	439		42	585	879	494	743	424	638
365	548	296	445	266	400		44	568	853	477	717	402	604
334	501	271	407	244	366		46	550	827	454	682	381	573
306	461	249	374	224	336		48	533	801	432	650	363	545
282	424	229	344	206	310		50	511	768	413	620	346	520
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1660	2500	1510	2270	1370	2070			12.3	48.7	11.6	44.3	11.6	41.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			42.7		38.8		35.3	
1280	1920	1160	1750	1060	1590			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1710	677	1530	548	1380	495
262	392	247	370	222	334			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.98		3.76		3.74	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
431	648	367	551	331	497			1.59		1.67		1.67	

Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
109		99		90		lb/ft		109[f]		99[f]		90[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1250	1870	1130	1700	1030	1550	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	615	924	541	813	479	719
1200	1810	1090	1640	995	1500		6	615	924	541	813	479	719
1190	1780	1080	1620	982	1480		7	615	924	541	813	479	719
1170	1760	1060	1600	968	1450		8	615	924	541	813	479	719
1150	1730	1040	1570	951	1430		9	615	924	541	813	479	719
1130	1700	1030	1540	933	1400		10	615	924	541	813	479	719
1110	1660	1000	1510	914	1370		11	615	924	541	813	479	719
1080	1620	982	1480	893	1340		12	615	924	541	813	479	719
1050	1590	957	1440	871	1310		13	611	918	541	813	479	719
1030	1540	932	1400	848	1270		14	602	905	541	813	479	719
998	1500	906	1360	824	1240		15	594	893	533	801	479	719
968	1460	878	1320	799	1200		16	586	880	525	789	473	712
937	1410	850	1280	773	1160		17	577	868	517	776	466	700
906	1360	821	1230	746	1120		18	569	855	509	764	458	688
873	1310	791	1190	719	1080		19	561	842	500	752	450	676
840	1260	761	1140	691	1040		20	552	830	492	740	442	664
774	1160	700	1050	636	956		22	535	805	476	716	426	640
707	1060	639	960	580	872		24	519	780	460	691	410	617
640	963	578	869	525	789		26	502	754	444	667	395	593
576	866	519	781	471	708		28	485	729	428	643	379	569
514	772	463	696	419	630		30	469	704	411	618	363	546
454	682	408	614	370	556		32	452	679	395	594	347	522
402	604	362	544	328	492		34	435	654	379	570	331	498
359	539	323	485	292	439		36	418	629	363	545	310	467
322	484	290	435	262	394		38	402	604	342	513	289	434
290	437	261	393	237	356		40	381	573	320	481	270	406
263	396	237	356	215	323		42	359	539	301	452	253	381
240	361	216	325	196	294		44	339	510	284	427	239	359
220	330	198	297	179	269		46	321	483	269	404	226	339
202	303	181	273	164	247		48	306	459	255	384	214	322
186	279	167	251	151	228		50	291	438	243	365	204	306

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1250	1870	1130	1700	1030	1550	12.5	39.1	14.0	36.8	15.3	34.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	32.0		29.1		26.5	
960	1440	873	1310	795	1190	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1240	447	1110	402	999	362
195	293	179	269	160	240	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.73		3.71		3.70	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
295	443	257	386	223	336	1.67		1.66		1.66	

[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
82		74		68		lb/ft		82		74		68	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
934	1400	849	1280	778	1170	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	451	678	409	614	373	561
862	1300	783	1180	718	1080		6	451	678	409	614	373	561
838	1260	761	1140	697	1050		7	451	678	409	614	373	561
810	1220	736	1110	674	1010		8	448	673	406	610	370	556
780	1170	709	1060	648	974		9	439	660	397	597	361	543
748	1120	679	1020	621	933		10	430	646	388	584	353	530
714	1070	648	974	592	890		11	421	633	379	570	344	517
678	1020	616	926	562	845		12	412	619	371	557	336	505
641	964	583	876	531	798		13	403	606	362	544	327	492
604	908	549	824	500	751		14	394	592	353	531	319	479
566	851	514	773	468	703		15	385	578	344	517	310	466
528	794	480	721	436	656		16	376	565	335	504	302	453
491	738	446	670	405	609		17	367	551	327	491	293	441
454	683	413	620	374	562		18	358	538	318	478	285	428
418	629	380	571	344	517		19	349	524	309	465	276	415
384	576	348	524	315	473		20	340	511	300	451	268	402
318	478	289	435	261	392		22	322	484	283	425	251	377
267	402	243	365	219	330		24	304	456	265	398	233	351
228	343	207	311	187	281		26	286	429	244	367	210	315
197	295	179	268	161	242		28	263	396	222	334	190	286
171	257	156	234	140	211		30	242	364	204	306	174	262
150	226	137	205	123	185		32	224	337	188	283	161	242
133	200	121	182	109	164		34	209	313	175	263	149	224
119	179	108	162	97.5	147		36	195	293	164	246	139	209
107	160	96.9	146	87.5	131		38	183	276	154	231	131	196
96.3	145	87.5	131	79.0	119		40	173	260	145	218	123	185
							42	164	246	137	206	116	175
							44	156	234	130	195	110	166
							46	148	223	124	186	105	157
							48	141	212	118	177	99.9	150
							50	135	203	113	169	95.4	143

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
934	1400	849	1280	778	1170	7.68	26.7	7.68	25.2	7.62	24.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	24.0		21.8		20.0	
720	1080	654	981	600	900	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	881	148	795	134	722	121
190	284	166	249	151	227	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.48		2.48		2.46	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
145	218	131	197	120	180	2.44		2.44		2.44	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
61		53		48[c]		lb/ft		61		53		48	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
697	1050	607	913	542	815	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	331	497	283	425	254	382
642	965	531	798	479	721		6	331	497	282	424	254	381
623	936	506	761	457	686		7	331	497	274	411	245	369
602	905	479	720	432	649		8	328	492	265	398	237	357
579	871	449	676	405	609		9	320	480	257	386	229	344
555	834	419	630	377	567		10	311	468	248	373	221	332
529	795	387	582	349	524		11	303	456	239	360	213	320
502	754	356	535	320	481		12	295	444	231	347	205	308
474	712	324	487	291	438		13	287	432	222	334	197	295
446	670	293	441	263	395		14	279	420	214	321	188	283
417	627	263	396	236	355		15	271	408	205	309	180	271
389	584	234	352	210	315		16	263	396	197	296	172	259
360	542	208	312	186	279		17	255	384	188	283	164	246
333	500	185	278	166	249		18	247	372	180	270	153	231
306	460	166	250	149	224		19	239	360	168	253	142	213
280	421	150	226	134	202		20	231	347	157	236	132	198
232	348	124	186	111	167		22	215	323	138	207	116	174
195	293	104	157	93.2	140		24	194	291	123	185	103	155
166	249	88.8	133	79.4	119		26	173	261	111	167	92.7	139
143	215	76.6	115	68.5	103		28	157	236	101	153	84.3	127
125	187	66.7	100	59.7	89.7		30	143	215	93.3	140	77.4	116
110	165	58.6	88.1				32	132	198	86.4	130	71.5	107
97.0	146						34	122	184	80.4	121	66.5	99.9
86.5	130						36	114	171	75.3	113	62.1	93.4
77.7	117						38	107	160	70.8	106	58.3	87.6
70.1	105						40	100	151	66.8	100	55.0	82.6
							42	94.6	142	63.2	95.0	52.0	78.1
							44	89.5	135	60.0	90.2	49.3	74.1
							46	85.0	128	57.1	85.9	46.9	70.5
							48	81.0	122	54.5	82.0	44.8	67.3
							50	77.3	116	52.2	78.4	42.8	64.3
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
697	1050	607	913	549	825			7.59	22.7	5.95	18.4	5.92	17.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			17.9		15.6		14.1	
537	806	468	702	423	635			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			640	107	541	57.7	484	51.4
136	203	134	201	122	183			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.45		1.92		1.91	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
106	160	71.4	107	63.6	95.6			2.44		3.07		3.06	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
43[c]		38[c]		34[c]		lb/ft		43		38		34	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
475	713	413	621	361	542	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	226	339	199	300	177	266
419	630	345	518	300	451		6	225	338	189	285	167	251
401	602	323	485	280	422		7	217	326	181	272	159	239
380	571	299	450	260	390		8	209	315	172	259	151	228
358	539	275	413	238	358		9	202	303	164	246	144	216
334	502	247	371	216	324		10	194	292	155	234	136	204
308	464	219	329	192	288		11	186	280	147	221	128	192
282	425	192	288	168	252		12	179	269	138	208	120	180
257	386	166	250	145	217		13	171	257	130	195	112	169
231	348	143	215	125	187		14	164	246	120	180	100	151
207	311	125	188	109	163		15	156	234	108	162	89.9	135
184	276	110	165	95.4	143		16	148	223	97.4	146	81.2	122
163	244	97.2	146	84.5	127		17	140	210	88.9	134	73.9	111
145	218	86.7	130	75.4	113		18	128	192	81.8	123	67.7	102
130	196	77.8	117	67.7	102		19	118	177	75.6	114	62.5	93.9
117	177	70.2	106	61.1	91.8		20	109	164	70.3	106	57.9	87.1
97.1	146	58.0	87.2	50.5	75.9		22	95.5	144	61.6	92.6	50.6	76.0
81.6	123	48.8	73.3	42.4	63.8		24	84.6	127	54.8	82.4	44.8	67.4
69.5	104						26	76.0	114	49.4	74.2	40.2	60.5
59.9	90.1						28	68.9	104	44.9	67.5	36.5	54.9
52.2	78.5						30	63.1	94.8	41.2	62.0	33.4	50.2
							32	58.2	87.4	38.1	57.3	30.8	46.3
							34	54.0	81.1	35.4	53.2	28.6	43.0
							36	50.4	75.7	33.1	49.8	26.7	40.1
							38	47.2	70.9	31.1	46.7	25.0	37.6
							40	44.4	66.8	29.3	44.0	23.5	35.4
							42	42.0	63.1	27.7	41.7	22.2	33.4
							44	39.8	59.8	26.3	39.5	21.1	31.7
							46	37.8	56.8	25.0	37.6	20.0	30.1
							48	36.0	54.2	23.9	35.9	19.1	28.7
							50	34.4	51.7	22.8	34.3	18.2	27.4
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
490	737	436	655	389	585			5.86	16.8	4.80	13.7	4.74	13.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			12.6		11.2		10.0	
378	567	336	504	300	450			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			428	45.2	385	26.7	340	23.3
109	163	114	170	104	156			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.89		1.55		1.53	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
56.1	84.3	39.2	59.0	34.4	51.7			3.08		3.79		3.81	

[c] Shape is slender for compression with F_y = 65 ksi.

Note:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W14×						Shape		W14×					
30[c]		26[c]		22[c]		lb/ft		30[f]		26[v]		22[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
314	471	266	400	216	325	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	150	226	130	196	108	162
258	388	185	278	146	220		6	143	216	108	163	87.5	131
241	362	162	244	127	191		7	136	205	100	151	80.2	121
222	334	139	209	108	163		8	129	194	91.9	138	72.9	110
203	305	116	174	90.1	135		9	122	183	83.7	126	65.4	98.2
183	275	93.6	141	73.3	110		10	115	173	72.5	109	54.4	81.7
163	246	77.4	116	60.6	91.0		11	108	162	61.9	93.1	46.2	69.4
142	213	65.0	97.7	50.9	76.5		12	100	151	53.9	81.0	39.9	60.0
121	182	55.4	83.3	43.4	65.2		13	91.7	138	47.5	71.5	35.0	52.7
105	157	47.8	71.8	37.4	56.2		14	80.9	122	42.5	63.8	31.1	46.8
91.1	137	41.6	62.5	32.6	48.9		15	72.1	108	38.3	57.6	28.0	42.0
80.1	120	36.6	55.0	28.6	43.0		16	64.9	97.5	34.9	52.4	25.3	38.1
71.0	107	32.4	48.7	25.4	38.1		17	58.9	88.5	32.0	48.1	23.1	34.8
63.3	95.1	28.9	43.4				18	53.8	80.9	29.5	44.4	21.3	32.0
56.8	85.4						19	49.5	74.4	27.4	41.2	19.7	29.6
51.3	77.1						20	45.8	68.8	25.6	38.5	18.3	27.5
42.4	63.7						22	39.7	59.7	22.6	34.0	16.1	24.1
35.6	53.5						24	35.1	52.7	20.2	30.4	14.3	21.5
							26	31.3	47.1	18.3	27.5	12.9	19.4
							28	28.3	42.6	16.7	25.1	11.7	17.6
							30	25.9	38.9	15.4	23.2	10.8	16.2
							32	23.8	35.7	14.3	21.5	9.94	14.9
							34	22.0	33.1	13.3	20.0	9.25	13.9
							36	20.5	30.8	12.5	18.8	8.64	13.0
							38	19.2	28.8	11.7	17.6	8.12	12.2
							40	18.0	27.1	11.1	16.7	7.65	11.5
							42	17.0	25.5	10.5	15.8	7.24	10.9
							44	16.1	24.2	9.98	15.0	6.87	10.3
							46	15.3	22.9	9.51	14.3	6.54	9.82
							48	14.5	21.8	9.08	13.6	6.23	9.37
							50	13.9	20.8	8.69	13.1	5.96	8.96
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
344	518	299	450	253	380			5.06	12.7	3.35	9.42	3.22	8.97
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			8.85		7.69		6.49	
266	398	231	346	195	292			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			291	19.6	245	8.91	199	7.00
96.9	145	82.8	124	73.6	111			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.49		1.08		1.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
28.3	42.5	18.0	27.0	14.2	21.4			3.85		5.23		5.33	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
336[h]		305[h]		279[h]		lb/ft		336[h]		305[h]		279[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3850	5790	3480	5240	3190	4790	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1960	2940	1740	2620	1560	2340
3700	5550	3340	5020	3050	4590		6	1960	2940	1740	2620	1560	2340
3640	5470	3290	4940	3010	4520		7	1960	2940	1740	2620	1560	2340
3580	5380	3230	4860	2950	4440		8	1960	2940	1740	2620	1560	2340
3510	5280	3170	4760	2890	4350		9	1960	2940	1740	2620	1560	2340
3440	5160	3100	4660	2830	4250		10	1960	2940	1740	2620	1560	2340
3350	5040	3020	4540	2760	4140		11	1950	2940	1740	2610	1560	2340
3270	4910	2940	4420	2680	4030		12	1950	2920	1730	2600	1550	2330
3180	4770	2860	4300	2600	3910		13	1940	2910	1720	2590	1540	2320
3080	4630	2770	4160	2520	3790		14	1930	2900	1710	2580	1530	2300
2980	4480	2680	4020	2430	3660		15	1920	2890	1710	2570	1530	2290
2880	4320	2580	3880	2350	3530		16	1910	2880	1700	2550	1520	2280
2770	4170	2480	3730	2250	3390		17	1900	2860	1690	2540	1510	2270
2660	4000	2380	3580	2160	3250		18	1900	2850	1680	2530	1500	2260
2550	3840	2280	3430	2070	3110		19	1890	2840	1670	2520	1490	2250
2440	3670	2180	3280	1970	2970		20	1880	2830	1670	2510	1490	2230
2220	3340	1980	2970	1790	2680		22	1860	2800	1650	2480	1470	2210
2000	3010	1780	2670	1600	2400		24	1850	2780	1630	2460	1460	2190
1790	2680	1580	2370	1420	2130		26	1830	2750	1620	2430	1440	2160
1580	2370	1390	2090	1250	1870		28	1810	2730	1600	2410	1420	2140
1380	2080	1210	1820	1090	1630		30	1800	2700	1590	2390	1410	2120
1210	1820	1070	1600	954	1430		32	1780	2680	1570	2360	1390	2090
1080	1620	945	1420	845	1270		34	1770	2650	1560	2340	1380	2070
959	1440	843	1270	754	1130		36	1750	2630	1540	2310	1360	2050
861	1290	757	1140	676	1020		38	1730	2600	1520	2290	1350	2020
777	1170	683	1030	610	917		40	1720	2580	1510	2270	1330	2000
705	1060	619	931	554	832		42	1700	2560	1490	2240	1320	1980
642	965	564	848	504	758		44	1680	2530	1480	2220	1300	1960
587	883	516	776	462	694		46	1670	2510	1460	2190	1290	1930
539	811	474	713	424	637		48	1650	2480	1440	2170	1270	1910
497	747	437	657	391	587		50	1630	2460	1430	2150	1250	1890
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3850	5790	3480	5240	3190	4790			10.7	116	10.6	105	10.5	96.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			98.9		89.5		81.9	
2970	4450	2690	4030	2460	3690			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			4060	1190	3550	1050	3110	937
778	1170	691	1040	633	949			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.47		3.42		3.38	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
889	1340	791	1190	714	1070			1.85		1.84		1.82	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
252[h]		230[h]		210		lb/ft		252[h]		230[h]		210	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2880	4330	2640	3960	2410	3620	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1390	2090	1250	1880	1130	1700
2760	4150	2520	3790	2300	3450		6	1390	2090	1250	1880	1130	1700
2720	4080	2480	3730	2260	3400		7	1390	2090	1250	1880	1130	1700
2670	4010	2430	3660	2220	3330		8	1390	2090	1250	1880	1130	1700
2610	3920	2380	3580	2170	3260		9	1390	2090	1250	1880	1130	1700
2550	3830	2330	3500	2120	3180		10	1390	2090	1250	1880	1130	1700
2490	3740	2270	3400	2060	3100		11	1380	2080	1250	1870	1120	1690
2420	3630	2200	3310	2000	3010		12	1380	2070	1240	1860	1120	1680
2340	3520	2130	3210	1940	2920		13	1370	2060	1230	1850	1110	1670
2270	3410	2060	3100	1870	2820		14	1360	2050	1220	1840	1100	1650
2190	3290	1990	2990	1810	2720		15	1350	2030	1220	1830	1090	1640
2110	3170	1910	2880	1740	2610		16	1350	2020	1210	1820	1090	1630
2020	3040	1840	2760	1670	2500		17	1340	2010	1200	1810	1080	1620
1940	2910	1760	2640	1590	2390		18	1330	2000	1190	1800	1070	1610
1850	2780	1680	2520	1520	2280		19	1320	1990	1190	1780	1060	1600
1770	2650	1600	2400	1450	2170		20	1320	1980	1180	1770	1060	1590
1590	2390	1440	2160	1300	1950		22	1300	1950	1160	1750	1040	1570
1420	2140	1280	1930	1160	1740		24	1290	1930	1150	1730	1030	1540
1260	1890	1130	1700	1020	1530		26	1270	1910	1140	1710	1010	1520
1100	1650	988	1480	885	1330		28	1250	1890	1120	1680	998	1500
959	1440	860	1290	771	1160		30	1240	1860	1110	1660	984	1480
843	1270	756	1140	678	1020		32	1220	1840	1090	1640	969	1460
746	1120	670	1010	600	902		34	1210	1820	1080	1620	955	1430
666	1000	597	898	535	805		36	1190	1800	1060	1590	940	1410
598	898	536	806	481	722		38	1180	1770	1050	1570	925	1390
539	811	484	727	434	652		40	1160	1750	1030	1550	911	1370
489	735	439	660	393	591		42	1150	1730	1020	1530	896	1350
446	670	400	601	358	539		44	1130	1700	1000	1510	882	1320
408	613	366	550	328	493		46	1120	1680	987	1480	867	1300
374	563	336	505	301	453		48	1100	1660	972	1460	852	1280
345	519	310	465	278	417		50	1090	1640	957	1440	838	1260

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2880	4330	2640	3960	2410	3620	10.3	88.0	10.3	80.7	10.2	73.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	74.1		67.7		61.8	
2220	3330	2030	3050	1850	2780	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	2720	828	2420	742	2140	664
561	841	506	760	451	676	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.34		3.31		3.28	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
636	956	574	863	516	775	1.81		1.80		1.80	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
190		170		152		lb/ft		190		170		152	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2180	3280	1950	2930	1740	2610	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1010	1520	892	1340	788	1180
2080	3130	1860	2790	1660	2490		6	1010	1520	892	1340	788	1180
2050	3070	1820	2740	1630	2450		7	1010	1520	892	1340	788	1180
2010	3020	1790	2690	1600	2400		8	1010	1520	892	1340	788	1180
1960	2950	1750	2630	1560	2350		9	1010	1520	892	1340	788	1180
1910	2880	1710	2560	1520	2290		10	1010	1520	892	1340	787	1180
1860	2800	1660	2490	1480	2220		11	1000	1510	885	1330	780	1170
1810	2720	1610	2420	1430	2150		12	995	1500	878	1320	773	1160
1750	2630	1560	2340	1390	2080		13	988	1480	871	1310	766	1150
1690	2540	1500	2260	1340	2010		14	980	1470	864	1300	759	1140
1630	2450	1450	2170	1290	1930		15	973	1460	856	1290	752	1130
1560	2350	1390	2090	1230	1850		16	966	1450	849	1280	745	1120
1500	2250	1330	2000	1180	1770		17	959	1440	842	1270	738	1110
1430	2150	1270	1910	1130	1690		18	952	1430	835	1260	731	1100
1370	2050	1210	1820	1070	1610		19	945	1420	828	1240	724	1090
1300	1950	1150	1730	1020	1530		20	937	1410	821	1230	717	1080
1160	1750	1030	1540	907	1360		22	923	1390	807	1210	703	1060
1030	1550	910	1370	802	1210		24	909	1370	793	1190	690	1040
908	1360	797	1200	701	1050		26	894	1340	779	1170	676	1020
788	1180	690	1040	606	910		28	880	1320	765	1150	662	994
686	1030	601	904	528	793		30	866	1300	751	1130	648	973
603	906	528	794	464	697		32	851	1280	736	1110	634	952
534	803	468	704	411	617		34	837	1260	722	1090	620	931
476	716	418	628	366	551		36	823	1240	708	1060	606	910
428	643	375	563	329	494		38	808	1210	694	1040	592	889
386	580	338	508	297	446		40	794	1190	680	1020	578	868
350	526	307	461	269	405		42	779	1170	666	1000	564	847
319	479	280	420	245	369		44	765	1150	652	979	550	826
292	439	256	384	224	337		46	751	1130	637	958	536	805
268	403	235	353	206	310		48	736	1110	623	937	522	784
247	371	216	325	190	285		50	722	1090	609	916	508	763
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2180	3280	1950	2930	1740	2610			10.1	67.4	9.98	60.7	9.88	54.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			56.0		50.0		44.7	
1680	2520	1500	2250	1340	2010			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1890	589	1650	517	1430	454
397	595	349	524	310	465			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.25		3.22		3.19	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
464	697	409	614	360	541			1.79		1.78		1.77	

Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
136		120		106		lb/ft		136		120		106	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1550	2330	1370	2060	1210	1830	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	694	1040	603	907	532	800
1480	2220	1300	1960	1150	1730		6	694	1040	603	907	532	800
1450	2180	1280	1920	1130	1700		7	694	1040	603	907	532	800
1420	2140	1250	1880	1110	1670		8	694	1040	603	907	532	800
1390	2090	1220	1840	1080	1630		9	694	1040	603	907	532	800
1350	2040	1190	1790	1050	1580		10	693	1040	601	904	529	796
1320	1980	1160	1740	1020	1540		11	686	1030	594	893	523	786
1270	1920	1120	1680	990	1490		12	679	1020	588	883	516	776
1230	1850	1080	1630	956	1440		13	672	1010	581	873	509	766
1190	1780	1040	1570	920	1380		14	665	1000	574	863	503	756
1140	1710	1000	1500	883	1330		15	658	989	567	853	496	745
1090	1640	958	1440	845	1270		16	651	979	561	843	489	735
1050	1570	915	1380	807	1210		17	644	968	554	832	483	725
996	1500	871	1310	768	1150		18	637	958	547	822	476	715
947	1420	827	1240	729	1100		19	630	948	540	812	469	705
898	1350	783	1180	689	1040		20	624	937	534	802	462	695
800	1200	697	1050	612	920		22	610	916	520	782	449	675
705	1060	613	921	537	808		24	596	896	507	761	436	655
615	924	532	800	466	700		26	582	875	493	741	422	635
530	797	459	690	402	604		28	568	854	479	721	409	615
462	695	400	601	350	526		30	554	833	466	700	395	594
406	610	352	528	308	462		32	541	813	452	680	382	574
360	541	311	468	272	410		34	527	792	439	660	369	554
321	482	278	417	243	365		36	513	771	425	639	355	534
288	433	249	375	218	328		38	499	750	412	619	342	514
260	391	225	338	197	296		40	485	730	398	599	328	493
236	354	204	307	179	268		42	472	709	385	578	311	467
215	323	186	279	163	245		44	458	688	371	558	295	444
197	295	170	256	149	224		46	444	667	354	532	281	423
181	271	156	235	137	205		48	430	646	338	508	268	404
166	250	144	216	126	189		50	414	623	324	487	257	386
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1550	2330	1370	2060	1210	1830			9.79	49.1	9.70	44.2	9.63	39.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			39.9		35.2		31.2	
1200	1800	1060	1580	936	1400			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1240	398	1070	345	933	301
275	413	242	363	205	307			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.16		3.13		3.11	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
318	478	277	416	244	366			1.77		1.76		1.76	

Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
96		87		79		lb/ft		96		87		79[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1100	1650	996	1500	903	1360	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	477	717	428	644	384	577
1040	1570	946	1420	856	1290		6	477	717	428	644	384	577
1020	1540	928	1390	840	1260		7	477	717	428	644	384	577
1000	1510	908	1360	822	1240		8	477	717	428	644	384	577
977	1470	886	1330	802	1200		9	477	717	428	644	384	577
951	1430	862	1300	779	1170		10	474	712	425	639	382	575
923	1390	836	1260	756	1140		11	467	703	419	629	376	565
893	1340	808	1210	731	1100		12	461	693	412	619	370	556
861	1290	780	1170	704	1060		13	454	683	406	610	364	546
829	1250	750	1130	677	1020		14	448	673	399	600	357	537
795	1190	719	1080	648	975		15	441	663	393	590	351	527
760	1140	687	1030	620	931		16	435	653	386	581	345	518
725	1090	655	984	590	887		17	428	644	380	571	338	508
690	1040	622	936	561	843		18	422	634	373	561	332	499
654	983	590	887	531	798		19	415	624	367	552	326	490
619	930	557	838	501	753		20	409	614	361	542	319	480
548	824	493	742	443	666		22	395	594	348	522	307	461
481	722	432	649	387	582		24	382	575	335	503	294	442
416	625	373	560	333	501		26	369	555	322	484	282	423
358	539	321	483	287	432		28	356	535	309	464	269	404
312	469	280	421	250	376		30	343	516	296	445	256	385
274	413	246	370	220	331		32	330	496	283	426	244	366
243	365	218	327	195	293		34	317	476	270	406	226	340
217	326	194	292	174	261		36	304	456	253	381	211	317
195	293	174	262	156	234		38	288	433	238	357	198	297
176	264	157	237	141	212		40	272	408	224	337	186	280
159	239	143	215	128	192		42	257	386	212	318	176	264
145	218	130	196	116	175		44	244	367	201	302	167	250
133	200	119	179	106	160		46	232	349	191	287	158	238
122	183	109	164	97.8	147		48	222	333	182	274	151	227
112	169	101	151	90.1	135		50	212	319	174	262	144	217
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1100	1650	996	1500	903	1360			9.57	37.0	9.51	34.4	9.78	32.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			28.2		25.6		23.2	
846	1270	768	1150	696	1040			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			833	270	740	241	662	216
182	272	167	251	152	227			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.09		3.07		3.05	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
219	329	196	294	175	263			1.76		1.75		1.75	

[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
72		65		58		lb/ft		72[f]		65[f]		58	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
821	1230	743	1120	662	995	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	341	512	297	447	280	421
779	1170	704	1060	612	920		6	341	512	297	447	280	421
764	1150	691	1040	595	894		7	341	512	297	447	280	421
747	1120	675	1020	576	865		8	341	512	297	447	279	419
728	1090	658	989	555	834		9	341	512	297	447	273	410
708	1060	640	962	532	800		10	341	512	297	447	266	400
687	1030	620	932	509	765		11	341	512	297	447	260	391
664	997	599	900	484	727		12	334	503	297	447	254	382
639	961	577	867	458	689		13	328	493	293	440	248	372
614	923	554	833	432	650		14	322	484	287	431	242	363
589	885	530	797	406	610		15	316	475	281	422	235	354
562	845	506	761	379	570		16	310	466	275	413	229	344
535	805	482	724	353	531		17	304	456	269	404	223	335
508	764	457	687	327	492		18	298	447	263	395	217	326
481	723	432	650	302	454		19	291	438	257	387	210	316
454	683	408	613	277	417		20	285	429	251	378	204	307
401	603	360	540	231	347		22	273	410	240	360	192	288
350	526	313	471	194	292		24	261	392	228	342	179	270
301	453	269	404	165	249		26	248	373	216	325	162	244
260	390	232	349	143	214		28	236	355	204	307	148	222
226	340	202	304	124	187		30	224	336	189	284	135	203
199	299	178	267	109	164		32	207	311	173	260	125	188
176	265	157	236	96.7	145		34	192	288	160	241	116	174
157	236	140	211	86.3	130		36	179	268	149	224	108	163
141	212	126	189	77.4	116		38	167	251	139	209	102	153
127	191	114	171	69.9	105		40	157	236	130	196	95.7	144
115	173	103	155				42	148	223	123	185	90.5	136
105	158	93.9	141				44	140	211	116	175	85.8	129
96.2	145	85.9	129				46	133	200	110	166	81.6	123
88.3	133	78.9	119				48	127	191	105	158	77.8	117
81.4	122	72.7	109				50	121	182	100	150	74.3	112

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
821	1230	743	1120	662	995	11.0	30.4	12.2	28.8	7.78	24.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	21.1		19.1		17.0	
633	950	573	860	510	765	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	597	195	533	174	475	107
138	206	123	184	114	171	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.04		3.02		2.51	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
153	230	132	198	105	158	1.75		1.75		2.10	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
53		50		45		lb/ft		53[f]		50		45	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
607	913	568	854	510	766	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	248	373	233	351	208	313
560	842	500	751	448	673		6	248	373	233	351	208	313
544	818	477	717	427	642		7	248	373	227	341	202	304
527	791	452	680	405	609		8	248	373	221	332	196	295
507	762	426	640	381	573		9	245	368	214	322	190	285
486	731	398	598	356	535		10	239	359	208	312	184	276
464	697	369	555	330	496		11	233	350	201	302	177	267
441	662	340	511	304	456		12	227	341	195	292	171	257
417	627	311	468	278	417		13	221	332	188	283	165	248
393	590	283	425	252	378		14	215	323	181	273	159	239
368	553	255	383	227	341		15	209	314	175	263	153	229
343	516	228	343	203	305		16	203	306	168	253	146	220
319	480	203	304	180	270		17	197	297	162	243	140	211
295	444	181	272	160	241		18	191	288	155	233	134	201
272	409	162	244	144	216		19	185	279	149	224	126	189
249	375	146	220	130	195		20	180	270	140	211	117	176
207	311	121	182	107	161		22	168	252	124	186	103	155
174	261	102	153	90.3	136		24	153	230	111	167	92.0	138
148	223	86.6	130	76.9	116		26	137	206	101	151	83.1	125
128	192	74.7	112	66.3	99.7		28	124	187	91.9	138	75.8	114
111	167	65.0	97.8	57.8	86.8		30	114	171	84.6	127	69.7	105
97.8	147	57.2	85.9	50.8	76.3		32	105	157	78.5	118	64.5	97.0
86.6	130						34	97.2	146	73.2	110	60.1	90.3
77.3	116						36	90.6	136	68.6	103	56.2	84.5
69.4	104						38	84.9	128	64.5	97.0	52.9	79.4
62.6	94.1						40	79.8	120	60.9	91.6	49.9	75.0
							42	75.4	113	57.7	86.8	47.2	71.0
							44	71.4	107	54.9	82.5	44.8	67.4
							46	67.9	102	52.3	78.6	42.7	64.2
							48	64.7	97.2	49.9	75.1	40.7	61.2
							50	61.7	92.8	47.8	71.8	39.0	58.6
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
607	913	568	854	510	766			8.47	23.2	6.07	19.5	6.04	18.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			15.6		14.6		13.1	
468	702	438	657	393	590			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			425	95.8	391	56.3	348	50.0
109	163	117	176	105	158			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.48		1.96		1.95	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
91.8	138	69.1	104	61.6	92.6			2.11		2.64		2.64	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
40[c]		35[c]		30[c]		lb/ft		40		35		30	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
450	677	389	585	321	483	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	185	278	166	250	140	210
400	600	323	486	266	400		6	185	278	158	237	132	198
381	573	302	454	248	373		7	179	269	151	227	126	189
361	542	277	416	229	345		8	173	260	144	216	120	180
339	510	251	378	210	315		9	167	252	137	206	113	171
317	476	225	338	189	284		10	161	243	130	196	107	161
293	441	199	300	167	251		11	156	234	124	186	101	152
270	405	175	262	146	219		12	150	225	117	175	95.1	143
246	370	151	227	125	189		13	144	216	110	165	88.9	134
223	336	130	196	108	163		14	138	207	103	154	79.8	120
201	302	113	170	94.2	142		15	132	199	92.6	139	71.6	108
179	270	99.6	150	82.8	124		16	126	190	84.3	127	64.8	97.4
159	239	88.2	133	73.3	110		17	120	181	77.2	116	59.1	88.9
142	213	78.7	118	65.4	98.3		18	113	170	71.3	107	54.4	81.7
127	191	70.6	106	58.7	88.3		19	104	157	66.1	99.4	50.3	75.5
115	173	63.7	95.8	53.0	79.7		20	97.0	146	61.7	92.7	46.7	70.2
95.0	143	52.7	79.2	43.8	65.8		22	85.0	128	54.4	81.7	40.9	61.5
79.8	120	44.3	66.5	36.8	55.3		24	75.6	114	48.6	73.1	36.4	54.7
68.0	102						26	68.0	102	44.0	66.1	32.8	49.3
58.6	88.1						28	61.9	93.0	40.2	60.4	29.8	44.8
51.1	76.8						30	56.8	85.3	37.0	55.6	27.3	41.1
44.9	67.5						32	52.4	78.8	34.3	51.5	25.3	38.0
							34	48.7	73.3	31.9	48.0	23.5	35.3
							36	45.6	68.5	29.9	44.9	21.9	33.0
							38	42.8	64.3	28.1	42.3	20.6	31.0
							40	40.3	60.6	26.6	39.9	19.4	29.2
							42	38.1	57.3	25.2	37.8	18.4	27.6
							44	36.2	54.3	23.9	35.9	17.4	26.2
							46	34.4	51.7	22.8	34.2	16.6	24.9
							48	32.8	49.3	21.7	32.7	15.8	23.8
							50	31.4	47.1	20.8	31.3	15.1	22.7
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
455	684	401	603	342	514			6.01	17.6	4.77	13.9	4.71	13.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			11.7		10.3		8.79	
351	527	309	464	264	396			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			307	44.1	285	24.5	238	20.3
91.3	137	97.5	146	83.1	125			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.94		1.54		1.52	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
54.5	81.9	37.3	56.1	31.0	46.6			2.64		3.41		3.43	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12×						Shape		W12×					
26[c]		22[c]		19[c]		lb/ft		26[f]		22		19	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
272	409	231	348	192	288	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	119	179	95.0	143	80.1	120
224	337	127	191	104	156		6	113	170	70.4	106	57.3	86.2
209	315	99.2	149	80.2	120		7	108	162	63.1	94.8	50.7	76.2
193	291	76.0	114	61.4	92.3		8	102	153	54.6	82.1	41.9	63.0
177	265	60.0	90.3	48.5	72.9		9	96.5	145	45.3	68.1	34.5	51.9
160	240	48.6	73.1	39.3	59.0		10	90.9	137	38.6	58.0	29.2	43.9
143	214	40.2	60.4	32.5	48.8		11	85.3	128	33.5	50.4	25.2	37.9
125	189	33.8	50.8	27.3	41.0		12	79.8	120	29.6	44.5	22.1	33.3
108	162	28.8	43.3	23.2	34.9		13	72.8	109	26.5	39.8	19.7	29.6
92.9	140	24.8	37.3				14	64.4	96.8	24.0	36.0	17.7	26.7
80.9	122						15	57.5	86.5	21.9	32.9	16.1	24.2
71.1	107						16	51.9	78.0	20.1	30.3	14.8	22.2
63.0	94.7						17	47.2	70.9	18.6	28.0	13.6	20.5
56.2	84.5						18	43.2	64.9	17.4	26.1	12.7	19.0
50.4	75.8						19	39.8	59.9	16.2	24.4	11.8	17.8
45.5	68.4						20	36.9	55.5	15.3	23.0	11.1	16.7
37.6	56.5						22	32.1	48.3	13.6	20.5	9.86	14.8
31.6	47.5						24	28.4	42.8	12.3	18.5	8.88	13.3
							26	25.5	38.3	11.3	16.9	8.08	12.2
							28	23.1	34.7	10.4	15.6	7.42	11.2
							30	21.1	31.8	9.60	14.4	6.86	10.3
							32	19.5	29.3	8.95	13.4	6.39	9.60
							34	18.0	27.1	8.38	12.6	5.97	8.97
							36	16.8	25.3	7.88	11.8	5.61	8.43
							38	15.8	23.7	7.44	11.2	5.29	7.95
							40	14.8	22.3	7.04	10.6	5.00	7.52
							42	14.0	21.0	6.69	10.1	4.75	7.14
							44	13.3	19.9	6.37	9.58	4.52	6.79
							46	12.6	18.9	6.08	9.14	4.31	6.48
							48	12.0	18.0	5.82	8.74	4.12	6.19
							50	11.5	17.2	5.58	8.38	3.95	5.93
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
298	448	252	379	217	326			4.99	12.7	2.63	7.74	2.55	7.36
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			7.65		6.48		5.57	
230	344	194	292	167	251			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			204	17.3	156	4.66	130	3.76
73.0	109	83.1	125	74.5	112			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.51		0.848		0.822	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
25.9	39.0	11.9	17.8	9.67	14.5			3.42		5.79		5.86	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12–W10

Table 6-A (continued)

Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W12× 16[c]		W12× 14[c]		W10× 112		Shape lb/ft		W12× 16[v]		W12× 14[f], [v]		W10× 112	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
156	235	133	200	1280	1920	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	65.2	98.0	55.1	82.8	477	717
79.3	119	65.2	98.1	1200	1800		6	44.2	66.4	37.4	56.2	477	717
60.0	90.1	50.2	75.5	1170	1750		7	38.0	57.2	31.0	46.6	477	717
45.9	69.0	38.5	57.8	1130	1700		8	30.1	45.3	24.4	36.7	477	717
36.3	54.5	30.4	45.7	1100	1650		9	24.7	37.1	19.9	29.9	474	712
29.4	44.2	24.6	37.0	1060	1590		10	20.7	31.1	16.7	25.0	469	705
24.3	36.5	20.3	30.6	1020	1530		11	17.8	26.7	14.2	21.4	464	698
20.4	30.7	17.1	25.7	973	1460		12	15.5	23.3	12.4	18.6	460	691
				928	1390		13	13.8	20.7	10.9	16.4	455	684
				881	1320		14	12.3	18.5	9.76	14.7	450	677
				834	1250		15	11.2	16.8	8.80	13.2	446	670
				786	1180		16	10.2	15.3	8.01	12.0	441	663
				738	1110		17	9.37	14.1	7.35	11.0	437	656
				691	1040		18	8.67	13.0	6.78	10.2	432	649
				644	967		19	8.07	12.1	6.30	9.46	427	642
				597	898		20	7.55	11.3	5.87	8.83	423	635
				509	765		22	6.68	10.0	5.18	7.79	414	622
				428	644		24	6.00	9.02	4.64	6.97	404	608
				365	548		26	5.45	8.18	4.20	6.31	395	594
				315	473		28	4.99	7.50	3.83	5.76	386	580
				274	412		30	4.60	6.92	3.53	5.31	377	566
				241	362		32	4.27	6.42	3.27	4.92	367	552
				213	321		34	3.99	6.00	3.05	4.59	358	538
				190	286		36	3.74	5.62	2.86	4.30	349	524
				171	257		38	3.52	5.30	2.69	4.04	340	511
				154	232		40	3.33	5.01	2.54	3.82	330	497
				140	210		42	3.16	4.75	2.41	3.61	321	483
				127	191		44	3.00	4.51	2.29	3.43	312	469
							46	2.86	4.30	2.18	3.27	303	455
							48	2.74	4.11	2.08	3.12	294	441
							50	2.62	3.94	1.99	2.99	284	426
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
183	276	162	243	1280	1920			2.39	6.92	2.60	6.68	8.30	49.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			4.71		4.16		32.9	
141	212	125	187	987	1480			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			103	2.82	88.6	2.36	716	236
61.7	92.7	55.0	82.6	224	336			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								0.773		0.753		2.68	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
7.32	11.0	5.95	8.95	224	337			6.04		6.14		1.74	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 65 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W10×						Shape		W10×					
100		88		77		lb/ft		100		88		77	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1140	1710	1010	1520	884	1330	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	422	634	367	551	317	476
1060	1600	942	1420	821	1230		6	422	634	367	551	317	476
1040	1560	918	1380	800	1200		7	422	634	367	551	317	476
1010	1510	892	1340	776	1170		8	422	634	367	551	317	476
974	1460	862	1300	750	1130		9	418	628	363	545	312	469
938	1410	830	1250	722	1080		10	413	621	358	538	308	463
901	1350	796	1200	692	1040		11	409	615	354	532	304	456
861	1290	761	1140	660	992		12	404	608	349	525	299	449
820	1230	724	1090	627	943		13	400	601	345	518	295	443
778	1170	687	1030	594	893		14	395	594	340	511	290	436
736	1110	648	974	560	842		15	391	587	336	505	286	429
692	1040	610	916	526	791		16	386	580	331	498	281	423
649	976	571	859	492	740		17	381	573	327	491	277	416
606	912	533	801	458	689		18	377	567	322	484	272	409
564	848	495	745	425	639		19	372	560	318	477	268	403
523	786	459	689	393	591		20	368	553	313	471	264	396
444	667	388	583	331	497		22	359	539	304	457	255	383
373	560	326	490	278	418		24	350	525	295	444	246	369
318	478	278	417	237	356		26	340	512	286	430	237	356
274	412	239	360	204	307		28	331	498	277	417	228	343
239	359	209	313	178	267		30	322	484	268	403	219	329
210	315	183	276	156	235		32	313	470	259	389	210	316
186	279	162	244	139	208		34	304	457	250	376	201	303
166	249	145	218	124	186		36	295	443	241	362	192	288
149	224	130	195	111	167		38	286	429	232	349	181	272
134	202	117	176	100	150		40	276	415	223	335	171	257
122	183	106	160	90.8	136		42	267	402	212	318	162	244
111	167						44	258	388	202	303	155	232
							46	248	372	192	289	147	222
							48	237	356	184	277	141	212
							50	227	341	176	265	135	203
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1140	1710	1010	1520	884	1330			8.21	44.8	8.15	39.9	8.05	35.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			29.3		26.0		22.7	
879	1320	780	1170	681	1020			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			623	207	534	179	455	154
196	294	170	255	146	219			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.65		2.63		2.60	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
198	297	172	259	149	224			1.74		1.73		1.73	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W10×						Shape		W10×					
68		60		54		lb/ft		68		60		54[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
775	1160	689	1040	615	924	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	277	416	242	364	215	324
720	1080	639	961	570	857		6	277	416	242	364	215	324
701	1050	622	935	555	834		7	277	416	242	364	215	324
680	1020	603	907	538	809		8	277	416	242	363	215	324
657	987	582	875	519	780		9	272	409	238	357	212	318
632	949	560	842	499	750		10	268	403	233	351	207	312
605	909	536	806	478	718		11	264	396	229	344	203	305
577	868	511	768	455	684		12	259	390	225	338	199	299
549	825	485	730	432	649		13	255	383	220	331	195	293
519	780	459	690	408	614		14	251	377	216	325	191	287
489	736	432	650	384	578		15	246	370	212	318	186	280
459	690	405	609	360	542		16	242	364	208	312	182	274
429	646	379	569	336	505		17	238	357	203	306	178	268
400	601	352	529	313	470		18	233	350	199	299	174	261
371	557	326	490	289	435		19	229	344	195	293	170	255
342	515	301	452	267	401		20	224	337	191	286	166	249
288	433	252	379	223	336		22	216	324	182	274	157	236
242	364	212	318	188	282		24	207	311	173	261	149	224
206	310	181	271	160	240		26	198	298	165	248	140	211
178	267	156	234	138	207		28	190	285	156	235	130	196
155	233	136	204	120	180		30	181	272	146	220	120	180
136	205	119	179	106	159		32	172	259	136	204	111	167
121	181	106	159	93.5	141		34	161	242	127	190	103	155
108	162	94.2	142	83.4	125		36	151	227	119	178	96.7	145
96.5	145	84.5	127	74.8	112		38	142	214	112	168	91.0	137
87.1	131	76.3	115	67.6	102		40	134	202	105	159	85.8	129
79.0	119	69.2	104	61.3	92.1		42	128	192	100	150	81.3	122
							44	121	182	95.0	143	77.2	116
							46	116	174	90.5	136	73.5	110
							48	111	166	86.5	130	70.2	105
							50	106	159	82.8	124	67.1	101
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
775	1160	689	1040	615	924			8.02	32.1	7.96	29.2	8.11	27.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			19.9		17.7		15.8	
597	896	531	797	474	711			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			394	134	341	116	303	103
127	191	111	167	97.2	146			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.59		2.57		2.56	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
130	195	114	171	101	152			1.71		1.71		1.71	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W10×						Shape		W10×					
49		45		39		lb/ft		49[f]		45		39	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
560	842	518	778	448	673	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	191	287	178	268	152	228
519	780	458	689	395	593		6	191	287	178	268	152	228
505	759	438	659	377	567		7	191	287	175	263	148	223
489	735	417	626	358	538		8	191	287	170	256	144	217
472	709	393	591	337	507		9	191	287	166	250	140	210
453	681	369	554	316	474		10	187	281	162	243	136	204
434	652	344	516	293	441		11	183	275	157	237	132	198
413	621	318	478	271	407		12	179	269	153	230	128	192
392	589	292	439	248	373		13	175	263	149	224	123	186
370	556	266	401	226	339		14	171	257	144	217	119	179
348	523	242	363	204	307		15	167	251	140	211	115	173
326	489	217	327	183	275		16	163	245	136	204	111	167
304	456	194	292	163	245		17	159	239	131	198	107	161
282	424	173	260	145	218		18	155	233	127	191	103	154
261	392	155	234	130	196		19	151	227	123	185	98.6	148
240	361	140	211	118	177		20	147	221	118	178	93.9	141
200	301	116	174	97.2	146		22	139	208	109	164	83.0	125
168	253	97.4	146	81.7	123		24	131	196	98.1	147	74.4	112
143	216	83.0	125	69.6	105		26	122	183	89.2	134	67.4	101
124	186	71.5	108	60.0	90.2		28	111	166	81.9	123	61.7	92.8
108	162	62.3	93.7	52.3	78.6		30	102	153	75.7	114	56.9	85.5
94.7	142	54.8	82.3	46.0	69.1		32	93.9	141	70.3	106	52.8	79.4
83.9	126						34	87.3	131	65.8	98.8	49.3	74.0
74.8	112						36	81.6	123	61.7	92.8	46.2	69.4
67.2	101						38	76.7	115	58.2	87.5	43.5	65.4
60.6	91.1						40	72.3	109	55.0	82.7	41.1	61.7
55.0	82.6						42	68.4	103	52.2	78.5	38.9	58.5
							44	64.9	97.5	49.7	74.7	37.0	55.6
							46	61.7	92.8	47.4	71.2	35.3	53.0
							48	58.9	88.5	45.3	68.1	33.7	50.7
							50	56.3	84.6	43.4	65.2	32.3	48.5

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
560	842	518	778	448	673	9.09	25.6	6.23	21.6	6.13	19.7
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	14.4		13.3		11.5	
432	648	399	599	345	518	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	272	93.4	248	53.4	209	45.0
88.4	133	91.9	138	81.2	122	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.54		2.01		1.98	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
88.4	133	65.8	99.0	55.8	83.9	1.71		2.15		2.16	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W10×						Shape		W10×					
33		30		26[c]		lb/ft		33[f]		30		26	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
378	568	344	517	292	438	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	122	183	119	178	102	153
332	498	265	398	227	341		6	122	183	110	165	93.2	140
316	475	241	362	206	310		7	122	183	105	158	88.6	133
299	450	216	324	184	277		8	118	178	100	150	84.0	126
282	423	191	286	163	244		9	114	172	95.0	143	79.4	119
263	395	166	249	141	212		10	110	166	90.0	135	74.7	112
243	366	142	214	121	182		11	107	160	85.0	128	70.1	105
224	336	120	181	102	153		12	103	154	80.0	120	65.5	98.4
204	307	102	154	86.9	131		13	98.8	149	75.0	113	59.4	89.3
185	278	88.4	133	75.0	113		14	95.0	143	68.4	103	53.3	80.1
167	251	77.0	116	65.3	98.1		15	91.1	137	62.2	93.5	48.3	72.7
149	224	67.7	102	57.4	86.3		16	87.2	131	57.1	85.8	44.2	66.4
132	198	59.9	90.1	50.8	76.4		17	83.4	125	52.8	79.3	40.7	61.2
118	177	53.5	80.3	45.3	68.2		18	79.5	119	49.0	73.7	37.7	56.7
106	159	48.0	72.1	40.7	61.2		19	73.6	111	45.8	68.9	35.1	52.8
95.4	143	43.3	65.1	36.7	55.2		20	68.5	103	43.0	64.6	32.9	49.5
78.8	118	35.8	53.8	30.4	45.6		22	60.2	90.5	38.3	57.6	29.2	43.9
66.2	99.5						24	53.7	80.8	34.6	51.9	26.2	39.4
56.4	84.8						26	48.5	72.9	31.5	47.3	23.8	35.8
48.7	73.1						28	44.2	66.5	28.9	43.5	21.9	32.9
42.4	63.7						30	40.6	61.1	26.8	40.3	20.2	30.3
37.3	56.0						32	37.6	56.5	24.9	37.5	18.8	28.2
							34	35.0	52.6	23.3	35.1	17.5	26.3
							36	32.8	49.2	21.9	32.9	16.4	24.7
							38	30.8	46.3	20.7	31.1	15.5	23.3
							40	29.0	43.7	19.6	29.4	14.7	22.0
							42	27.5	41.3	18.6	27.9	13.9	20.9
							44	26.1	39.2	17.7	26.6	13.2	19.9
							46	24.9	37.4	16.9	25.4	12.6	18.9
							48	23.7	35.6	16.1	24.3	12.0	18.1
							50	22.7	34.1	15.5	23.2	11.5	17.3
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
378	568	344	517	296	445			7.04	18.0	4.24	13.3	4.21	12.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			9.71		8.84		7.61	
291	437	265	398	228	342			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			171	36.6	170	16.7	144	14.1
73.4	110	81.9	123	69.6	104			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.94		1.37		1.36	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
43.3	65.1	28.7	43.1	24.3	36.6			2.16		3.20		3.20	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W10× 22[c]		W10× 19[c]		W10× 17[c]		Shape lb/ft		W10× 22		W10× 19		W10× 17	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
244	366	212	318	185	279	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	84.3	127	70.1	105	60.7	91.2
190	286	115	172	97.4	146		6	76.4	115	53.6	80.5	44.9	67.5
173	260	90.9	137	75.9	114		7	72.2	109	48.5	72.9	40.3	60.6
154	231	70.0	105	58.1	87.3		8	68.0	102	43.5	65.4	34.9	52.5
135	203	55.3	83.1	45.9	69.0		9	63.8	95.9	36.8	55.3	29.0	43.6
117	175	44.8	67.3	37.2	55.9		10	59.6	89.6	31.5	47.4	24.7	37.2
99.0	149	37.0	55.7	30.7	46.2		11	55.4	83.2	27.5	41.4	21.5	32.3
83.2	125	31.1	46.8	25.8	38.8		12	50.1	75.3	24.4	36.7	19.0	28.5
70.9	107	26.5	39.9	22.0	33.1		13	44.2	66.5	21.9	33.0	17.0	25.5
61.1	91.9	22.9	34.4	19.0	28.5		14	39.5	59.3	19.9	30.0	15.4	23.1
53.3	80.0						15	35.6	53.5	18.3	27.4	14.0	21.1
46.8	70.4						16	32.4	48.7	16.8	25.3	12.9	19.4
41.5	62.3						17	29.7	44.7	15.6	23.5	12.0	18.0
37.0	55.6						18	27.4	41.2	14.6	21.9	11.1	16.7
33.2	49.9						19	25.5	38.3	13.7	20.6	10.4	15.7
30.0	45.0						20	23.8	35.7	12.9	19.4	9.81	14.7
24.8	37.2						22	21.0	31.5	11.5	17.4	8.76	13.2
							24	18.8	28.2	10.5	15.7	7.92	11.9
							26	17.0	25.5	9.57	14.4	7.23	10.9
							28	15.5	23.3	8.82	13.3	6.66	10.0
							30	14.3	21.5	8.19	12.3	6.17	9.27
							32	13.2	19.9	7.64	11.5	5.75	8.64
							34	12.3	18.5	7.16	10.8	5.39	8.09
							36	11.6	17.4	6.74	10.1	5.06	7.61
							38	10.9	16.3	6.36	9.56	4.78	7.19
							40	10.3	15.4	6.03	9.06	4.53	6.81
							42	9.73	14.6	5.73	8.61	4.30	6.46
							44	9.24	13.9	5.46	8.21	4.10	6.16
							46	8.80	13.2	5.21	7.84	3.91	5.88
							48	8.41	12.6	4.99	7.50	3.74	5.62
							50	8.05	12.1	4.78	7.19	3.58	5.39

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
253	380	219	329	194	292	4.12	11.6	2.71	8.17	2.62	7.75
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	6.49		5.62		4.99	
195	292	169	253	150	225	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	118	11.4	96.3	4.29	81.9	3.56
63.6	95.5	66.3	99.5	63.0	94.5	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						1.33		0.874		0.845	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
19.8	29.7	10.9	16.3	9.08	13.7	3.21		4.74		4.79	

[c] Shape is slender for compression with F_y = 65 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10–W8

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W10× 15[c]		W10× 12[c]		W8× 67		Shape lb/ft		W10× 15		W10× 12[f]		W8× 67	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
161	242	121	182	767	1150	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	51.9	78.0	39.1	58.8	227	342
81.0	122	61.9	93.1	687	1030		6	37.0	55.7	28.1	42.2	227	342
61.6	92.6	46.5	69.8	660	993		7	32.8	49.3	24.3	36.5	226	340
47.2	70.9	35.6	53.5	631	948		8	27.1	40.8	19.2	28.9	223	335
37.3	56.0	28.1	42.3	599	901		9	22.4	33.7	15.7	23.7	220	331
30.2	45.4	22.8	34.2	565	850		10	19.0	28.6	13.2	19.9	217	326
25.0	37.5	18.8	28.3	530	797		11	16.5	24.7	11.4	17.1	214	322
21.0	31.5	15.8	23.8	495	743		12	14.5	21.8	9.92	14.9	211	317
17.9	26.9	13.5	20.3	458	689		13	12.9	19.4	8.79	13.2	208	313
				422	634		14	11.6	17.5	7.88	11.8	205	309
				386	581		15	10.6	15.9	7.13	10.7	202	304
				352	528		16	9.73	14.6	6.51	9.79	199	300
				318	478		17	9.00	13.5	5.99	9.00	196	295
				285	429		18	8.36	12.6	5.54	8.33	193	291
				256	385		19	7.81	11.7	5.16	7.76	190	286
				231	347		20	7.33	11.0	4.83	7.25	187	282
				191	287		22	6.54	9.82	4.27	6.43	181	273
				160	241		24	5.90	8.86	3.84	5.77	176	264
				137	205		26	5.37	8.08	3.48	5.24	170	255
				118	177		28	4.94	7.42	3.19	4.80	164	246
				103	154		30	4.57	6.87	2.94	4.43	158	237
				90.3	136		32	4.26	6.40	2.73	4.11	152	228
				79.9	120		34	3.98	5.98	2.55	3.84	146	219
							36	3.74	5.62	2.39	3.60	140	210
							38	3.53	5.31	2.26	3.39	133	200
							40	3.34	5.02	2.13	3.20	126	190
							42	3.17	4.77	2.02	3.04	120	180
							44	3.02	4.54	1.92	2.89	114	172
							46	2.88	4.33	1.83	2.75	109	164
							48	2.76	4.14	1.75	2.63	105	157
							50	2.64	3.97	1.68	2.52	100	151
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
172	258	138	207	767	1150			2.51	7.34	2.91	6.93	6.57	36.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			4.41		3.54		19.7	
132	198	106	159	591	887			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			68.9	2.89	53.8	2.18	272	88.6
59.7	89.6	48.8	73.1	133	200			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								0.810		0.785		2.12	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
7.46	11.2	5.31	7.98	106	159			4.88		4.97		1.75	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W8×						Shape		W8×					
58		48		40		lb/ft		58		48		40	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
666	1000	549	825	455	684	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	194	292	159	239	129	194
595	895	490	736	405	608		6	194	292	159	239	129	194
572	859	470	706	388	583		7	193	289	157	236	127	191
546	820	448	674	369	555		8	190	285	154	232	124	187
518	778	425	638	349	524		9	187	281	152	228	122	183
488	733	400	601	328	493		10	184	276	149	224	119	179
457	687	374	562	306	460		11	181	272	146	219	116	175
426	640	348	523	284	426		12	178	267	143	215	113	170
394	592	322	483	261	393		13	175	263	140	211	111	166
362	544	295	444	239	359		14	172	258	137	206	108	162
331	498	269	405	217	327		15	169	254	134	202	105	158
301	452	244	367	196	295		16	166	250	131	198	102	154
271	408	220	331	176	264		17	163	245	129	193	99.4	149
243	365	197	295	157	236		18	160	241	126	189	96.7	145
218	328	176	265	141	212		19	157	236	123	185	93.9	141
197	296	159	239	127	191		20	154	232	120	180	91.1	137
163	244	132	198	105	158		22	148	223	114	172	85.6	129
137	205	111	166	88.2	133		24	143	214	109	163	79.7	120
116	175	94.2	142	75.2	113		26	137	206	103	154	72.7	109
100	151	81.2	122	64.8	97.4		28	131	197	96.6	145	66.8	100
87.5	131	70.7	106	56.5	84.9		30	125	188	89.6	135	61.8	92.9
76.9	116	62.2	93.5	49.6	74.6		32	119	179	83.6	126	57.6	86.5
68.1	102	55.1	82.8	44.0	66.1		34	112	168	78.3	118	53.9	81.0
							36	106	159	73.7	111	50.6	76.1
							38	99.7	150	69.6	105	47.8	71.8
							40	94.6	142	65.9	99.1	45.2	67.9
							42	89.9	135	62.7	94.2	42.9	64.5
							44	85.7	129	59.7	89.7	40.9	61.4
							46	81.8	123	57.0	85.7	39.0	58.6
							48	78.3	118	54.5	82.0	37.3	56.0
							50	75.1	113	52.3	78.6	35.7	53.7
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
666	1000	549	825	455	684			6.51	32.4	6.44	27.6	6.32	23.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			17.1		14.1		11.7	
513	770	423	635	351	527			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			228	75.1	184	60.9	146	49.1
116	174	88.4	133	77.2	116			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.10		2.08		2.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
90.5	136	74.3	112	60.0	90.2			1.74		1.74		1.73	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W8×						Shape		W8×					
35		31		28		lb/ft		35[f]		31[f]		28	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
401	603	355	534	321	483	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	112	169	95.4	143	88.2	133
356	535	315	473	266	400		6	112	169	95.4	143	85.5	129
341	512	301	453	249	374		7	111	166	95.4	143	82.7	124
324	487	287	431	230	346		8	108	162	94.1	141	80.0	120
306	460	271	407	210	316		9	105	158	91.5	137	77.2	116
288	432	254	382	191	286		10	102	154	88.8	134	74.4	112
268	403	237	356	171	257		11	99.8	150	86.2	130	71.7	108
248	373	219	329	152	228		12	97.1	146	83.6	126	68.9	104
229	344	202	303	133	200		13	94.4	142	81.0	122	66.1	99.4
209	314	184	277	115	173		14	91.7	138	78.4	118	63.4	95.2
190	285	167	251	100	151		15	89.0	134	75.8	114	60.6	91.1
171	257	151	226	88.3	133		16	86.2	130	73.2	110	57.8	86.9
153	230	135	202	78.2	118		17	83.5	126	70.6	106	55.0	82.6
137	206	120	180	69.8	105		18	80.8	121	68.0	102	51.2	76.9
123	184	108	162	62.6	94.1		19	78.1	117	65.4	98.3	47.9	71.9
111	166	97.2	146	56.5	84.9		20	75.4	113	62.8	94.4	45.0	67.6
91.5	138	80.3	121	46.7	70.2		22	69.5	105	55.7	83.7	40.1	60.3
76.9	116	67.5	101	39.2	59.0		24	62.6	94.1	49.9	75.0	36.3	54.5
65.5	98.5	57.5	86.5	33.4	50.2		26	56.9	85.5	45.3	68.1	33.1	49.8
56.5	84.9	49.6	74.5				28	52.2	78.5	41.4	62.3	30.5	45.8
49.2	74.0	43.2	64.9				30	48.2	72.5	38.2	57.4	28.2	42.4
43.3	65.0	38.0	57.1				32	44.8	67.4	35.5	53.3	26.3	39.5
							34	41.9	63.0	33.1	49.8	24.6	37.0
							36	39.3	59.1	31.0	46.7	23.1	34.8
							38	37.1	55.7	29.2	43.9	21.8	32.8
							40	35.1	52.7	27.6	41.5	20.7	31.1
							42	33.3	50.0	26.2	39.3	19.6	29.5
							44	31.7	47.6	24.9	37.4	18.7	28.1
							46	30.2	45.4	23.7	35.7	17.8	26.8
							48	28.9	43.4	22.7	34.1	17.1	25.7
							50	27.6	41.5	21.7	32.6	16.4	24.6
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
401	603	355	534	321	483			6.38	21.7	7.49	20.1	5.02	17.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			10.3		9.13		8.25	
309	464	274	411	248	371			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			127	42.6	110	37.1	98.0	21.7
65.4	98.2	59.3	88.9	59.7	89.6			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.03		2.02		1.62	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
52.1	78.2	43.5	65.4	32.8	49.2			1.73		1.72		2.13	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W8×						Shape		W8×					
24		21		18		lb/ft		24[f]		21		18	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
276	414	240	360	205	308	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	74.7	112	66.2	99.5	55.1	82.9
228	342	176	264	148	222		6	72.3	109	59.9	90.0	49.1	73.8
213	320	157	236	131	198		7	69.7	105	56.9	85.5	46.3	69.6
197	295	138	208	115	172		8	67.0	101	53.9	81.0	43.5	65.4
180	270	119	179	98.4	148		9	64.4	96.8	50.9	76.5	40.8	61.3
163	244	101	152	82.8	125		10	61.8	92.9	47.9	72.0	38.0	57.1
145	219	84.4	127	68.6	103		11	59.2	89.0	44.9	67.5	35.2	52.9
129	194	70.9	107	57.7	86.7		12	56.6	85.1	41.9	62.9	31.4	47.1
113	170	60.4	90.8	49.2	73.9		13	54.0	81.1	37.8	56.8	27.9	42.0
97.7	147	52.1	78.3	42.4	63.7		14	51.4	77.2	34.2	51.4	25.2	37.8
85.1	128	45.4	68.2	36.9	55.5		15	48.7	73.3	31.2	46.9	22.9	34.4
74.8	112	39.9	59.9	32.4	48.8		16	45.4	68.2	28.7	43.2	21.0	31.5
66.3	99.6	35.3	53.1	28.7	43.2		17	41.9	63.0	26.6	40.0	19.4	29.1
59.1	88.9	31.5	47.4	25.6	38.5		18	38.9	58.4	24.8	37.3	18.0	27.1
53.1	79.8	28.3	42.5	23.0	34.6		19	36.3	54.5	23.2	34.9	16.8	25.3
47.9	72.0	25.5	38.4	20.8	31.2		20	34.0	51.1	21.8	32.8	15.8	23.7
39.6	59.5						22	30.3	45.5	19.5	29.3	14.0	21.1
33.3	50.0						24	27.2	41.0	17.6	26.5	12.6	19.0
28.3	42.6						26	24.8	37.3	16.1	24.2	11.5	17.3
							28	22.8	34.2	14.8	22.3	10.6	15.9
							30	21.1	31.6	13.7	20.6	9.79	14.7
							32	19.6	29.4	12.8	19.2	9.11	13.7
							34	18.3	27.5	12.0	18.0	8.52	12.8
							36	17.2	25.8	11.3	17.0	8.00	12.0
							38	16.2	24.4	10.6	16.0	7.55	11.3
							40	15.3	23.1	10.1	15.2	7.14	10.7
							42	14.6	21.9	9.58	14.4	6.78	10.2
							44	13.9	20.8	9.12	13.7	6.45	9.69
							46	13.2	19.9	8.71	13.1	6.15	9.25
							48	12.6	19.0	8.33	12.5	5.88	8.84
							50	12.1	18.2	7.98	12.0	5.64	8.47
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
276	414	240	360	205	308			5.06	15.5	3.90	12.2	3.81	11.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			7.08		6.16		5.26	
212	319	185	277	158	237			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			82.7	18.3	75.3	9.77	61.9	7.97
50.5	75.8	53.8	80.7	48.7	73.0			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.61		1.26		1.23	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
27.7	41.6	18.5	27.7	15.1	22.7			2.12		2.77		2.79	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W8×						Shape		W8×					
15		13		10[c]		lb/ft		15		13		10[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
173	260	149	225	108	162	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	44.1	66.3	37.0	55.6	27.4	41.2
90.9	137	74.7	112	57.4	86.3		6	34.1	51.2	27.6	41.4	20.8	31.2
72.1	108	58.1	87.4	44.6	67.0		7	31.0	46.6	24.8	37.2	18.4	27.7
55.6	83.5	44.5	66.9	34.1	51.3		8	28.0	42.0	21.7	32.6	15.1	22.7
43.9	66.0	35.2	52.9	27.0	40.5		9	24.1	36.2	18.1	27.2	12.5	18.7
35.6	53.5	28.5	42.8	21.9	32.8		10	20.7	31.2	15.5	23.3	10.5	15.8
29.4	44.2	23.5	35.4	18.1	27.1		11	18.2	27.3	13.5	20.3	9.11	13.7
24.7	37.1	19.8	29.7	15.2	22.8		12	16.2	24.3	12.0	18.0	8.00	12.0
21.0	31.6	16.9	25.3	12.9	19.4		13	14.6	21.9	10.7	16.1	7.12	10.7
18.1	27.3	14.5	21.8	11.1	16.8		14	13.3	20.0	9.75	14.6	6.41	9.64
							15	12.2	18.3	8.92	13.4	5.83	8.76
							16	11.3	16.9	8.23	12.4	5.35	8.03
							17	10.5	15.7	7.63	11.5	4.93	7.42
							18	9.79	14.7	7.12	10.7	4.58	6.89
							19	9.19	13.8	6.67	10.0	4.28	6.43
							20	8.67	13.0	6.28	9.44	4.01	6.03
							22	7.78	11.7	5.63	8.46	3.57	5.36
							24	7.06	10.6	5.10	7.66	3.22	4.83
							26	6.47	9.72	4.66	7.00	2.93	4.40
							28	5.97	8.97	4.29	6.45	2.69	4.04
							30	5.54	8.33	3.98	5.99	2.49	3.74
							32	5.17	7.78	3.72	5.58	2.31	3.48
							34	4.85	7.29	3.48	5.23	2.16	3.25
							36	4.57	6.87	3.28	4.92	2.03	3.06
							38	4.32	6.49	3.09	4.65	1.92	2.88
							40	4.09	6.15	2.93	4.41	1.81	2.73
							42	3.89	5.85	2.79	4.19	1.72	2.59
							44	3.71	5.57	2.65	3.99	1.64	2.46
							46	3.54	5.32	2.53	3.81	1.56	2.35
							48	3.39	5.10	2.42	3.64	1.49	2.25
							50	3.25	4.89	2.32	3.49	1.43	2.15
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
173	260	149	225	115	173			2.71	8.38	2.61	7.82	3.17	7.28
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			4.44		3.84		2.96	
133	200	115	173	88.8	133			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			48.0	3.41	39.6	2.73	30.8	2.09
51.7	77.5	47.8	71.7	34.9	52.3			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								0.876		0.843		0.841	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
8.66	13.0	6.97	10.5	5.02	7.55			3.76		3.81		3.83	

[c] Shape is slender for compression with F_y = 65 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 65 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W6

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W6×						Shape		W6×					
25		20		16		lb/ft		25		20[f]		16	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
286	429	228	343	184	277	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	61.3	92.1	48.0	72.2	37.9	57.0
231	347	184	276	109	164		6	59.2	88.9	46.2	69.4	32.6	48.9
214	321	170	255	90.0	135		7	57.5	86.4	44.6	67.0	30.8	46.3
196	294	155	233	72.3	109		8	55.8	83.9	43.0	64.6	29.0	43.6
177	266	140	210	57.1	85.8		9	54.2	81.4	41.4	62.2	27.2	40.9
158	237	124	187	46.3	69.5		10	52.5	78.9	39.8	59.9	25.4	38.2
139	210	109	164	38.2	57.5		11	50.8	76.4	38.2	57.5	23.6	35.5
122	183	95.1	143	32.1	48.3		12	49.2	73.9	36.6	55.1	21.4	32.2
105	157	81.6	123	27.4	41.1		13	47.5	71.4	35.1	52.7	19.5	29.4
90.3	136	70.3	106	23.6	35.5		14	45.8	68.9	33.5	50.3	17.9	27.0
78.7	118	61.3	92.1	20.6	30.9		15	44.2	66.4	31.9	47.9	16.6	24.9
69.1	104	53.9	80.9	18.1	27.2		16	42.5	63.9	30.2	45.4	15.4	23.2
61.2	92.1	47.7	71.7				17	40.9	61.4	28.0	42.1	14.5	21.7
54.6	82.1	42.5	64.0				18	39.2	58.9	26.1	39.3	13.6	20.4
49.0	73.7	38.2	57.4				19	37.4	56.2	24.5	36.8	12.8	19.2
44.3	66.5	34.5	51.8				20	35.3	53.0	23.1	34.7	12.1	18.2
36.6	55.0	28.5	42.8				22	31.7	47.6	20.6	31.0	10.9	16.5
30.7	46.2	23.9	36.0				24	28.8	43.3	18.7	28.1	9.99	15.0
							26	26.4	39.7	17.1	25.7	9.19	13.8
							28	24.4	36.7	15.8	23.7	8.50	12.8
							30	22.7	34.1	14.6	22.0	7.92	11.9
							32	21.2	31.8	13.6	20.5	7.41	11.1
							34	19.9	29.9	12.8	19.2	6.96	10.5
							36	18.7	28.1	12.0	18.1	6.57	9.87
							38	17.7	26.6	11.4	17.1	6.21	9.34
							40	16.8	25.2	10.8	16.2	5.90	8.86
							42	15.9	24.0	10.2	15.4	5.61	8.43
							44	15.2	22.8	9.73	14.6	5.35	8.04
							46	14.5	21.8	9.30	14.0	5.12	7.69
							48	13.9	20.9	8.89	13.4	4.90	7.36
							50	13.3	20.0	8.53	12.8	4.70	7.07
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
286	429	228	343	184	277			4.71	18.8	4.84	15.9	3.00	11.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			7.34		5.87		4.74	
220	330	176	264	142	213			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			53.4	17.1	41.4	13.3	32.1	4.43
53.1	79.6	41.9	62.9	42.5	63.7			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.52		1.50		0.967	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
27.8	41.7	21.6	32.5	11.0	16.5			1.78		1.77		2.69	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W6

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W6×						Shape		W6×					
15		12		9		lb/ft		15[f]		12		9[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
172	259	138	208	104	157	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	31.6	47.5	26.9	40.5	19.6	29.4
136	205	77.0	116	57.2	85.9		6	31.6	47.5	21.8	32.8	15.7	23.6
125	188	62.3	93.7	46.0	69.1		7	31.5	47.3	20.2	30.3	14.3	21.5
114	171	48.8	73.3	35.8	53.8		8	30.1	45.2	18.5	27.9	12.9	19.4
102	153	38.6	57.9	28.3	42.5		9	28.6	43.0	16.9	25.4	10.9	16.4
89.9	135	31.2	46.9	22.9	34.4		10	27.2	40.9	14.8	22.3	9.36	14.1
78.4	118	25.8	38.8	18.9	28.5		11	25.8	38.8	13.1	19.7	8.17	12.3
67.5	101	21.7	32.6	15.9	23.9		12	24.4	36.6	11.7	17.6	7.25	10.9
57.5	86.5	18.5	27.8	13.6	20.4		13	23.0	34.5	10.6	15.9	6.52	9.80
49.6	74.6	15.9	23.9	11.7	17.6		14	21.2	31.9	9.70	14.6	5.92	8.90
43.2	64.9	13.9	20.9	10.2	15.3		15	19.3	29.0	8.94	13.4	5.42	8.15
38.0	57.1						16	17.6	26.5	8.29	12.5	5.01	7.52
33.6	50.6						17	16.3	24.5	7.73	11.6	4.65	6.98
30.0	45.1						18	15.1	22.7	7.24	10.9	4.34	6.52
26.9	40.5						19	14.1	21.2	6.82	10.2	4.07	6.12
24.3	36.5						20	13.2	19.9	6.44	9.68	3.83	5.76
20.1	30.2						22	11.7	17.7	5.80	8.71	3.43	5.16
16.9	25.4						24	10.6	15.9	5.28	7.93	3.11	4.68
							26	9.62	14.5	4.84	7.28	2.85	4.28
							28	8.83	13.3	4.48	6.73	2.63	3.95
							30	8.17	12.3	4.16	6.26	2.44	3.66
							32	7.59	11.4	3.89	5.85	2.27	3.42
							34	7.10	10.7	3.65	5.49	2.13	3.20
							36	6.67	10.0	3.44	5.17	2.00	3.01
							38	6.29	9.45	3.25	4.89	1.89	2.85
							40	5.95	8.94	3.09	4.64	1.79	2.70
							42	5.64	8.48	2.94	4.41	1.71	2.56
							44	5.37	8.07	2.80	4.21	1.62	2.44
							46	5.12	7.70	2.67	4.02	1.55	2.33
							48	4.90	7.36	2.56	3.85	1.48	2.23
							50	4.69	7.05	2.46	3.69	1.42	2.14
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
172	259	138	208	104	157			6.91	13.6	2.84	9.20	3.27	8.18
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			4.43		3.55		2.68	
133	199	107	160	80.4	121			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			29.1	9.32	22.1	2.99	16.4	2.20
35.8	53.7	36.1	54.1	26.1	39.1			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.45		0.918		0.905	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
13.2	19.8	7.52	11.3	5.31	7.99			1.77		2.71		2.73	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W6–W5

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W6×		W5×				Shape		W6×		W5×			
8.5		19		16		lb/ft		8.5[f]		19		16	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
98.1	147	216	325	183	276	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	17.5	26.3	37.6	56.6	31.2	46.9
52.7	79.1	160	241	134	202		6	14.2	21.4	35.5	53.4	29.1	43.8
42.1	63.2	144	216	120	181		7	12.9	19.4	34.5	51.8	28.1	42.3
32.6	48.9	127	191	106	159		8	11.5	17.3	33.5	50.3	27.1	40.7
25.7	38.7	110	165	91.2	137		9	9.63	14.5	32.4	48.7	26.1	39.2
20.8	31.3	93.9	141	77.4	116		10	8.23	12.4	31.4	47.2	25.1	37.7
17.2	25.9	78.6	118	64.5	97.0		11	7.18	10.8	30.3	45.6	24.1	36.2
14.5	21.7	66.0	99.2	54.2	81.5		12	6.36	9.56	29.3	44.1	23.1	34.7
12.3	18.5	56.3	84.6	46.2	69.4		13	5.71	8.58	28.3	42.5	22.1	33.2
10.6	16.0	48.5	72.9	39.8	59.9		14	5.18	7.78	27.2	41.0	21.1	31.7
		42.3	63.5	34.7	52.1		15	4.74	7.12	26.2	39.4	20.1	30.1
		37.1	55.8	30.5	45.8		16	4.37	6.56	25.2	37.8	18.9	28.4
		32.9	49.5	27.0	40.6		17	4.05	6.09	24.1	36.3	17.7	26.5
		29.3	44.1	24.1	36.2		18	3.78	5.68	23.1	34.7	16.6	24.9
		26.3	39.6	21.6	32.5		19	3.54	5.32	21.8	32.7	15.6	23.5
		23.8	35.7	19.5	29.3		20	3.33	5.01	20.6	31.0	14.8	22.2
							22	2.98	4.49	18.6	28.0	13.3	20.0
							24	2.70	4.06	17.0	25.6	12.1	18.3
							26	2.47	3.71	15.6	23.5	11.2	16.8
							28	2.28	3.42	14.5	21.8	10.3	15.5
							30	2.11	3.17	13.5	20.3	9.61	14.4
							32	1.97	2.96	12.6	19.0	8.99	13.5
							34	1.85	2.77	11.9	17.8	8.44	12.7
							36	1.74	2.61	11.2	16.8	7.96	12.0
							38	1.64	2.46	10.6	15.9	7.53	11.3
							40	1.55	2.34	10.0	15.1	7.14	10.7
							42	1.48	2.22	9.56	14.4	6.80	10.2
							44	1.41	2.11	9.12	13.7	6.48	9.74
							46	1.34	2.02	8.72	13.1	6.19	9.31
							48	1.28	1.93	8.35	12.5	5.93	8.92
							50	1.23	1.85	8.01	12.0	5.69	8.55
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
98.1	147	216	325	183	276			3.59	7.99	3.97	18.0	3.90	15.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			2.52		5.56		4.71	
75.6	113	167	250	141	212			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			14.9	1.99	26.3	9.13	21.4	7.51
25.8	38.7	36.2	54.2	31.3	46.9			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								0.890		1.28		1.26	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
4.62	6.95	17.9	27.0	14.9	22.3			2.73		1.70		1.69	

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

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W4

Table 6-A (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 65
F_y = 65 ksi
F_u = 80 ksi

W4×		Shape		W4×	
13		lb/ft		13	
P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips				Available Flexural Strength, kip-ft	
ASD	LRFD	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending		ASD	LRFD
149	224		0	20.4	30.6
91.1	137		6	18.4	27.7
76.2	115		7	17.8	26.7
62.1	93.3		8	17.1	25.7
49.4	74.2		9	16.4	24.7
40.0	60.1		10	15.7	23.7
33.0	49.7		11	15.1	22.6
27.8	41.7		12	14.4	21.6
23.7	35.6		13	13.7	20.6
20.4	30.7		14	13.1	19.6
17.8	26.7		15	12.4	18.6
15.6	23.5		16	11.6	17.4
			17	10.8	16.3
			18	10.2	15.3
			19	9.64	14.5
			20	9.14	13.7
			22	8.28	12.4
			24	7.57	11.4
			26	6.97	10.5
			28	6.46	9.72
			30	6.03	9.06
			32	5.64	8.48
			34	5.31	7.98
			36	5.01	7.53
			38	4.74	7.13
			40	4.50	6.77
			42	4.29	6.44
			44	4.09	6.15
			46	3.91	5.88
			48	3.75	5.63
			50	3.59	5.40

Strength		Properties	
Available Strength in Tensile Yielding, kips		Limiting Unbraced Lengths, ft	
P_n/Ω_t	$\phi_t P_n$	L_p	L_r
149	224	3.10	15.0
Available Strength in Tensile Rupture, kips		Area, in.^{2}	
P_n/Ω_t	$\phi_t P_n$	3.83	
115	172	Moment of Inertia, in.^{4}	
Available Strength in Major Axis Shear, kips		I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	11.3	3.86
30.3	45.4	r_y, in.	
Available Strength in Flexure about Y-Y Axis, kip-ft		1.00	
M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y	
9.47	14.2	1.72	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W44

Table 6-B
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W44×						Shape		W44×					
408[c], [h]		368[c]		335[c]		lb/ft		408[h]		368		335	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4960	7460	4340	6520	3870	5820	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	6990	10500	6290	9450	5660	8510
4790	7190	4180	6290	3730	5610		6	6990	10500	6290	9450	5660	8510
4720	7100	4130	6210	3680	5530		7	6990	10500	6290	9450	5660	8510
4650	7000	4070	6110	3620	5450		8	6990	10500	6290	9450	5660	8510
4580	6880	4000	6010	3560	5350		9	6990	10500	6290	9450	5660	8510
4480	6730	3920	5890	3490	5250		10	6990	10500	6290	9450	5660	8510
4370	6570	3840	5770	3420	5130		11	6940	10400	6240	9380	5600	8410
4250	6390	3750	5640	3340	5010		12	6820	10300	6120	9210	5490	8250
4130	6210	3660	5500	3250	4890		13	6700	10100	6010	9030	5380	8090
4000	6020	3560	5350	3160	4750		14	6580	9900	5900	8860	5280	7930
3870	5820	3450	5190	3070	4610		15	6470	9720	5780	8690	5170	7770
3730	5610	3350	5030	2970	4460		16	6350	9540	5670	8520	5060	7610
3590	5400	3220	4840	2870	4310		17	6230	9360	5560	8350	4960	7450
3450	5190	3090	4650	2770	4160		18	6110	9180	5440	8180	4850	7290
3310	4970	2960	4450	2660	4000		19	5990	9000	5330	8010	4740	7130
3160	4750	2830	4250	2540	3820		20	5870	8820	5210	7840	4640	6970
2860	4310	2560	3850	2300	3450		22	5630	8460	4990	7490	4420	6650
2570	3870	2300	3460	2060	3090		24	5390	8110	4760	7150	4210	6320
2290	3440	2040	3070	1820	2740		26	5150	7750	4530	6810	3990	6000
2020	3040	1800	2710	1600	2400		28	4920	7390	4300	6470	3780	5680
1760	2650	1570	2360	1390	2090		30	4680	7030	4080	6130	3570	5360
1550	2330	1380	2070	1220	1840		32	4440	6670	3850	5780	3300	4960
1370	2060	1220	1840	1080	1630		34	4180	6290	3530	5300	3000	4510
1220	1840	1090	1640	966	1450		36	3850	5790	3240	4880	2750	4140
1100	1650	978	1470	867	1300		38	3570	5370	3000	4510	2540	3820
992	1490	883	1330	783	1180		40	3330	5000	2790	4200	2360	3550
900	1350	801	1200	710	1070		42	3120	4690	2610	3920	2200	3310
820	1230	730	1100	647	972		44	2930	4400	2450	3680	2060	3100
750	1130	668	1000	592	890		46	2760	4150	2310	3460	1940	2910
689	1040	613	922	544	817		48	2620	3930	2180	3270	1830	2750
635	954	565	849	501	753		50	2480	3730	2060	3100	1730	2600
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
5030	7560	4530	6800	4130	6210			10.6	33.8	10.6	32.3	10.4	31.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			120		108		98.5	
4050	6080	3650	5470	3320	4990			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			38700	1520	34700	1350	31100	1200
1530	2300	1370	2050	1270	1900			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.56		3.54		3.49	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
1040	1560	926	1390	824	1240			5.06		5.06		5.10	

[c] Shape is slender for compression with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W44

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W44×						Shape		W44×					
290[c]		262[c]		230[c]		lb/ft		290		262[v]		230[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3220	4830	2830	4260	2410	3630	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4930	7400	4440	6670	3840	5780
3100	4650	2730	4100	2320	3490		6	4930	7400	4440	6670	3840	5780
3060	4590	2690	4040	2290	3440		7	4930	7400	4440	6670	3840	5780
3010	4520	2650	3980	2250	3380		8	4930	7400	4440	6670	3840	5780
2950	4440	2600	3910	2210	3320		9	4930	7400	4440	6670	3840	5780
2900	4350	2550	3830	2160	3250		10	4930	7400	4440	6670	3840	5780
2830	4260	2490	3740	2120	3180		11	4870	7320	4380	6580	3780	5680
2770	4160	2430	3650	2060	3100		12	4770	7170	4290	6440	3700	5560
2690	4050	2370	3560	2010	3020		13	4670	7030	4190	6300	3620	5440
2620	3940	2300	3460	1950	2930		14	4580	6880	4100	6160	3540	5310
2540	3820	2230	3350	1890	2840		15	4480	6730	4010	6030	3450	5190
2460	3700	2160	3240	1830	2750		16	4380	6590	3920	5890	3370	5070
2380	3570	2080	3130	1760	2650		17	4290	6440	3830	5750	3290	4950
2290	3440	2010	3020	1700	2550		18	4190	6290	3730	5610	3210	4820
2200	3310	1930	2900	1630	2450		19	4090	6150	3640	5470	3130	4700
2120	3180	1850	2790	1560	2350		20	3990	6000	3550	5340	3050	4580
1940	2910	1700	2550	1430	2150		22	3800	5710	3370	5060	2880	4330
1760	2650	1540	2310	1290	1940		24	3610	5420	3180	4780	2720	4090
1580	2370	1380	2080	1160	1750		26	3410	5130	3000	4510	2560	3840
1380	2080	1230	1860	1030	1550		28	3220	4830	2820	4230	2390	3600
1210	1810	1080	1620	918	1380		30	3010	4530	2580	3870	2130	3200
1060	1590	948	1420	813	1220		32	2710	4070	2310	3480	1910	2870
939	1410	839	1260	720	1080		34	2460	3700	2090	3150	1720	2590
838	1260	749	1130	642	966		36	2250	3380	1910	2870	1570	2350
752	1130	672	1010	577	867		38	2070	3110	1750	2630	1430	2150
679	1020	606	911	520	782		40	1920	2880	1620	2430	1320	1980
616	925	550	827	472	709		42	1780	2680	1500	2260	1220	1830
561	843	501	753	430	646		44	1660	2500	1400	2100	1130	1700
513	771	459	689	393	591		46	1560	2350	1310	1970	1060	1590
471	708	421	633	361	543		48	1470	2210	1230	1850	991	1490
434	653	388	583	333	501		50	1390	2090	1160	1740	932	1400

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3580	5380	3240	4860	2840	4270	10.4	29.9	10.4	29.1	10.2	28.2
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	85.4		77.2		67.8	
2880	4320	2610	3910	2290	3430	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	27000	1040	24100	923	20800	796
1060	1580	855	1280	723	1090	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.49		3.47		3.43	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
716	1080	636	956	548	824	5.10		5.10		5.10	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Note: Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
655[h]		593[h]		503[h]		lb/ft		655[h]		593[h]		503[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
8090	12200	7290	11000	6200	9320	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	10800	16200	9640	14500	8100	12200
7810	11700	7030	10600	5970	8970		6	10800	16200	9640	14500	8100	12200
7710	11600	6940	10400	5890	8850		7	10800	16200	9640	14500	8100	12200
7590	11400	6830	10300	5790	8710		8	10800	16200	9640	14500	8100	12200
7470	11200	6710	10100	5690	8550		9	10800	16200	9640	14500	8100	12200
7330	11000	6590	9900	5580	8380		10	10800	16200	9640	14500	8100	12200
7180	10800	6450	9690	5450	8200		11	10800	16200	9640	14500	8100	12200
7020	10500	6300	9460	5320	8000		12	10700	16100	9570	14400	8010	12000
6840	10300	6140	9230	5180	7790		13	10600	15900	9460	14200	7900	11900
6660	10000	5970	8970	5030	7570		14	10500	15800	9350	14100	7790	11700
6480	9730	5800	8710	4880	7340		15	10400	15600	9240	13900	7690	11600
6280	9440	5620	8440	4720	7100		16	10300	15400	9130	13700	7580	11400
6080	9140	5430	8160	4560	6850		17	10100	15300	9020	13600	7470	11200
5870	8820	5240	7880	4390	6600		18	10000	15100	8910	13400	7360	11100
5660	8510	5050	7580	4220	6350		19	9930	14900	8810	13200	7260	10900
5450	8190	4850	7290	4050	6090		20	9820	14800	8700	13100	7150	10700
5010	7530	4450	6690	3700	5570		22	9590	14400	8480	12700	6940	10400
4580	6880	4050	6090	3360	5050		24	9370	14100	8260	12400	6720	10100
4140	6230	3660	5500	3020	4540		26	9150	13800	8040	12100	6510	9780
3720	5600	3280	4920	2690	4050		28	8930	13400	7820	11800	6290	9460
3320	4990	2910	4370	2380	3570		30	8700	13100	7610	11400	6080	9140
2930	4410	2560	3850	2090	3140		32	8480	12700	7390	11100	5860	8810
2600	3900	2270	3410	1850	2780		34	8260	12400	7170	10800	5650	8490
2320	3480	2020	3040	1650	2480		36	8040	12100	6950	10400	5440	8170
2080	3120	1820	2730	1480	2230		38	7820	11700	6730	10100	5220	7850
1880	2820	1640	2460	1340	2010		40	7590	11400	6510	9790	5010	7530
1700	2560	1490	2230	1210	1820		42	7370	11100	6300	9460	4770	7170
1550	2330	1350	2040	1100	1660		44	7150	10700	6080	9140	4510	6780
1420	2130	1240	1860	1010	1520		46	6930	10400	5860	8810	4280	6430
1300	1960	1140	1710	928	1390		48	6700	10100	5620	8440	4070	6110
1200	1800	1050	1580	855	1290		50	6480	9740	5360	8060	3880	5830

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
8090	12200	7290	11000	6200	9320	11.5	51.3	11.3	47.3	11.1	41.5
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	193		174		148	
6510	9770	5870	8810	5000	7490	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	56500	2870	50400	2520	41600	2040
2400	3610	2160	3230	1820	2720	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.86		3.80		3.72	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1890	2850	1680	2530	1380	2070	4.43		4.47		4.52	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
431[h]		397[h]		392[h]		lb/ft		431[h]		397[h]		392[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
5320	8000	4900	7370	4860	7310	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	6850	10300	6290	9450	5970	8980
5120	7690	4710	7080	4510	6770		6	6850	10300	6290	9450	5970	8980
5040	7580	4640	6980	4380	6590		7	6850	10300	6290	9450	5970	8980
4960	7450	4570	6860	4250	6380		8	6850	10300	6290	9450	5960	8960
4870	7320	4480	6740	4100	6160		9	6850	10300	6290	9450	5840	8780
4770	7160	4390	6590	3940	5910		10	6850	10300	6290	9450	5730	8610
4660	7000	4290	6440	3760	5660		11	6840	10300	6270	9430	5610	8440
4540	6820	4180	6280	3590	5390		12	6730	10100	6180	9280	5500	8260
4420	6640	4060	6110	3400	5110		13	6630	9970	6080	9140	5380	8090
4290	6440	3940	5930	3210	4830		14	6530	9820	5980	8990	5270	7910
4150	6240	3820	5740	3020	4540		15	6430	9660	5880	8840	5150	7740
4010	6030	3690	5540	2830	4250		16	6330	9510	5780	8690	5030	7570
3870	5810	3560	5340	2640	3970		17	6230	9360	5690	8540	4920	7390
3720	5590	3420	5140	2450	3680		18	6120	9200	5590	8400	4800	7220
3570	5370	3280	4930	2270	3410		19	6020	9050	5490	8250	4690	7050
3420	5140	3140	4720	2090	3140		20	5920	8900	5390	8100	4570	6870
3120	4680	2860	4300	1740	2620		22	5720	8590	5190	7810	4340	6520
2810	4230	2580	3880	1470	2200		24	5510	8290	5000	7510	4110	6180
2520	3790	2310	3470	1250	1880		26	5310	7980	4800	7220	3880	5830
2240	3360	2050	3080	1080	1620		28	5110	7670	4610	6920	3650	5480
1960	2950	1800	2700	938	1410		30	4900	7370	4410	6630	3380	5090
1720	2590	1580	2380	824	1240		32	4700	7060	4210	6330	3120	4690
1530	2300	1400	2100	730	1100		34	4500	6760	4020	6040	2900	4360
1360	2050	1250	1880	651	979		36	4290	6450	3820	5740	2710	4070
1220	1840	1120	1680	584	878		38	4070	6110	3550	5340	2540	3810
1100	1660	1010	1520	527	793		40	3810	5720	3320	4990	2390	3590
1000	1500	917	1380	478	719		42	3580	5370	3110	4680	2260	3390
912	1370	836	1260	436	655		44	3370	5070	2930	4410	2140	3220
835	1250	765	1150				46	3190	4800	2770	4170	2040	3060
767	1150	702	1060				48	3030	4550	2630	3950	1940	2920
706	1060	647	973				50	2880	4330	2500	3760	1850	2790

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
5320	8000	4900	7370	4860	7310	10.9	37.6	10.9	36.1	7.88	29.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	127		117		116	
4290	6430	3950	5920	3920	5870	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	34800	1690	32000	1540	29900	803
1550	2320	1400	2100	1650	2480	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.65		3.64		2.64	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1150	1720	1050	1580	727	1090	4.55		4.56		6.10	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
372[h]		362[c],[h]		331[h]		lb/ft		372[h]		362[h]		331[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4610	6930	4440	6670	4100	6160	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	5870	8820	5730	8610	5000	7510
4430	6650	4260	6410	3780	5680		6	5870	8820	5730	8610	5000	7510
4360	6550	4200	6320	3670	5520		7	5870	8820	5730	8610	5000	7510
4290	6440	4130	6210	3550	5340		8	5870	8820	5730	8610	4960	7450
4200	6320	4050	6090	3420	5140		9	5870	8820	5730	8610	4850	7290
4120	6180	3970	5960	3280	4920		10	5870	8820	5730	8610	4740	7120
4020	6040	3870	5820	3130	4700		11	5840	8780	5700	8570	4630	6960
3910	5880	3770	5670	2970	4460		12	5750	8640	5610	8430	4520	6790
3800	5720	3670	5510	2810	4220		13	5650	8490	5510	8290	4410	6620
3690	5550	3560	5340	2640	3970		14	5560	8350	5420	8140	4300	6460
3570	5370	3440	5170	2480	3730		15	5460	8200	5320	8000	4190	6290
3450	5180	3320	4990	2310	3480		16	5360	8060	5230	7860	4080	6130
3320	4990	3200	4810	2150	3230		17	5270	7920	5130	7710	3970	5960
3190	4790	3070	4620	1990	2990		18	5170	7770	5040	7570	3860	5800
3060	4600	2950	4430	1830	2750		19	5070	7630	4940	7420	3750	5630
2930	4400	2820	4240	1680	2520		20	4980	7480	4840	7280	3640	5470
2660	4000	2560	3850	1390	2090		22	4780	7190	4650	6990	3420	5130
2390	3600	2310	3470	1170	1760		24	4590	6900	4460	6710	3200	4800
2140	3210	2060	3100	996	1500		26	4400	6610	4270	6420	2980	4470
1890	2840	1820	2740	859	1290		28	4210	6320	4080	6130	2690	4050
1650	2490	1590	2390	748	1120		30	4010	6030	3890	5850	2460	3690
1450	2180	1400	2100	658	989		32	3820	5740	3700	5560	2260	3400
1290	1930	1240	1860	583	876		34	3630	5450	3510	5270	2090	3140
1150	1730	1110	1660	520	781		36	3380	5080	3250	4880	1950	2930
1030	1550	993	1490	466	701		38	3140	4710	3020	4530	1820	2740
930	1400	896	1350	421	633		40	2930	4400	2810	4230	1710	2570
844	1270	813	1220	382	574		42	2740	4120	2640	3960	1620	2430
769	1160	741	1110				44	2580	3880	2480	3730	1530	2300
703	1060	678	1020				46	2440	3660	2340	3520	1450	2180
646	971	622	935				48	2310	3470	2220	3330	1380	2080
595	895	574	862				50	2190	3300	2110	3170	1320	1980

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4610	6930	4440	6680	4100	6160	10.7	34.6	10.7	34.4	7.67	26.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	110		106		97.7	
3710	5570	3580	5370	3300	4950	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	29600	1420	28900	1380	24700	644
1320	1980	1270	1910	1390	2090	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.60		3.60		2.57	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
968	1450	943	1420	592	890	4.58		4.58		6.19	

[c] Shape is slender for compression with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
327[h]		324[c]		297[c]		lb/ft		327[h]		324		297	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4020	6040	3880	5830	3490	5240	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4930	7400	5100	7670	4650	6980
3710	5580	3740	5620	3360	5050		6	4930	7400	5100	7670	4650	6980
3610	5420	3690	5550	3310	4980		7	4930	7400	5100	7670	4650	6980
3490	5240	3640	5470	3260	4910		8	4890	7350	5100	7670	4650	6980
3360	5050	3570	5370	3210	4820		9	4780	7190	5100	7670	4650	6980
3220	4840	3510	5270	3150	4730		10	4680	7030	5100	7670	4650	6980
3070	4620	3430	5160	3080	4630		11	4570	6870	5070	7620	4610	6930
2920	4390	3350	5040	3010	4520		12	4460	6700	4980	7490	4520	6800
2760	4160	3270	4920	2930	4400		13	4350	6540	4890	7350	4440	6670
2600	3910	3180	4790	2850	4280		14	4240	6380	4800	7220	4350	6540
2440	3670	3080	4630	2770	4160		15	4130	6210	4710	7080	4270	6410
2280	3430	2980	4470	2680	4030		16	4030	6050	4620	6950	4180	6280
2120	3190	2860	4310	2590	3890		17	3920	5890	4530	6810	4090	6150
1960	2950	2750	4140	2500	3760		18	3810	5730	4440	6680	4010	6020
1810	2720	2640	3960	2390	3600		19	3700	5560	4350	6540	3920	5890
1660	2490	2520	3790	2290	3440		20	3590	5400	4260	6410	3840	5770
1380	2070	2290	3440	2070	3110		22	3380	5070	4080	6140	3660	5510
1160	1740	2060	3100	1860	2790		24	3160	4750	3900	5860	3490	5250
986	1480	1840	2760	1650	2480		26	2940	4420	3720	5590	3320	4990
850	1280	1620	2440	1460	2190		28	2660	4000	3540	5320	3150	4730
740	1110	1420	2130	1270	1910		30	2430	3650	3360	5050	2980	4480
651	978	1250	1870	1120	1680		32	2230	3360	3180	4780	2770	4160
576	866	1100	1660	988	1480		34	2070	3110	2940	4410	2530	3800
514	773	984	1480	881	1320		36	1920	2890	2700	4060	2320	3490
461	694	883	1330	791	1190		38	1800	2710	2500	3760	2150	3220
416	626	797	1200	714	1070		40	1690	2540	2330	3500	1990	3000
378	568	723	1090	647	973		42	1600	2400	2180	3270	1860	2800
		659	990	590	887		44	1510	2270	2050	3070	1740	2620
		603	906	540	811		46	1430	2150	1930	2900	1640	2470
		553	832	496	745		48	1360	2050	1820	2740	1550	2330
		510	766	457	687		50	1300	1960	1730	2600	1470	2210

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4020	6040	3990	6000	3660	5500	7.70	26.1	10.7	32.6	10.6	31.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	95.9		95.3		87.3	
3240	4850	3220	4820	2950	4420	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	24500	640	25600	1220	23200	1090
1350	2020	1130	1690	1040	1550	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.58		3.58		3.54	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
587	882	835	1250	751	1130	6.20		4.58		4.60	

[c] Shape is slender for compression with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
294[c]		278[c]		277[c]		lb/ft		294		278		277	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3550	5340	3360	5040	3170	4770	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4440	6670	4160	6250	4370	6560
3310	4980	3130	4700	3060	4600		6	4440	6670	4160	6250	4370	6560
3230	4860	3050	4580	3020	4540		7	4440	6670	4160	6250	4370	6560
3130	4700	2960	4450	2980	4470		8	4400	6610	4110	6180	4370	6560
3010	4520	2860	4300	2920	4400		9	4290	6450	4010	6020	4370	6560
2880	4330	2740	4110	2870	4310		10	4190	6290	3910	5870	4370	6560
2750	4130	2600	3920	2810	4220		11	4080	6130	3810	5720	4340	6520
2610	3920	2470	3710	2740	4120		12	3980	5970	3700	5570	4260	6400
2460	3700	2330	3500	2680	4020		13	3870	5820	3600	5420	4180	6280
2320	3480	2190	3290	2600	3910		14	3770	5660	3500	5270	4090	6150
2170	3260	2050	3080	2530	3800		15	3660	5500	3400	5110	4010	6030
2020	3040	1900	2860	2450	3680		16	3550	5340	3300	4960	3930	5910
1880	2820	1760	2650	2370	3560		17	3450	5190	3200	4810	3850	5780
1730	2610	1630	2440	2290	3440		18	3340	5030	3100	4660	3770	5660
1590	2400	1490	2240	2200	3310		19	3240	4870	3000	4510	3680	5540
1460	2190	1360	2050	2120	3180		20	3130	4710	2900	4350	3600	5410
1210	1820	1130	1690	1950	2920		22	2920	4400	2700	4050	3440	5170
1020	1530	947	1420	1760	2650		24	2710	4080	2490	3740	3270	4920
865	1300	807	1210	1570	2360		26	2450	3680	2220	3330	3110	4670
746	1120	696	1050	1390	2080		28	2210	3320	2000	3000	2940	4430
650	977	606	911	1210	1820		30	2010	3020	1810	2730	2780	4180
571	859	533	801	1060	1600		32	1850	2770	1660	2500	2570	3860
506	761	472	709	943	1420		34	1710	2560	1530	2300	2340	3520
451	679	421	633	841	1260		36	1580	2380	1420	2140	2150	3220
405	609	378	568	755	1130		38	1480	2220	1330	2000	1980	2970
366	550	341	512	681	1020		40	1390	2090	1250	1870	1840	2760
332	499	309	465	618	929		42	1310	1970	1170	1760	1710	2570
				563	846		44	1240	1860	1110	1670	1600	2410
				515	774		46	1170	1760	1050	1580	1510	2260
				473	711		48	1120	1680	998	1500	1420	2140
				436	655		50	1060	1600	951	1430	1340	2020

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3610	5430	3450	5180	3420	5130	7.61	24.7	7.52	24.0	10.7	31.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	86.2		82.3		81.5	
2910	4360	2780	4170	2750	4130	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	21900	562	20500	521	21900	1040
1200	1800	1160	1740	923	1380	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.55		2.52		3.58	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
523	785	487	732	713	1070	6.24		6.27		4.58	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
264[c]		249[c]		235[c]		lb/ft		264		249[v]		235	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3100	4650	2800	4200	2650	3990	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3950	5930	3910	5880	3530	5300
2880	4330	2690	4050	2470	3720		6	3950	5930	3910	5880	3530	5300
2810	4220	2660	3990	2410	3620		7	3950	5930	3910	5880	3530	5300
2730	4100	2620	3930	2340	3520		8	3900	5860	3910	5880	3490	5250
2640	3960	2570	3860	2270	3400		9	3800	5710	3910	5880	3400	5110
2540	3820	2520	3790	2180	3280		10	3700	5570	3910	5880	3310	4970
2440	3660	2470	3710	2090	3150		11	3610	5420	3880	5830	3220	4830
2320	3490	2410	3620	2000	3010		12	3510	5270	3810	5720	3120	4700
2190	3290	2350	3530	1910	2870		13	3410	5120	3730	5600	3030	4560
2060	3090	2280	3430	1810	2720		14	3310	4980	3650	5490	2940	4420
1920	2890	2220	3330	1710	2570		15	3210	4830	3580	5380	2850	4280
1790	2690	2150	3230	1610	2420		16	3110	4680	3500	5260	2760	4150
1660	2490	2070	3120	1500	2250		17	3020	4530	3420	5150	2670	4010
1530	2300	2000	3010	1380	2080		18	2920	4390	3350	5030	2580	3870
1400	2110	1930	2900	1270	1910		19	2820	4240	3270	4920	2490	3740
1280	1930	1850	2780	1160	1750		20	2720	4090	3200	4800	2390	3600
1060	1590	1700	2550	961	1450		22	2530	3800	3040	4570	2210	3320
891	1340	1540	2320	808	1210		24	2300	3460	2890	4350	1970	2960
759	1140	1390	2090	688	1030		26	2050	3080	2740	4120	1740	2620
654	984	1230	1850	594	892		28	1840	2760	2590	3890	1560	2350
570	857	1070	1610	517	777		30	1670	2510	2430	3660	1410	2120
501	753	944	1420	454	683		32	1530	2300	2190	3300	1290	1940
444	667	836	1260	403	605		34	1410	2120	1990	2990	1180	1780
396	595	746	1120	359	540		36	1310	1960	1820	2740	1100	1650
355	534	670	1010	322	484		38	1220	1830	1680	2520	1020	1530
321	482	604	908	291	437		40	1140	1710	1550	2330	953	1430
291	437	548	824	264	396		42	1070	1610	1440	2170	895	1350
		499	751				44	1010	1520	1350	2030	844	1270
		457	687				46	959	1440	1270	1900	798	1200
		420	631				48	911	1370	1190	1790	757	1140
		387	581				50	867	1300	1130	1690	720	1080

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3240	4880	3080	4630	2900	4350	7.52	23.5	10.6	30.1	7.58	22.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	77.4		73.5		69.1	
2610	3920	2480	3720	2330	3500	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	19400	493	19600	926	17400	444
1080	1610	743	1120	923	1380	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.52		3.55		2.54	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
461	693	636	956	412	620	6.27		4.59		6.26	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
215[c]		211[c]		199[c]		lb/ft		215[v]		211[v]		199[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2340	3510	2320	3480	2140	3220	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3370	5060	3160	4760	3040	4560
2250	3380	2160	3240	2060	3090		6	3370	5060	3160	4760	3040	4560
2220	3340	2100	3160	2030	3050		7	3370	5060	3160	4760	3040	4560
2190	3290	2040	3060	2000	3000		8	3370	5060	3120	4690	3040	4560
2150	3230	1970	2960	1960	2950		9	3370	5060	3040	4560	3040	4560
2110	3170	1900	2850	1920	2890		10	3370	5060	2950	4430	3040	4560
2060	3100	1820	2730	1880	2820		11	3340	5020	2860	4300	2990	4490
2010	3020	1740	2610	1830	2750		12	3270	4910	2780	4170	2930	4400
1960	2950	1650	2480	1780	2680		13	3200	4810	2690	4040	2860	4300
1910	2860	1560	2350	1730	2600		14	3130	4710	2610	3920	2800	4200
1850	2780	1480	2220	1680	2520		15	3060	4610	2520	3790	2730	4110
1790	2690	1390	2080	1620	2440		16	3000	4500	2430	3660	2670	4010
1730	2600	1300	1950	1560	2350		17	2930	4400	2350	3530	2600	3910
1670	2510	1210	1820	1510	2260		18	2860	4300	2260	3400	2540	3820
1600	2410	1120	1680	1450	2180		19	2790	4200	2180	3270	2480	3720
1540	2320	1020	1530	1390	2090		20	2720	4090	2090	3140	2410	3620
1410	2120	844	1270	1270	1910		22	2590	3890	1910	2870	2280	3430
1280	1930	709	1070	1150	1730		24	2450	3680	1660	2500	2150	3240
1160	1740	604	908	1030	1550		26	2310	3480	1470	2200	2030	3040
1040	1560	521	783	917	1380		28	2180	3270	1310	1970	1900	2850
919	1380	454	682	812	1220		30	1990	3000	1180	1770	1690	2540
811	1220	399	599	713	1070		32	1790	2690	1070	1610	1510	2270
719	1080	353	531	632	950		34	1620	2430	985	1480	1370	2050
641	963	315	474	564	847		36	1470	2220	909	1370	1240	1870
575	865	283	425	506	760		38	1350	2030	844	1270	1140	1710
519	780	255	384	457	686		40	1250	1880	787	1180	1050	1570
471	708			414	622		42	1160	1740	738	1110	969	1460
429	645			377	567		44	1080	1620	694	1040	901	1350
393	590			345	519		46	1010	1520	656	986	841	1260
361	542			317	477		48	947	1420	621	934	788	1190
332	499			292	439		50	892	1340	590	887	742	1110

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2660	4000	2600	3910	2460	3700	10.6	29.1	7.49	22.0	10.3	28.2
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	63.5		62.1		58.8	
2140	3210	2100	3140	1980	2980	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	16700	803	15500	390	14900	695
627	943	743	1120	622	935	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.54		2.51		3.45	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
545	819	367	551	479	719	4.58		6.29		4.64	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W40

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W40×						Shape		W40×					
183[c]		167[c]		149[c]		lb/ft		183[v]		167[v]		149[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1910	2870	1740	2620	1510	2260	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2700	4060	2420	3640	2090	3140
1770	2670	1610	2420	1380	2080		6	2700	4060	2420	3640	2090	3140
1730	2600	1570	2350	1340	2020		7	2700	4060	2420	3640	2080	3120
1680	2520	1520	2280	1300	1950		8	2660	4000	2360	3550	2010	3020
1620	2430	1460	2200	1250	1870		9	2580	3880	2290	3440	1950	2920
1560	2340	1400	2110	1190	1790		10	2510	3770	2220	3330	1880	2830
1490	2240	1340	2010	1130	1700		11	2430	3650	2140	3220	1810	2730
1420	2140	1270	1920	1070	1620		12	2350	3540	2070	3110	1750	2630
1350	2030	1210	1810	1010	1520		13	2270	3420	2000	3010	1680	2530
1280	1920	1140	1710	952	1430		14	2200	3300	1930	2900	1620	2430
1210	1810	1070	1610	890	1340		15	2120	3190	1860	2790	1550	2330
1130	1700	1000	1500	828	1240		16	2040	3070	1780	2680	1480	2230
1060	1590	932	1400	767	1150		17	1970	2960	1710	2570	1420	2130
986	1480	864	1300	707	1060		18	1890	2840	1640	2460	1350	2030
915	1370	798	1200	648	974		19	1810	2720	1570	2350	1290	1930
844	1270	733	1100	595	894		20	1740	2610	1490	2250	1190	1790
713	1070	612	920	495	745		22	1540	2310	1280	1930	1010	1510
599	900	515	773	416	626		24	1330	2000	1110	1660	866	1300
510	767	438	659	355	533		26	1170	1750	967	1450	755	1140
440	661	378	568	306	460		28	1040	1560	857	1290	667	1000
383	576	329	495	266	400		30	929	1400	767	1150	595	895
337	506	289	435	234	352		32	842	1270	693	1040	537	806
298	448	256	385	207	312		34	769	1160	631	949	487	733
266	400	229	344	185	278		36	707	1060	579	870	446	670
239	359	205	309	166	250		38	654	982	535	803	411	617
216	324	185	278				40	608	914	496	746	380	572
							42	568	854	463	695	354	532
							44	533	801	433	651	331	497
							46	502	754	407	612	310	466
							48	474	713	384	578	292	439
							50	449	676	364	547	276	415

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2230	3360	2070	3110	1840	2760	7.43	21.1	7.16	20.4	6.84	19.5
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	53.3		49.3		43.8	
1800	2700	1660	2500	1480	2220	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	13200	331	11600	283	9800	229
627	943	621	933	577	867	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.49		2.40		2.29	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
308	464	265	399	217	326	6.31		6.38		6.55	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
925[h]		853[h]		802[h]		lb/ft		925[h]		853[h]		802[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
11400	17100	10500	15800	9890	14900	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	14400	21700	13700	20600	12800	19200
11100	16600	10200	15400	9600	14400		6	14400	21700	13700	20600	12800	19200
11000	16500	10100	15200	9500	14300		7	14400	21700	13700	20600	12800	19200
10800	16300	9990	15000	9380	14100		8	14400	21700	13700	20600	12800	19200
10700	16000	9860	14800	9250	13900		9	14400	21700	13700	20600	12800	19200
10500	15800	9710	14600	9110	13700		10	14400	21700	13700	20600	12800	19200
10300	15500	9540	14300	8950	13500		11	14400	21700	13700	20600	12800	19200
10100	15200	9370	14100	8780	13200		12	14400	21700	13700	20600	12800	19200
9940	14900	9180	13800	8600	12900		13	14400	21600	13700	20500	12700	19200
9720	14600	8990	13500	8410	12600		14	14300	21500	13600	20400	12600	19000
9500	14300	8780	13200	8210	12300		15	14200	21400	13500	20300	12600	18900
9260	13900	8560	12900	8000	12000		16	14100	21200	13400	20100	12500	18700
9020	13600	8340	12500	7790	11700		17	14000	21100	13300	20000	12400	18600
8760	13200	8110	12200	7570	11400		18	13900	20900	13200	19800	12300	18400
8500	12800	7870	11800	7340	11000		19	13800	20800	13100	19700	12200	18300
8240	12400	7630	11500	7100	10700		20	13700	20600	13000	19500	12100	18100
7700	11600	7130	10700	6630	9960		22	13500	20300	12800	19200	11900	17900
7140	10700	6620	9950	6140	9230		24	13300	20100	12600	18900	11700	17600
6580	9900	6110	9180	5650	8500		26	13200	19800	12400	18700	11500	17300
6030	9060	5600	8410	5170	7770		28	13000	19500	12200	18400	11300	17000
5490	8250	5100	7660	4700	7060		30	12800	19200	12000	18100	11100	16700
4960	7460	4620	6940	4240	6370		32	12600	18900	11800	17800	10900	16400
4460	6700	4150	6240	3790	5700		34	12400	18600	11600	17500	10700	16100
3980	5980	3700	5570	3380	5090		36	12200	18300	11400	17200	10500	15800
3570	5360	3320	5000	3040	4570		38	12000	18000	11300	16900	10300	15600
3220	4840	3000	4510	2740	4120		40	11800	17800	11100	16600	10200	15300
2920	4390	2720	4090	2490	3740		42	11600	17500	10900	16300	9960	15000
2660	4000	2480	3730	2270	3410		44	11400	17200	10700	16000	9770	14700
2430	3660	2270	3410	2070	3120		46	11200	16900	10500	15800	9580	14400
2240	3360	2080	3130	1900	2860		48	11000	16600	10300	15500	9390	14100
2060	3100	1920	2890	1750	2640		50	10900	16300	10100	15200	9200	13800

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
11400	17100	10500	15800	9890	14900	12.7	76.8	12.8	72.2	12.6	68.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	272		251		236	
9180	13800	8470	12700	7970	11900	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	73000	4940	70000	4600	64800	4210
3640	5470	3040	4560	2840	4260	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.26		4.28		4.22	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
2970	4460	2810	4230	2600	3910	3.85		3.90		3.93	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
723[h]		652[h]		529[h]		lb/ft		723[h]		652[h]		529[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
8930	13400	8050	12100	6540	9830	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	11400	17200	10200	15300	8140	12200
8660	13000	7800	11700	6330	9510		6	11400	17200	10200	15300	8140	12200
8560	12900	7710	11600	6250	9390		7	11400	17200	10200	15300	8140	12200
8460	12700	7610	11400	6160	9270		8	11400	17200	10200	15300	8140	12200
8340	12500	7500	11300	6070	9120		9	11400	17200	10200	15300	8140	12200
8200	12300	7370	11100	5960	8960		10	11400	17200	10200	15300	8140	12200
8060	12100	7240	10900	5850	8790		11	11400	17200	10200	15300	8140	12200
7900	11900	7090	10700	5730	8610		12	11400	17200	10200	15300	8130	12200
7740	11600	6940	10400	5600	8410		13	11400	17100	10100	15200	8040	12100
7560	11400	6780	10200	5460	8200		14	11300	16900	10000	15000	7950	11900
7380	11100	6610	9930	5310	7990		15	11200	16800	9910	14900	7860	11800
7190	10800	6430	9660	5170	7760		16	11100	16700	9810	14800	7770	11700
6990	10500	6250	9390	5010	7530		17	11000	16500	9720	14600	7680	11500
6780	10200	6060	9100	4850	7290		18	10900	16400	9630	14500	7590	11400
6570	9880	5860	8810	4690	7050		19	10800	16200	9540	14300	7490	11300
6360	9560	5670	8520	4520	6800		20	10700	16100	9440	14200	7400	11100
5920	8900	5260	7910	4190	6290		22	10500	15800	9260	13900	7220	10900
5480	8240	4860	7300	3850	5780		24	10300	15500	9070	13600	7040	10600
5030	7570	4450	6690	3510	5270		26	10100	15200	8880	13400	6850	10300
4590	6900	4050	6080	3180	4770		28	9940	14900	8700	13100	6670	10000
4160	6260	3660	5490	2850	4290		30	9750	14700	8510	12800	6490	9750
3750	5630	3280	4930	2540	3820		32	9560	14400	8320	12500	6310	9480
3340	5030	2910	4380	2250	3390		34	9370	14100	8140	12200	6120	9200
2980	4480	2600	3910	2010	3020		36	9180	13800	7950	12000	5940	8930
2680	4020	2330	3510	1800	2710		38	8990	13500	7770	11700	5760	8650
2420	3630	2110	3160	1630	2450		40	8800	13200	7580	11400	5580	8380
2190	3290	1910	2870	1480	2220		42	8610	12900	7390	11100	5390	8110
2000	3000	1740	2620	1350	2020		44	8420	12700	7210	10800	5210	7830
1830	2750	1590	2390	1230	1850		46	8230	12400	7020	10600	5030	7560
1680	2520	1460	2200	1130	1700		48	8040	12100	6840	10300	4840	7270
1550	2320	1350	2030	1040	1570		50	7850	11800	6650	9990	4610	6930

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
8930	13400	8050	12100	6540	9830	12.4	62.1	12.2	56.8	11.9	47.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	213		192		156	
7190	10800	6480	9720	5270	7900	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	57300	3700	50600	3230	39600	2490
2540	3810	2270	3400	1790	2690	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.17		4.10		4.00	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
2300	3450	2030	3050	1590	2380	3.93		3.95		4.00	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
487[h]		441[h]		395[h]		lb/ft		487[h]		441[h]		395[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
5990	9010	5450	8190	4860	7310	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	7440	11200	6670	10000	5970	8980
5790	8710	5260	7910	4690	7050		6	7440	11200	6670	10000	5970	8980
5720	8600	5200	7810	4630	6970		7	7440	11200	6670	10000	5970	8980
5640	8480	5120	7700	4570	6860		8	7440	11200	6670	10000	5970	8980
5550	8350	5040	7580	4490	6750		9	7440	11200	6670	10000	5970	8980
5460	8200	4950	7440	4410	6630		10	7440	11200	6670	10000	5970	8980
5350	8040	4850	7290	4320	6490		11	7440	11200	6670	10000	5970	8980
5240	7870	4750	7130	4220	6350		12	7420	11200	6650	9990	5940	8920
5110	7690	4630	6960	4120	6190		13	7330	11000	6560	9860	5850	8800
4990	7490	4520	6790	4010	6030		14	7240	10900	6470	9730	5770	8670
4850	7290	4390	6600	3900	5860		15	7160	10800	6380	9600	5680	8540
4710	7080	4260	6410	3780	5690		16	7070	10600	6300	9470	5600	8410
4570	6870	4130	6210	3660	5510		17	6980	10500	6210	9330	5510	8290
4420	6640	3990	6000	3540	5320		18	6890	10300	6120	9200	5430	8160
4270	6420	3850	5790	3410	5130		19	6800	10200	6040	9070	5340	8030
4120	6190	3710	5580	3290	4940		20	6710	10100	5950	8940	5260	7900
3800	5720	3430	5150	3030	4550		22	6530	9810	5780	8680	5090	7650
3490	5240	3140	4710	2770	4160		24	6350	9540	5600	8420	4920	7390
3180	4770	2850	4280	2510	3770		26	6170	9270	5430	8160	4750	7140
2870	4310	2570	3860	2260	3390		28	5990	9000	5250	7900	4580	6880
2570	3870	2300	3450	2010	3030		30	5810	8730	5080	7630	4410	6630
2290	3440	2040	3060	1780	2680		32	5630	8460	4900	7370	4240	6370
2020	3040	1800	2710	1580	2370		34	5450	8190	4730	7110	4070	6120
1810	2710	1610	2420	1410	2110		36	5270	7920	4560	6850	3900	5860
1620	2440	1440	2170	1260	1900		38	5090	7650	4380	6590	3730	5610
1460	2200	1300	1960	1140	1710		40	4910	7380	4210	6320	3530	5300
1330	1990	1180	1780	1030	1550		42	4730	7110	4030	6060	3310	4970
1210	1820	1080	1620	942	1420		44	4550	6840	3800	5720	3120	4690
1110	1660	985	1480	861	1290		46	4340	6530	3600	5410	2950	4430
1020	1530	905	1360	791	1190		48	4130	6200	3420	5140	2800	4200
936	1410	834	1250	729	1100		50	3930	5910	3260	4890	2660	4000

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
5990	9010	5450	8190	4860	7310	11.8	44.9	11.7	42.0	11.6	39.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	143		130		116	
4830	7240	4390	6580	3920	5870	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	36000	2250	32100	1990	28500	1750
1650	2480	1480	2220	1310	1970	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.96		3.92		3.88	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1440	2160	1290	1930	1140	1710	3.99		4.01		4.05	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
387[h]		361[h]		350[h]		lb/ft		387[h]		361[h]		350[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4780	7180	4440	6680	4320	6490	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	5620	8450	5410	8140	5030	7560
4460	6710	4290	6440	4020	6050		6	5620	8450	5410	8140	5030	7560
4350	6540	4230	6360	3920	5900		7	5620	8450	5410	8140	5030	7560
4230	6360	4170	6270	3810	5730		8	5620	8450	5410	8140	5030	7560
4090	6150	4100	6160	3690	5540		9	5550	8350	5410	8140	4950	7450
3950	5930	4020	6050	3550	5340		10	5460	8200	5410	8140	4860	7300
3790	5700	3940	5920	3410	5130		11	5360	8050	5410	8140	4760	7160
3630	5460	3850	5790	3260	4900		12	5260	7900	5370	8080	4670	7020
3460	5200	3760	5640	3110	4670		13	5160	7750	5290	7950	4570	6870
3290	4940	3660	5500	2950	4430		14	5060	7600	5210	7830	4480	6730
3110	4680	3550	5340	2780	4190		15	4960	7450	5130	7710	4380	6590
2930	4410	3440	5180	2620	3940		16	4860	7310	5050	7580	4290	6440
2750	4140	3330	5010	2460	3690		17	4760	7160	4960	7460	4190	6300
2580	3870	3220	4840	2300	3450		18	4660	7010	4880	7340	4100	6160
2400	3610	3100	4660	2140	3210		19	4560	6860	4800	7210	4000	6010
2230	3350	2980	4490	1980	2980		20	4460	6710	4720	7090	3910	5870
1900	2850	2750	4130	1680	2520		22	4270	6410	4550	6840	3710	5580
1600	2400	2510	3770	1410	2120		24	4070	6110	4390	6600	3520	5300
1360	2040	2270	3410	1200	1810		26	3870	5820	4230	6350	3330	5010
1170	1760	2040	3060	1040	1560		28	3670	5520	4060	6110	3140	4720
1020	1540	1820	2730	903	1360		30	3470	5220	3900	5860	2940	4420
898	1350	1600	2410	794	1190		32	3260	4900	3740	5610	2710	4070
796	1200	1420	2130	703	1060		34	3030	4550	3570	5370	2510	3770
710	1070	1270	1900	627	943		36	2830	4250	3410	5120	2340	3520
637	957	1140	1710	563	846		38	2650	3980	3220	4830	2190	3300
575	864	1030	1540	508	764		40	2500	3750	3000	4510	2060	3100
521	784	930	1400	461	693		42	2360	3550	2810	4230	1950	2930
475	714	847	1270	420	631		44	2240	3360	2650	3980	1850	2770
435	653	775	1160				46	2130	3200	2500	3750	1750	2640
		712	1070				48	2030	3050	2370	3560	1670	2510
		656	986				50	1940	2910	2250	3380	1600	2400

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4780	7180	4440	6680	4320	6490	8.30	31.5	11.5	37.3	8.21	29.7
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	114		106		103	
3850	5770	3580	5370	3480	5210	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	26500	882	25700	1570	23600	780
1550	2330	1190	1790	1410	2110	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.78		3.85		2.75	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
777	1170	1020	1540	693	1040	5.47		4.05		5.49	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
330[c]		318[h]		302[c]		lb/ft		330		318[h]		302	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4030	6060	3910	5880	3640	5460	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4930	7400	4540	6830	4470	6720
3900	5870	3640	5470	3520	5290		6	4930	7400	4540	6830	4470	6720
3860	5800	3550	5330	3480	5230		7	4930	7400	4540	6830	4470	6720
3810	5720	3440	5170	3430	5160		8	4930	7400	4540	6830	4470	6720
3740	5630	3320	5000	3380	5080		9	4930	7400	4450	6690	4470	6720
3670	5520	3200	4810	3330	5000		10	4930	7400	4360	6550	4470	6720
3600	5410	3070	4610	3260	4910		11	4930	7400	4270	6410	4470	6720
3510	5280	2930	4400	3200	4810		12	4880	7340	4170	6270	4430	6650
3430	5150	2780	4180	3130	4700		13	4800	7220	4080	6130	4350	6540
3340	5010	2630	3960	3050	4590		14	4720	7100	3990	5990	4280	6430
3240	4870	2480	3730	2970	4470		15	4650	6980	3900	5860	4210	6320
3140	4720	2330	3510	2880	4330		16	4570	6860	3800	5720	4130	6210
3040	4570	2180	3280	2790	4190		17	4490	6750	3710	5580	4060	6100
2930	4410	2030	3060	2690	4040		18	4410	6630	3620	5440	3980	5990
2830	4250	1890	2840	2590	3890		19	4330	6510	3520	5300	3910	5880
2720	4080	1740	2620	2490	3740		20	4250	6390	3430	5160	3840	5760
2500	3750	1470	2210	2290	3440		22	4100	6160	3240	4880	3690	5540
2280	3420	1230	1850	2080	3130		24	3940	5920	3060	4600	3540	5320
2060	3090	1050	1580	1880	2830		26	3780	5690	2870	4320	3390	5100
1850	2780	907	1360	1690	2540		28	3630	5450	2670	4020	3240	4880
1640	2470	790	1190	1500	2260		30	3470	5220	2440	3670	3100	4650
1450	2180	694	1040	1320	1990		32	3310	4980	2240	3370	2950	4430
1280	1930	615	924	1170	1760		34	3160	4750	2080	3120	2800	4210
1140	1720	548	824	1050	1570		36	2980	4480	1940	2910	2590	3900
1030	1540	492	740	939	1410		38	2760	4150	1810	2720	2400	3600
927	1390	444	668	847	1270		40	2570	3870	1700	2560	2230	3350
841	1260	403	606	768	1160		42	2410	3620	1610	2410	2080	3130
766	1150	367	552	700	1050		44	2260	3400	1520	2280	1950	2930
701	1050			641	963		46	2130	3200	1440	2170	1840	2760
644	968			588	884		48	2020	3030	1370	2070	1730	2610
593	892			542	815		50	1910	2880	1310	1970	1640	2470
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4060	6100	3910	5880	3730	5610			11.4	35.6	8.06	27.7	11.4	34.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			96.9		93.4		89.0	
3270	4910	3150	4730	3000	4510			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			23300	1420	21200	682	21100	1300
1080	1620	1260	1890	987	1480			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.83		2.70		3.82	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
926	1390	615	924	842	1270			4.05		5.59		4.03	

[c] Shape is slender for compression with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
286[c]		282[c]		262[c]		lb/ft		286		282		262	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3510	5270	3330	5010	3060	4600	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4050	6090	4160	6250	3840	5780
3270	4910	3230	4850	2960	4450		6	4050	6090	4160	6250	3840	5780
3180	4780	3190	4790	2930	4400		7	4050	6090	4160	6250	3840	5780
3080	4640	3150	4730	2890	4340		8	4050	6090	4160	6250	3840	5780
2980	4480	3100	4660	2840	4270		9	3960	5960	4160	6250	3840	5780
2860	4300	3050	4580	2790	4200		10	3880	5820	4160	6250	3840	5780
2740	4120	2990	4490	2740	4120		11	3790	5690	4160	6250	3840	5780
2620	3930	2930	4400	2680	4030		12	3700	5560	4110	6180	3790	5690
2490	3740	2860	4300	2620	3940		13	3610	5430	4040	6070	3720	5590
2350	3540	2790	4200	2560	3840		14	3520	5290	3970	5960	3650	5490
2220	3330	2720	4090	2490	3740		15	3430	5160	3900	5860	3580	5390
2080	3130	2650	3980	2420	3640		16	3350	5030	3820	5750	3510	5280
1940	2920	2570	3860	2350	3530		17	3260	4900	3750	5640	3450	5180
1810	2720	2490	3740	2270	3420		18	3170	4760	3680	5530	3380	5080
1680	2520	2400	3610	2200	3310		19	3080	4630	3610	5430	3310	4970
1550	2330	2310	3470	2120	3190		20	2990	4500	3540	5320	3240	4870
1300	1950	2120	3190	1950	2940		22	2820	4230	3400	5100	3100	4660
1090	1640	1930	2900	1770	2670		24	2640	3970	3250	4890	2960	4460
930	1400	1740	2620	1600	2400		26	2460	3700	3110	4670	2830	4250
802	1210	1560	2350	1430	2150		28	2230	3350	2970	4460	2690	4040
699	1050	1390	2080	1270	1900		30	2030	3050	2820	4250	2550	3840
614	923	1220	1830	1110	1670		32	1860	2800	2680	4030	2410	3630
544	818	1080	1620	985	1480		34	1720	2590	2520	3790	2220	3330
485	729	964	1450	879	1320		36	1600	2400	2310	3470	2030	3050
436	655	865	1300	789	1190		38	1490	2250	2130	3210	1870	2810
393	591	781	1170	712	1070		40	1400	2110	1980	2970	1730	2600
357	536	708	1060	646	971		42	1320	1990	1850	2770	1610	2420
325	488	645	970	588	884		44	1250	1880	1730	2600	1510	2270
		591	888	538	809		46	1180	1780	1630	2440	1420	2130
		542	815	494	743		48	1130	1690	1530	2300	1330	2000
		500	751	456	685		50	1070	1610	1450	2180	1260	1900
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3520	5290	3470	5220	3240	4860			8.00	26.2	11.3	33.6	11.2	32.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			83.9		82.9		77.2	
2830	4250	2800	4200	2610	3910			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			18900	602	19600	1200	17900	1090
1120	1680	919	1380	868	1300			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.68		3.80		3.76	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
545	819	779	1170	713	1070			5.60		4.05		4.07	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
256[c]		247[c]		232[c]		lb/ft		256		247		232	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3060	4600	2840	4270	2690	4040	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3630	5460	3600	5410	3270	4910
2870	4310	2750	4130	2510	3780		6	3630	5460	3600	5410	3270	4910
2800	4210	2710	4080	2450	3690		7	3630	5460	3600	5410	3270	4910
2730	4100	2680	4020	2390	3590		8	3630	5450	3600	5410	3260	4890
2650	3980	2630	3960	2310	3480		9	3540	5320	3600	5410	3170	4770
2560	3840	2590	3890	2240	3360		10	3450	5190	3600	5410	3090	4650
2450	3680	2540	3810	2150	3230		11	3370	5060	3600	5410	3010	4530
2330	3510	2480	3730	2060	3100		12	3280	4940	3540	5320	2930	4410
2210	3330	2430	3650	1970	2960		13	3200	4810	3480	5220	2850	4290
2090	3140	2370	3560	1870	2810		14	3110	4680	3410	5130	2770	4170
1970	2960	2310	3460	1760	2640		15	3030	4550	3340	5030	2690	4050
1840	2770	2240	3370	1640	2470		16	2940	4420	3280	4930	2610	3930
1720	2590	2170	3270	1530	2300		17	2860	4290	3210	4830	2530	3800
1600	2400	2100	3160	1420	2140		18	2770	4170	3150	4730	2450	3680
1480	2220	2030	3060	1310	1970		19	2690	4040	3080	4630	2370	3560
1360	2050	1960	2950	1210	1810		20	2600	3910	3010	4530	2290	3440
1140	1710	1810	2730	1010	1510		22	2430	3650	2880	4330	2130	3200
958	1440	1660	2490	846	1270		24	2260	3400	2750	4130	1960	2950
817	1230	1490	2240	721	1080		26	2040	3070	2620	3930	1740	2610
704	1060	1330	2000	621	934		28	1840	2760	2480	3730	1560	2340
613	922	1180	1770	541	814		30	1670	2510	2350	3530	1410	2120
539	810	1030	1550	476	715		32	1530	2290	2210	3320	1290	1930
477	718	916	1380	421	633		34	1410	2120	2000	3010	1180	1780
426	640	817	1230	376	565		36	1310	1960	1830	2750	1100	1650
382	575	733	1100	337	507		38	1220	1830	1680	2530	1020	1530
345	518	662	994	305	458		40	1140	1710	1560	2340	954	1430
313	470	600	902	276	415		42	1070	1610	1450	2180	896	1350
285	429	547	822				44	1010	1520	1350	2030	844	1270
		500	752				46	960	1440	1270	1910	799	1200
		459	691				48	912	1370	1200	1800	758	1140
		423	636				50	868	1310	1130	1700	721	1080

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3160	4740	3040	4570	2850	4280	7.91	24.8	11.2	31.8	7.82	23.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	75.3		72.5		68.0	
2540	3810	2450	3670	2300	3440	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	16800	528	16700	1010	15000	468
1010	1510	822	1230	904	1360	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.65		3.74		2.62	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
479	719	664	998	426	641	5.62		4.06		5.65	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
231[c]		210[c]		194[c]		lb/ft		231		210		194	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2640	3960	2400	3610	2160	3250	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3360	5060	2910	4370	2680	4030
2550	3830	2250	3380	2020	3030		6	3360	5060	2910	4370	2680	4030
2520	3780	2190	3290	1970	2960		7	3360	5060	2910	4370	2680	4030
2480	3730	2130	3200	1910	2870		8	3360	5060	2890	4340	2650	3990
2440	3670	2060	3100	1850	2780		9	3360	5060	2810	4230	2580	3880
2400	3610	1990	2990	1780	2680		10	3360	5060	2740	4110	2510	3770
2350	3540	1910	2880	1710	2580		11	3360	5060	2660	4000	2440	3660
2300	3460	1830	2760	1640	2470		12	3310	4970	2590	3890	2370	3560
2250	3380	1750	2630	1560	2350		13	3240	4870	2510	3770	2290	3450
2190	3290	1660	2500	1490	2230		14	3180	4780	2430	3660	2220	3340
2130	3210	1570	2370	1410	2110		15	3120	4680	2360	3540	2150	3230
2070	3110	1470	2210	1320	1990		16	3050	4590	2280	3430	2080	3130
2010	3020	1370	2060	1240	1870		17	2990	4490	2210	3320	2010	3020
1940	2920	1270	1900	1150	1730		18	2930	4400	2130	3200	1940	2910
1880	2820	1170	1750	1060	1590		19	2860	4300	2060	3090	1860	2800
1810	2720	1070	1610	972	1460		20	2800	4210	1980	2980	1790	2690
1670	2510	889	1340	806	1210		22	2670	4020	1830	2750	1650	2480
1530	2310	747	1120	677	1020		24	2550	3830	1640	2460	1440	2170
1390	2080	636	956	577	867		26	2420	3640	1440	2170	1270	1910
1230	1860	549	825	497	748		28	2290	3450	1290	1940	1130	1700
1090	1640	478	718	433	651		30	2170	3260	1160	1750	1020	1530
957	1440	420	631	381	572		32	2000	3010	1060	1590	925	1390
848	1270	372	559	337	507		34	1820	2730	970	1460	847	1270
756	1140	332	499	301	452		36	1660	2490	895	1350	780	1170
679	1020	298	448	270	406		38	1520	2290	831	1250	723	1090
612	920	269	404	244	366		40	1410	2120	776	1170	674	1010
555	835	244	366	221	332		42	1310	1960	727	1090	630	948
506	761						44	1220	1830	684	1030	593	891
463	696						46	1140	1720	646	971	559	840
425	639						48	1070	1610	612	920	529	795
392	589						50	1010	1520	581	874	502	754
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2860	4300	2590	3900	2390	3590			11.1	31.2	7.70	23.0	7.64	22.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			68.2		61.9		57.0	
2300	3450	2090	3130	1920	2890			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			15600	940	13200	411	12100	375
777	1170	853	1280	782	1170			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.71		2.58		2.56	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
615	924	374	562	341	513			4.07		5.66		5.70	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×						Shape		W36×					
182[c]		170[c]		160[c]		lb/ft		182		170[v]		160[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2000	3000	1830	2740	1690	2540	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2510	3770	2330	3510	2180	3280
1860	2800	1700	2560	1570	2360		6	2510	3770	2330	3510	2180	3280
1820	2730	1660	2490	1530	2300		7	2510	3770	2330	3510	2180	3280
1760	2650	1610	2420	1490	2230		8	2480	3730	2300	3460	2150	3230
1710	2570	1560	2340	1440	2160		9	2410	3630	2240	3370	2080	3130
1650	2470	1500	2260	1380	2080		10	2340	3520	2170	3270	2020	3040
1580	2380	1440	2170	1330	1990		11	2280	3420	2110	3170	1960	2950
1510	2270	1380	2070	1270	1900		12	2210	3320	2040	3070	1900	2850
1440	2170	1310	1970	1200	1810		13	2140	3210	1980	2970	1840	2760
1370	2060	1240	1870	1140	1720		14	2070	3110	1910	2880	1770	2670
1290	1950	1180	1770	1080	1620		15	2000	3010	1850	2780	1710	2570
1220	1830	1110	1660	1010	1520		16	1930	2900	1780	2680	1650	2480
1150	1720	1040	1560	949	1430		17	1860	2800	1720	2580	1590	2390
1070	1610	970	1460	885	1330		18	1790	2700	1650	2480	1520	2290
991	1490	903	1360	822	1240		19	1730	2590	1590	2390	1460	2200
907	1360	834	1250	761	1140		20	1660	2490	1520	2290	1400	2110
752	1130	690	1040	634	952		22	1520	2280	1370	2060	1240	1870
632	949	580	872	532	800		24	1310	1970	1180	1780	1070	1610
538	809	494	743	454	682		26	1150	1730	1040	1560	936	1410
464	697	426	640	391	588		28	1020	1540	920	1380	829	1250
404	608	371	558	341	512		30	921	1380	825	1240	742	1120
355	534	326	490	299	450		32	835	1250	746	1120	670	1010
315	473	289	434	265	399		34	763	1150	681	1020	610	917
281	422	258	387	237	356		36	702	1050	625	940	560	841
252	379	231	348	212	319		38	650	976	578	869	516	776
227	342	209	314	192	288		40	604	908	537	807	479	720
206	310	189	285				42	565	849	501	753	447	671
							44	530	797	470	706	418	629
							46	500	751	442	665	393	591
							48	473	710	418	628	371	557
							50	448	674	396	595	351	528

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2250	3380	2100	3150	1970	2960	7.61	22.0	7.55	21.6	7.46	21.2
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	53.6		50.0		47.0	
1810	2710	1690	2530	1590	2380	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	11300	347	10500	320	9760	295
737	1110	619	930	589	885	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.55		2.53		2.50	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
317	476	293	440	270	406	5.69		5.73		5.76	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W36–W33

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W36×				W33×		Shape		W36×				W33×	
150[c]		135[c]		387[h]		lb/ft		150[v]		135[v]		387[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1570	2360	1380	2070	4780	7180	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2030	3050	1780	2670	5450	8190
1460	2190	1270	1910	4600	6920		6	2030	3050	1780	2670	5450	8190
1420	2130	1240	1860	4540	6830		7	2030	3050	1780	2670	5450	8190
1380	2070	1200	1800	4470	6720		8	1990	2990	1730	2600	5450	8190
1330	2000	1150	1730	4390	6600		9	1930	2910	1680	2520	5450	8190
1280	1920	1110	1660	4310	6470		10	1870	2820	1620	2440	5450	8190
1220	1840	1060	1590	4210	6330		11	1810	2730	1570	2350	5450	8190
1170	1760	1010	1510	4120	6190		12	1760	2640	1510	2270	5390	8110
1110	1670	953	1430	4010	6030		13	1700	2550	1460	2190	5320	8000
1050	1580	899	1350	3900	5860		14	1640	2460	1400	2110	5250	7890
991	1490	845	1270	3780	5690		15	1580	2370	1350	2030	5170	7770
930	1400	790	1190	3660	5510		16	1520	2280	1290	1950	5100	7660
870	1310	736	1110	3540	5320		17	1460	2190	1240	1860	5020	7550
811	1220	682	1030	3410	5130		18	1400	2100	1190	1780	4950	7440
752	1130	630	947	3290	4940		19	1340	2010	1130	1700	4880	7330
694	1040	579	870	3160	4740		20	1280	1920	1080	1620	4800	7220
583	876	487	733	2890	4350		22	1120	1680	909	1370	4650	7000
490	736	410	616	2630	3950		24	960	1440	780	1170	4510	6770
417	627	349	525	2370	3560		26	838	1260	679	1020	4360	6550
360	541	301	452	2120	3190		28	741	1110	598	899	4210	6330
313	471	262	394	1880	2820		30	662	994	533	801	4060	6110
275	414	230	346	1650	2480		32	597	897	479	720	3920	5890
244	367	204	307	1460	2200		34	542	815	435	653	3770	5660
218	327	182	274	1300	1960		36	497	746	397	597	3620	5440
195	294	163	246	1170	1760		38	457	688	365	548	3470	5220
176	265			1060	1590		40	424	637	337	507	3320	5000
				959	1440		42	395	593	313	471	3140	4710
				874	1310		44	369	555	292	439	2960	4450
				799	1200		46	346	521	274	412	2810	4220
				734	1100		48	326	491	258	387	2670	4010
				676	1020		50	309	464	243	365	2540	3820
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1860	2790	1670	2510	4780	7180			7.37	20.8	7.10	20.1	11.3	40.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			44.3		39.9		114	
1500	2240	1350	2020	3850	5770			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			9040	270	7800	225	24300	1620
563	845	514	772	1270	1910			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.47		2.38		3.77	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
248	372	209	313	1090	1640			5.79		5.88		3.87	

[c] Shape is slender for compression with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W33×						Shape		W33×					
354[h]		318		291[c]		lb/ft		354[h]		318		291	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4360	6550	3930	5900	3570	5370	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4960	7460	4440	6670	4050	6090
4200	6310	3780	5680	3450	5180		6	4960	7460	4440	6670	4050	6090
4140	6220	3730	5600	3400	5110		7	4960	7460	4440	6670	4050	6090
4070	6120	3670	5510	3350	5030		8	4960	7460	4440	6670	4050	6090
4000	6020	3600	5410	3290	4940		9	4960	7460	4440	6670	4050	6090
3920	5900	3530	5300	3220	4840		10	4960	7460	4440	6670	4050	6090
3840	5770	3450	5190	3150	4730		11	4960	7460	4440	6670	4050	6090
3750	5630	3370	5060	3070	4610		12	4900	7370	4370	6570	3980	5990
3650	5480	3280	4930	2990	4490		13	4830	7260	4300	6470	3920	5890
3550	5330	3180	4790	2900	4360		14	4760	7150	4230	6360	3850	5790
3440	5170	3090	4640	2810	4220		15	4690	7040	4160	6260	3780	5690
3330	5000	2990	4490	2720	4080		16	4610	6930	4100	6160	3720	5580
3210	4830	2880	4330	2620	3940		17	4540	6830	4030	6050	3650	5480
3100	4660	2780	4170	2520	3790		18	4470	6720	3960	5950	3580	5380
2980	4480	2670	4010	2420	3640		19	4400	6610	3890	5840	3510	5280
2860	4300	2560	3850	2320	3490		20	4330	6500	3820	5740	3450	5180
2620	3930	2340	3520	2120	3180		22	4180	6290	3680	5530	3310	4980
2380	3570	2120	3190	1920	2880		24	4040	6070	3540	5320	3180	4780
2140	3210	1900	2860	1720	2580		26	3900	5860	3400	5120	3050	4580
1910	2870	1700	2550	1530	2300		28	3750	5640	3270	4910	2910	4380
1690	2540	1500	2250	1340	2020		30	3610	5430	3130	4700	2780	4170
1480	2230	1310	1980	1180	1780		32	3470	5210	2990	4490	2640	3970
1310	1970	1160	1750	1050	1570		34	3330	5000	2850	4290	2510	3770
1170	1760	1040	1560	934	1400		36	3180	4780	2710	4070	2320	3490
1050	1580	932	1400	838	1260		38	3040	4570	2520	3790	2150	3240
949	1430	841	1260	756	1140		40	2840	4280	2350	3540	2010	3020
861	1290	763	1150	686	1030		42	2670	4020	2210	3320	1880	2830
784	1180	695	1050	625	939		44	2520	3790	2080	3120	1770	2660
718	1080	636	956	572	859		46	2390	3590	1960	2950	1670	2510
659	991	584	878	525	789		48	2270	3400	1860	2800	1580	2370
607	913	538	809	484	727		50	2160	3240	1770	2660	1500	2260
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4360	6550	3930	5900	3590	5390			11.2	38.1	11.1	36.0	11.0	34.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			104		93.7		85.6	
3510	5270	3160	4740	2890	4330			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			22000	1460	19500	1290	17700	1160
1160	1730	1030	1540	935	1400			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.74		3.71		3.68	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
985	1480	873	1310	789	1190			3.88		3.91		3.91	

[c] Shape is slender for compression with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W33×						Shape		W33×					
263[c]		241[c]		221[c]		lb/ft		263		241		221	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3150	4740	2860	4300	2580	3880	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3630	5460	3280	4940	2990	4500
3050	4580	2760	4150	2490	3740		6	3630	5460	3280	4940	2990	4500
3010	4520	2730	4100	2460	3690		7	3630	5460	3280	4940	2990	4500
2960	4450	2690	4040	2420	3640		8	3630	5460	3280	4940	2990	4500
2910	4380	2640	3970	2380	3580		9	3630	5460	3280	4940	2990	4500
2860	4300	2590	3900	2340	3510		10	3630	5460	3280	4940	2990	4500
2800	4210	2540	3820	2290	3440		11	3630	5450	3270	4920	2980	4480
2740	4120	2480	3730	2230	3360		12	3560	5360	3210	4830	2920	4390
2680	4020	2420	3640	2180	3280		13	3500	5260	3150	4740	2860	4300
2610	3920	2360	3540	2120	3190		14	3440	5170	3090	4650	2810	4220
2530	3810	2290	3440	2060	3100		15	3380	5070	3030	4560	2750	4130
2450	3680	2220	3340	2000	3000		16	3310	4980	2970	4470	2690	4050
2360	3550	2150	3230	1930	2900		17	3250	4880	2910	4380	2640	3960
2270	3410	2070	3110	1870	2800		18	3190	4790	2850	4290	2580	3880
2180	3280	1990	2980	1800	2700		19	3120	4690	2790	4200	2520	3790
2090	3140	1900	2860	1730	2600		20	3060	4600	2730	4110	2470	3710
1900	2860	1730	2600	1570	2370		22	2930	4410	2610	3930	2350	3540
1720	2590	1560	2340	1420	2130		24	2810	4220	2490	3750	2240	3370
1540	2320	1390	2090	1260	1900		26	2680	4030	2370	3570	2130	3190
1370	2060	1230	1850	1120	1680		28	2550	3840	2260	3390	2010	3020
1200	1810	1080	1620	976	1470		30	2430	3650	2140	3210	1900	2850
1060	1590	950	1430	858	1290		32	2300	3460	2000	3010	1740	2610
936	1410	841	1260	760	1140		34	2140	3210	1830	2740	1580	2380
835	1260	750	1130	678	1020		36	1970	2950	1680	2520	1450	2180
749	1130	674	1010	608	914		38	1820	2730	1550	2330	1330	2010
676	1020	608	914	549	825		40	1690	2540	1440	2160	1240	1860
614	922	551	829	498	748		42	1580	2380	1340	2010	1150	1730
559	840	502	755	454	682		44	1490	2230	1260	1890	1080	1620
511	769	460	691	415	624		46	1400	2100	1180	1780	1010	1520
470	706	422	634	381	573		48	1320	1990	1110	1680	953	1430
433	651	389	585	351	528		50	1260	1890	1060	1590	901	1350
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3240	4880	2980	4480	2740	4110			10.9	32.9	10.8	31.7	10.7	30.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			77.4		71.1		65.3	
2610	3920	2400	3600	2200	3310			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			15900	1040	14200	933	12900	840
840	1260	795	1190	736	1100			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.66		3.62		3.59	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
706	1060	636	956	573	861			3.91		3.90		3.93	

[c] Shape is slender for compression with F_y = 70 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W33× 201[c]		W33× 169[c]		W33× 152[c]		Shape lb/ft		W33× 201		W33× 169		W33× 152[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2290	3440	1860	2800	1650	2490	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2700	4060	2200	3300	1950	2930
2210	3320	1730	2600	1540	2310		6	2700	4060	2200	3300	1950	2930
2180	3270	1690	2530	1490	2250		7	2700	4060	2200	3300	1950	2930
2140	3220	1630	2460	1450	2180		8	2700	4060	2160	3250	1920	2880
2110	3170	1580	2370	1400	2100		9	2700	4060	2100	3160	1860	2800
2070	3110	1520	2280	1340	2020		10	2700	4060	2040	3070	1810	2710
2020	3040	1460	2190	1290	1940		11	2680	4030	1980	2980	1750	2630
1980	2970	1390	2090	1230	1850		12	2630	3950	1920	2890	1690	2550
1930	2900	1320	1990	1170	1750		13	2570	3870	1860	2800	1640	2460
1870	2820	1250	1880	1100	1660		14	2520	3790	1800	2710	1580	2380
1820	2740	1180	1770	1040	1560		15	2470	3710	1740	2620	1530	2290
1760	2650	1110	1660	975	1470		16	2410	3630	1680	2530	1470	2210
1710	2560	1040	1560	911	1370		17	2360	3550	1620	2440	1410	2120
1650	2470	965	1450	848	1270		18	2310	3470	1560	2340	1360	2040
1580	2380	886	1330	786	1180		19	2250	3390	1500	2250	1300	1960
1520	2290	807	1210	715	1070		20	2200	3310	1440	2160	1250	1870
1400	2100	667	1000	591	888		22	2090	3150	1300	1950	1100	1650
1270	1910	561	843	496	746		24	1990	2990	1130	1700	949	1430
1130	1700	478	718	423	636		26	1880	2830	997	1500	834	1250
995	1500	412	619	365	548		28	1770	2670	890	1340	741	1110
869	1310	359	539	318	478		30	1660	2490	803	1210	666	1000
763	1150	315	474	279	420		32	1490	2240	730	1100	604	908
676	1020	279	420	247	372		34	1350	2030	670	1010	552	830
603	907	249	375	221	332		36	1240	1860	618	929	508	763
541	814	224	336	198	298		38	1140	1710	574	862	470	707
489	734	202	303	179	269		40	1050	1580	535	805	438	658
443	666						42	976	1470	502	754	409	615
404	607						44	911	1370	472	710	384	577
369	555						46	854	1280	446	670	362	544
339	510						48	804	1210	422	635	342	514
313	470						50	759	1140	401	603	324	488

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2480	3720	2070	3120	1880	2830	10.6	29.8	7.46	21.6	7.37	21.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	59.1		49.5		44.9	
1990	2990	1670	2510	1520	2270	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	11600	749	9290	310	8160	273
675	1010	634	951	535	804	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.56		2.50		2.47	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
513	772	295	443	258	388	3.93		5.48		5.47	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W33

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W33×						Shape		W33×					
141[c]		130[c]		118[c]		lb/ft		141[v]		130[v]		118[f],[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1500	2250	1360	2040	1200	1810	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1800	2700	1630	2450	1450	2180
1390	2090	1260	1890	1110	1660		6	1800	2700	1630	2450	1450	2180
1350	2030	1220	1830	1070	1610		7	1800	2700	1630	2450	1450	2170
1310	1970	1180	1780	1040	1560		8	1760	2640	1590	2390	1400	2100
1260	1900	1140	1710	996	1500		9	1700	2560	1540	2310	1350	2040
1210	1820	1090	1640	954	1430		10	1650	2480	1490	2240	1310	1970
1160	1740	1040	1570	909	1370		11	1600	2400	1440	2160	1260	1900
1100	1660	992	1490	862	1300		12	1540	2320	1390	2090	1220	1830
1050	1570	940	1410	814	1220		13	1490	2240	1340	2010	1170	1760
989	1490	886	1330	765	1150		14	1440	2160	1290	1940	1130	1690
930	1400	832	1250	716	1080		15	1390	2080	1240	1860	1080	1620
871	1310	778	1170	667	1000		16	1330	2000	1190	1790	1030	1550
813	1220	724	1090	619	930		17	1280	1920	1140	1710	988	1490
755	1130	671	1010	572	859		18	1230	1840	1090	1640	942	1420
698	1050	619	931	524	788		19	1170	1770	1040	1570	896	1350
639	961	568	854	481	723		20	1120	1690	989	1490	830	1250
528	794	472	709	403	605		22	968	1460	837	1260	700	1050
444	667	396	596	338	509		24	836	1260	721	1080	601	903
378	569	338	508	288	433		26	732	1100	630	946	524	787
326	490	291	438	249	374		28	649	976	557	837	462	694
284	427	254	381	217	326		30	582	875	498	749	412	619
250	375	223	335	190	286		32	527	792	450	676	371	558
221	333	198	297	169	253		34	480	722	409	615	337	506
197	297	176	265	150	226		36	441	663	375	564	308	463
177	266	158	238	135	203		38	408	613	346	520	283	426
160	240						40	379	569	321	482	262	394
							42	353	531	299	449	244	366
							44	331	498	280	420	228	342
							46	312	468	263	395	213	321
							48	294	442	248	372	201	302
							50	279	419	234	352	190	285

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1740	2610	1610	2410	1450	2190	7.25	20.5	7.13	20.0	6.95	19.4
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	41.5		38.3		34.7	
1400	2100	1290	1940	1170	1760	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	7450	246	6710	218	5900	187
507	762	483	726	432	649	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.43		2.39		2.32	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
234	351	208	312	179	269	5.51		5.52		5.60	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W30×						Shape		W30×					
391[h]		357[h]		326[h]		lb/ft		391[h]		357[h]		326[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4820	7250	4400	6620	4020	6040	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	5060	7610	4610	6930	4160	6250
4630	6970	4230	6360	3860	5800		6	5060	7610	4610	6930	4160	6250
4570	6870	4170	6260	3800	5710		7	5060	7610	4610	6930	4160	6250
4490	6750	4100	6160	3740	5620		8	5060	7610	4610	6930	4160	6250
4410	6630	4020	6040	3670	5510		9	5060	7610	4610	6930	4160	6250
4320	6490	3940	5920	3590	5390		10	5060	7610	4610	6930	4160	6250
4220	6350	3850	5780	3500	5260		11	5060	7610	4600	6920	4140	6230
4120	6190	3750	5640	3410	5130		12	5000	7520	4540	6830	4080	6140
4010	6020	3650	5480	3320	4990		13	4940	7420	4480	6730	4020	6050
3890	5850	3540	5320	3220	4830		14	4880	7330	4420	6640	3970	5960
3770	5660	3430	5150	3110	4680		15	4820	7240	4360	6550	3910	5870
3640	5470	3310	4980	3000	4520		16	4750	7150	4300	6460	3850	5780
3510	5280	3190	4800	2890	4350		17	4690	7050	4240	6370	3790	5700
3380	5080	3070	4610	2780	4180		18	4630	6960	4180	6280	3730	5610
3250	4880	2950	4430	2670	4010		19	4570	6870	4110	6180	3670	5520
3110	4680	2820	4240	2550	3830		20	4510	6780	4050	6090	3610	5430
2840	4270	2570	3860	2320	3480		22	4390	6590	3930	5910	3500	5260
2570	3860	2320	3490	2090	3140		24	4260	6410	3810	5730	3380	5080
2300	3460	2070	3120	1860	2800		26	4140	6220	3690	5540	3260	4900
2040	3070	1840	2770	1650	2480		28	4020	6040	3570	5360	3150	4730
1800	2700	1610	2430	1440	2170		30	3890	5850	3440	5180	3030	4550
1580	2370	1420	2130	1270	1900		32	3770	5670	3320	4990	2910	4370
1400	2100	1260	1890	1120	1690		34	3650	5480	3200	4810	2790	4200
1250	1880	1120	1680	1000	1500		36	3530	5300	3080	4630	2680	4020
1120	1680	1010	1510	898	1350		38	3400	5110	2960	4440	2560	3850
1010	1520	908	1360	811	1220		40	3280	4930	2830	4260	2410	3610
917	1380	823	1240	735	1110		42	3160	4740	2690	4040	2270	3400
835	1260	750	1130	670	1010		44	3020	4550	2540	3820	2140	3220
764	1150	686	1030	613	921		46	2870	4320	2410	3630	2030	3050
702	1050	630	947	563	846		48	2740	4110	2300	3450	1930	2900
647	972	581	873	519	780		50	2610	3930	2190	3290	1840	2770

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4820	7250	4400	6620	4020	6040	11.0	43.6	10.9	40.8	10.7	38.3
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	115		105		95.9	
3880	5820	3540	5320	3240	4850	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	20700	1550	18700	1390	16800	1240
1260	1900	1140	1710	1030	1550	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.67		3.64		3.60	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1080	1630	975	1460	880	1320	3.65		3.65		3.67	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W30×						Shape		W30×					
292		261		235[c]		lb/ft		292		261		235	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3600	5420	3230	4850	2870	4310	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3700	5570	3290	4950	2960	4450
3460	5200	3090	4650	2760	4150		6	3700	5570	3290	4950	2960	4450
3410	5120	3050	4580	2720	4090		7	3700	5570	3290	4950	2960	4450
3350	5030	2990	4500	2680	4030		8	3700	5570	3290	4950	2960	4450
3280	4940	2930	4410	2630	3950		9	3700	5570	3290	4950	2960	4450
3210	4830	2870	4310	2580	3870		10	3700	5570	3290	4950	2960	4450
3140	4710	2800	4200	2510	3780		11	3680	5540	3270	4910	2930	4410
3050	4590	2720	4090	2450	3670		12	3630	5450	3210	4830	2880	4330
2970	4460	2640	3970	2370	3570		13	3570	5370	3160	4750	2830	4250
2880	4320	2560	3850	2300	3450		14	3510	5280	3100	4670	2780	4170
2780	4180	2470	3720	2220	3340		15	3460	5200	3050	4580	2720	4090
2690	4040	2380	3580	2140	3210		16	3400	5110	2990	4500	2670	4010
2590	3890	2290	3450	2060	3090		17	3340	5030	2940	4420	2620	3940
2480	3730	2200	3310	1970	2960		18	3290	4940	2890	4340	2570	3860
2380	3580	2110	3160	1890	2830		19	3230	4860	2830	4250	2510	3780
2280	3420	2010	3020	1800	2710		20	3170	4770	2780	4170	2460	3700
2070	3110	1820	2740	1630	2450		22	3060	4600	2670	4010	2360	3540
1860	2790	1630	2450	1460	2190		24	2950	4430	2560	3840	2250	3390
1660	2490	1450	2180	1290	1940		26	2830	4260	2450	3680	2150	3230
1460	2200	1280	1920	1140	1710		28	2720	4090	2340	3510	2050	3080
1280	1920	1110	1670	990	1490		30	2610	3920	2230	3350	1940	2920
1120	1690	978	1470	870	1310		32	2490	3750	2120	3180	1840	2760
995	1500	866	1300	771	1160		34	2380	3580	2000	3000	1690	2540
888	1330	773	1160	688	1030		36	2260	3400	1850	2780	1560	2340
797	1200	694	1040	617	928		38	2110	3170	1720	2580	1450	2170
719	1080	626	941	557	837		40	1980	2970	1610	2410	1350	2030
652	980	568	853	505	759		42	1860	2790	1510	2270	1260	1900
594	893	517	778	460	692		44	1750	2640	1420	2130	1190	1790
544	817	473	711	421	633		46	1660	2500	1340	2020	1120	1690
499	751	435	653	387	581		48	1580	2370	1270	1910	1060	1600
460	692	401	602	356	536		50	1500	2260	1210	1820	1010	1520
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3600	5420	3230	4850	2900	4370			10.7	35.9	10.5	33.7	10.5	32.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			86.0		77.0		69.3	
2900	4350	2600	3900	2340	3510			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			14900	1100	13100	959	11700	855
914	1370	823	1230	727	1090			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.58		3.53		3.51	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
779	1170	685	1030	611	919			3.69		3.71		3.70	

[c] Shape is slender for compression with F_y = 70 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W30×						Shape		W30×					
211[c]		191[c]		173[c]		lb/ft		211		191		173	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2540	3810	2240	3360	1990	2990	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2620	3940	2360	3540	2120	3190
2440	3670	2150	3230	1910	2870		6	2620	3940	2360	3540	2120	3190
2410	3620	2120	3190	1880	2830		7	2620	3940	2360	3540	2120	3190
2370	3560	2080	3130	1850	2780		8	2620	3940	2360	3540	2120	3190
2330	3490	2050	3080	1820	2730		9	2620	3940	2360	3540	2120	3190
2280	3420	2000	3010	1780	2670		10	2620	3940	2360	3540	2120	3190
2230	3350	1960	2950	1740	2610		11	2590	3900	2330	3500	2090	3140
2170	3270	1910	2870	1690	2550		12	2550	3830	2280	3430	2040	3070
2120	3180	1860	2800	1650	2480		13	2500	3750	2230	3360	2000	3010
2060	3090	1810	2710	1600	2400		14	2450	3680	2190	3290	1960	2940
1990	2990	1750	2630	1550	2330		15	2400	3610	2140	3220	1910	2880
1920	2880	1690	2540	1500	2250		16	2350	3530	2100	3150	1870	2810
1840	2770	1630	2450	1440	2170		17	2300	3460	2050	3080	1830	2750
1760	2650	1570	2360	1390	2090		18	2250	3380	2000	3010	1780	2680
1690	2540	1510	2270	1330	2000		19	2200	3310	1960	2940	1740	2620
1610	2420	1440	2160	1280	1920		20	2150	3240	1910	2870	1700	2550
1450	2180	1300	1950	1160	1740		22	2060	3090	1820	2730	1610	2420
1300	1950	1160	1740	1030	1550		24	1960	2940	1730	2590	1530	2290
1150	1730	1020	1540	910	1370		26	1860	2800	1630	2450	1440	2160
1010	1520	894	1340	793	1190		28	1760	2650	1540	2310	1350	2030
880	1320	779	1170	690	1040		30	1660	2500	1430	2150	1230	1850
773	1160	685	1030	607	912		32	1530	2300	1300	1950	1110	1670
685	1030	606	911	538	808		34	1400	2100	1180	1770	1010	1510
611	919	541	813	479	721		36	1290	1940	1080	1630	922	1390
549	824	485	730	430	647		38	1190	1790	1000	1500	850	1280
495	744	438	659	388	584		40	1110	1670	928	1400	787	1180
449	675	397	597	352	529		42	1040	1560	866	1300	733	1100
409	615	362	544	321	482		44	973	1460	812	1220	685	1030
374	563	331	498	294	441		46	917	1380	763	1150	643	967
344	517	304	457	270	405		48	866	1300	720	1080	606	911
317	476	280	421	249	374		50	822	1230	682	1030	573	861
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2610	3920	2350	3530	2130	3210			10.4	30.8	10.3	29.6	10.2	28.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			62.3		56.1		50.9	
2100	3150	1890	2840	1720	2580			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			10300	757	9200	673	8230	598
671	1010	610	915	558	836			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.49		3.46		3.42	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
541	814	482	725	430	646			3.70		3.70		3.71	

[c] Shape is slender for compression with F_y = 70 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W30×						Shape		W30×					
148[c]		132[c]		124[c]		lb/ft		148		132		124[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1670	2520	1460	2190	1350	2030	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1750	2630	1530	2290	1430	2140
1530	2300	1330	2000	1230	1850		6	1750	2630	1530	2290	1430	2140
1480	2230	1290	1940	1190	1790		7	1740	2610	1510	2270	1410	2120
1430	2150	1240	1870	1150	1720		8	1690	2530	1470	2200	1360	2050
1370	2060	1190	1790	1100	1650		9	1630	2460	1420	2130	1320	1980
1310	1970	1140	1710	1050	1580		10	1580	2380	1370	2060	1270	1910
1250	1870	1080	1620	994	1490		11	1530	2300	1320	1990	1230	1850
1180	1770	1020	1530	938	1410		12	1480	2220	1280	1920	1180	1780
1110	1670	959	1440	881	1320		13	1430	2150	1230	1850	1140	1710
1040	1560	897	1350	823	1240		14	1380	2070	1180	1780	1090	1640
966	1450	835	1250	765	1150		15	1330	1990	1130	1710	1050	1580
884	1330	772	1160	708	1060		16	1270	1910	1090	1630	1000	1510
805	1210	701	1050	650	976		17	1220	1840	1040	1560	958	1440
729	1100	633	951	585	879		18	1170	1760	993	1490	912	1370
655	985	568	854	525	789		19	1120	1680	946	1420	866	1300
591	889	513	770	474	712		20	1070	1610	878	1320	794	1190
489	735	424	637	391	588		22	919	1380	751	1130	677	1020
411	617	356	535	329	494		24	805	1210	654	983	588	884
350	526	303	456	280	421		26	714	1070	578	868	518	779
302	454	262	393	242	363		28	641	963	516	776	462	695
263	395	228	342	211	316		30	581	874	466	701	417	626
231	347	200	301	185	278		32	531	799	425	638	379	569
205	308	177	267	164	246		34	489	736	390	586	347	522
183	274	158	238	146	220		36	454	682	360	541	320	481
							38	423	635	335	503	297	446
							40	396	595	312	469	277	416
							42	372	559	293	440	259	390
							44	351	528	276	415	244	367
							46	332	500	261	392	230	346
							48	316	474	247	371	218	328
							50	300	452	235	353	207	311
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1830	2750	1630	2440	1530	2300			6.81	20.0	6.72	19.3	6.66	19.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			43.6		38.8		36.5	
1470	2210	1310	1960	1230	1850			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			6680	227	5770	196	5360	181
559	838	522	783	444	668			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.28		2.25		2.23	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
238	357	204	307	189	284			5.44		5.42		5.43	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W30

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W30×						Shape		W30×					
116[c]		108[c]		99[c]		lb/ft		116[v]		108[v]		99[f],[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1250	1870	1130	1710	1020	1530	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1320	1980	1210	1820	1090	1630
1130	1700	1030	1550	918	1380		6	1320	1980	1210	1820	1090	1630
1100	1650	994	1490	885	1330		7	1300	1950	1180	1780	1060	1600
1050	1580	955	1440	849	1280		8	1260	1890	1140	1720	1020	1540
1010	1520	913	1370	810	1220		9	1210	1830	1100	1660	986	1480
960	1440	867	1300	768	1150		10	1170	1760	1060	1600	948	1420
909	1370	820	1230	724	1090		11	1130	1700	1020	1540	910	1370
857	1290	771	1160	680	1020		12	1090	1630	982	1480	872	1310
803	1210	721	1080	634	953		13	1040	1570	941	1410	834	1250
748	1120	671	1010	588	884		14	1000	1500	900	1350	796	1200
694	1040	621	934	543	816		15	957	1440	860	1290	758	1140
641	963	572	860	498	749		16	915	1370	819	1230	720	1080
588	884	524	787	454	682		17	872	1310	779	1170	682	1030
528	794	472	710	412	619		18	829	1250	738	1110	634	952
474	713	424	637	370	556		19	772	1160	675	1010	575	865
428	643	382	575	334	502		20	707	1060	617	927	525	790
354	532	316	475	276	415		22	602	904	524	788	445	669
297	447	266	399	232	348		24	521	784	453	681	384	577
253	381	226	340	197	297		26	458	689	397	597	336	504
218	328	195	293	170	256		28	408	613	353	530	297	447
190	286	170	255	148	223		30	367	552	317	476	266	400
167	251	149	224	130	196		32	333	501	287	431	241	362
148	223	132	199	115	174		34	305	458	262	393	219	329
132	199						36	281	422	241	362	201	302
							38	260	391	222	334	186	279
							40	242	364	207	311	172	259
							42	226	340	193	290	161	241
							44	213	320	181	272	150	226
							46	201	301	171	257	142	213
							48	190	285	161	242	134	201
							50	180	271	153	230	126	190

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1430	2150	1330	2000	1220	1830	6.54	18.6	6.42	18.2	6.33	17.6
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	34.2		31.7		29.0	
1150	1730	1070	1600	979	1470	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	4930	164	4470	146	3990	128
426	641	408	614	387	582	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.19		2.15		2.10	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
172	258	153	230	134	202	5.48		5.53		5.57	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W30–W27

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W30×		W27×				Shape		W30×		W27×			
90[c]		539[h]		368[h]		lb/ft		90[f],[v]		539[h]		368[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
892	1340	6660	10000	4570	6870	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	964	1450	6600	9920	4330	6510
805	1210	6400	9630	4370	6570		6	964	1450	6600	9920	4330	6510
776	1170	6310	9490	4300	6470		7	962	1450	6600	9920	4330	6510
744	1120	6210	9330	4230	6350		8	927	1390	6600	9920	4330	6510
709	1070	6090	9160	4140	6220		9	892	1340	6600	9920	4330	6510
672	1010	5970	8970	4050	6080		10	857	1290	6600	9920	4330	6510
633	952	5830	8760	3940	5930		11	822	1230	6600	9910	4300	6460
593	892	5680	8540	3830	5760		12	787	1180	6540	9840	4250	6390
553	831	5530	8310	3720	5590		13	751	1130	6490	9760	4200	6320
513	771	5370	8060	3600	5410		14	716	1080	6440	9680	4150	6240
473	710	5200	7810	3470	5220		15	681	1020	6390	9600	4100	6170
433	651	5020	7550	3350	5030		16	646	971	6340	9520	4050	6090
394	593	4840	7280	3210	4830		17	611	919	6280	9440	4000	6020
359	539	4660	7000	3080	4630		18	559	840	6230	9370	3950	5940
328	493	4470	6720	2940	4430		19	507	762	6180	9290	3900	5870
300	451	4280	6430	2810	4220		20	462	695	6130	9210	3850	5790
248	372	3900	5860	2530	3810		22	390	587	6020	9050	3760	5640
208	313	3520	5300	2270	3410		24	335	504	5920	8890	3660	5500
177	267	3150	4740	2010	3020		26	293	440	5810	8740	3560	5350
153	230	2800	4210	1760	2640		28	259	389	5710	8580	3460	5200
133	200	2460	3690	1530	2300		30	231	347	5600	8420	3360	5050
117	176	2160	3250	1350	2020		32	208	313	5500	8270	3260	4900
104	156	1910	2870	1190	1790		34	189	284	5400	8110	3160	4750
		1710	2560	1060	1600		36	173	260	5290	7950	3060	4600
		1530	2300	954	1430		38	159	240	5190	7800	2960	4450
		1380	2080	861	1290		40	148	222	5080	7640	2860	4300
		1250	1880	781	1170		42	137	206	4980	7480	2760	4150
		1140	1720	712	1070		44	128	193	4870	7320	2670	4010
		1040	1570	651	979		46	121	181	4770	7170	2560	3840
		960	1440	598	899		48	114	171	4660	7010	2440	3670
		884	1330	551	828		50	107	161	4560	6850	2330	3510
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1100	1660	6660	10000	4570	6870			6.93	17.3	10.9	63.8	10.4	45.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			26.3		159		109	
888	1330	5370	8050	3680	5520			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3610	115	25600	2110	16200	1310
314	472	1790	2690	1170	1760			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.09		3.65		3.48	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
117	176	1530	2290	975	1460			5.60		3.48		3.51	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W27×						Shape		W27×					
336[h]		307[h]		281		lb/ft		336[h]		307[h]		281	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4160	6250	3780	5680	3480	5240	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3950	5930	3600	5410	3270	4910
3980	5980	3610	5430	3330	5000		6	3950	5930	3600	5410	3270	4910
3910	5880	3550	5340	3270	4920		7	3950	5930	3600	5410	3270	4910
3840	5770	3490	5240	3210	4820		8	3950	5930	3600	5410	3270	4910
3760	5650	3410	5130	3140	4720		9	3950	5930	3600	5410	3270	4910
3670	5520	3330	5010	3060	4610		10	3950	5930	3600	5410	3270	4910
3580	5380	3240	4870	2980	4480		11	3910	5880	3560	5350	3230	4850
3480	5230	3150	4730	2900	4350		12	3860	5810	3510	5270	3180	4780
3370	5070	3050	4590	2800	4220		13	3810	5730	3460	5200	3130	4710
3260	4900	2950	4430	2710	4070		14	3760	5660	3410	5120	3080	4640
3150	4730	2840	4270	2610	3920		15	3720	5580	3360	5050	3040	4560
3030	4550	2730	4110	2510	3770		16	3670	5510	3310	4980	2990	4490
2910	4370	2620	3940	2400	3610		17	3620	5440	3260	4900	2940	4420
2780	4180	2510	3770	2300	3460		18	3570	5360	3210	4830	2890	4350
2660	4000	2390	3600	2190	3290		19	3520	5290	3160	4750	2850	4280
2530	3810	2280	3420	2090	3130		20	3470	5210	3110	4680	2800	4210
2280	3430	2050	3080	1870	2810		22	3370	5070	3020	4530	2700	4060
2040	3060	1820	2740	1660	2500		24	3270	4920	2920	4380	2610	3920
1800	2710	1600	2410	1460	2200		26	3170	4770	2820	4240	2510	3780
1570	2360	1400	2100	1270	1910		28	3070	4620	2720	4090	2420	3630
1370	2060	1220	1830	1110	1660		30	2980	4470	2620	3940	2320	3490
1200	1810	1070	1610	973	1460		32	2880	4320	2520	3790	2230	3350
1070	1600	947	1420	862	1300		34	2780	4180	2420	3640	2130	3200
951	1430	845	1270	769	1160		36	2680	4030	2330	3500	2040	3060
853	1280	758	1140	690	1040		38	2580	3880	2230	3350	1920	2890
770	1160	684	1030	623	936		40	2480	3730	2120	3180	1810	2710
699	1050	621	933	565	849		42	2380	3580	2000	3000	1700	2560
637	957	565	850	515	774		44	2260	3400	1890	2850	1610	2420
582	875	517	778	471	708		46	2150	3230	1800	2700	1530	2300
535	804	475	714	433	650		48	2050	3080	1710	2580	1460	2190
493	741	438	658	399	599		50	1960	2940	1640	2460	1390	2090

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4160	6250	3780	5680	3480	5240	10.3	42.1	10.2	39.2	10.1	36.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	99.2		90.2		83.1	
3350	5020	3040	4570	2800	4210	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	14600	1180	13100	1050	11900	953
1060	1590	961	1440	870	1300	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.45		3.41		3.39	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
880	1320	793	1190	720	1080	3.51		3.52		3.54	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W27×						Shape		W27×					
258		235		217		lb/ft		258		235		217	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3190	4790	2910	4370	2680	4030	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2980	4470	2700	4050	2480	3730
3040	4570	2770	4170	2550	3840		6	2980	4470	2700	4050	2480	3730
2990	4500	2730	4100	2510	3770		7	2980	4470	2700	4050	2480	3730
2930	4410	2670	4020	2460	3700		8	2980	4470	2700	4050	2480	3730
2870	4310	2610	3930	2400	3610		9	2980	4470	2700	4050	2480	3730
2800	4210	2550	3830	2340	3520		10	2980	4470	2690	4050	2480	3730
2720	4090	2480	3720	2280	3420		11	2930	4410	2650	3980	2440	3660
2640	3970	2400	3610	2210	3320		12	2880	4340	2600	3910	2390	3600
2560	3840	2320	3490	2140	3210		13	2840	4270	2560	3850	2350	3530
2470	3710	2240	3370	2060	3100		14	2790	4200	2510	3780	2300	3460
2380	3570	2160	3240	1980	2980		15	2750	4130	2470	3710	2260	3400
2280	3430	2070	3110	1900	2860		16	2700	4060	2420	3640	2220	3330
2190	3290	1980	2980	1820	2740		17	2650	3990	2380	3570	2170	3270
2090	3140	1890	2840	1740	2610		18	2610	3920	2330	3510	2130	3200
1990	2990	1800	2710	1650	2480		19	2560	3850	2290	3440	2090	3140
1890	2840	1710	2570	1570	2360		20	2510	3780	2240	3370	2040	3070
1700	2550	1530	2300	1400	2110		22	2420	3640	2150	3230	1950	2940
1500	2260	1350	2030	1240	1860		24	2330	3500	2060	3100	1870	2810
1320	1980	1180	1780	1080	1630		26	2230	3360	1970	2960	1780	2680
1140	1720	1020	1540	938	1410		28	2140	3220	1880	2830	1690	2540
996	1500	893	1340	817	1230		30	2050	3080	1790	2690	1610	2410
876	1320	784	1180	718	1080		32	1950	2940	1700	2550	1510	2270
776	1170	695	1040	636	956		34	1860	2800	1590	2390	1390	2090
692	1040	620	932	567	853		36	1750	2630	1470	2220	1290	1940
621	933	556	836	509	765		38	1630	2460	1380	2070	1200	1800
560	842	502	755	459	691		40	1530	2300	1290	1940	1120	1690
508	764	455	684	417	626		42	1450	2170	1210	1820	1060	1590
463	696	415	624	380	571		44	1370	2050	1150	1720	997	1500
424	637	380	571	347	522		46	1300	1950	1090	1630	944	1420
389	585	349	524	319	480		48	1230	1850	1030	1550	896	1350
359	539	321	483	294	442		50	1180	1770	984	1480	853	1280
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3190	4790	2910	4370	2680	4030			10.0	34.9	9.94	33.0	9.91	31.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			76.1		69.4		63.9	
2570	3850	2340	3510	2160	3230			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			10800	859	9700	769	8910	704
796	1190	731	1100	660	990			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.36		3.33		3.32	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
653	982	587	882	538	809			3.54		3.54		3.55	

Note: Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W27×						Shape		W27×					
194[c]		178[c]		161[c]		lb/ft		194		178		161	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2370	3560	2160	3250	1920	2880	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2200	3310	1990	2990	1800	2700
2270	3410	2070	3110	1830	2760		6	2200	3310	1990	2990	1800	2700
2230	3360	2030	3060	1800	2710		7	2200	3310	1990	2990	1800	2700
2190	3300	2000	3000	1770	2660		8	2200	3310	1990	2990	1800	2700
2140	3220	1950	2940	1730	2600		9	2200	3310	1990	2990	1800	2700
2090	3140	1910	2870	1690	2540		10	2200	3300	1980	2970	1790	2680
2030	3050	1860	2790	1650	2480		11	2160	3240	1940	2920	1750	2630
1970	2960	1800	2710	1600	2410		12	2110	3180	1900	2860	1710	2570
1900	2860	1740	2610	1550	2330		13	2070	3110	1860	2800	1670	2510
1830	2750	1670	2520	1500	2260		14	2030	3050	1820	2740	1640	2460
1760	2650	1610	2420	1450	2180		15	1990	2990	1780	2680	1600	2400
1690	2540	1540	2310	1390	2090		16	1950	2930	1740	2620	1560	2350
1610	2430	1470	2210	1330	1990		17	1910	2860	1700	2560	1520	2290
1540	2310	1400	2100	1260	1900		18	1860	2800	1660	2500	1490	2230
1460	2200	1330	2000	1200	1800		19	1820	2740	1620	2440	1450	2180
1390	2090	1260	1890	1130	1700		20	1780	2680	1580	2380	1410	2120
1240	1860	1120	1680	1010	1510		22	1700	2550	1510	2260	1340	2010
1090	1640	985	1480	884	1330		24	1620	2430	1430	2140	1260	1900
953	1430	856	1290	767	1150		26	1530	2300	1350	2030	1190	1780
823	1240	738	1110	661	994		28	1450	2180	1270	1910	1100	1660
717	1080	643	967	576	866		30	1360	2050	1160	1750	993	1490
630	947	565	850	506	761		32	1240	1870	1060	1590	900	1350
558	839	501	753	448	674		34	1140	1720	969	1460	823	1240
498	748	447	671	400	601		36	1060	1590	894	1340	757	1140
447	671	401	602	359	540		38	982	1480	829	1250	701	1050
403	606	362	544	324	487		40	918	1380	773	1160	652	980
366	550	328	493	294	442		42	861	1290	724	1090	610	916
333	501	299	449	268	402		44	811	1220	681	1020	572	860
305	458	274	411	245	368		46	767	1150	643	966	539	811
280	421	251	378	225	338		48	727	1090	608	914	510	766
258	388	232	348	207	312		50	692	1040	578	868	484	727

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2390	3600	2200	3310	2000	3000	9.82	30.0	9.70	28.9	9.64	27.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	57.1		52.5		47.6	
1930	2890	1770	2660	1610	2410	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	7860	619	7020	555	6310	497
590	885	564	847	510	765	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.29		3.25		3.23	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
475	714	426	641	381	572	3.56		3.57		3.56	

[c] Shape is slender for compression with F_y = 70 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W27×						Shape		W27×					
146[c]		129[c]		114[c]		lb/ft		146		129		114	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1710	2560	1470	2210	1280	1920	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1620	2440	1380	2070	1200	1800
1630	2450	1340	2020	1160	1750		6	1620	2440	1380	2070	1200	1800
1600	2410	1300	1950	1120	1690		7	1620	2440	1360	2050	1180	1770
1570	2360	1250	1870	1080	1620		8	1620	2440	1320	1990	1140	1720
1540	2310	1190	1790	1030	1550		9	1620	2440	1280	1920	1100	1660
1500	2260	1140	1710	981	1470		10	1610	2410	1240	1860	1070	1600
1460	2200	1070	1620	927	1390		11	1570	2360	1200	1800	1030	1540
1420	2130	1010	1520	872	1310		12	1540	2310	1150	1730	989	1490
1370	2070	948	1430	816	1230		13	1500	2250	1110	1670	951	1430
1330	2000	877	1320	760	1140		14	1470	2200	1070	1610	913	1370
1280	1920	803	1210	701	1050		15	1430	2150	1030	1550	874	1310
1230	1850	732	1100	637	957		16	1400	2100	987	1480	836	1260
1180	1770	662	995	575	864		17	1360	2040	945	1420	798	1200
1130	1700	595	894	514	773		18	1330	1990	904	1360	760	1140
1080	1620	534	802	462	694		19	1290	1940	862	1300	715	1070
1020	1530	482	724	417	626		20	1250	1890	805	1210	657	988
902	1360	398	598	344	518		22	1180	1780	695	1050	564	848
790	1190	335	503	289	435		24	1110	1680	611	918	493	740
683	1030	285	428	247	371		26	1040	1570	544	817	436	655
589	885	246	369	213	320		28	949	1430	489	736	391	587
513	771	214	322	185	278		30	851	1280	445	669	354	532
451	678	188	283	163	245		32	769	1160	408	613	323	485
399	600	167	251	144	217		34	701	1050	376	566	297	446
356	535	149	223	129	193		36	644	967	349	525	275	413
320	481						38	594	893	326	490	256	384
289	434						40	552	830	306	460	239	359
262	393						42	515	774	288	433	225	338
239	358						44	483	725	272	409	212	318
218	328						46	454	682	258	388	200	301
200	301						48	429	644	245	368	190	286
185	278						50	406	610	234	351	181	272
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1810	2720	1580	2380	1410	2120			9.55	26.9	6.60	19.4	6.51	18.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			43.2		37.8		33.6	
1460	2190	1280	1910	1130	1700			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			5660	443	4760	184	4080	159
464	696	471	707	436	654			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.20		2.21		2.18	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
341	513	201	302	172	259			3.59		5.07		5.05	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W27

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W27×						Shape		W27×					
102[c]		94[c]		84[c]		lb/ft		102[v]		94[v]		84[f],[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1110	1670	1000	1500	872	1310	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1070	1600	971	1460	851	1280
1000	1510	905	1360	785	1180		6	1070	1600	971	1460	851	1280
969	1460	872	1310	756	1140		7	1040	1570	949	1430	827	1240
930	1400	836	1260	724	1090		8	1010	1520	916	1380	797	1200
888	1330	797	1200	689	1030		9	975	1470	883	1330	767	1150
843	1270	756	1140	651	979		10	940	1410	850	1280	737	1110
796	1200	713	1070	613	921		11	905	1360	817	1230	707	1060
748	1120	669	1010	573	862		12	870	1310	784	1180	676	1020
698	1050	624	937	533	801		13	835	1250	751	1130	646	971
649	975	579	870	493	741		14	800	1200	718	1080	616	926
600	901	534	802	453	681		15	765	1150	685	1030	586	880
551	828	489	736	414	623		16	729	1100	652	979	555	835
500	752	446	671	376	565		17	694	1040	619	930	525	789
447	671	400	601	341	512		18	659	991	578	869	477	717
401	603	359	539	306	460		19	605	910	527	791	433	651
362	544	324	487	276	415		20	555	834	482	725	396	595
299	450	268	402	228	343		22	474	713	411	618	336	505
251	378	225	338	192	288		24	413	620	356	535	290	437
214	322	192	288	163	246		26	364	547	313	471	255	383
185	277	165	248	141	212		28	325	488	279	419	226	340
161	242	144	216	123	184		30	293	441	251	377	203	305
141	212	126	190	108	162		32	267	401	228	343	184	276
125	188	112	168	95.6	144		34	245	368	209	314	167	252
							36	226	340	192	289	154	231
							38	210	315	178	268	142	214
							40	196	294	166	249	132	199
							42	183	276	155	233	123	186
							44	173	260	146	219	116	174
							46	163	245	138	207	109	164
							48	155	232	130	196	103	155
							50	147	221	124	186	97.5	147
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1260	1890	1160	1740	1040	1560			6.42	18.2	6.33	17.7	6.22	17.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			30.0		27.6		24.7	
1010	1520	932	1400	834	1250			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3620	139	3270	124	2850	106
351	528	331	498	303	456			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.15		2.12		2.07	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
152	228	136	204	116	174			5.12		5.14		5.17	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W24×						Shape		W24×					
370[h]		335[h]		306[h]		lb/ft		370[h]		335[h]		306[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4570	6870	4120	6190	3760	5650	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3950	5930	3560	5360	3220	4840
4350	6530	3920	5890	3570	5370		6	3950	5930	3560	5360	3220	4840
4270	6420	3840	5780	3500	5270		7	3950	5930	3560	5360	3220	4840
4180	6290	3760	5660	3430	5150		8	3950	5930	3560	5360	3220	4840
4090	6140	3670	5520	3350	5030		9	3950	5930	3560	5360	3220	4840
3980	5980	3580	5380	3260	4890		10	3940	5920	3550	5330	3200	4810
3870	5810	3470	5220	3160	4750		11	3900	5860	3510	5270	3160	4760
3750	5630	3360	5050	3060	4590		12	3860	5800	3470	5210	3120	4700
3620	5440	3250	4880	2950	4430		13	3820	5740	3430	5150	3090	4640
3490	5240	3120	4690	2840	4260		14	3780	5680	3390	5090	3050	4580
3350	5040	3000	4510	2720	4090		15	3740	5620	3350	5030	3010	4520
3210	4830	2870	4310	2600	3910		16	3700	5560	3310	4970	2970	4460
3070	4610	2740	4120	2480	3730		17	3660	5500	3270	4910	2930	4400
2920	4390	2610	3920	2360	3540		18	3620	5440	3230	4850	2890	4340
2780	4170	2470	3720	2240	3360		19	3580	5380	3190	4790	2850	4280
2630	3960	2340	3520	2110	3180		20	3540	5320	3150	4730	2810	4220
2340	3520	2080	3130	1870	2820		22	3460	5200	3070	4610	2730	4110
2070	3100	1830	2740	1640	2470		24	3380	5080	2990	4490	2650	3990
1800	2700	1580	2380	1420	2130		26	3300	4960	2910	4370	2570	3870
1550	2330	1370	2050	1220	1840		28	3220	4840	2830	4250	2500	3750
1350	2030	1190	1790	1070	1600		30	3140	4720	2750	4130	2420	3630
1190	1790	1050	1570	936	1410		32	3060	4600	2670	4010	2340	3510
1050	1580	926	1390	829	1250		34	2980	4480	2590	3890	2260	3400
939	1410	826	1240	740	1110		36	2900	4360	2510	3770	2180	3280
843	1270	741	1110	664	998		38	2820	4240	2430	3650	2100	3160
760	1140	669	1010	599	901		40	2740	4120	2350	3530	2020	3040
690	1040	607	912	544	817		42	2660	4000	2270	3410	1950	2920
628	944	553	831	495	744		44	2580	3880	2190	3290	1850	2780
575	864	506	760	453	681		46	2510	3770	2110	3170	1760	2650
528	794	465	698	416	625		48	2430	3650	2020	3030	1680	2530
487	731	428	644	384	576		50	2350	3530	1930	2900	1610	2420
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
4570	6870	4120	6190	3760	5650			9.76	50.1	9.64	46.0	9.55	42.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			109		98.3		89.7	
3680	5520	3320	4980	3030	4540			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			13400	1160	11900	1030	10700	919
1190	1790	1060	1590	956	1430			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.27		3.23		3.20	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
933	1400	831	1250	748	1120			3.39		3.41		3.41	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W24×						Shape		W24×					
279[h]		250		229		lb/ft		279[h]		250		229	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3430	5160	3080	4630	2820	4230	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2920	4380	2600	3910	2360	3540
3260	4890	2920	4390	2670	4010		6	2920	4380	2600	3910	2360	3540
3190	4800	2860	4300	2610	3930		7	2920	4380	2600	3910	2360	3540
3130	4700	2800	4210	2560	3840		8	2920	4380	2600	3910	2360	3540
3050	4580	2730	4100	2490	3740		9	2920	4380	2600	3910	2360	3540
2960	4460	2650	3990	2420	3640		10	2900	4350	2570	3870	2330	3500
2870	4320	2570	3860	2340	3520		11	2860	4290	2540	3810	2290	3450
2780	4180	2480	3730	2260	3400		12	2820	4240	2500	3760	2260	3390
2680	4030	2390	3600	2180	3270		13	2780	4180	2460	3700	2220	3340
2580	3870	2300	3450	2090	3140		14	2740	4120	2420	3640	2180	3280
2470	3710	2200	3310	2000	3000		15	2700	4060	2380	3580	2140	3220
2360	3540	2100	3160	1910	2870		16	2660	4000	2350	3530	2110	3170
2250	3380	2000	3010	1810	2730		17	2620	3940	2310	3470	2070	3110
2130	3210	1900	2850	1720	2580		18	2590	3890	2270	3410	2030	3060
2020	3040	1800	2700	1620	2440		19	2550	3830	2230	3360	2000	3000
1910	2870	1690	2550	1530	2300		20	2510	3770	2190	3300	1960	2940
1690	2540	1490	2250	1350	2020		22	2430	3650	2120	3180	1880	2830
1470	2220	1300	1960	1170	1760		24	2350	3540	2040	3070	1810	2720
1270	1910	1120	1680	1000	1510		26	2280	3420	1970	2960	1730	2610
1100	1650	965	1450	865	1300		28	2200	3300	1890	2840	1660	2500
955	1430	840	1260	754	1130		30	2120	3190	1810	2730	1590	2380
839	1260	739	1110	663	996		32	2040	3070	1740	2610	1510	2270
743	1120	654	983	587	882		34	1970	2950	1660	2500	1440	2160
663	996	584	877	523	787		36	1890	2840	1590	2380	1340	2010
595	894	524	787	470	706		38	1810	2720	1490	2240	1260	1890
537	807	473	711	424	637		40	1720	2590	1400	2110	1180	1780
487	732	429	645	385	578		42	1630	2450	1330	2000	1120	1680
444	667	391	587	350	527		44	1550	2330	1260	1890	1060	1590
406	610	357	537	321	482		46	1480	2220	1200	1800	1010	1510
373	560	328	493	294	443		48	1410	2120	1140	1720	958	1440
344	516	303	455	271	408		50	1350	2020	1090	1640	915	1380

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3430	5160	3080	4630	2820	4230	9.46	39.4	9.37	36.3	9.28	34.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	81.9		73.5		67.2	
2760	4150	2480	3720	2270	3400	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	9600	823	8490	724	7650	651
867	1300	766	1150	699	1050	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.17		3.14		3.11	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
674	1010	597	898	538	809	3.41		3.41		3.44	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W24×						Shape		W24×					
207		192		176		lb/ft		207		192		176	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2540	3820	2370	3560	2170	3260	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2120	3180	1950	2930	1780	2680
2410	3620	2240	3360	2050	3080		6	2120	3180	1950	2930	1780	2680
2360	3540	2190	3300	2000	3010		7	2120	3180	1950	2930	1780	2680
2300	3460	2140	3220	1960	2940		8	2120	3180	1950	2930	1780	2680
2240	3370	2090	3140	1900	2860		9	2120	3180	1950	2930	1780	2680
2180	3270	2030	3040	1850	2780		10	2090	3140	1920	2890	1750	2640
2110	3170	1960	2950	1790	2690		11	2050	3080	1890	2840	1720	2580
2030	3060	1890	2840	1720	2590		12	2010	3030	1850	2780	1680	2530
1960	2940	1820	2730	1660	2490		13	1980	2970	1820	2730	1650	2480
1880	2820	1740	2620	1590	2380		14	1940	2920	1780	2680	1620	2430
1790	2700	1670	2500	1510	2270		15	1910	2860	1750	2620	1580	2380
1710	2570	1590	2390	1440	2170		16	1870	2810	1710	2570	1550	2330
1620	2440	1510	2270	1370	2050		17	1830	2760	1680	2520	1510	2270
1540	2310	1430	2140	1290	1940		18	1800	2700	1640	2470	1480	2220
1450	2180	1350	2020	1220	1830		19	1760	2650	1600	2410	1440	2170
1370	2050	1270	1900	1140	1720		20	1720	2590	1570	2360	1410	2120
1200	1800	1110	1670	1000	1510		22	1650	2480	1500	2250	1340	2020
1040	1560	962	1450	865	1300		24	1580	2370	1430	2150	1270	1910
889	1340	822	1240	738	1110		26	1510	2260	1360	2040	1200	1810
767	1150	709	1070	636	956		28	1430	2160	1290	1930	1140	1710
668	1000	618	928	554	833		30	1360	2050	1220	1830	1050	1580
587	882	543	816	487	732		32	1280	1930	1120	1690	963	1450
520	781	481	723	431	648		34	1190	1790	1040	1560	889	1340
464	697	429	645	385	578		36	1110	1660	966	1450	826	1240
416	626	385	579	345	519		38	1040	1560	903	1360	771	1160
376	565	347	522	312	468		40	975	1460	848	1270	723	1090
341	512	315	474	283	425		42	920	1380	800	1200	681	1020
310	467	287	432	258	387		44	871	1310	757	1140	643	967
284	427	263	395	236	354		46	827	1240	718	1080	610	916
261	392	241	363	216	325		48	787	1180	683	1030	580	871
240	361	222	334	199	300		50	752	1130	652	979	552	830
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2540	3820	2370	3560	2170	3260			9.19	31.7	9.16	30.4	9.08	29.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			60.7		56.5		51.7	
2050	3070	1910	2860	1740	2620			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			6820	578	6260	530	5680	479
626	939	578	868	529	794			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.08		3.07		3.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
479	719	440	662	402	604			3.44		3.42		3.45	

Note: Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W24×						Shape		W24×					
162[c]		146[c]		131[c]		lb/ft		162		146		131	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2000	3010	1770	2660	1560	2340	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1630	2460	1460	2190	1290	1940
1890	2840	1680	2520	1480	2220		6	1630	2460	1460	2190	1290	1940
1850	2790	1650	2470	1450	2180		7	1630	2460	1460	2190	1290	1940
1810	2720	1610	2420	1420	2130		8	1630	2460	1460	2190	1290	1940
1760	2650	1570	2360	1380	2080		9	1630	2460	1460	2190	1290	1940
1710	2570	1530	2300	1350	2020		10	1610	2410	1430	2150	1260	1890
1650	2490	1480	2220	1300	1960		11	1570	2360	1400	2100	1230	1850
1590	2400	1430	2140	1260	1890		12	1540	2310	1370	2050	1200	1800
1530	2300	1370	2060	1210	1830		13	1510	2260	1330	2010	1170	1760
1470	2210	1310	1970	1170	1750		14	1470	2210	1300	1960	1140	1720
1400	2110	1250	1880	1110	1670		15	1440	2170	1270	1910	1110	1670
1340	2010	1190	1790	1050	1590		16	1410	2120	1240	1870	1080	1630
1270	1900	1130	1690	998	1500		17	1370	2070	1210	1820	1050	1580
1200	1800	1060	1600	942	1420		18	1340	2020	1180	1770	1030	1540
1130	1700	1000	1510	885	1330		19	1310	1970	1150	1720	996	1500
1060	1600	940	1410	829	1250		20	1280	1920	1120	1680	967	1450
931	1400	820	1230	721	1080		22	1210	1820	1050	1580	908	1360
804	1210	706	1060	617	927		24	1140	1720	991	1490	850	1280
687	1030	602	904	526	790		26	1080	1620	929	1400	781	1170
592	890	519	780	453	681		28	1010	1520	844	1270	697	1050
516	775	452	679	395	594		30	917	1380	763	1150	628	943
453	681	397	597	347	522		32	839	1260	696	1050	570	857
402	603	352	529	307	462		34	773	1160	639	960	523	785
358	538	314	472	274	412		36	716	1080	591	888	482	724
321	483	282	423	246	370		38	667	1000	549	826	447	672
290	436	254	382	222	334		40	625	939	513	771	417	626
263	395	231	346	201	303		42	587	883	482	724	390	586
240	360	210	316	184	276		44	554	833	454	682	367	551
219	330	192	289	168	252		46	525	789	429	645	346	520
201	303	176	265	154	232		48	498	749	407	611	328	493
186	279	163	244				50	474	713	387	581	311	468
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2000	3010	1800	2710	1620	2430			9.11	28.0	8.99	26.7	8.87	25.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			47.8		43.0		38.6	
1610	2420	1450	2180	1300	1950			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			5170	443	4580	391	4020	340
494	740	450	674	415	623			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.05		3.01		2.97	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
367	551	326	489	285	428			3.41		3.42		3.43	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W24×						Shape		W24×					
117[c]		104[c]		103[c]		lb/ft		117		104[f]		103	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1360	2040	1180	1780	1180	1780	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1140	1720	987	1480	978	1470
1290	1930	1120	1680	1060	1590		6	1140	1720	987	1480	976	1470
1260	1890	1100	1650	1010	1520		7	1140	1720	987	1480	943	1420
1230	1850	1070	1610	964	1450		8	1140	1720	987	1480	911	1370
1200	1810	1040	1570	913	1370		9	1140	1710	987	1480	878	1320
1170	1750	1010	1520	859	1290		10	1110	1670	977	1470	846	1270
1130	1700	982	1480	803	1210		11	1080	1630	952	1430	813	1220
1090	1640	948	1430	743	1120		12	1050	1590	927	1390	780	1170
1050	1580	913	1370	677	1020		13	1030	1540	902	1360	748	1120
1010	1520	876	1320	612	920		14	1000	1500	877	1320	715	1070
968	1450	838	1260	550	826		15	973	1460	852	1280	683	1030
924	1390	799	1200	489	735		16	946	1420	826	1240	650	977
879	1320	760	1140	433	651		17	919	1380	801	1200	617	928
830	1250	720	1080	387	581		18	892	1340	776	1170	576	865
779	1170	681	1020	347	521		19	865	1300	751	1130	529	796
729	1100	641	964	313	471		20	838	1260	726	1090	490	736
632	949	554	833	259	389		22	783	1180	676	1020	425	639
539	810	471	708	217	327		24	729	1100	622	935	375	563
459	690	401	603	185	278		26	651	979	544	817	335	504
396	595	346	520	160	240		28	578	869	481	723	303	455
345	518	302	453	139	209		30	519	781	430	647	276	415
303	456	265	398	122	184		32	470	707	389	584	254	382
268	404	235	353				34	430	646	354	532	235	353
239	360	209	315				36	395	594	324	488	219	329
215	323	188	282				38	365	549	299	450	205	308
194	292	170	255				40	340	511	278	417	192	289
176	264	154	231				42	317	477	259	389	181	273
160	241	140	211				44	298	448	242	364	172	258
147	220	128	193				46	281	422	228	342	163	245
135	202	118	177				48	265	398	215	323	155	233
							50	251	378	203	305	148	222

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1440	2170	1290	1930	1270	1910	8.78	24.6	9.60	23.8	5.94	17.6
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	34.4		30.7		30.3	
1160	1740	1040	1550	1020	1530	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	3540	297	3100	259	3000	119
374	561	337	506	377	566	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.94		2.91		1.99	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
249	375	211	317	145	218	3.44		3.47		5.03	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W24×						Shape		W24×					
94[c]		84[c]		76[c]		lb/ft		94		84[v]		76[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1060	1600	921	1380	817	1230	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	887	1330	782	1180	699	1050
945	1420	817	1230	722	1080		6	884	1330	777	1170	692	1040
906	1360	782	1180	690	1040		7	854	1280	749	1130	665	1000
863	1300	744	1120	656	986		8	823	1240	721	1080	639	961
817	1230	703	1060	619	930		9	793	1190	693	1040	613	922
768	1150	660	992	580	871		10	762	1150	664	999	587	882
718	1080	615	925	540	811		11	731	1100	636	956	561	843
666	1000	570	857	499	750		12	701	1050	608	914	535	804
614	923	525	789	458	689		13	670	1010	580	871	509	765
556	835	480	721	418	628		14	639	961	551	829	483	725
498	749	433	650	379	569		15	609	915	523	786	456	686
443	665	383	576	337	506		16	578	869	495	744	430	647
392	590	339	510	298	448		17	547	823	458	688	387	582
350	526	303	455	266	400		18	501	753	416	626	351	528
314	472	272	408	239	359		19	460	691	381	572	320	482
283	426	245	368	215	324		20	424	638	350	527	294	442
234	352	203	304	178	268		22	366	551	301	453	252	379
197	296	170	256	150	225		24	322	484	264	396	220	330
168	252	145	218	128	192		26	287	431	234	351	194	292
145	217	125	188	110	165		28	258	388	210	315	174	261
126	189	109	164	95.8	144		30	235	353	190	286	157	236
111	166	95.7	144	84.2	127		32	215	324	174	261	143	215
							34	199	299	160	241	131	198
							36	185	277	148	223	121	183
							38	172	259	138	208	113	170
							40	162	243	129	194	106	159
							42	152	229	122	183	99.0	149
							44	144	216	115	172	93.2	140
							46	136	205	109	163	88.1	132
							48	130	195	103	155	83.6	126
							50	124	186	98.2	148	79.5	119
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1160	1750	1040	1560	939	1410			5.91	17.2	5.82	16.6	5.73	16.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			27.7		24.7		22.4	
935	1400	834	1250	756	1130			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			2700	109	2370	94.4	2100	82.5
350	526	285	428	264	398			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.98		1.95		1.92	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
131	197	114	171	99.9	150			4.98		5.02		5.05	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W24

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W24×						Shape		W24×					
68[c]		62[c]		55[c]		lb/ft		68		62[v]		55[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
714	1070	639	960	548	823	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	618	929	534	803	468	704
628	944	507	763	430	646		6	608	914	483	725	418	628
599	901	467	702	394	592		7	584	878	455	684	393	590
568	853	425	638	356	535		8	560	841	428	643	368	552
534	803	381	573	318	478		9	535	805	400	601	342	515
499	750	338	508	280	421		10	511	768	372	560	317	477
463	696	296	444	243	365		11	487	732	345	518	292	439
427	642	251	378	211	317		12	463	696	315	473	259	390
391	587	214	322	180	270		13	439	659	274	411	225	338
355	533	185	277	155	233		14	414	623	241	362	197	296
320	481	161	242	135	203		15	390	586	214	322	175	263
287	431	141	212	119	178		16	358	538	192	289	157	235
254	382	125	188	105	158		17	322	483	174	262	141	212
226	340	112	168	93.7	141		18	291	437	159	239	129	193
203	305	100	151	84.1	126		19	265	398	146	219	118	177
183	276	90.4	136	75.9	114		20	243	365	135	202	108	163
152	228	74.7	112	62.7	94.3		22	207	311	116	175	93.3	140
127	191						24	180	270	102	154	81.7	123
109	163						26	158	238	91.2	137	72.6	109
93.6	141						28	141	212	82.2	124	65.2	98.0
81.5	123						30	127	191	74.8	112	59.1	88.9
							32	116	174	68.7	103	54.1	81.3
							34	106	159	63.4	95.3	49.8	74.9
							36	97.5	147	58.9	88.6	46.2	69.4
							38	90.4	136	55.1	82.8	43.1	64.7
							40	84.3	127	51.7	77.7	40.3	60.6
							42	78.9	119	48.7	73.2	37.9	57.0
							44	74.2	112	46.0	69.2	35.8	53.8
							46	70.0	105	43.6	65.6	33.9	51.0
							48	66.3	99.6	41.5	62.4	32.2	48.4
							50	62.9	94.6	39.6	59.5	30.7	46.1
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
843	1270	763	1150	679	1020			5.58	15.6	4.12	11.9	4.00	11.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			20.1		18.2		16.2	
678	1020	614	921	547	820			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1830	70.4	1550	34.5	1350	29.1
246	370	256	385	222	334			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.87		1.38		1.34	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
85.6	129	54.8	82.3	46.4	69.7			5.11		6.69		6.80	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W21×						Shape		W21×					
275[h]		248		223		lb/ft		275[h]		248		223	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3430	5150	3090	4650	2790	4190	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2620	3930	2340	3520	2100	3160
3240	4880	2930	4400	2630	3960		6	2620	3930	2340	3520	2100	3160
3180	4780	2870	4310	2580	3870		7	2620	3930	2340	3520	2100	3160
3110	4670	2800	4210	2520	3780		8	2620	3930	2340	3520	2100	3160
3030	4550	2730	4100	2450	3680		9	2620	3930	2340	3520	2100	3160
2940	4420	2650	3980	2380	3570		10	2590	3900	2320	3490	2070	3120
2850	4280	2560	3850	2300	3450		11	2570	3860	2290	3440	2040	3070
2750	4130	2470	3720	2220	3330		12	2540	3810	2260	3400	2020	3030
2650	3980	2380	3580	2130	3200		13	2510	3770	2230	3360	1990	2990
2540	3820	2280	3430	2040	3060		14	2480	3720	2210	3310	1960	2940
2430	3650	2180	3280	1950	2930		15	2450	3680	2180	3270	1930	2900
2320	3480	2080	3120	1850	2790		16	2420	3640	2150	3230	1900	2860
2200	3310	1970	2970	1760	2640		17	2390	3590	2120	3190	1870	2810
2090	3140	1870	2810	1660	2500		18	2360	3550	2090	3140	1840	2770
1970	2960	1770	2650	1570	2360		19	2330	3500	2060	3100	1810	2730
1860	2790	1660	2500	1470	2210		20	2300	3460	2030	3060	1790	2680
1630	2450	1460	2190	1290	1940		22	2240	3370	1980	2970	1730	2600
1420	2130	1260	1900	1110	1670		24	2190	3290	1920	2880	1670	2510
1210	1820	1080	1620	949	1430		26	2130	3200	1860	2800	1610	2420
1050	1570	932	1400	818	1230		28	2070	3110	1800	2710	1560	2340
912	1370	812	1220	713	1070		30	2010	3020	1750	2620	1500	2250
801	1200	714	1070	626	942		32	1950	2930	1690	2540	1440	2170
710	1070	632	950	555	834		34	1890	2850	1630	2450	1380	2080
633	952	564	847	495	744		36	1840	2760	1570	2360	1330	1990
568	854	506	761	444	668		38	1780	2670	1510	2280	1270	1900
513	771	457	686	401	603		40	1720	2580	1460	2190	1200	1800
465	699	414	623	364	547		42	1660	2500	1400	2100	1130	1700
424	637	377	567	331	498		44	1600	2410	1330	2000	1080	1620
388	583	345	519	303	456		46	1540	2310	1270	1900	1020	1540
356	535	317	477	278	418		48	1470	2210	1210	1820	978	1470
328	493	292	439	257	386		50	1410	2120	1160	1740	936	1410

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3430	5150	3090	4650	2790	4190	9.25	45.4	9.19	41.7	9.08	37.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	81.8		73.8		66.5	
2760	4140	2490	3740	2240	3370	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	7690	787	6830	699	6080	614
823	1230	730	1090	655	983	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.10		3.08		3.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
667	1000	594	893	524	788	3.13		3.12		3.14	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W21×						Shape		W21×					
201		182		166		lb/ft		201		182		166	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2490	3740	2250	3380	2050	3070	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1850	2780	1660	2500	1510	2270
2350	3520	2120	3180	1930	2900		6	1850	2780	1660	2500	1510	2270
2300	3450	2070	3120	1890	2840		7	1850	2780	1660	2500	1510	2270
2240	3370	2020	3040	1840	2770		8	1850	2780	1660	2500	1510	2270
2180	3280	1970	2960	1790	2690		9	1850	2780	1660	2500	1510	2260
2110	3180	1910	2870	1730	2610		10	1820	2740	1630	2460	1480	2220
2040	3070	1840	2770	1680	2520		11	1790	2700	1610	2410	1450	2180
1970	2960	1770	2670	1610	2420		12	1770	2650	1580	2370	1430	2140
1890	2840	1700	2560	1550	2330		13	1740	2610	1550	2330	1400	2100
1810	2720	1630	2450	1480	2230		14	1710	2570	1520	2290	1370	2060
1730	2600	1550	2340	1410	2120		15	1680	2530	1500	2250	1340	2020
1640	2470	1480	2220	1340	2020		16	1650	2480	1470	2210	1320	1980
1560	2340	1400	2100	1270	1910		17	1620	2440	1440	2160	1290	1940
1470	2210	1320	1990	1200	1800		18	1600	2400	1410	2120	1260	1900
1390	2080	1240	1870	1130	1700		19	1570	2360	1380	2080	1240	1860
1300	1960	1170	1750	1060	1590		20	1540	2310	1360	2040	1210	1820
1140	1710	1020	1530	921	1380		22	1480	2230	1300	1960	1160	1740
980	1470	874	1310	791	1190		24	1420	2140	1250	1870	1100	1660
835	1260	745	1120	674	1010		26	1370	2060	1190	1790	1050	1570
720	1080	642	965	581	873		28	1310	1970	1130	1710	993	1490
627	943	559	841	506	760		30	1250	1880	1080	1620	939	1410
551	829	492	739	445	668		32	1200	1800	1020	1540	868	1310
488	734	436	655	394	592		34	1140	1710	952	1430	805	1210
436	655	389	584	351	528		36	1070	1610	888	1330	750	1130
391	588	349	524	315	474		38	1000	1510	833	1250	703	1060
353	530	315	473	285	428		40	947	1420	784	1180	661	993
320	481	285	429	258	388		42	896	1350	741	1110	624	938
292	438	260	391	235	354		44	850	1280	703	1060	591	888
267	401	238	358	215	323		46	809	1220	668	1000	562	844
245	368	219	328	198	297		48	771	1160	637	957	535	804
226	339	201	303				50	737	1110	609	915	511	768
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2490	3740	2250	3380	2050	3070			9.02	34.5	8.96	32.2	8.93	30.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			59.3		53.6		48.8	
2000	3000	1810	2710	1650	2470			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			5310	542	4730	483	4280	435
586	879	528	791	473	709			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.02		3.00		2.99	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
465	698	416	625	377	567			3.14		3.13		3.13	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W21×						Shape		W21×					
147		132		122[c]		lb/ft		147		132		122	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1810	2720	1630	2440	1500	2250	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1300	1960	1160	1750	1070	1610
1700	2560	1530	2300	1410	2130		6	1300	1960	1160	1750	1070	1610
1670	2500	1500	2250	1380	2080		7	1300	1960	1160	1750	1070	1610
1620	2440	1460	2190	1350	2020		8	1300	1960	1160	1750	1070	1610
1580	2370	1420	2130	1310	1970		9	1300	1950	1160	1740	1070	1600
1530	2300	1370	2060	1270	1900		10	1270	1910	1130	1700	1040	1570
1480	2220	1320	1990	1220	1830		11	1250	1870	1110	1670	1020	1530
1420	2130	1270	1910	1170	1760		12	1220	1830	1080	1630	995	1500
1360	2040	1220	1830	1120	1690		13	1190	1800	1060	1590	971	1460
1300	1950	1160	1750	1070	1610		14	1170	1760	1030	1560	948	1420
1240	1860	1110	1660	1020	1530		15	1140	1720	1010	1520	924	1390
1170	1760	1050	1570	967	1450		16	1120	1680	986	1480	900	1350
1110	1670	990	1490	913	1370		17	1090	1640	961	1440	877	1320
1050	1570	932	1400	859	1290		18	1070	1600	937	1410	853	1280
982	1480	875	1320	806	1210		19	1040	1560	912	1370	830	1250
920	1380	818	1230	754	1130		20	1010	1520	888	1330	806	1210
798	1200	708	1060	652	980		22	963	1450	839	1260	759	1140
681	1020	604	907	555	834		24	911	1370	790	1190	712	1070
580	872	514	773	473	710		26	860	1290	741	1110	662	995
501	752	443	667	408	613		28	808	1210	677	1020	594	892
436	655	386	581	355	534		30	737	1110	615	924	538	808
383	576	340	510	312	469		32	676	1020	563	846	491	738
339	510	301	452	276	415		34	625	939	519	779	452	679
303	455	268	403	247	371		36	581	873	481	723	418	629
272	408	241	362	221	333		38	542	815	448	674	390	585
245	369	217	327	200	300		40	509	765	420	631	364	548
222	334	197	296	181	272		42	480	721	395	594	342	515
203	305	180	270	165	248		44	453	681	373	561	323	485
185	279	164	247	151	227		46	430	646	353	531	306	459
170	256	151	227	139	208		48	409	615	336	505	290	436
							50	390	586	320	481	276	415
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1810	2720	1630	2440	1500	2260			8.81	28.1	8.75	26.8	8.72	25.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			43.2		38.8		35.9	
1460	2190	1310	1960	1210	1820			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3630	376	3220	333	2960	305
446	668	397	595	365	547			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.95		2.93		2.92	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
323	486	287	432	264	397			3.11		3.11		3.11	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W21×						Shape		W21×					
111[c]		101[c]		93[c]		lb/ft		111		101		93	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1330	2000	1190	1790	1130	1690	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	975	1460	884	1330	772	1160
1260	1890	1130	1690	978	1470		6	975	1460	884	1330	759	1140
1230	1850	1100	1660	924	1390		7	975	1460	884	1330	732	1100
1210	1810	1080	1620	866	1300		8	975	1460	884	1330	706	1060
1170	1760	1050	1580	804	1210		9	967	1450	876	1320	679	1020
1140	1710	1020	1530	740	1110		10	944	1420	855	1280	653	981
1100	1660	986	1480	676	1020		11	922	1390	834	1250	626	941
1060	1600	951	1430	611	919		12	899	1350	813	1220	600	901
1020	1530	915	1370	548	824		13	877	1320	791	1190	573	861
969	1460	877	1320	487	733		14	855	1280	770	1160	547	822
921	1380	838	1260	429	644		15	832	1250	749	1130	520	782
872	1310	795	1190	377	566		16	810	1220	728	1090	494	742
823	1240	750	1130	334	502		17	787	1180	707	1060	465	700
774	1160	705	1060	298	448		18	765	1150	686	1030	427	642
726	1090	661	993	267	402		19	742	1120	665	999	395	594
678	1020	617	927	241	363		20	720	1080	644	968	367	551
585	879	532	799	199	300		22	675	1010	602	904	321	482
497	747	451	678	167	252		24	630	947	559	841	285	429
423	636	384	578	143	215		26	570	857	495	744	257	386
365	549	331	498	123	185		28	510	767	441	663	233	351
318	478	289	434	107	161		30	461	692	397	597	214	321
279	420	254	381				32	420	631	361	543	197	297
248	372	225	338				34	385	579	331	497	183	276
221	332	200	301				36	356	535	305	458	171	258
198	298	180	270				38	331	497	283	425	161	242
179	269	162	244				40	309	464	263	396	151	228
162	244	147	221				42	290	436	247	371	143	215
148	222	134	202				44	273	410	232	349	136	204
135	203	123	185				46	258	388	219	329	129	194
124	187	113	169				48	245	367	207	311	123	185
							50	232	349	197	296	118	177
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1370	2050	1250	1880	1140	1720			8.66	24.9	8.63	24.2	5.49	16.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			32.6		29.8		27.3	
1100	1650	1010	1510	921	1380			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			2670	274	2420	248	2070	92.9
331	497	300	449	351	526			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.90		2.89		1.84	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
238	358	216	324	121	182			3.12		3.12		4.73	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W21×						Shape		W21×					
83[c]		73[c]		68[c]		lb/ft		83		73		68	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
973	1460	829	1250	758	1140	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	685	1030	601	903	559	840
849	1280	720	1080	658	989		6	671	1010	587	883	545	819
808	1210	685	1030	625	940		7	646	972	564	848	523	786
763	1150	646	971	590	886		8	622	934	542	814	501	753
716	1080	605	909	552	829		9	597	897	519	780	479	720
659	990	562	845	512	770		10	572	859	496	746	457	687
600	902	518	779	472	709		11	547	822	474	712	435	654
543	816	471	709	431	648		12	522	785	451	677	413	621
486	731	421	633	389	584		13	497	747	428	643	392	588
432	649	373	561	344	517		14	472	710	405	609	370	555
379	570	327	491	301	452		15	447	673	383	575	348	522
333	501	287	432	264	397		16	423	635	353	531	315	474
295	444	254	382	234	352		17	387	581	320	481	285	429
263	396	227	341	209	314		18	354	532	292	440	260	391
236	355	204	306	187	282		19	326	491	269	404	239	359
213	320	184	276	169	254		20	302	455	248	373	220	331
176	265	152	228	140	210		22	264	396	215	324	191	286
148	223	128	192	117	176		24	233	351	190	285	168	252
126	190	109	163	100	150		26	209	314	169	255	149	224
109	164	93.8	141	86.3	130		28	190	285	153	230	135	202
94.8	142	81.7	123	75.2	113		30	173	261	140	210	122	184
							32	160	240	128	193	112	169
							34	148	223	119	178	104	156
							36	138	208	110	166	96.4	145
							38	129	195	103	155	90.0	135
							40	122	183	96.9	146	84.5	127
							42	115	173	91.3	137	79.6	120
							44	109	164	86.4	130	75.2	113
							46	104	156	82.0	123	71.3	107
							48	98.6	148	78.0	117	67.8	102
							50	94.2	142	74.4	112	64.7	97.2
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1020	1540	901	1350	838	1260			5.46	16.2	5.40	15.6	5.37	15.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			24.4		21.5		20.0	
824	1240	726	1090	675	1010			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1830	81.4	1600	70.6	1480	64.7
309	463	270	405	254	381			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.83		1.81		1.80	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
107	160	92.9	140	85.2	128			4.74		4.77		4.78	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W21×						Shape		W21×					
62[c]		57[c]		55[c]		lb/ft		62[v]		57[v]		55[f],[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
678	1020	613	921	585	879	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	503	756	451	677	438	659
586	881	479	720	503	756		6	489	734	405	608	425	638
556	836	439	659	476	715		7	468	704	381	573	406	610
523	787	396	595	447	672		8	448	674	358	538	387	582
489	735	353	530	416	626		9	428	644	334	503	368	554
453	680	310	466	384	578		10	408	613	311	467	350	526
416	625	263	395	352	529		11	388	583	288	432	331	498
379	570	221	332	320	481		12	368	553	259	390	312	470
343	515	188	283	288	433		13	348	523	227	341	294	441
305	458	162	244	257	386		14	328	492	201	302	275	413
266	400	141	212	225	338		15	305	458	180	270	248	372
234	351	124	187	198	297		16	273	410	163	244	221	332
207	311	110	165	175	263		17	246	370	148	222	199	299
185	278	98.1	147	156	235		18	224	337	136	204	181	272
166	249	88.0	132	140	211		19	205	309	125	188	165	248
150	225	79.4	119	127	190		20	189	284	116	175	152	228
124	186	65.6	98.7	105	157		22	163	245	101	153	130	195
104	156			87.9	132		24	143	214	90.0	135	113	170
88.5	133			74.9	113		26	127	190	80.8	121	100	151
76.3	115			64.6	97.0		28	114	171	73.4	110	89.7	135
							30	103	155	67.2	101	81.2	122
							32	94.4	142	62.0	93.1	74.0	111
							34	87.0	131	57.5	86.4	68.0	102
							36	80.7	121	53.7	80.7	62.9	94.5
							38	75.2	113	50.3	75.6	58.5	87.9
							40	70.4	106	47.4	71.2	54.7	82.2
							42	66.2	99.6	44.8	67.3	51.3	77.1
							44	62.5	94.0	42.4	63.8	48.3	72.7
							46	59.2	89.0	40.3	60.6	45.7	68.7
							48	56.3	84.5	38.5	57.8	43.3	65.2
							50	53.6	80.5	36.7	55.2	41.2	62.0
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
767	1150	700	1050	679	1020			5.28	14.8	4.03	11.7	5.26	14.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			18.3		16.7		16.2	
618	926	564	845	547	820			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1330	57.5	1170	30.6	1140	48.4
211	318	215	323	196	295			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.77		1.35		1.73	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
75.8	114	51.7	77.7	63.9	96.0			4.82		6.19		4.86	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W21

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W21×						Shape		W21×					
50[c]		48[c]		44[c]		lb/ft		50[v]		48[f],[v]		44[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
523	786	493	740	446	671	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	384	578	354	531	333	501
402	605	419	629	338	509		6	340	511	354	531	290	436
366	550	395	593	306	461		7	319	479	340	510	271	408
329	494	369	555	273	411		8	298	448	323	485	252	379
291	437	342	514	240	361		9	277	416	306	460	233	350
253	381	314	472	208	312		10	256	385	289	435	214	322
214	322	286	429	178	267		11	235	353	273	410	191	287
180	271	258	387	150	225		12	204	307	256	385	164	246
153	231	230	346	127	192		13	178	267	239	360	142	214
132	199	204	307	110	165		14	157	236	219	329	125	188
115	173	180	271	95.7	144		15	140	210	193	290	111	167
101	152	158	238	84.2	126		16	126	189	172	259	99.9	150
89.7	135	140	211	74.5	112		17	114	172	155	233	90.4	136
80.0	120	125	188	66.5	99.9		18	105	157	140	210	82.4	124
71.8	108	112	169	59.7	89.7		19	96.2	145	128	192	75.6	114
64.8	97.4	101	152	53.9	80.9		20	89.0	134	117	176	69.8	105
		83.8	126				22	77.3	116	99.8	150	60.3	90.7
		70.4	106				24	68.2	103	86.7	130	53.0	79.7
		60.0	90.2				26	61.0	91.7	76.3	115	47.3	71.0
							28	55.2	82.9	68.1	102	42.6	64.0
							30	50.4	75.7	61.3	92.2	38.8	58.3
							32	46.3	69.6	55.8	83.8	35.6	53.4
							34	42.9	64.5	51.1	76.8	32.8	49.4
							36	39.9	60.0	47.1	70.8	30.5	45.9
							38	37.4	56.2	43.7	65.7	28.5	42.8
							40	35.1	52.8	40.7	61.2	26.7	40.2
							42	33.1	49.8	38.2	57.4	25.2	37.9
							44	31.4	47.2	35.9	53.9	23.8	35.8
							46	29.8	44.8	33.9	50.9	22.6	33.9
							48	28.4	42.6	32.1	48.2	21.5	32.3
							50	27.1	40.7	30.4	45.8	20.5	30.8
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
616	926	591	888	545	819			3.88	11.2	6.16	13.7	3.76	10.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			14.7		14.1		13.0	
496	744	476	714	439	658			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			984	24.9	959	38.7	843	20.7
199	299	175	263	176	264			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.30		1.66		1.26	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
42.6	64.1	48.1	72.3	35.6	53.5			6.29		4.96		6.40	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×						Shape		W18×					
311[h]		283[h]		258[h]		lb/ft		311[h]		283[h]		258[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3840	5770	3490	5250	3190	4790	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2630	3960	2360	3550	2130	3210
3610	5430	3280	4930	2990	4490		6	2630	3960	2360	3550	2130	3210
3530	5310	3210	4820	2920	4390		7	2630	3960	2360	3550	2130	3210
3450	5180	3120	4690	2840	4270		8	2630	3960	2360	3550	2130	3210
3350	5030	3030	4560	2760	4150		9	2630	3950	2350	3540	2130	3190
3240	4870	2930	4410	2670	4010		10	2610	3920	2330	3510	2100	3160
3130	4700	2830	4250	2570	3860		11	2580	3880	2310	3470	2080	3130
3010	4520	2720	4080	2470	3710		12	2560	3850	2290	3440	2060	3100
2880	4330	2600	3910	2360	3550		13	2540	3820	2270	3410	2040	3060
2750	4140	2480	3730	2250	3380		14	2520	3780	2240	3370	2020	3030
2620	3940	2360	3550	2140	3210		15	2490	3750	2220	3340	1990	3000
2490	3740	2240	3360	2020	3040		16	2470	3720	2200	3310	1970	2960
2350	3540	2110	3170	1910	2860		17	2450	3680	2180	3270	1950	2930
2220	3330	1990	2990	1790	2690		18	2430	3650	2160	3240	1930	2900
2080	3130	1860	2800	1680	2520		19	2410	3620	2130	3210	1910	2860
1950	2930	1740	2620	1560	2350		20	2380	3580	2110	3170	1880	2830
1690	2540	1500	2260	1350	2030		22	2340	3510	2070	3110	1840	2770
1440	2170	1280	1920	1140	1720		24	2290	3450	2020	3040	1800	2700
1230	1850	1090	1640	973	1460		26	2250	3380	1980	2970	1750	2630
1060	1600	939	1410	839	1260		28	2200	3310	1930	2910	1710	2570
925	1390	818	1230	731	1100		30	2160	3240	1890	2840	1660	2500
813	1220	719	1080	643	966		32	2110	3180	1850	2770	1620	2430
720	1080	637	957	569	855		34	2070	3110	1800	2710	1580	2370
642	965	568	854	508	763		36	2020	3040	1760	2640	1530	2300
576	866	510	766	456	685		38	1980	2980	1710	2570	1490	2240
520	782	460	692	411	618		40	1930	2910	1670	2510	1440	2170
472	709	417	627	373	561		42	1890	2840	1620	2440	1400	2100
430	646	380	572	340	511		44	1850	2770	1580	2380	1360	2040
393	591	348	523	311	467		46	1800	2710	1540	2310	1310	1970
361	543	320	480	286	429		48	1760	2640	1490	2240	1270	1910
							50	1710	2570	1450	2180	1220	1830

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3840	5770	3490	5250	3190	4790	8.81	58.2	8.69	53.0	8.60	48.5
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	91.6		83.3		76.0	
3090	4640	2810	4220	2570	3850	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	6970	795	6170	704	5510	628
949	1420	858	1290	771	1160	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.95		2.91		2.88	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
723	1090	646	971	580	872	2.96		2.96		2.96	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×						Shape		W18×					
234[h]		211		192		lb/ft		234[h]		211		192	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2880	4320	2610	3920	2360	3540	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1920	2880	1710	2570	1540	2320
2690	4050	2440	3670	2200	3310		6	1920	2880	1710	2570	1540	2320
2630	3950	2380	3580	2150	3230		7	1920	2880	1710	2570	1540	2320
2560	3850	2320	3490	2090	3140		8	1920	2880	1710	2570	1540	2320
2480	3730	2250	3380	2020	3040		9	1910	2870	1700	2550	1530	2300
2400	3600	2170	3260	1950	2930		10	1890	2830	1680	2520	1510	2270
2310	3470	2090	3140	1870	2820		11	1860	2800	1660	2490	1490	2240
2210	3330	2000	3010	1790	2700		12	1840	2770	1630	2460	1470	2200
2120	3180	1910	2870	1710	2570		13	1820	2740	1610	2420	1440	2170
2010	3030	1820	2730	1630	2440		14	1800	2700	1590	2390	1420	2140
1910	2870	1720	2590	1540	2310		15	1780	2670	1570	2360	1400	2110
1810	2720	1620	2440	1450	2180		16	1760	2640	1550	2330	1380	2080
1700	2560	1530	2300	1360	2050		17	1730	2610	1530	2300	1360	2040
1600	2400	1430	2150	1280	1920		18	1710	2570	1510	2260	1340	2010
1490	2240	1340	2010	1190	1790		19	1690	2540	1480	2230	1320	1980
1390	2090	1240	1870	1100	1660		20	1670	2510	1460	2200	1300	1950
1190	1800	1060	1600	942	1420		22	1630	2440	1420	2140	1250	1880
1010	1520	898	1350	793	1190		24	1580	2380	1380	2070	1210	1820
860	1290	765	1150	675	1020		26	1540	2310	1330	2010	1170	1760
742	1120	660	991	582	875		28	1500	2250	1290	1940	1130	1690
646	971	575	864	507	763		30	1450	2180	1250	1880	1080	1630
568	854	505	759	446	670		32	1410	2120	1210	1810	1040	1560
503	756	447	672	395	594		34	1370	2050	1160	1750	999	1500
449	675	399	600	352	530		36	1320	1990	1120	1680	956	1440
403	605	358	538	316	475		38	1280	1920	1080	1620	909	1370
364	546	323	486	285	429		40	1240	1860	1030	1560	860	1290
330	496	293	441	259	389		42	1190	1790	984	1480	815	1230
300	452	267	401	236	355		44	1150	1730	937	1410	776	1170
275	413	244	367	216	324		46	1100	1650	894	1340	740	1110
							48	1050	1580	854	1280	707	1060
							50	1010	1510	818	1230	677	1020
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2880	4320	2610	3920	2360	3540			8.51	44.4	8.42	40.5	8.33	37.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			68.6		62.3		56.2	
2320	3470	2100	3150	1900	2850			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			4900	558	4330	493	3870	440
685	1030	614	922	548	823			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.85		2.82		2.79	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
520	782	461	693	416	625			2.96		2.96		2.97	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Notes:

1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×						Shape		W18×					
175		158		143		lb/ft		175		158		143	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2150	3240	1940	2920	1760	2650	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1390	2090	1240	1870	1120	1690
2010	3020	1810	2720	1640	2460		6	1390	2090	1240	1870	1120	1690
1960	2950	1760	2650	1600	2400		7	1390	2090	1240	1870	1120	1690
1900	2860	1710	2570	1550	2330		8	1390	2090	1240	1870	1120	1690
1840	2770	1660	2490	1500	2250		9	1370	2070	1230	1840	1110	1660
1780	2670	1590	2400	1440	2170		10	1350	2030	1210	1810	1090	1630
1700	2560	1530	2300	1380	2080		11	1330	2000	1190	1780	1070	1600
1630	2450	1460	2200	1320	1990		12	1310	1970	1170	1750	1050	1570
1550	2330	1390	2090	1260	1890		13	1290	1940	1140	1720	1030	1540
1470	2220	1320	1990	1190	1790		14	1270	1910	1120	1690	1010	1510
1390	2100	1250	1880	1120	1690		15	1250	1880	1100	1660	986	1480
1310	1970	1170	1760	1060	1590		16	1230	1850	1080	1630	966	1450
1230	1850	1100	1650	990	1490		17	1210	1810	1060	1600	946	1420
1150	1730	1030	1540	923	1390		18	1190	1780	1040	1570	926	1390
1070	1610	955	1440	858	1290		19	1170	1750	1020	1530	906	1360
994	1490	885	1330	793	1190		20	1140	1720	1000	1500	886	1330
845	1270	750	1130	670	1010		22	1100	1660	960	1440	845	1270
710	1070	630	947	563	846		24	1060	1590	919	1380	805	1210
605	909	537	807	480	721		26	1020	1530	878	1320	765	1150
521	784	463	696	414	622		28	977	1470	836	1260	724	1090
454	683	403	606	360	542		30	935	1410	795	1200	682	1020
399	600	354	533	317	476		32	893	1340	752	1130	631	948
354	531	314	472	281	422		34	851	1280	701	1050	587	883
315	474	280	421	250	376		36	801	1200	657	988	549	826
283	425	251	378	225	338		38	754	1130	618	929	516	776
255	384	227	341	203	305		40	713	1070	584	877	487	732
232	348	206	309	184	276		42	676	1020	553	831	461	693
211	317	187	282	168	252		44	643	966	525	790	438	658
							46	612	920	500	752	417	626
							48	585	879	478	718	398	598
							50	560	842	457	687	380	572
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
2150	3240	1940	2920	1760	2650			8.24	34.5	8.18	31.8	8.12	29.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			51.4		46.3		42.0	
1730	2600	1560	2340	1420	2130			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			3450	391	3060	347	2750	311
498	748	447	670	399	598			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.76		2.74		2.72	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
370	557	331	498	298	448			2.97		2.96		2.97	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×						Shape		W18×					
130		119		106		lb/ft		130		119		106	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1610	2410	1470	2210	1300	1960	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1010	1520	915	1380	803	1210
1490	2240	1370	2050	1210	1820		6	1010	1520	915	1380	803	1210
1450	2190	1330	2000	1180	1770		7	1010	1520	915	1380	803	1210
1410	2120	1290	1940	1140	1710		8	1010	1520	915	1380	802	1210
1360	2050	1250	1870	1100	1660		9	995	1490	897	1350	784	1180
1310	1970	1200	1800	1060	1590		10	975	1470	877	1320	766	1150
1260	1890	1150	1730	1010	1520		11	955	1440	858	1290	748	1120
1200	1800	1100	1650	966	1450		12	936	1410	839	1260	730	1100
1140	1710	1040	1570	917	1380		13	916	1380	820	1230	712	1070
1080	1620	987	1480	867	1300		14	896	1350	801	1200	694	1040
1020	1530	930	1400	816	1230		15	877	1320	782	1170	676	1020
957	1440	873	1310	765	1150		16	857	1290	763	1150	658	988
895	1350	817	1230	714	1070		17	838	1260	743	1120	640	961
834	1250	760	1140	664	998		18	818	1230	724	1090	622	934
774	1160	705	1060	615	924		19	798	1200	705	1060	603	907
715	1070	651	979	567	852		20	779	1170	686	1030	585	880
602	905	548	823	475	713		22	740	1110	648	973	549	825
506	760	460	692	399	599		24	700	1050	609	916	513	771
431	648	392	589	340	511		26	661	994	571	858	466	701
372	559	338	508	293	440		28	620	931	520	782	421	633
324	487	295	443	255	384		30	568	854	476	716	384	578
285	428	259	389	224	337		32	525	789	439	660	353	531
252	379	229	345	199	299		34	488	734	407	612	327	492
225	338	205	307	177	266		36	456	686	380	571	305	458
202	303	184	276	159	239		38	428	644	356	535	285	428
182	274	166	249	144	216		40	404	607	335	504	268	402
165	248	150	226	130	196		42	382	574	316	476	252	379
151	226	137	206	119	178		44	362	544	300	451	239	359
							46	345	518	285	428	227	341
							48	329	494	272	408	216	325
							50	314	472	259	390	206	310
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1610	2410	1470	2210	1300	1960			8.06	27.8	8.03	26.3	7.94	24.8
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			38.3		35.1		31.1	
1290	1940	1180	1780	1050	1570			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			2460	278	2190	253	1910	220
362	543	348	523	309	463			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.70		2.69		2.66	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
268	403	241	363	211	318			2.97		2.94		2.95	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×						Shape		W18×					
97		86[c]		76[c]		lb/ft		97		86		76[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1190	1800	1040	1560	892	1340	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	737	1110	650	977	563	846
1110	1660	971	1460	832	1250		6	737	1110	650	977	563	846
1080	1620	947	1420	812	1220		7	737	1110	650	977	563	846
1040	1570	920	1380	788	1190		8	735	1110	647	973	563	846
1010	1510	891	1340	763	1150		9	718	1080	631	948	551	828
968	1460	857	1290	735	1110		10	701	1050	615	924	536	805
927	1390	819	1230	706	1060		11	683	1030	598	899	521	783
883	1330	780	1170	675	1020		12	666	1000	582	874	506	760
838	1260	740	1110	644	967		13	649	975	565	850	490	737
792	1190	698	1050	611	918		14	631	949	549	825	475	714
745	1120	657	987	574	863		15	614	923	533	801	460	692
698	1050	615	924	537	807		16	596	896	516	776	445	669
651	979	573	861	500	752		17	579	870	500	751	430	646
605	910	532	799	464	697		18	562	844	484	727	415	623
560	842	491	738	428	643		19	544	818	467	702	400	601
516	775	452	680	393	591		20	527	792	451	678	384	578
432	649	377	567	328	492		22	492	740	418	628	352	528
363	545	317	477	275	414		24	456	685	374	562	306	461
309	464	270	406	235	353		26	406	610	332	499	271	407
266	400	233	350	202	304		28	366	550	298	448	242	364
232	349	203	305	176	265		30	333	501	270	406	219	329
204	307	178	268	155	233		32	306	460	247	372	200	300
181	272	158	237	137	206		34	283	425	228	343	183	276
161	242	141	212	122	184		36	263	395	211	318	170	255
145	217	126	190	110	165		38	245	369	197	296	158	237
131	196	114	172	99.1	149		40	230	346	184	277	147	221
118	178	104	156	89.9	135		42	217	326	173	261	138	208
108	162						44	205	308	164	246	130	196
							46	194	292	155	233	123	185
							48	185	278	147	221	117	175
							50	176	265	140	211	111	167

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1190	1800	1060	1590	935	1400	7.91	23.9	7.85	22.7	8.21	21.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	28.5		25.3		22.3	
962	1440	854	1280	753	1130	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1750	201	1530	175	1330	152
279	418	247	371	217	325	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.65		2.63		2.61	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
193	290	169	254	145	218	2.95		2.95		2.96	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×						Shape		W18×					
71[c]		65[c]		60[c]		lb/ft		71		65		60	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
861	1290	767	1150	692	1040	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	510	767	465	698	430	646
729	1100	653	981	588	884		6	492	740	447	673	413	620
682	1030	616	926	554	833		7	473	711	430	646	396	595
632	950	575	865	518	778		8	454	683	412	619	378	569
580	871	527	792	479	720		9	435	654	394	592	361	543
526	791	478	718	438	658		10	416	625	376	565	344	517
473	710	429	644	392	589		11	397	597	358	538	327	491
420	632	381	572	348	523		12	378	568	340	511	310	465
370	556	335	503	305	459		13	359	539	322	484	292	440
322	483	291	437	265	398		14	340	511	304	457	275	414
280	421	253	380	230	346		15	321	482	286	430	254	382
246	370	222	334	203	304		16	297	446	259	389	230	345
218	328	197	296	179	270		17	272	408	236	355	209	314
195	292	176	264	160	241		18	250	376	217	326	192	288
175	262	158	237	144	216		19	232	348	201	302	177	266
158	237	142	214	130	195		20	216	324	187	281	164	247
130	196	118	177	107	161		22	190	285	164	246	144	216
109	165	98.9	149	90.0	135		24	169	254	145	219	127	192
93.3	140	84.2	127	76.7	115		26	153	230	131	197	115	172
80.4	121	72.6	109	66.1	99.4		28	139	209	119	179	104	156
							30	128	192	109	164	95.2	143
							32	118	178	101	152	87.9	132
							34	110	166	93.9	141	81.6	123
							36	103	155	87.8	132	76.1	114
							38	96.9	146	82.4	124	71.4	107
							40	91.4	137	77.6	117	67.2	101
							42	86.6	130	73.4	110	63.5	95.5
							44	82.2	124	69.7	105	60.2	90.5
							46	78.2	118	66.3	99.6	57.3	86.1
							48	74.7	112	63.2	95.0	54.6	82.1
							50	71.4	107	60.4	90.8	52.2	78.4
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
876	1320	801	1200	738	1110			5.07	15.5	5.05	15.0	5.02	14.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			20.9		19.1		17.6	
705	1060	645	967	594	891			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1170	60.3	1070	54.8	984	50.1
256	385	232	348	211	317			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.70		1.69		1.68	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
86.3	130	78.6	118	72.0	108			4.41		4.43		4.45	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×						Shape		W18×					
55[c]		50[c]		46[c]		lb/ft		55		50		46	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
626	941	554	833	505	759	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	391	588	353	530	317	476
531	798	468	703	385	578		6	375	563	336	506	280	421
500	752	440	661	349	524		7	358	539	321	483	263	395
467	702	410	616	312	468		8	342	514	306	460	246	370
432	650	379	569	274	412		9	326	489	291	437	229	344
396	596	347	521	233	351		10	309	465	276	414	212	319
358	538	314	472	194	291		11	293	440	260	391	195	293
317	477	282	424	163	245		12	277	416	245	368	170	255
278	418	247	371	139	209		13	260	391	230	345	149	224
241	362	213	320	120	180		14	244	367	212	319	133	200
210	315	186	279	104	157		15	220	331	189	284	119	179
184	277	163	245	91.6	138		16	198	298	170	256	108	163
163	245	145	217	81.1	122		17	180	271	154	232	99.0	149
146	219	129	194	72.4	109		18	165	248	141	212	91.1	137
131	196	116	174	65.0	97.6		19	152	228	130	195	84.4	127
118	177	104	157	58.6	88.1		20	141	212	120	180	78.5	118
97.4	146	86.3	130				22	123	184	104	156	69.0	104
81.9	123	72.5	109				24	108	163	91.5	137	61.5	92.4
69.8	105	61.8	92.9				26	97.1	146	81.7	123	55.4	83.3
							28	87.9	132	73.8	111	50.5	75.9
							30	80.4	121	67.3	101	46.4	69.7
							32	74.0	111	61.8	92.9	42.9	64.5
							34	68.6	103	57.2	85.9	39.9	60.0
							36	63.9	96.1	53.2	79.9	37.4	56.2
							38	59.9	90.0	49.7	74.8	35.1	52.8
							40	56.3	84.6	46.7	70.2	33.1	49.8
							42	53.2	79.9	44.0	66.2	31.3	47.1
							44	50.3	75.7	41.7	62.6	29.7	44.7
							46	47.8	71.9	39.5	59.4	28.3	42.5
							48	45.6	68.5	37.6	56.6	27.0	40.6
							50	43.5	65.4	35.9	54.0	25.8	38.8
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
679	1020	616	926	566	851			4.99	14.2	4.93	13.8	3.85	11.1
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			16.2		14.7		13.5	
547	820	496	744	456	683			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			890	44.9	800	40.1	712	22.5
198	296	179	268	182	274			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.67		1.65		1.29	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
64.6	97.1	58.0	87.2	40.9	61.4			4.44		4.47		5.62	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W18–W16

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W18×				W16×		Shape		W18×				W16×	
40[c]		35[c]		100		lb/ft		40[v]		35[v]		100	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
425	639	360	541	1230	1850	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	274	412	232	349	692	1040
321	482	266	400	1130	1700		6	240	361	199	300	692	1040
290	435	239	359	1100	1650		7	225	338	185	279	692	1040
258	387	211	317	1060	1590		8	209	315	171	258	684	1030
226	339	183	276	1020	1530		9	194	292	158	237	669	1010
195	293	156	235	975	1470		10	179	268	144	216	654	983
164	247	132	199	928	1400		11	160	241	123	185	639	960
138	207	111	167	880	1320		12	138	208	106	159	624	938
118	177	94.7	142	830	1250		13	121	182	91.9	138	609	915
101	152	81.6	123	779	1170		14	107	161	81.1	122	594	892
88.3	133	71.1	107	728	1090		15	95.9	144	72.4	109	579	870
77.6	117	62.5	93.9	677	1020		16	86.6	130	65.2	97.9	564	847
68.7	103	55.4	83.2	627	942		17	78.9	119	59.2	88.9	549	825
61.3	92.2	49.4	74.2	577	868		18	72.4	109	54.1	81.3	534	802
55.0	82.7	44.3	66.6	530	796		19	66.8	100	49.8	74.8	519	780
49.7	74.6	40.0	60.1	483	727		20	62.0	93.2	46.1	69.2	504	757
				399	600		22	54.2	81.4	40.0	60.1	474	712
				336	504		24	48.0	72.2	35.3	53.1	443	667
				286	430		26	43.2	64.9	31.6	47.5	407	612
				247	371		28	39.2	58.9	28.6	43.0	370	557
				215	323		30	35.9	53.9	26.1	39.2	340	511
				189	284		32	33.1	49.8	24.0	36.1	314	472
				167	251		34	30.7	46.2	22.2	33.4	292	439
				149	224		36	28.7	43.1	20.7	31.1	273	410
				134	201		38	26.9	40.4	19.4	29.1	256	385
				121	182		40	25.3	38.1	18.2	27.4	242	363
							42	23.9	36.0	17.2	25.8	228	343
							44	22.7	34.1	16.3	24.4	217	326
							46	21.6	32.4	15.4	23.2	206	310
							48	20.6	30.9	14.7	22.1	197	296
							50	19.6	29.5	14.0	21.1	188	283

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
495	743	432	649	1230	1850	3.79	10.7	3.64	10.2	7.49	25.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	11.8		10.3		29.4	
398	597	348	521	992	1490	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	612	19.1	510	15.3	1490	186
142	213	129	194	278	418	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						1.27		1.22		2.51	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
34.9	52.5	28.2	42.3	192	288	5.68		5.77		2.83	

[c] Shape is slender for compression with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W16×						Shape		W16×					
89		77[c]		67[c]		lb/ft		89		77		67	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1100	1650	942	1420	795	1190	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	611	919	524	788	454	683
1010	1520	868	1310	734	1100		6	611	919	524	788	454	683
977	1470	842	1260	714	1070		7	611	919	524	788	454	683
943	1420	812	1220	691	1040		8	603	906	516	775	446	670
906	1360	779	1170	665	1000		9	588	884	502	755	433	651
866	1300	744	1120	638	959		10	574	863	489	734	421	633
824	1240	707	1060	609	916		11	559	841	475	714	409	614
780	1170	669	1010	579	869		12	545	819	462	694	396	595
735	1100	630	946	544	818		13	530	797	448	674	384	577
689	1040	590	887	510	766		14	516	775	435	653	371	558
643	967	550	827	475	714		15	501	753	421	633	359	539
598	898	510	767	440	662		16	487	731	408	613	346	520
552	830	471	708	406	611		17	472	709	394	592	334	502
508	764	433	651	373	561		18	457	688	381	572	321	483
466	700	396	595	341	513		19	443	666	367	552	309	464
424	637	360	541	310	465		20	428	644	354	532	296	445
350	527	297	447	256	384		22	399	600	326	490	262	395
294	442	250	376	215	323		24	365	549	287	432	230	346
251	377	213	320	183	275		26	328	493	257	386	205	308
216	325	184	276	158	237		28	298	447	232	349	184	277
188	283	160	240	138	207		30	272	409	212	318	167	252
166	249	141	211	121	182		32	251	377	194	292	153	230
147	220	124	187	107	161		34	233	350	180	270	141	213
131	197	111	167	95.5	144		36	217	327	167	252	131	197
117	176	99.7	150	85.7	129		38	204	306	157	235	122	184
106	159	89.9	135	77.4	116		40	192	288	147	221	115	172
							42	181	272	139	209	108	162
							44	172	258	131	197	102	153
							46	163	245	125	187	96.7	145
							48	156	234	119	178	91.9	138
							50	149	223	113	170	87.5	132

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1100	1650	947	1420	822	1230	7.43	23.4	7.37	21.9	7.34	20.8
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	26.2		22.6		19.6	
884	1330	763	1140	662	992	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1300	163	1110	138	954	119
247	370	210	315	180	270	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.49		2.47		2.46	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
168	253	144	216	124	186	2.83		2.83		2.83	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W16×						Shape		W16×					
57[c]		50[c]		45[c]		lb/ft		57		50		45	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
690	1040	584	878	516	776	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	367	551	321	483	287	432
572	860	487	731	428	643		6	349	525	304	457	271	407
531	798	455	684	400	601		7	335	503	291	437	258	388
487	732	422	634	370	555		8	320	481	277	416	245	369
442	664	384	577	338	508		9	306	459	263	396	233	350
396	595	344	517	306	460		10	291	437	250	375	220	331
351	527	304	457	270	406		11	277	416	236	355	207	312
307	462	266	400	236	354		12	262	394	222	334	195	292
266	399	230	345	202	304		13	248	372	209	314	182	273
229	344	198	297	175	262		14	233	350	193	290	164	246
200	300	172	259	152	229		15	215	323	173	260	147	220
175	264	152	228	134	201		16	195	293	157	236	133	199
155	233	134	202	118	178		17	179	269	143	216	121	181
139	208	120	180	106	159		18	165	248	132	198	111	166
124	187	107	162	94.8	142		19	153	230	122	183	102	154
112	169	97.0	146	85.5	129		20	143	215	114	171	94.9	143
92.8	139	80.1	120	70.7	106		22	126	189	99.6	150	82.9	125
77.9	117	67.3	101	59.4	89.3		24	112	169	88.6	133	73.5	111
66.4	99.8	57.4	86.2	50.6	76.1		26	102	153	79.9	120	66.1	99.3
							28	92.9	140	72.7	109	60.0	90.2
							30	85.5	128	66.8	100	55.0	82.6
							32	79.2	119	61.7	92.7	50.7	76.2
							34	73.8	111	57.4	86.3	47.1	70.8
							36	69.1	104	53.7	80.6	43.9	66.0
							38	65.0	97.7	50.4	75.7	41.2	61.9
							40	61.3	92.2	47.5	71.4	38.8	58.3
							42	58.1	87.3	44.9	67.5	36.7	55.1
							44	55.2	83.0	42.6	64.1	34.8	52.3
							46	52.6	79.0	40.6	61.0	33.1	49.7
							48	50.2	75.4	38.7	58.2	31.5	47.4
							50	48.0	72.2	37.0	55.6	30.1	45.2
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
704	1060	616	926	557	838			4.78	14.5	4.75	13.8	4.69	13.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			16.8		14.7		13.3	
567	851	496	744	449	673			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			758	43.1	659	37.2	586	32.8
197	296	173	260	156	233			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.60		1.59		1.57	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
66.0	99.2	56.9	85.6	50.6	76.1			4.20		4.20		4.24	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W16×						Shape		W16×					
40[c]		36[c]		31[c]		lb/ft		40[v]		36[f],[v]		31[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
444	668	392	590	328	492	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	255	383	221	332	189	284
368	553	321	483	235	353		6	240	360	208	312	159	239
344	517	299	450	209	313		7	228	343	197	296	147	222
318	478	275	414	182	273		8	216	325	187	280	136	204
291	437	251	377	156	234		9	205	307	176	264	124	186
263	396	226	339	130	196		10	193	290	165	248	110	165
236	355	201	302	108	162		11	181	272	154	232	93.1	140
209	314	177	266	90.6	136		12	170	255	144	216	80.4	121
180	270	151	227	77.2	116		13	157	236	129	194	70.5	106
155	233	130	196	66.6	100		14	139	209	114	171	62.6	94.0
135	203	114	171	58.0	87.1		15	124	186	101	152	56.1	84.4
119	178	99.9	150	51.0	76.6		16	112	168	90.8	136	50.8	76.4
105	158	88.5	133	45.1	67.8		17	101	152	82.2	124	46.4	69.7
93.7	141	78.9	119	40.3	60.5		18	92.8	139	75.0	113	42.6	64.0
84.1	126	70.8	106	36.1	54.3		19	85.4	128	68.8	103	39.4	59.2
75.9	114	63.9	96.1				20	79.0	119	63.6	95.5	36.6	55.0
62.7	94.3	52.8	79.4				22	68.7	103	55.0	82.6	32.0	48.2
52.7	79.2	44.4	66.7				24	60.7	91.2	48.4	72.7	28.5	42.8
44.9	67.5						26	54.3	81.7	43.1	64.8	25.6	38.5
							28	49.2	73.9	38.9	58.4	23.3	35.1
							30	44.9	67.5	35.4	53.2	21.4	32.1
							32	41.3	62.1	32.5	48.8	19.8	29.7
							34	38.3	57.5	30.0	45.1	18.4	27.6
							36	35.7	53.6	27.9	41.9	17.2	25.8
							38	33.4	50.2	26.0	39.1	16.1	24.2
							40	31.4	47.2	24.4	36.7	15.2	22.8
							42	29.6	44.5	23.0	34.6	14.4	21.6
							44	28.0	42.1	21.8	32.7	13.6	20.5
							46	26.6	40.0	20.6	31.0	13.0	19.5
							48	25.4	38.1	19.6	29.5	12.4	18.6
							50	24.2	36.4	18.7	28.1	11.8	17.7
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
495	743	444	668	383	575			4.69	13.0	4.78	12.5	3.49	9.72
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			11.8		10.6		9.13	
398	597	358	537	308	462			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			518	28.9	448	24.5	375	12.4
123	184	118	177	110	165			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.57		1.52		1.17	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
44.4	66.7	37.1	55.8	24.6	36.9			4.22		4.28		5.48	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W16–W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W16×		W14×				Shape		W16×		W14×			
26[c]		873[h]		808[h]		lb/ft		26[f],[v]		873[h]		808[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
264	397	10800	16200	9980	15000	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	153	230	7090	10700	6390	9610
185	277	10500	15800	9750	14700		6	127	191	7090	10700	6390	9610
162	244	10500	15700	9670	14500		7	117	176	7090	10700	6390	9610
140	210	10400	15600	9580	14400		8	107	160	7090	10700	6390	9610
118	178	10200	15400	9480	14200		9	96.5	145	7090	10700	6390	9610
99.1	149	10100	15200	9370	14100		10	81.5	122	7090	10700	6390	9610
83.1	125	10000	15000	9240	13900		11	68.8	103	7090	10700	6390	9610
69.8	105	9860	14800	9110	13700		12	59.1	88.8	7090	10700	6390	9610
59.5	89.4	9710	14600	8970	13500		13	51.5	77.5	7090	10700	6390	9610
51.3	77.1	9550	14400	8810	13200		14	45.5	68.4	7090	10700	6390	9610
44.7	67.2	9380	14100	8650	13000		15	40.6	61.1	7090	10600	6380	9590
39.3	59.0	9210	13800	8490	12800		16	36.6	55.0	7070	10600	6370	9570
34.8	52.3	9020	13600	8310	12500		17	33.2	50.0	7050	10600	6350	9550
31.0	46.6	8830	13300	8130	12200		18	30.4	45.7	7040	10600	6340	9530
		8630	13000	7940	11900		19	28.0	42.1	7020	10600	6330	9510
		8430	12700	7750	11600		20	25.9	39.0	7010	10500	6310	9490
		8000	12000	7350	11000		22	22.6	33.9	6980	10500	6280	9440
		7560	11400	6930	10400		24	19.9	30.0	6950	10400	6250	9400
		7110	10700	6510	9780		26	17.8	26.8	6920	10400	6220	9360
		6660	10000	6080	9140		28	16.2	24.3	6890	10400	6200	9310
		6200	9320	5650	8490		30	14.8	22.2	6860	10300	6170	9270
		5740	8630	5220	7850		32	13.6	20.4	6830	10300	6140	9220
		5300	7960	4810	7220		34	12.6	18.9	6800	10200	6110	9180
		4860	7310	4400	6610		36	11.7	17.6	6770	10200	6080	9140
		4440	6670	4010	6020		38	11.0	16.5	6740	10100	6050	9090
		4030	6050	3620	5440		40	10.3	15.5	6710	10100	6020	9050
		3650	5490	3290	4940		42	9.74	14.6	6680	10000	5990	9010
		3330	5000	2990	4500		44	9.22	13.9	6640	9990	5960	8960
		3040	4570	2740	4120		46	8.76	13.2	6610	9940	5930	8920
		2800	4200	2520	3780		48	8.34	12.5	6580	9900	5910	8880
		2580	3870	2320	3480		50	7.96	12.0	6550	9850	5880	8830

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
322	484	10800	16200	9980	15000	3.45	9.25	14.6	235	14.4	221
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	7.68		257		238	
259	389	8670	13000	8030	12000	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	301	9.59	18100	6170	15900	5550
89.9	135	2600	3910	2390	3580	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						1.12		4.90		4.83	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
18.9	28.5	3560	5360	3250	4880	5.59		1.71		1.69	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
730[h]		665[h]		605[h]		lb/ft		730[h]		665[h]		605[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
9010	13500	8220	12300	7460	11200	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	5800	8720	5170	7770	4610	6930
8800	13200	8010	12000	7270	10900		6	5800	8720	5170	7770	4610	6930
8720	13100	7940	11900	7210	10800		7	5800	8720	5170	7770	4610	6930
8630	13000	7860	11800	7130	10700		8	5800	8720	5170	7770	4610	6930
8540	12800	7770	11700	7040	10600		9	5800	8720	5170	7770	4610	6930
8430	12700	7670	11500	6950	10400		10	5800	8720	5170	7770	4610	6930
8310	12500	7560	11400	6850	10300		11	5800	8720	5170	7770	4610	6930
8180	12300	7440	11200	6730	10100		12	5800	8720	5170	7770	4610	6930
8050	12100	7310	11000	6620	9940		13	5800	8720	5170	7770	4610	6930
7900	11900	7180	10800	6490	9750		14	5800	8720	5170	7770	4610	6920
7750	11600	7030	10600	6360	9550		15	5780	8690	5150	7740	4590	6900
7590	11400	6880	10300	6220	9350		16	5770	8670	5140	7720	4580	6880
7430	11200	6730	10100	6070	9130		17	5750	8650	5120	7700	4560	6860
7250	10900	6570	9870	5920	8900		18	5740	8630	5110	7680	4550	6840
7080	10600	6400	9620	5770	8670		19	5730	8610	5100	7660	4540	6820
6890	10400	6230	9370	5610	8430		20	5710	8580	5080	7640	4520	6800
6520	9790	5880	8840	5290	7950		22	5680	8540	5050	7600	4500	6760
6130	9210	5520	8300	4950	7440		24	5650	8500	5030	7550	4470	6720
5730	8610	5150	7740	4610	6930		26	5620	8450	5000	7510	4440	6680
5330	8010	4780	7190	4270	6420		28	5590	8410	4970	7470	4410	6640
4930	7410	4410	6630	3930	5910		30	5560	8360	4940	7430	4390	6590
4540	6820	4050	6090	3600	5410		32	5540	8320	4910	7380	4360	6550
4150	6240	3700	5560	3280	4920		34	5510	8280	4880	7340	4330	6510
3780	5680	3360	5050	2970	4460		36	5480	8230	4860	7300	4310	6470
3420	5140	3020	4550	2660	4000		38	5450	8190	4830	7260	4280	6430
3090	4640	2730	4100	2400	3610		40	5420	8140	4800	7210	4250	6390
2800	4210	2480	3720	2180	3280		42	5390	8100	4770	7170	4220	6350
2550	3830	2260	3390	1990	2990		44	5360	8060	4740	7130	4200	6310
2330	3510	2060	3100	1820	2730		46	5330	8010	4720	7090	4170	6270
2140	3220	1900	2850	1670	2510		48	5300	7970	4690	7040	4140	6230
1970	2970	1750	2630	1540	2310		50	5270	7920	4660	7000	4120	6190

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
9010	13500	8220	12300	7460	11200	14.0	197	13.8	181	13.6	166
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	215		196		178	
7260	10900	6620	9920	6010	9010	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	14300	4720	12400	4170	10800	3680
1930	2890	1710	2570	1520	2280	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.69		4.62		4.55	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
2850	4280	2550	3830	2280	3420	1.74		1.73		1.71	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
550[h]		500[h]		455[h]		lb/ft		550[h]		500[h]		455[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
6790	10200	6160	9260	5620	8440	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	4120	6200	3670	5510	3270	4910
6610	9940	6000	9010	5460	8210		6	4120	6200	3670	5510	3270	4910
6550	9850	5940	8930	5410	8130		7	4120	6200	3670	5510	3270	4910
6480	9740	5870	8830	5350	8040		8	4120	6200	3670	5510	3270	4910
6400	9620	5800	8710	5280	7930		9	4120	6200	3670	5510	3270	4910
6310	9490	5720	8590	5200	7820		10	4120	6200	3670	5510	3270	4910
6220	9340	5630	8460	5120	7690		11	4120	6200	3670	5510	3270	4910
6110	9190	5530	8310	5030	7560		12	4120	6200	3670	5510	3270	4910
6000	9020	5430	8160	4930	7410		13	4120	6200	3670	5510	3270	4910
5880	8840	5320	7990	4830	7260		14	4110	6180	3660	5500	3260	4900
5760	8660	5200	7820	4730	7100		15	4100	6160	3640	5480	3250	4880
5630	8460	5080	7640	4610	6930		16	4090	6140	3630	5460	3230	4860
5500	8260	4960	7450	4500	6760		17	4070	6120	3620	5440	3220	4840
5360	8050	4830	7260	4380	6580		18	4060	6100	3610	5420	3210	4820
5220	7840	4700	7060	4260	6400		19	4050	6080	3590	5400	3200	4800
5070	7620	4560	6860	4130	6210		20	4030	6060	3580	5380	3180	4790
4770	7160	4280	6440	3870	5820		22	4010	6020	3560	5340	3160	4750
4460	6700	4000	6010	3610	5420		24	3980	5980	3530	5310	3130	4710
4140	6230	3710	5570	3340	5020		26	3950	5940	3500	5270	3110	4670
3830	5750	3420	5140	3080	4620		28	3930	5900	3480	5230	3090	4640
3520	5290	3130	4710	2810	4230		30	3900	5860	3450	5190	3060	4600
3210	4830	2860	4290	2560	3840		32	3880	5820	3430	5150	3040	4560
2920	4380	2590	3890	2310	3470		34	3850	5780	3400	5110	3010	4530
2630	3950	2320	3490	2070	3110		36	3820	5740	3380	5070	2990	4490
2360	3550	2090	3130	1860	2790		38	3800	5700	3350	5040	2960	4450
2130	3200	1880	2830	1680	2520		40	3770	5660	3330	5000	2940	4410
1930	2900	1710	2570	1520	2290		42	3740	5620	3300	4960	2910	4380
1760	2650	1560	2340	1390	2080		44	3720	5580	3270	4920	2890	4340
1610	2420	1420	2140	1270	1910		46	3690	5550	3250	4880	2860	4300
1480	2220	1310	1960	1160	1750		48	3660	5510	3220	4840	2840	4270
1360	2050	1200	1810	1070	1610		50	3640	5470	3200	4810	2810	4230

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
6790	10200	6160	9260	5620	8440	13.4	153	13.2	140	13.1	128
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	162		147		134	
5470	8200	4960	7440	4520	6780	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	9430	3250	8210	2880	7190	2560
1350	2020	1200	1800	1070	1610	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.49		4.43		4.38	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
2040	3060	1820	2740	1630	2460	1.70		1.69		1.67	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
426[h]		398[h]		370[h]		lb/ft		426[h]		398[h]		370[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
5240	7880	4900	7370	4570	6870	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	3040	4560	2800	4210	2570	3860
5090	7660	4770	7160	4440	6670		6	3040	4560	2800	4210	2570	3860
5040	7580	4720	7090	4390	6600		7	3040	4560	2800	4210	2570	3860
4980	7490	4660	7010	4340	6520		8	3040	4560	2800	4210	2570	3860
4920	7390	4600	6910	4280	6430		9	3040	4560	2800	4210	2570	3860
4850	7280	4530	6810	4210	6330		10	3040	4560	2800	4210	2570	3860
4770	7160	4460	6700	4140	6230		11	3040	4560	2800	4210	2570	3860
4680	7040	4370	6580	4070	6110		12	3040	4560	2800	4210	2570	3860
4590	6900	4290	6450	3990	5990		13	3030	4560	2800	4200	2570	3860
4490	6760	4200	6310	3900	5860		14	3020	4540	2780	4180	2560	3840
4390	6600	4100	6170	3810	5720		15	3010	4520	2770	4170	2540	3820
4290	6450	4000	6020	3710	5580		16	3000	4510	2760	4150	2530	3810
4180	6280	3900	5860	3620	5440		17	2990	4490	2750	4130	2520	3790
4070	6110	3790	5700	3520	5280		18	2970	4470	2740	4110	2510	3770
3950	5940	3680	5540	3410	5130		19	2960	4450	2720	4100	2500	3750
3830	5760	3570	5370	3310	4970		20	2950	4430	2710	4080	2490	3740
3590	5390	3340	5020	3090	4640		22	2930	4400	2690	4040	2460	3700
3340	5020	3110	4670	2870	4310		24	2900	4360	2670	4010	2440	3670
3090	4640	2870	4310	2650	3980		26	2880	4320	2640	3970	2420	3630
2840	4260	2630	3960	2420	3640		28	2850	4290	2620	3930	2390	3600
2590	3890	2400	3610	2210	3320		30	2830	4250	2590	3900	2370	3560
2350	3530	2180	3270	2000	3000		32	2800	4210	2570	3860	2350	3530
2120	3190	1960	2950	1790	2700		34	2780	4180	2550	3830	2320	3490
1900	2850	1750	2630	1600	2410		36	2750	4140	2520	3790	2300	3460
1700	2560	1570	2360	1440	2160		38	2730	4100	2500	3750	2280	3420
1540	2310	1420	2130	1300	1950		40	2710	4070	2470	3720	2250	3390
1390	2090	1290	1930	1180	1770		42	2680	4030	2450	3680	2230	3350
1270	1910	1170	1760	1070	1610		44	2660	3990	2430	3650	2210	3320
1160	1750	1070	1610	980	1470		46	2630	3960	2400	3610	2180	3280
1070	1600	985	1480	900	1350		48	2610	3920	2380	3580	2160	3250
983	1480	907	1360	830	1250		50	2580	3880	2350	3540	2140	3210

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
5240	7880	4900	7370	4570	6870	13.0	120	12.9	113	12.7	106
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	125		117		109	
4220	6330	3950	5920	3680	5520	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	6600	2360	6000	2170	5440	1990
984	1480	907	1360	832	1250	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.34		4.31		4.27	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1520	2280	1400	2110	1290	1940	1.67		1.66		1.66	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
342[h]		311[h]		283[h]		lb/ft		342[h]		311[h]		283[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4230	6360	3830	5760	3490	5250	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2350	3530	2110	3170	1890	2850
4110	6180	3720	5590	3390	5090		6	2350	3530	2110	3170	1890	2850
4070	6110	3680	5530	3350	5030		7	2350	3530	2110	3170	1890	2850
4020	6040	3630	5460	3310	4970		8	2350	3530	2110	3170	1890	2850
3960	5950	3580	5380	3260	4900		9	2350	3530	2110	3170	1890	2850
3900	5860	3520	5300	3210	4820		10	2350	3530	2110	3170	1890	2850
3830	5760	3460	5200	3150	4740		11	2350	3530	2110	3170	1890	2850
3760	5650	3400	5110	3090	4640		12	2350	3530	2110	3170	1890	2850
3690	5540	3330	5000	3030	4550		13	2340	3520	2100	3160	1890	2840
3610	5420	3250	4890	2960	4440		14	2330	3500	2090	3140	1880	2820
3520	5290	3170	4770	2890	4340		15	2320	3490	2080	3120	1860	2800
3430	5160	3090	4650	2810	4220		16	2310	3470	2070	3110	1850	2790
3340	5020	3010	4520	2730	4110		17	2300	3450	2060	3090	1840	2770
3250	4880	2920	4390	2650	3990		18	2290	3440	2040	3070	1830	2750
3150	4730	2830	4260	2570	3860		19	2270	3420	2030	3060	1820	2740
3050	4580	2740	4120	2490	3740		20	2260	3400	2020	3040	1810	2720
2850	4280	2560	3840	2320	3480		22	2240	3370	2000	3010	1790	2690
2640	3970	2370	3560	2140	3220		24	2220	3330	1980	2970	1770	2650
2430	3660	2180	3270	1970	2960		26	2190	3300	1960	2940	1740	2620
2230	3350	1990	2990	1800	2700		28	2170	3260	1930	2900	1720	2590
2020	3040	1810	2710	1630	2450		30	2150	3230	1910	2870	1700	2550
1830	2750	1630	2450	1470	2200		32	2130	3200	1890	2840	1680	2520
1640	2460	1460	2190	1310	1970		34	2100	3160	1870	2800	1650	2490
1460	2200	1300	1950	1170	1750		36	2080	3130	1840	2770	1630	2450
1310	1970	1170	1750	1050	1570		38	2060	3090	1820	2740	1610	2420
1180	1780	1050	1580	945	1420		40	2030	3060	1800	2700	1590	2390
1070	1610	954	1430	857	1290		42	2010	3020	1780	2670	1570	2350
979	1470	869	1310	781	1170		44	1990	2990	1750	2630	1540	2320
896	1350	795	1200	715	1070		46	1970	2960	1730	2600	1520	2290
823	1240	730	1100	656	986		48	1940	2920	1710	2570	1500	2250
758	1140	673	1010	605	909		50	1920	2890	1690	2530	1480	2220

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4230	6360	3830	5760	3490	5250	12.7	98.7	12.5	89.9	12.4	82.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	101		91.4		83.3	
3410	5110	3080	4630	2810	4220	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	4900	1810	4330	1610	3840	1440
755	1130	675	1010	603	905	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.24		4.20		4.17	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
1180	1770	1060	1600	957	1440	1.65		1.64		1.63	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
257		233		211		lb/ft		257		233		211	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3170	4760	2870	4320	2600	3910	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1700	2560	1520	2290	1360	2050
3070	4620	2780	4180	2520	3780		6	1700	2560	1520	2290	1360	2050
3040	4570	2750	4130	2490	3740		7	1700	2560	1520	2290	1360	2050
3000	4510	2710	4080	2450	3690		8	1700	2560	1520	2290	1360	2050
2950	4440	2670	4020	2420	3630		9	1700	2560	1520	2290	1360	2050
2910	4370	2630	3950	2380	3570		10	1700	2560	1520	2290	1360	2050
2850	4290	2580	3880	2330	3510		11	1700	2560	1520	2290	1360	2050
2800	4210	2530	3800	2290	3440		12	1700	2560	1520	2290	1360	2050
2740	4120	2480	3720	2240	3360		13	1690	2550	1510	2280	1350	2030
2680	4020	2420	3630	2180	3280		14	1680	2530	1500	2260	1340	2020
2610	3920	2360	3540	2130	3200		15	1670	2510	1490	2240	1330	2000
2540	3820	2290	3450	2070	3110		16	1660	2500	1480	2230	1320	1990
2470	3710	2230	3350	2010	3020		17	1650	2480	1470	2210	1310	1970
2390	3600	2160	3250	1950	2930		18	1640	2460	1460	2200	1300	1950
2320	3490	2090	3140	1880	2830		19	1630	2450	1450	2180	1290	1940
2240	3370	2020	3040	1820	2740		20	1620	2430	1440	2160	1280	1920
2090	3130	1880	2820	1690	2540		22	1600	2400	1420	2130	1260	1890
1930	2900	1730	2600	1560	2340		24	1570	2360	1400	2100	1240	1860
1770	2660	1590	2390	1420	2140		26	1550	2330	1370	2070	1220	1830
1610	2420	1440	2170	1290	1940		28	1530	2300	1350	2030	1190	1790
1460	2190	1300	1960	1170	1750		30	1510	2270	1330	2000	1170	1760
1310	1970	1170	1760	1040	1570		32	1490	2230	1310	1970	1150	1730
1160	1750	1040	1560	927	1390		34	1460	2200	1290	1940	1130	1700
1040	1560	927	1390	827	1240		36	1440	2170	1270	1900	1110	1670
932	1400	832	1250	742	1120		38	1420	2130	1250	1870	1090	1640
841	1260	751	1130	670	1010		40	1400	2100	1220	1840	1070	1600
763	1150	681	1020	608	913		42	1380	2070	1200	1810	1050	1570
695	1040	621	933	554	832		44	1350	2040	1180	1770	1020	1540
636	956	568	854	507	761		46	1330	2000	1160	1740	1000	1510
584	878	522	784	465	699		48	1310	1970	1140	1710	982	1480
538	809	481	723	429	644		50	1290	1940	1120	1680	960	1440

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
3170	4760	2870	4320	2600	3910	12.3	75.1	12.2	68.4	12.1	62.6
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	75.6		68.5		62.0	
2550	3830	2310	3470	2090	3140	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	3400	1290	3010	1150	2660	1030
542	813	479	719	431	646	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.13		4.10		4.07	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
859	1290	772	1160	692	1040	1.62		1.62		1.61	

Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
193		176		159		lb/ft		193		176		159	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2380	3580	2170	3260	1960	2940	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1240	1860	1120	1680	1000	1510
2310	3460	2100	3160	1890	2850		6	1240	1860	1120	1680	1000	1510
2280	3420	2080	3120	1870	2810		7	1240	1860	1120	1680	1000	1510
2250	3380	2050	3080	1850	2770		8	1240	1860	1120	1680	1000	1510
2210	3330	2020	3030	1820	2730		9	1240	1860	1120	1680	1000	1510
2180	3270	1980	2980	1790	2680		10	1240	1860	1120	1680	1000	1510
2140	3210	1940	2920	1750	2630		11	1240	1860	1120	1680	1000	1510
2090	3140	1900	2860	1710	2580		12	1240	1860	1120	1680	1000	1510
2050	3070	1860	2800	1680	2520		13	1230	1850	1110	1660	992	1490
2000	3000	1820	2730	1630	2460		14	1220	1830	1100	1650	981	1470
1940	2920	1770	2660	1590	2390		15	1210	1820	1090	1630	971	1460
1890	2840	1720	2580	1550	2320		16	1200	1800	1080	1620	961	1440
1840	2760	1670	2510	1500	2250		17	1190	1790	1070	1600	950	1430
1780	2670	1620	2430	1450	2180		18	1180	1770	1060	1590	940	1410
1720	2590	1560	2350	1400	2110		19	1170	1750	1040	1570	930	1400
1660	2500	1510	2270	1350	2040		20	1160	1740	1030	1550	920	1380
1540	2320	1400	2100	1250	1880		22	1140	1710	1010	1520	899	1350
1420	2130	1280	1930	1150	1730		24	1110	1670	993	1490	878	1320
1300	1950	1170	1760	1050	1580		26	1090	1640	972	1460	858	1290
1180	1770	1060	1600	951	1430		28	1070	1610	951	1430	837	1260
1060	1590	955	1440	854	1280		30	1050	1580	930	1400	817	1230
949	1430	853	1280	762	1140		32	1030	1550	909	1370	796	1200
841	1260	756	1140	675	1010		34	1010	1520	889	1340	775	1170
750	1130	674	1010	602	905		36	987	1480	868	1300	755	1130
673	1010	605	909	540	812		38	966	1450	847	1270	734	1100
608	914	546	821	487	733		40	945	1420	826	1240	714	1070
551	829	495	744	442	665		42	924	1390	805	1210	693	1040
502	755	451	678	403	605		44	902	1360	785	1180	672	1010
460	691	413	621	369	554		46	881	1320	764	1150	652	980
422	634	379	570	339	509		48	860	1290	743	1120	631	949
389	585	350	525	312	469		50	839	1260	722	1090	607	912

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2380	3580	2170	3260	1960	2940	12.1	57.6	12.0	53.4	11.9	49.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	56.8		51.8		46.7	
1920	2880	1750	2620	1580	2360	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	2400	931	2140	838	1900	748
386	579	353	530	313	469	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						4.05		4.02		4.00	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
629	945	569	856	510	767	1.60		1.60		1.60	

Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
145		132		120		lb/ft		145		132		120[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1790	2690	1630	2440	1480	2220	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	908	1370	817	1230	739	1110
1730	2600	1570	2350	1420	2140		6	908	1370	817	1230	739	1110
1710	2570	1550	2320	1410	2110		7	908	1370	817	1230	739	1110
1690	2530	1520	2290	1380	2080		8	908	1370	817	1230	739	1110
1660	2490	1490	2250	1360	2040		9	908	1370	817	1230	739	1110
1630	2450	1470	2200	1330	2000		10	908	1370	817	1230	739	1110
1600	2400	1430	2150	1300	1960		11	908	1370	817	1230	739	1110
1570	2350	1400	2100	1270	1910		12	907	1360	810	1220	732	1100
1530	2300	1360	2050	1240	1860		13	897	1350	799	1200	722	1090
1490	2240	1330	1990	1200	1810		14	887	1330	789	1190	712	1070
1450	2180	1290	1930	1170	1750		15	877	1320	779	1170	702	1060
1410	2120	1250	1870	1130	1700		16	867	1300	769	1160	693	1040
1370	2060	1200	1810	1090	1640		17	857	1290	759	1140	683	1030
1320	1990	1160	1740	1050	1580		18	846	1270	749	1130	673	1010
1280	1920	1120	1680	1010	1520		19	836	1260	739	1110	663	996
1230	1850	1070	1610	971	1460		20	826	1240	729	1100	653	981
1140	1710	982	1480	888	1340		22	806	1210	709	1060	633	952
1050	1570	892	1340	806	1210		24	786	1180	688	1030	613	922
954	1430	804	1210	726	1090		26	766	1150	668	1000	593	892
863	1300	718	1080	648	973		28	745	1120	648	974	574	862
775	1160	636	956	573	861		30	725	1090	628	944	554	832
689	1040	559	840	503	756		32	705	1060	608	913	534	803
611	918	495	744	446	670		34	685	1030	587	883	514	773
545	819	442	664	398	598		36	665	999	567	853	494	743
489	735	397	596	357	536		38	644	969	547	822	474	713
441	663	358	538	322	484		40	624	938	527	792	450	677
400	602	325	488	292	439		42	604	908	504	758	424	638
365	548	296	445	266	400		44	584	878	478	718	402	604
334	501	271	407	244	366		46	562	845	454	682	381	573
306	461	249	374	224	336		48	535	804	432	650	363	545
282	424	229	344	206	310		50	511	768	413	620	346	520
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
1790	2690	1630	2440	1480	2220			11.9	45.7	11.2	41.6	11.3	39.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			42.7		38.8		35.3	
1440	2160	1310	1960	1190	1790			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			1710	677	1530	548	1380	495
282	423	265	398	240	359			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.98		3.76		3.74	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
465	698	395	593	355	534			1.59		1.67		1.67	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
109		99		90		lb/ft		109[f]		99[f]		90[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1340	2020	1220	1830	1110	1670	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	656	986	576	866	510	766
1290	1940	1170	1760	1070	1610		6	656	986	576	866	510	766
1270	1910	1160	1740	1050	1580		7	656	986	576	866	510	766
1250	1880	1140	1710	1040	1560		8	656	986	576	866	510	766
1230	1850	1120	1680	1020	1530		9	656	986	576	866	510	766
1210	1810	1100	1650	997	1500		10	656	986	576	866	510	766
1180	1770	1070	1610	975	1470		11	656	986	576	866	510	766
1150	1730	1050	1570	951	1430		12	656	986	576	866	510	766
1120	1690	1020	1530	926	1390		13	653	981	576	866	510	766
1090	1640	989	1490	899	1350		14	643	966	576	866	510	766
1060	1590	959	1440	872	1310		15	633	952	568	853	510	766
1020	1540	927	1390	843	1270		16	624	938	559	839	504	757
988	1480	895	1350	814	1220		17	614	923	549	825	495	743
952	1430	862	1300	784	1180		18	604	909	540	812	486	730
915	1380	829	1250	753	1130		19	595	894	531	798	477	716
878	1320	795	1190	722	1090		20	585	880	521	784	467	703
803	1210	726	1090	660	991		22	566	851	503	756	449	675
729	1100	658	989	597	898		24	547	822	484	728	431	648
655	985	591	889	536	806		26	527	793	466	700	413	621
585	879	527	792	478	718		28	508	764	447	672	395	594
516	776	465	698	421	632		30	489	735	428	644	377	567
454	682	408	614	370	556		32	470	706	410	616	359	540
402	604	362	544	328	492		34	450	677	391	588	336	505
359	539	323	485	292	439		36	431	648	367	551	310	467
322	484	290	435	262	394		38	406	611	342	513	289	434
290	437	261	393	237	356		40	381	573	320	481	270	406
263	396	237	356	215	323		42	359	539	301	452	253	381
240	361	216	325	196	294		44	339	510	284	427	239	359
220	330	198	297	179	269		46	321	483	269	404	226	339
202	303	181	273	164	247		48	306	459	255	384	214	322
186	279	167	251	151	228		50	291	438	243	365	204	306

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1340	2020	1220	1830	1110	1670	12.7	36.8	14.1	34.8	15.3	33.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	32.0		29.1		26.5	
1080	1620	982	1470	894	1340	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1240	447	1110	402	999	362
210	315	193	289	172	259	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.73		3.71		3.70	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
313	471	272	409	236	355	1.67		1.66		1.66	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
82		74		68		lb/ft		82		74		68	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1010	1510	914	1370	838	1260	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	486	730	440	662	402	604
923	1390	838	1260	768	1150		6	486	730	440	662	402	604
895	1340	813	1220	744	1120		7	486	730	440	662	402	604
863	1300	784	1180	717	1080		8	479	720	434	652	395	594
828	1250	753	1130	688	1030		9	469	705	424	637	386	579
792	1190	719	1080	657	988		10	459	689	414	622	376	565
753	1130	684	1030	624	938		11	448	674	404	607	366	550
712	1070	647	973	590	887		12	438	658	394	592	356	535
671	1010	609	916	555	835		13	427	642	384	576	347	521
629	945	571	859	520	782		14	417	627	373	561	337	506
587	882	533	801	485	728		15	407	611	363	546	327	491
545	819	495	744	449	675		16	396	595	353	531	317	477
503	756	457	687	415	623		17	386	580	343	516	307	462
463	696	420	632	381	572		18	375	564	333	500	298	448
423	637	385	578	348	523		19	365	549	323	485	288	433
385	579	350	526	316	475		20	355	533	313	470	278	418
318	478	289	435	261	392		22	334	502	292	440	259	389
267	402	243	365	219	330		24	313	470	271	408	233	351
228	343	207	311	187	281		26	289	434	244	367	210	315
197	295	179	268	161	242		28	263	396	222	334	190	286
171	257	156	234	140	211		30	242	364	204	306	174	262
150	226	137	205	123	185		32	224	337	188	283	161	242
133	200	121	182	109	164		34	209	313	175	263	149	224
119	179	108	162	97.5	147		36	195	293	164	246	139	209
107	160	96.9	146	87.5	131		38	183	276	154	231	131	196
96.3	145	87.5	131	79.0	119		40	173	260	145	218	123	185
							42	164	246	137	206	116	175
							44	156	234	130	195	110	166
							46	148	223	124	186	105	157
							48	141	212	118	177	99.9	150
							50	135	203	113	169	95.4	143

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1010	1510	914	1370	838	1260	7.40	25.2	7.40	23.8	7.34	22.7
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	24.0		21.8		20.0	
810	1220	736	1100	675	1010	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	881	148	795	134	722	121
204	306	179	268	163	244	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.48		2.48		2.46	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
156	235	141	213	129	194	2.44		2.44		2.44	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
61[c]		53[c]		48[c]		lb/ft		61[f]		53		48	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
750	1130	652	980	580	871	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	356	535	304	457	274	412
687	1030	566	851	508	764		6	356	535	302	453	271	407
665	1000	538	808	485	728		7	356	535	292	439	262	393
641	964	506	761	456	686		8	350	526	282	424	252	379
615	924	473	711	426	640		9	341	512	272	409	243	366
587	882	438	659	395	593		10	332	498	263	395	234	352
557	838	403	606	362	545		11	322	485	253	380	225	338
527	792	368	553	330	496		12	313	471	243	366	215	324
495	745	333	500	299	449		13	304	457	233	351	206	310
464	697	299	449	268	402		14	295	443	224	336	197	296
432	649	266	400	238	358		15	286	430	214	322	187	282
400	601	234	352	210	315		16	277	416	204	307	178	268
369	555	208	312	186	279		17	267	402	194	292	167	251
339	509	185	278	166	249		18	258	388	182	273	153	231
309	465	166	250	149	224		19	249	374	168	253	142	213
280	421	150	226	134	202		20	240	361	157	236	132	198
232	348	124	186	111	167		22	219	329	138	207	116	174
195	293	104	157	93.2	140		24	194	291	123	185	103	155
166	249	88.8	133	79.4	119		26	173	261	111	167	92.7	139
143	215	76.6	115	68.5	103		28	157	236	101	153	84.3	127
125	187	66.7	100	59.7	89.7		30	143	215	93.3	140	77.4	116
110	165	58.6	88.1				32	132	198	86.4	130	71.5	107
97.0	146						34	122	184	80.4	121	66.5	99.9
86.5	130						36	114	171	75.3	113	62.1	93.4
77.7	117						38	107	160	70.8	106	58.3	87.6
70.1	105						40	100	151	66.8	100	55.0	82.6
							42	94.6	142	63.2	95.0	52.0	78.1
							44	89.5	135	60.0	90.2	49.3	74.1
							46	85.0	128	57.1	85.9	46.9	70.5
							48	81.0	122	54.5	82.0	44.8	67.3
							50	77.3	116	52.2	78.4	42.8	64.3
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
750	1130	654	983	591	888			7.33	21.6	5.73	17.4	5.70	16.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			17.9		15.6		14.1	
604	906	527	790	476	714			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			640	107	541	57.7	484	51.4
146	219	144	216	131	197			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.45		1.92		1.91	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
114	172	76.8	116	68.5	103			2.44		3.07		3.06	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
43[c]		38[c]		34[c]		lb/ft		43		38		34	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
508	763	441	663	385	579	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	243	365	215	323	191	287
444	667	363	545	315	474		6	240	361	202	303	178	268
423	635	338	508	294	441		7	231	348	192	289	169	254
400	601	312	469	270	406		8	223	335	182	274	160	241
375	564	284	428	246	370		9	214	322	173	260	151	227
349	525	254	382	221	333		10	205	309	163	245	142	214
321	482	223	336	196	294		11	197	296	154	231	134	201
292	438	194	292	169	254		12	188	283	144	216	125	187
263	395	166	250	145	217		13	179	270	134	202	113	171
235	354	143	215	125	187		14	171	256	120	180	100	151
209	314	125	188	109	163		15	162	243	108	162	89.9	135
184	276	110	165	95.4	143		16	153	230	97.4	146	81.2	122
163	244	97.2	146	84.5	127		17	140	210	88.9	134	73.9	111
145	218	86.7	130	75.4	113		18	128	192	81.8	123	67.7	102
130	196	77.8	117	67.7	102		19	118	177	75.6	114	62.5	93.9
117	177	70.2	106	61.1	91.8		20	109	164	70.3	106	57.9	87.1
97.1	146	58.0	87.2	50.5	75.9		22	95.5	144	61.6	92.6	50.6	76.0
81.6	123	48.8	73.3	42.4	63.8		24	84.6	127	54.8	82.4	44.8	67.4
69.5	104						26	76.0	114	49.4	74.2	40.2	60.5
59.9	90.1						28	68.9	104	44.9	67.5	36.5	54.9
52.2	78.5						30	63.1	94.8	41.2	62.0	33.4	50.2
							32	58.2	87.4	38.1	57.3	30.8	46.3
							34	54.0	81.1	35.4	53.2	28.6	43.0
							36	50.4	75.7	33.1	49.8	26.7	40.1
							38	47.2	70.9	31.1	46.7	25.0	37.6
							40	44.4	66.8	29.3	44.0	23.5	35.4
							42	42.0	63.1	27.7	41.7	22.2	33.4
							44	39.8	59.8	26.3	39.5	21.1	31.7
							46	37.8	56.8	25.0	37.6	20.0	30.1
							48	36.0	54.2	23.9	35.9	19.1	28.7
							50	34.4	51.7	22.8	34.3	18.2	27.4
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
528	794	469	706	419	630			5.64	16.0	4.63	13.1	4.57	12.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			12.6		11.2		10.0	
425	638	378	567	338	506			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			428	45.2	385	26.7	340	23.3
117	175	122	184	112	168			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.89		1.55		1.53	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
60.4	90.8	42.3	63.5	37.0	55.7			3.08		3.79		3.81	

[c] Shape is slender for compression with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W14

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W14×						Shape		W14×					
30[c]		26[c]		22[c]		lb/ft		30[f]		26[v]		22[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
335	503	283	426	230	346	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	160	241	140	211	116	174
271	408	191	288	151	227		6	153	229	115	172	92.2	139
252	378	166	250	130	196		7	145	217	105	158	84.0	126
231	347	141	212	109	165		8	136	205	95.9	144	75.8	114
209	315	116	174	90.1	135		9	128	193	86.5	130	65.4	98.2
188	282	93.6	141	73.3	110		10	120	181	72.5	109	54.4	81.7
166	250	77.4	116	60.6	91.0		11	112	169	61.9	93.1	46.2	69.4
142	214	65.0	97.7	50.9	76.5		12	104	157	53.9	81.0	39.9	60.0
121	182	55.4	83.3	43.4	65.2		13	91.7	138	47.5	71.5	35.0	52.7
105	157	47.8	71.8	37.4	56.2		14	80.9	122	42.5	63.8	31.1	46.8
91.1	137	41.6	62.5	32.6	48.9		15	72.1	108	38.3	57.6	28.0	42.0
80.1	120	36.6	55.0	28.6	43.0		16	64.9	97.5	34.9	52.4	25.3	38.1
71.0	107	32.4	48.7	25.4	38.1		17	58.9	88.5	32.0	48.1	23.1	34.8
63.3	95.1	28.9	43.4				18	53.8	80.9	29.5	44.4	21.3	32.0
56.8	85.4						19	49.5	74.4	27.4	41.2	19.7	29.6
51.3	77.1						20	45.8	68.8	25.6	38.5	18.3	27.5
42.4	63.7						22	39.7	59.7	22.6	34.0	16.1	24.1
35.6	53.5						24	35.1	52.7	20.2	30.4	14.3	21.5
							26	31.3	47.1	18.3	27.5	12.9	19.4
							28	28.3	42.6	16.7	25.1	11.7	17.6
							30	25.9	38.9	15.4	23.2	10.8	16.2
							32	23.8	35.7	14.3	21.5	9.94	14.9
							34	22.0	33.1	13.3	20.0	9.25	13.9
							36	20.5	30.8	12.5	18.8	8.64	13.0
							38	19.2	28.8	11.7	17.6	8.12	12.2
							40	18.0	27.1	11.1	16.7	7.65	11.5
							42	17.0	25.5	10.5	15.8	7.24	10.9
							44	16.1	24.2	9.98	15.0	6.87	10.3
							46	15.3	22.9	9.51	14.3	6.54	9.82
							48	14.5	21.8	9.08	13.6	6.23	9.37
							50	13.9	20.8	8.69	13.1	5.96	8.96
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
371	558	322	484	272	409			5.06	12.2	3.22	9.02	3.10	8.60
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			8.85		7.69		6.49	
299	448	260	389	219	329			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			291	19.6	245	8.91	199	7.00
104	156	89.1	134	76.9	116			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.49		1.08		1.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
30.0	45.1	19.4	29.1	15.3	23.0			3.85		5.23		5.33	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
336[h]		305[h]		279[h]		lb/ft		336[h]		305[h]		279[h]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
4150	6230	3750	5640	3430	5160	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	2110	3170	1880	2820	1680	2530
3970	5960	3590	5390	3280	4930		6	2110	3170	1880	2820	1680	2530
3900	5870	3530	5300	3220	4840		7	2110	3170	1880	2820	1680	2530
3830	5760	3460	5200	3160	4750		8	2110	3170	1880	2820	1680	2530
3750	5640	3390	5090	3090	4650		9	2110	3170	1880	2820	1680	2530
3670	5510	3310	4970	3020	4540		10	2110	3170	1880	2820	1680	2530
3570	5370	3220	4840	2940	4410		11	2100	3160	1870	2810	1670	2510
3480	5220	3130	4700	2850	4280		12	2090	3140	1860	2790	1660	2500
3370	5070	3030	4560	2760	4150		13	2080	3130	1850	2780	1650	2490
3260	4900	2930	4400	2670	4010		14	2070	3110	1840	2770	1640	2470
3150	4730	2830	4250	2570	3860		15	2060	3100	1830	2750	1640	2460
3030	4550	2720	4080	2470	3710		16	2050	3080	1820	2740	1630	2450
2910	4370	2610	3920	2360	3550		17	2040	3070	1810	2720	1620	2430
2790	4190	2490	3750	2260	3400		18	2030	3060	1800	2710	1610	2420
2660	4010	2380	3580	2150	3240		19	2020	3040	1790	2700	1600	2400
2540	3820	2270	3410	2050	3080		20	2010	3030	1780	2680	1590	2390
2290	3450	2040	3060	1840	2760		22	2000	3000	1770	2650	1570	2360
2050	3080	1820	2730	1630	2450		24	1980	2970	1750	2630	1550	2340
1810	2720	1600	2410	1440	2160		26	1960	2940	1730	2600	1540	2310
1590	2380	1390	2090	1250	1870		28	1940	2910	1710	2570	1520	2280
1380	2080	1210	1820	1090	1630		30	1920	2880	1690	2540	1500	2260
1210	1820	1070	1600	954	1430		32	1900	2860	1670	2520	1480	2230
1080	1620	945	1420	845	1270		34	1880	2830	1650	2490	1460	2200
959	1440	843	1270	754	1130		36	1860	2800	1640	2460	1450	2170
861	1290	757	1140	676	1020		38	1840	2770	1620	2430	1430	2150
777	1170	683	1030	610	917		40	1820	2740	1600	2400	1410	2120
705	1060	619	931	554	832		42	1800	2710	1580	2380	1390	2090
642	965	564	848	504	758		44	1790	2680	1560	2350	1370	2070
587	883	516	776	462	694		46	1770	2660	1540	2320	1360	2040
539	811	474	713	424	637		48	1750	2630	1520	2290	1340	2010
497	747	437	657	391	587		50	1730	2600	1510	2260	1320	1980

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
4150	6230	3750	5640	3430	5160	10.4	107	10.2	97.6	10.1	89.9
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	98.9		89.5		81.9	
3340	5010	3020	4530	2760	4150	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	4060	1190	3550	1050	3110	937
837	1260	744	1120	681	1020	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.47		3.42		3.38	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
957	1440	852	1280	768	1160	1.85		1.84		1.82	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
252[h]		230[h]		210		lb/ft		252[h]		230[h]		210	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
3110	4670	2840	4270	2590	3890	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1500	2250	1350	2030	1220	1830
2960	4450	2700	4060	2470	3710		6	1500	2250	1350	2030	1220	1830
2910	4380	2660	3990	2420	3640		7	1500	2250	1350	2030	1220	1830
2850	4290	2600	3910	2370	3570		8	1500	2250	1350	2030	1220	1830
2790	4190	2540	3820	2320	3480		9	1500	2250	1350	2030	1220	1830
2720	4090	2480	3730	2260	3390		10	1490	2250	1350	2020	1210	1820
2650	3980	2410	3620	2190	3300		11	1490	2230	1340	2010	1210	1810
2570	3860	2340	3510	2130	3200		12	1480	2220	1330	2000	1200	1800
2480	3730	2260	3400	2050	3090		13	1470	2210	1320	1990	1190	1790
2400	3600	2180	3280	1980	2980		14	1460	2190	1310	1970	1180	1770
2310	3470	2100	3150	1900	2860		15	1450	2180	1300	1960	1170	1760
2210	3330	2010	3020	1820	2740		16	1440	2170	1300	1950	1160	1750
2120	3190	1920	2890	1740	2620		17	1430	2150	1290	1930	1150	1730
2020	3040	1840	2760	1660	2500		18	1420	2140	1280	1920	1150	1720
1930	2900	1750	2620	1580	2370		19	1420	2130	1270	1910	1140	1710
1830	2750	1660	2490	1500	2250		20	1410	2110	1260	1890	1130	1700
1640	2460	1480	2220	1330	2010		22	1390	2090	1240	1870	1110	1670
1450	2180	1310	1970	1180	1770		24	1370	2060	1230	1840	1090	1650
1270	1910	1140	1720	1030	1540		26	1350	2030	1210	1820	1080	1620
1100	1650	988	1480	885	1330		28	1340	2010	1190	1790	1060	1590
959	1440	860	1290	771	1160		30	1320	1980	1170	1760	1040	1570
843	1270	756	1140	678	1020		32	1300	1960	1160	1740	1030	1540
746	1120	670	1010	600	902		34	1280	1930	1140	1710	1010	1520
666	1000	597	898	535	805		36	1270	1900	1120	1690	992	1490
598	898	536	806	481	722		38	1250	1880	1110	1660	975	1470
539	811	484	727	434	652		40	1230	1850	1090	1640	958	1440
489	735	439	660	393	591		42	1210	1820	1070	1610	941	1410
446	670	400	601	358	539		44	1200	1800	1050	1580	924	1390
408	613	366	550	328	493		46	1180	1770	1040	1560	907	1360
374	563	336	505	301	453		48	1160	1740	1020	1530	890	1340
345	519	310	465	278	417		50	1140	1720	1000	1510	873	1310
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
3110	4670	2840	4270	2590	3890			9.97	81.7	9.88	75.0	9.79	68.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			74.1		67.7		61.8	
2500	3750	2280	3430	2090	3130			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			2720	828	2420	742	2140	664
604	906	545	818	486	729			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								3.34		3.31		3.28	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
685	1030	618	929	555	835			1.81		1.80		1.80	

[h] Flange thickness is greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.
Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
190		170		152		lb/ft		190		170		152	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
2350	3530	2100	3150	1870	2820	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	1090	1630	961	1440	849	1280
2230	3360	1990	2990	1780	2670		6	1090	1630	961	1440	849	1280
2190	3290	1950	2940	1750	2620		7	1090	1630	961	1440	849	1280
2150	3230	1910	2880	1710	2570		8	1090	1630	961	1440	849	1280
2100	3150	1870	2810	1670	2500		9	1090	1630	961	1440	849	1280
2040	3070	1820	2730	1620	2440		10	1080	1630	957	1440	845	1270
1980	2980	1760	2650	1570	2360		11	1080	1620	949	1430	837	1260
1920	2890	1710	2570	1520	2290		12	1070	1600	941	1410	829	1250
1850	2790	1650	2480	1470	2200		13	1060	1590	933	1400	820	1230
1790	2680	1590	2380	1410	2120		14	1050	1580	924	1390	812	1220
1710	2580	1520	2290	1350	2030		15	1040	1570	916	1380	804	1210
1640	2470	1460	2190	1290	1940		16	1030	1550	908	1360	796	1200
1570	2360	1390	2090	1230	1850		17	1030	1540	900	1350	788	1180
1490	2240	1320	1990	1170	1760		18	1020	1530	892	1340	780	1170
1420	2130	1250	1890	1110	1670		19	1010	1520	883	1330	772	1160
1340	2020	1190	1780	1050	1580		20	1000	1500	875	1320	763	1150
1190	1800	1050	1580	929	1400		22	983	1480	859	1290	747	1120
1050	1580	924	1390	813	1220		24	967	1450	842	1270	731	1100
913	1370	800	1200	702	1060		26	950	1430	826	1240	715	1070
788	1180	690	1040	606	910		28	933	1400	809	1220	698	1050
686	1030	601	904	528	793		30	916	1380	793	1190	682	1030
603	906	528	794	464	697		32	900	1350	776	1170	666	1000
534	803	468	704	411	617		34	883	1330	760	1140	649	976
476	716	418	628	366	551		36	866	1300	743	1120	633	952
428	643	375	563	329	494		38	849	1280	727	1090	617	927
386	580	338	508	297	446		40	833	1250	710	1070	601	903
350	526	307	461	269	405		42	816	1230	694	1040	584	878
319	479	280	420	245	369		44	799	1200	677	1020	568	854
292	439	256	384	224	337		46	783	1180	661	993	552	829
268	403	235	353	206	310		48	766	1150	644	969	535	805
247	371	216	325	190	285		50	749	1130	628	944	519	780

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
2350	3530	2100	3150	1870	2820	9.70	62.7	9.61	56.5	9.52	51.0
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	56.0		50.0		44.7	
1890	2840	1690	2530	1510	2260	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1890	589	1650	517	1430	454
427	641	376	564	334	501	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.25		3.22		3.19	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
500	751	440	662	388	583	1.79		1.78		1.77	

Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
136		120		106		lb/ft		136		120		106	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1670	2510	1480	2220	1310	1970	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	748	1120	650	977	573	861
1590	2380	1400	2100	1240	1860		6	748	1120	650	977	573	861
1560	2340	1370	2060	1210	1820		7	748	1120	650	977	573	861
1520	2290	1340	2010	1190	1780		8	748	1120	650	977	573	861
1480	2230	1310	1960	1160	1740		9	748	1120	650	977	573	861
1440	2170	1270	1910	1120	1690		10	743	1120	645	969	567	853
1400	2100	1230	1850	1090	1630		11	735	1100	637	957	560	841
1350	2030	1190	1790	1050	1580		12	727	1090	629	945	552	829
1300	1960	1140	1720	1010	1520		13	719	1080	621	933	544	818
1250	1880	1100	1650	970	1460		14	711	1070	613	921	536	806
1200	1800	1050	1580	928	1390		15	703	1060	605	910	528	794
1150	1720	1000	1510	885	1330		16	695	1040	597	898	521	782
1090	1640	955	1440	842	1270		17	687	1030	589	886	513	771
1040	1560	906	1360	798	1200		18	679	1020	582	874	505	759
982	1480	857	1290	754	1130		19	671	1010	574	862	497	747
927	1390	808	1210	711	1070		20	662	996	566	850	489	736
819	1230	712	1070	625	940		22	646	972	550	827	474	712
715	1070	620	932	544	817		24	630	947	534	803	458	689
615	925	532	800	466	700		26	614	923	519	779	443	666
530	797	459	690	402	604		28	598	899	503	756	427	642
462	695	400	601	350	526		30	582	875	487	732	412	619
406	610	352	528	308	462		32	566	851	471	709	396	595
360	541	311	468	272	410		34	550	826	456	685	381	572
321	482	278	417	243	365		36	534	802	440	661	365	549
288	433	249	375	218	328		38	518	778	424	638	347	522
260	391	225	338	197	296		40	502	754	408	614	328	493
236	354	204	307	179	268		42	485	730	391	587	311	467
215	323	186	279	163	245		44	469	705	371	558	295	444
197	295	170	256	149	224		46	453	680	354	532	281	423
181	271	156	235	137	205		48	433	650	338	508	268	404
166	250	144	216	126	189		50	414	623	324	487	257	386

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1670	2510	1480	2220	1310	1970	9.43	45.8	9.34	41.3	9.28	37.3
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	39.9		35.2		31.2	
1350	2020	1190	1780	1050	1580	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	1240	398	1070	345	933	301
296	445	260	391	220	330	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.16		3.13		3.11	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
342	515	298	448	262	394	1.77		1.76		1.76	

Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
96		87		79		lb/ft		96		87		79[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1180	1780	1070	1610	972	1460	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	513	772	461	693	410	616
1120	1680	1010	1520	919	1380		6	513	772	461	693	410	616
1100	1650	994	1490	900	1350		7	513	772	461	693	410	616
1070	1610	971	1460	879	1320		8	513	772	461	693	410	616
1040	1570	945	1420	855	1290		9	513	772	461	693	410	616
1010	1520	918	1380	830	1250		10	508	763	455	684	409	615
981	1470	888	1330	803	1210		11	500	751	447	672	402	604
946	1420	857	1290	774	1160		12	492	740	440	661	395	593
911	1370	824	1240	744	1120		13	485	729	432	650	387	582
873	1310	790	1190	713	1070		14	477	717	425	639	380	571
835	1260	755	1130	681	1020		15	470	706	418	628	373	560
796	1200	719	1080	648	974		16	462	694	410	616	366	549
757	1140	683	1030	615	925		17	454	683	403	605	358	538
717	1080	646	972	582	875		18	447	672	395	594	351	527
677	1020	610	917	549	825		19	439	660	388	583	344	517
637	958	574	863	516	775		20	432	649	380	572	336	506
560	842	503	757	452	679		22	417	626	365	549	322	484
486	730	436	655	390	587		24	401	603	351	527	307	462
416	625	373	560	333	501		26	386	580	336	504	293	440
358	539	321	483	287	432		28	371	558	321	482	278	418
312	469	280	421	250	376		30	356	535	306	460	264	396
274	413	246	370	220	331		32	341	512	291	437	244	366
243	365	218	327	195	293		34	325	489	271	408	226	340
217	326	194	292	174	261		36	306	461	253	381	211	317
195	293	174	262	156	234		38	288	433	238	357	198	297
176	264	157	237	141	212		40	272	408	224	337	186	280
159	239	143	215	128	192		42	257	386	212	318	176	264
145	218	130	196	116	175		44	244	367	201	302	167	250
133	200	119	179	106	160		46	232	349	191	287	158	238
122	183	109	164	97.8	147		48	222	333	182	274	151	227
112	169	101	151	90.1	135		50	212	319	174	262	144	217

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1180	1780	1070	1610	972	1460	9.22	34.7	9.16	32.3	9.92	30.3
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	28.2		25.6		23.2	
952	1430	864	1300	783	1170	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	833	270	740	241	662	216
196	293	180	270	163	245	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.09		3.07		3.05	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
236	354	211	317	186	279	1.76		1.75		1.75	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Note: Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
72		65		58		lb/ft		72[f]		65[f]		58[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
884	1330	801	1200	713	1070	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	363	546	317	476	301	452
835	1260	755	1140	655	984		6	363	546	317	476	301	452
818	1230	740	1110	635	955		7	363	546	317	476	301	452
799	1200	722	1090	613	922		8	363	546	317	476	298	448
777	1170	702	1060	590	886		9	363	546	317	476	291	437
754	1130	681	1020	564	848		10	363	546	317	476	284	427
729	1100	658	990	537	807		11	363	546	317	476	277	416
703	1060	634	953	509	765		12	357	536	317	476	270	405
675	1020	609	916	480	721		13	350	525	311	468	263	395
647	972	583	877	450	677		14	342	515	305	458	255	384
618	928	557	836	421	633		15	335	504	298	448	248	373
588	884	529	796	391	588		16	328	493	291	437	241	362
558	838	502	754	362	545		17	321	483	284	427	234	352
528	793	474	713	334	502		18	314	472	278	417	227	341
497	747	447	671	306	460		19	307	462	271	407	220	330
467	702	419	630	279	420		20	300	451	264	397	213	320
409	614	366	550	231	347		22	286	430	251	377	198	298
353	530	316	474	194	292		24	272	409	237	356	181	272
301	453	269	404	165	249		26	258	387	224	336	162	244
260	390	232	349	143	214		28	244	366	207	312	148	222
226	340	202	304	124	187		30	225	338	189	284	135	203
199	299	178	267	109	164		32	207	311	173	260	125	188
176	265	157	236	96.7	145		34	192	288	160	241	116	174
157	236	140	211	86.3	130		36	179	268	149	224	108	163
141	212	126	189	77.4	116		38	167	251	139	209	102	153
127	191	114	171	69.9	105		40	157	236	130	196	95.7	144
115	173	103	155				42	148	223	123	185	90.5	136
105	158	93.9	141				44	140	211	116	175	85.8	129
96.2	145	85.9	129				46	133	200	110	166	81.6	123
88.3	133	78.9	119				48	127	191	105	158	77.8	117
81.4	122	72.7	109				50	121	182	100	150	74.3	112

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
884	1330	801	1200	713	1070	11.0	28.8	12.2	27.3	7.60	23.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	21.1		19.1		17.0	
712	1070	645	967	574	861	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	597	195	533	174	475	107
148	222	132	198	123	184	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						3.04		3.02		2.51	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
163	244	140	210	113	170	1.75		1.75		2.10	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
53		50		45		lb/ft		53[f]		50		45	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
654	983	612	920	549	825	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	265	398	251	377	224	337
600	902	533	801	478	718		6	265	398	250	376	223	335
581	874	507	762	454	683		7	265	398	243	365	216	324
561	843	479	720	428	644		8	265	398	235	353	209	314
539	809	448	674	401	603		9	261	393	228	342	202	303
515	773	417	627	373	560		10	254	382	220	331	195	292
489	735	385	578	344	516		11	248	372	213	320	187	282
463	696	352	529	314	472		12	241	362	205	308	180	271
436	655	320	481	285	429		13	234	352	198	297	173	260
409	614	288	434	257	386		14	227	342	190	286	166	250
381	573	258	388	230	345		15	220	331	183	275	159	239
354	532	229	344	203	305		16	214	321	175	263	152	228
327	492	203	304	180	270		17	207	311	168	252	145	218
301	452	181	272	160	241		18	200	301	160	241	136	204
275	414	162	244	144	216		19	193	291	150	226	126	189
250	376	146	220	130	195		20	187	280	140	211	117	176
207	311	121	182	107	161		22	173	260	124	186	103	155
174	261	102	153	90.3	136		24	153	230	111	167	92.0	138
148	223	86.6	130	76.9	116		26	137	206	101	151	83.1	125
128	192	74.7	112	66.3	99.7		28	124	187	91.9	138	75.8	114
111	167	65.0	97.8	57.8	86.8		30	114	171	84.6	127	69.7	105
97.8	147	57.2	85.9	50.8	76.3		32	105	157	78.5	118	64.5	97.0
86.6	130						34	97.2	146	73.2	110	60.1	90.3
77.3	116						36	90.6	136	68.6	103	56.2	84.5
69.4	104						38	84.9	128	64.5	97.0	52.9	79.4
62.6	94.1						40	79.8	120	60.9	91.6	49.9	75.0
							42	75.4	113	57.7	86.8	47.2	71.0
							44	71.4	107	54.9	82.5	44.8	67.4
							46	67.9	102	52.3	78.6	42.7	64.2
							48	64.7	97.2	49.9	75.1	40.7	61.2
							50	61.7	92.8	47.8	71.8	39.0	58.6
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
654	983	612	920	549	825			8.51	22.0	5.85	18.4	5.82	17.5
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			15.6		14.6		13.1	
527	790	493	739	442	663			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			425	95.8	391	56.3	348	50.0
117	175	126	190	113	170			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.48		1.96		1.95	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
97.5	147	74.4	112	66.4	99.8			2.11		2.64		2.64	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
40[c]		35[c]		30[c]		lb/ft		40[f]		35		30	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
482	724	415	624	343	516	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	199	299	179	269	151	226
424	637	340	512	280	421		6	198	297	168	252	140	211
404	608	317	476	260	391		7	191	287	160	241	133	201
382	574	290	436	239	359		8	184	277	152	229	126	190
357	537	261	392	217	326		9	178	267	145	217	120	180
331	498	232	349	195	293		10	171	257	137	206	113	169
305	459	204	306	170	256		11	164	247	129	194	106	159
279	419	176	265	147	221		12	158	237	121	183	98.7	148
253	380	151	227	125	189		13	151	227	114	171	89.9	135
228	342	130	196	108	163		14	144	217	103	154	79.8	120
203	305	113	170	94.2	142		15	138	207	92.6	139	71.6	108
180	270	99.6	150	82.8	124		16	131	197	84.3	127	64.8	97.4
159	239	88.2	133	73.3	110		17	123	185	77.2	116	59.1	88.9
142	213	78.7	118	65.4	98.3		18	113	170	71.3	107	54.4	81.7
127	191	70.6	106	58.7	88.3		19	104	157	66.1	99.4	50.3	75.5
115	173	63.7	95.8	53.0	79.7		20	97.0	146	61.7	92.7	46.7	70.2
95.0	143	52.7	79.2	43.8	65.8		22	85.0	128	54.4	81.7	40.9	61.5
79.8	120	44.3	66.5	36.8	55.3		24	75.6	114	48.6	73.1	36.4	54.7
68.0	102						26	68.0	102	44.0	66.1	32.8	49.3
58.6	88.1						28	61.9	93.0	40.2	60.4	29.8	44.8
51.1	76.8						30	56.8	85.3	37.0	55.6	27.3	41.1
44.9	67.5						32	52.4	78.8	34.3	51.5	25.3	38.0
							34	48.7	73.3	31.9	48.0	23.5	35.3
							36	45.6	68.5	29.9	44.9	21.9	33.0
							38	42.8	64.3	28.1	42.3	20.6	31.0
							40	40.3	60.6	26.6	39.9	19.4	29.2
							42	38.1	57.3	25.2	37.8	18.4	27.6
							44	36.2	54.3	23.9	35.9	17.4	26.2
							46	34.4	51.7	22.8	34.2	16.6	24.9
							48	32.8	49.3	21.7	32.7	15.8	23.8
							50	31.4	47.1	20.8	31.3	15.1	22.7
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
490	737	432	649	368	554			5.82	16.7	4.60	13.3	4.54	12.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			11.7		10.3		8.79	
395	592	348	521	297	445			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			307	44.1	285	24.5	238	20.3
98.3	147	105	158	89.5	134			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.94		1.54		1.52	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
58.6	88.1	40.2	60.4	33.4	50.2			2.64		3.41		3.43	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12×						Shape		W12×					
26[c]		22[c]		19[c]		lb/ft		26[f],[v]		22		19[v]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
291	437	246	370	204	307	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	127	191	102	154	86.3	130
236	355	130	195	106	159		6	121	181	73.7	111	59.9	90.0
219	329	99.3	149	80.2	120		7	114	172	65.4	98.3	52.4	78.8
201	302	76.0	114	61.4	92.3		8	108	162	54.6	82.1	41.9	63.0
182	274	60.0	90.3	48.5	72.9		9	102	153	45.3	68.1	34.5	51.9
164	246	48.6	73.1	39.3	59.0		10	95.3	143	38.6	58.0	29.2	43.9
145	218	40.2	60.4	32.5	48.8		11	89.0	134	33.5	50.4	25.2	37.9
126	190	33.8	50.8	27.3	41.0		12	82.7	124	29.6	44.5	22.1	33.3
108	162	28.8	43.3	23.2	34.9		13	72.8	109	26.5	39.8	19.7	29.6
92.9	140	24.8	37.3				14	64.4	96.8	24.0	36.0	17.7	26.7
80.9	122						15	57.5	86.5	21.9	32.9	16.1	24.2
71.1	107						16	51.9	78.0	20.1	30.3	14.8	22.2
63.0	94.7						17	47.2	70.9	18.6	28.0	13.6	20.5
56.2	84.5						18	43.2	64.9	17.4	26.1	12.7	19.0
50.4	75.8						19	39.8	59.9	16.2	24.4	11.8	17.8
45.5	68.4						20	36.9	55.5	15.3	23.0	11.1	16.7
37.6	56.5						22	32.1	48.3	13.6	20.5	9.86	14.8
31.6	47.5						24	28.4	42.8	12.3	18.5	8.88	13.3
							26	25.5	38.3	11.3	16.9	8.08	12.2
							28	23.1	34.7	10.4	15.6	7.42	11.2
							30	21.1	31.8	9.60	14.4	6.86	10.3
							32	19.5	29.3	8.95	13.4	6.39	9.60
							34	18.0	27.1	8.38	12.6	5.97	8.97
							36	16.8	25.3	7.88	11.8	5.61	8.43
							38	15.8	23.7	7.44	11.2	5.29	7.95
							40	14.8	22.3	7.04	10.6	5.00	7.52
							42	14.0	21.0	6.69	10.1	4.75	7.14
							44	13.3	19.9	6.37	9.58	4.52	6.79
							46	12.6	18.9	6.08	9.14	4.31	6.48
							48	12.0	18.0	5.82	8.74	4.12	6.19
							50	11.5	17.2	5.58	8.38	3.95	5.93
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
321	482	272	408	233	351			5.00	12.2	2.53	7.40	2.45	7.05
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			7.65		6.48		5.57	
258	387	219	328	188	282			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			204	17.3	156	4.66	130	3.76
70.6	106	89.5	134	72.1	108			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.51		0.848		0.822	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
27.5	41.4	12.8	19.2	10.4	15.6			3.42		5.79		5.86	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W12–W10

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W12× 16[c]		W12× 14[c]		W10× 112		Shape lb/ft		W12× 16[v]		W12× 14[f],[v]		W10× 112	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
166	250	141	212	1380	2070	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	70.2	106	58.7	88.2	513	772
80.0	120	65.6	98.6	1280	1930		6	46.0	69.2	38.8	58.4	513	772
60.0	90.1	50.2	75.5	1250	1870		7	38.0	57.2	31.0	46.6	513	772
45.9	69.0	38.5	57.8	1210	1820		8	30.1	45.3	24.4	36.7	513	772
36.3	54.5	30.4	45.7	1170	1760		9	24.7	37.1	19.9	29.9	508	764
29.4	44.2	24.6	37.0	1120	1690		10	20.7	31.1	16.7	25.0	503	756
24.3	36.5	20.3	30.6	1080	1620		11	17.8	26.7	14.2	21.4	497	747
20.4	30.7	17.1	25.7	1030	1540		12	15.5	23.3	12.4	18.6	492	739
				975	1470		13	13.8	20.7	10.9	16.4	487	731
				922	1390		14	12.3	18.5	9.76	14.7	481	723
				869	1310		15	11.2	16.8	8.80	13.2	476	715
				815	1230		16	10.2	15.3	8.01	12.0	470	707
				762	1150		17	9.37	14.1	7.35	11.0	465	699
				709	1070		18	8.67	13.0	6.78	10.2	460	691
				657	988		19	8.07	12.1	6.30	9.46	454	683
				607	912		20	7.55	11.3	5.87	8.83	449	675
				510	766		22	6.68	10.0	5.18	7.79	438	659
				428	644		24	6.00	9.02	4.64	6.97	427	642
				365	548		26	5.45	8.18	4.20	6.31	417	626
				315	473		28	4.99	7.50	3.83	5.76	406	610
				274	412		30	4.60	6.92	3.53	5.31	395	594
				241	362		32	4.27	6.42	3.27	4.92	384	578
				213	321		34	3.99	6.00	3.05	4.59	374	561
				190	286		36	3.74	5.62	2.86	4.30	363	545
				171	257		38	3.52	5.30	2.69	4.04	352	529
				154	232		40	3.33	5.01	2.54	3.82	341	513
				140	210		42	3.16	4.75	2.41	3.61	331	497
				127	191		44	3.00	4.51	2.29	3.43	320	481
							46	2.86	4.30	2.18	3.27	309	464
							48	2.74	4.11	2.08	3.12	296	445
							50	2.62	3.94	1.99	2.99	284	426
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
197	297	174	262	1380	2070			2.31	6.64	2.61	6.41	8.00	46.2
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			4.71		4.16		32.9	
159	238	140	211	1110	1670			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			103	2.82	88.6	2.36	716	236
66.4	99.8	57.0	85.7	241	361			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								0.773		0.753		2.68	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
7.88	11.8	6.32	9.49	242	363			6.04		6.14		1.74	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W10×						Shape		W10×					
100		88		77		lb/ft		100		88		77	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
1230	1850	1090	1640	951	1430	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	454	683	395	593	341	512
1140	1710	1010	1520	880	1320		6	454	683	395	593	341	512
1110	1670	982	1480	855	1290		7	454	683	395	593	341	512
1070	1610	951	1430	828	1240		8	454	682	394	592	340	511
1040	1560	917	1380	797	1200		9	448	674	389	584	335	503
996	1500	881	1320	765	1150		10	443	666	383	576	329	495
953	1430	842	1270	731	1100		11	438	658	378	568	324	487
908	1360	802	1210	695	1040		12	432	650	373	561	319	480
861	1290	760	1140	658	989		13	427	642	368	553	314	472
814	1220	718	1080	621	933		14	422	634	362	545	309	464
766	1150	675	1010	583	876		15	416	626	357	537	304	456
718	1080	632	949	544	818		16	411	618	352	529	298	449
670	1010	589	885	507	762		17	406	610	347	521	293	441
622	935	546	821	469	706		18	400	602	342	513	288	433
576	865	505	759	433	651		19	395	594	336	505	283	425
530	797	465	698	398	598		20	390	586	331	498	278	418
444	667	388	583	331	497		22	379	570	321	482	267	402
373	560	326	490	278	418		24	368	554	310	466	257	387
318	478	278	417	237	356		26	358	538	300	450	247	371
274	412	239	360	204	307		28	347	522	289	435	237	356
239	359	209	313	178	267		30	337	506	279	419	226	340
210	315	183	276	156	235		32	326	490	268	403	216	325
186	279	162	244	139	208		34	315	474	258	387	204	307
166	249	145	218	124	186		36	305	458	247	371	192	288
149	224	130	195	111	167		38	294	442	235	354	181	272
134	202	117	176	100	150		40	283	426	223	335	171	257
122	183	106	160	90.8	136		42	272	409	212	318	162	244
111	167						44	259	390	202	303	155	232
							46	248	372	192	289	147	222
							48	237	356	184	277	141	212
							50	227	341	176	265	135	203

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
1230	1850	1090	1640	951	1430	7.91	41.8	7.85	37.2	7.76	33.1
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	29.3		26.0		22.7	
989	1480	878	1320	766	1150	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	623	207	534	179	455	154
211	317	183	274	157	236	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.65		2.63		2.60	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
213	320	185	279	160	241	1.74		1.73		1.73	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W10×						Shape		W10×					
68		60		54		lb/ft		68		60		54[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
834	1250	742	1120	662	995	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	298	448	261	392	230	345
771	1160	685	1030	611	918		6	298	448	261	392	230	345
749	1130	665	1000	593	892		7	298	448	261	392	230	345
725	1090	643	967	573	862		8	297	446	259	389	230	345
698	1050	619	931	552	830		9	292	438	254	382	226	340
670	1010	594	892	529	795		10	286	431	249	374	221	333
639	961	566	851	504	758		11	281	423	244	367	216	325
608	914	538	809	479	720		12	276	415	239	359	212	318
575	865	509	765	453	681		13	271	408	234	352	207	311
542	815	479	720	426	641		14	266	400	229	345	202	304
509	765	449	675	399	600		15	261	393	224	337	197	296
475	714	419	630	372	560		16	256	385	219	330	192	289
442	664	389	585	346	520		17	251	377	214	322	188	282
409	615	360	541	320	480		18	246	370	210	315	183	275
377	567	331	498	294	442		19	241	362	205	307	178	267
346	521	304	457	269	405		20	236	355	200	300	173	260
288	433	252	379	223	336		22	226	339	190	285	163	246
242	364	212	318	188	282		24	216	324	180	270	154	231
206	310	181	271	160	240		26	206	309	170	255	143	215
178	267	156	234	138	207		28	195	294	159	239	130	196
155	233	136	204	120	180		30	185	279	146	220	120	180
136	205	119	179	106	159		32	172	259	136	204	111	167
121	181	106	159	93.5	141		34	161	242	127	190	103	155
108	162	94.2	142	83.4	125		36	151	227	119	178	96.7	145
96.5	145	84.5	127	74.8	112		38	142	214	112	168	91.0	137
87.1	131	76.3	115	67.6	102		40	134	202	105	159	85.8	129
79.0	119	69.2	104	61.3	92.1		42	128	192	100	150	81.3	122
							44	121	182	95.0	143	77.2	116
							46	116	174	90.5	136	73.5	110
							48	111	166	86.5	130	70.2	105
							50	106	159	82.8	124	67.1	101

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
834	1250	742	1120	662	995	7.73	30.1	7.67	27.4	8.23	25.5
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	19.9		17.7		15.8	
672	1010	597	896	533	800	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	394	134	341	116	303	103
137	205	120	180	105	157	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						2.59		2.57		2.56	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
140	211	122	184	107	161	1.71		1.71		1.71	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W10×						Shape		W10×					
49		45		39		lb/ft		49[f]		45		39	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
604	907	557	838	482	725	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	204	306	192	288	163	246
556	836	489	735	421	633		6	204	306	192	288	163	245
540	811	466	701	401	603		7	204	306	187	281	158	238
521	784	441	663	379	570		8	204	306	182	273	154	231
502	754	415	624	355	534		9	204	306	177	266	149	224
480	722	387	582	331	497		10	200	300	172	258	144	217
458	688	359	539	306	460		11	195	293	167	251	139	209
434	653	330	495	281	422		12	190	286	162	243	135	202
410	617	301	452	255	384		13	186	279	157	236	130	195
386	580	273	410	231	347		14	181	272	152	228	125	188
361	543	245	369	207	311		15	176	265	147	221	120	181
336	505	219	329	184	276		16	172	258	142	213	116	174
312	469	194	292	163	245		17	167	251	137	206	111	167
288	433	173	260	145	218		18	162	244	132	198	106	159
265	398	155	234	130	196		19	158	237	127	191	100	151
242	364	140	211	118	177		20	153	230	122	183	93.9	141
200	301	116	174	97.2	146		22	144	216	109	164	83.0	125
168	253	97.4	146	81.7	123		24	134	202	98.1	147	74.4	112
143	216	83.0	125	69.6	105		26	122	183	89.2	134	67.4	101
124	186	71.5	108	60.0	90.2		28	111	166	81.9	123	61.7	92.8
108	162	62.3	93.7	52.3	78.6		30	102	153	75.7	114	56.9	85.5
94.7	142	54.8	82.3	46.0	69.1		32	93.9	141	70.3	106	52.8	79.4
83.9	126						34	87.3	131	65.8	98.8	49.3	74.0
74.8	112						36	81.6	123	61.7	92.8	46.2	69.4
67.2	101						38	76.7	115	58.2	87.5	43.5	65.4
60.6	91.1						40	72.3	109	55.0	82.7	41.1	61.7
55.0	82.6						42	68.4	103	52.2	78.5	38.9	58.5
							44	64.9	97.5	49.7	74.7	37.0	55.6
							46	61.7	92.8	47.4	71.2	35.3	53.0
							48	58.9	88.5	45.3	68.1	33.7	50.7
							50	56.3	84.6	43.4	65.2	32.3	48.5
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
604	907	557	838	482	725			9.16	24.2	6.00	20.4	5.91	18.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			14.4		13.3		11.5	
486	729	449	673	388	582			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			272	93.4	248	53.4	209	45.0
95.2	143	99.0	148	87.5	131			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.54		2.01		1.98	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
93.8	141	70.9	107	60.1	90.3			1.71		2.15		2.16	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W10×						Shape		W10×					
33		30		26[c]		lb/ft		33[f]		30		26	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
407	612	371	557	312	468	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	130	195	128	192	109	164
353	531	279	420	239	360		6	130	195	117	176	99.1	149
336	505	252	379	216	324		7	130	195	111	167	93.8	141
317	476	224	337	192	288		8	126	189	106	159	88.6	133
296	445	196	295	167	251		9	121	182	99.8	150	83.3	125
275	413	169	254	144	216		10	117	176	94.1	141	78.0	117
253	381	143	215	121	182		11	113	169	88.4	133	72.7	109
232	348	120	181	102	153		12	108	162	82.7	124	66.9	101
210	316	102	154	86.9	131		13	104	156	75.8	114	59.4	89.3
189	284	88.4	133	75.0	113		14	99.3	149	68.4	103	53.3	80.1
169	253	77.0	116	65.3	98.1		15	94.9	143	62.2	93.5	48.3	72.7
149	224	67.7	102	57.4	86.3		16	90.5	136	57.1	85.8	44.2	66.4
132	198	59.9	90.1	50.8	76.4		17	86.0	129	52.8	79.3	40.7	61.2
118	177	53.5	80.3	45.3	68.2		18	79.4	119	49.0	73.7	37.7	56.7
106	159	48.0	72.1	40.7	61.2		19	73.6	111	45.8	68.9	35.1	52.8
95.4	143	43.3	65.1	36.7	55.2		20	68.5	103	43.0	64.6	32.9	49.5
78.8	118	35.8	53.8	30.4	45.6		22	60.2	90.5	38.3	57.6	29.2	43.9
66.2	99.5						24	53.7	80.8	34.6	51.9	26.2	39.4
56.4	84.8						26	48.5	72.9	31.5	47.3	23.8	35.8
48.7	73.1						28	44.2	66.5	28.9	43.5	21.9	32.9
42.4	63.7						30	40.6	61.1	26.8	40.3	20.2	30.3
37.3	56.0						32	37.6	56.5	24.9	37.5	18.8	28.2
							34	35.0	52.6	23.3	35.1	17.5	26.3
							36	32.8	49.2	21.9	32.9	16.4	24.7
							38	30.8	46.3	20.7	31.1	15.5	23.3
							40	29.0	43.7	19.6	29.4	14.7	22.0
							42	27.5	41.3	18.6	27.9	13.9	20.9
							44	26.1	39.2	17.7	26.6	13.2	19.9
							46	24.9	37.4	16.9	25.4	12.6	18.9
							48	23.7	35.6	16.1	24.3	12.0	18.1
							50	22.7	34.1	15.5	23.2	11.5	17.3
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
407	612	371	557	319	479			7.06	17.1	4.09	12.6	4.06	11.9
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			9.71		8.84		7.61	
328	492	298	448	257	385			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			171	36.6	170	16.7	144	14.1
79.0	119	88.2	132	75.0	112			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.94		1.37		1.36	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
45.9	69.0	30.9	46.4	26.2	39.4			2.16		3.20		3.20	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W10× 22[c]		W10× 19[c]		W10× 17[c]		Shape lb/ft		W10× 22[f]		W10× 19		W10× 17	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
260	391	226	340	197	297	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	90.1	135	75.4	113	65.3	98.2
200	300	118	177	99.5	150		6	81.1	122	56.1	84.4	47.0	70.7
181	272	91.4	137	75.9	114		7	76.4	115	50.4	75.8	41.8	62.8
160	240	70.0	105	58.1	87.3		8	71.6	108	44.0	66.2	34.9	52.5
139	208	55.3	83.1	45.9	69.0		9	66.8	100	36.8	55.3	29.0	43.6
118	178	44.8	67.3	37.2	55.9		10	62.1	93.3	31.5	47.4	24.7	37.2
99.0	149	37.0	55.7	30.7	46.2		11	57.3	86.1	27.5	41.4	21.5	32.3
83.2	125	31.1	46.8	25.8	38.8		12	50.1	75.3	24.4	36.7	19.0	28.5
70.9	107	26.5	39.9	22.0	33.1		13	44.2	66.5	21.9	33.0	17.0	25.5
61.1	91.9	22.9	34.4	19.0	28.5		14	39.5	59.3	19.9	30.0	15.4	23.1
53.3	80.0						15	35.6	53.5	18.3	27.4	14.0	21.1
46.8	70.4						16	32.4	48.7	16.8	25.3	12.9	19.4
41.5	62.3						17	29.7	44.7	15.6	23.5	12.0	18.0
37.0	55.6						18	27.4	41.2	14.6	21.9	11.1	16.7
33.2	49.9						19	25.5	38.3	13.7	20.6	10.4	15.7
30.0	45.0						20	23.8	35.7	12.9	19.4	9.81	14.7
24.8	37.2						22	21.0	31.5	11.5	17.4	8.76	13.2
							24	18.8	28.2	10.5	15.7	7.92	11.9
							26	17.0	25.5	9.57	14.4	7.23	10.9
							28	15.5	23.3	8.82	13.3	6.66	10.0
							30	14.3	21.5	8.19	12.3	6.17	9.27
							32	13.2	19.9	7.64	11.5	5.75	8.64
							34	12.3	18.5	7.16	10.8	5.39	8.09
							36	11.6	17.4	6.74	10.1	5.06	7.61
							38	10.9	16.3	6.36	9.56	4.78	7.19
							40	10.3	15.4	6.03	9.06	4.53	6.81
							42	9.73	14.6	5.73	8.61	4.30	6.46
							44	9.24	13.9	5.46	8.21	4.10	6.16
							46	8.80	13.2	5.21	7.84	3.91	5.88
							48	8.41	12.6	4.99	7.50	3.74	5.62
							50	8.05	12.1	4.78	7.19	3.58	5.39
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
272	409	236	354	209	314			4.12	11.1	2.61	7.79	2.52	7.41
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			6.49		5.62		4.99	
219	329	190	285	168	253			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			118	11.4	96.3	4.29	81.9	3.56
68.5	103	71.4	107	67.9	102			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.33		0.874		0.845	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
21.1	31.7	11.7	17.6	9.78	14.7			3.21		4.74		4.79	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W10–W8

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W10×				W8×		Shape		W10×				W8×	
15[c]		12[c]		67		lb/ft		15		12[f],[v]		67	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
171	257	129	194	826	1240	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	55.9	84.0	41.7	62.6	245	368
82.3	124	62.7	94.3	734	1100		6	38.7	58.1	29.3	44.0	245	368
61.6	92.6	46.5	69.8	703	1060		7	33.9	50.9	24.3	36.5	243	365
47.2	70.9	35.6	53.5	669	1010		8	27.1	40.8	19.2	28.9	239	359
37.3	56.0	28.1	42.3	633	952		9	22.4	33.7	15.7	23.7	236	354
30.2	45.4	22.8	34.2	595	894		10	19.0	28.6	13.2	19.9	232	349
25.0	37.5	18.8	28.3	555	835		11	16.5	24.7	11.4	17.1	229	344
21.0	31.5	15.8	23.8	515	774		12	14.5	21.8	9.92	14.9	225	338
17.9	26.9	13.5	20.3	474	713		13	12.9	19.4	8.79	13.2	222	333
				434	653		14	11.6	17.5	7.88	11.8	218	328
				395	593		15	10.6	15.9	7.13	10.7	215	323
				357	536		16	9.73	14.6	6.51	9.79	211	318
				320	481		17	9.00	13.5	5.99	9.00	208	312
				285	429		18	8.36	12.6	5.54	8.33	204	307
				256	385		19	7.81	11.7	5.16	7.76	201	302
				231	347		20	7.33	11.0	4.83	7.25	197	297
				191	287		22	6.54	9.82	4.27	6.43	191	286
				160	241		24	5.90	8.86	3.84	5.77	184	276
				137	205		26	5.37	8.08	3.48	5.24	177	266
				118	177		28	4.94	7.42	3.19	4.80	170	255
				103	154		30	4.57	6.87	2.94	4.43	163	245
				90.3	136		32	4.26	6.40	2.73	4.11	156	234
				79.9	120		34	3.98	5.98	2.55	3.84	149	224
							36	3.74	5.62	2.39	3.60	141	211
							38	3.53	5.31	2.26	3.39	133	200
							40	3.34	5.02	2.13	3.20	126	190
							42	3.17	4.77	2.02	3.04	120	180
							44	3.02	4.54	1.92	2.89	114	172
							46	2.88	4.33	1.83	2.75	109	164
							48	2.76	4.14	1.75	2.63	105	157
							50	2.64	3.97	1.68	2.52	100	151
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
185	278	148	223	826	1240			2.42	7.03	2.92	6.65	6.33	34.4
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			4.41		3.54		19.7	
149	223	119	179	665	997			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			68.9	2.89	53.8	2.18	272	88.6
64.3	96.5	47.2	70.9	144	215			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								0.810		0.785		2.12	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
8.03	12.1	5.62	8.45	114	172			4.88		4.97		1.75	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 70 ksi; therefore ϕ_v = 0.90 and Ω_v = 1.67.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W8×						Shape		W8×					
58		48		40		lb/ft		58		48		40	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
717	1080	591	888	490	737	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	209	314	171	257	139	209
636	955	523	786	432	649		6	209	314	171	257	139	209
608	915	500	752	412	620		7	206	310	169	253	136	205
579	870	475	714	391	588		8	203	305	165	248	133	200
547	822	448	674	368	553		9	200	300	162	243	130	195
513	771	420	632	344	517		10	196	295	159	238	126	190
478	719	391	588	319	480		11	193	290	155	233	123	185
443	666	362	544	294	443		12	189	285	152	228	120	180
407	612	332	499	270	405		13	186	279	148	223	117	176
372	560	303	456	245	368		14	182	274	145	218	114	171
338	508	275	413	221	332		15	179	269	142	213	110	166
305	458	247	371	198	298		16	176	264	138	208	107	161
272	409	220	331	176	264		17	172	259	135	203	104	156
243	365	197	295	157	236		18	169	254	132	198	101	151
218	328	176	265	141	212		19	165	249	128	193	97.5	147
197	296	159	239	127	191		20	162	243	125	188	94.3	142
163	244	132	198	105	158		22	155	233	118	178	87.9	132
137	205	111	166	88.2	133		24	148	223	112	168	79.7	120
116	175	94.2	142	75.2	113		26	141	213	105	158	72.7	109
100	151	81.2	122	64.8	97.4		28	135	202	96.6	145	66.8	100
87.5	131	70.7	106	56.5	84.9		30	128	192	89.6	135	61.8	92.9
76.9	116	62.2	93.5	49.6	74.6		32	119	180	83.6	126	57.6	86.5
68.1	102	55.1	82.8	44.0	66.1		34	112	168	78.3	118	53.9	81.0
							36	106	159	73.7	111	50.6	76.1
							38	99.7	150	69.6	105	47.8	71.8
							40	94.6	142	65.9	99.1	45.2	67.9
							42	89.9	135	62.7	94.2	42.9	64.5
							44	85.7	129	59.7	89.7	40.9	61.4
							46	81.8	123	57.0	85.7	39.0	58.6
							48	78.3	118	54.5	82.0	37.3	56.0
							50	75.1	113	52.3	78.6	35.7	53.7
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
717	1080	591	888	490	737			6.27	30.2	6.21	25.8	6.09	22.3
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			17.1		14.1		11.7	
577	866	476	714	395	592			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			228	75.1	184	60.9	146	49.1
125	187	95.2	143	83.2	125			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.10		2.08		2.04	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
97.5	146	80.0	120	64.6	97.1			1.74		1.74		1.73	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W8×						Shape		W8×					
35		31		28		lb/ft		35[f]		31[f]		28	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
432	649	383	575	346	520	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	120	180	102	153	95.0	143
380	570	336	505	283	425		6	120	180	102	153	91.3	137
362	545	321	482	263	395		7	118	178	102	153	88.1	132
343	516	304	456	241	363		8	115	173	100	151	84.9	128
323	486	286	429	219	330		9	112	168	97.3	146	81.7	123
302	454	267	401	197	296		10	109	164	94.3	142	78.5	118
280	421	247	372	175	263		11	106	159	91.3	137	75.4	113
258	388	227	342	154	231		12	103	154	88.3	133	72.2	108
236	355	208	312	134	201		13	99.5	150	85.3	128	69.0	104
214	322	189	283	115	173		14	96.4	145	82.3	124	65.8	98.9
193	290	170	255	100	151		15	93.3	140	79.3	119	62.6	94.1
173	260	152	228	88.3	133		16	90.1	135	76.3	115	59.4	89.3
153	230	135	202	78.2	118		17	87.0	131	73.3	110	55.0	82.6
137	206	120	180	69.8	105		18	83.9	126	70.3	106	51.2	76.9
123	184	108	162	62.6	94.1		19	80.8	121	67.3	101	47.9	71.9
111	166	97.2	146	56.5	84.9		20	77.6	117	62.9	94.6	45.0	67.6
91.5	138	80.3	121	46.7	70.2		22	69.5	105	55.7	83.7	40.1	60.3
76.9	116	67.5	101	39.2	59.0		24	62.6	94.1	49.9	75.0	36.3	54.5
65.5	98.5	57.5	86.5	33.4	50.2		26	56.9	85.5	45.3	68.1	33.1	49.8
56.5	84.9	49.6	74.5				28	52.2	78.5	41.4	62.3	30.5	45.8
49.2	74.0	43.2	64.9				30	48.2	72.5	38.2	57.4	28.2	42.4
43.3	65.0	38.0	57.1				32	44.8	67.4	35.5	53.3	26.3	39.5
							34	41.9	63.0	33.1	49.8	24.6	37.0
							36	39.3	59.1	31.0	46.7	23.1	34.8
							38	37.1	55.7	29.2	43.9	21.8	32.8
							40	35.1	52.7	27.6	41.5	20.7	31.1
							42	33.3	50.0	26.2	39.3	19.6	29.5
							44	31.7	47.6	24.9	37.4	18.7	28.1
							46	30.2	45.4	23.7	35.7	17.8	26.8
							48	28.9	43.4	22.7	34.1	17.1	25.7
							50	27.6	41.5	21.7	32.6	16.4	24.6
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
432	649	383	575	346	520			6.48	20.4	7.53	19.0	4.84	16.0
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			10.3		9.13		8.25	
348	521	308	462	278	418			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			127	42.6	110	37.1	98.0	21.7
70.5	106	63.8	95.8	64.3	96.5			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								2.03		2.02		1.62	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
55.4	83.2	46.2	69.4	35.3	53.0			1.73		1.72		2.13	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W8×						Shape		W8×					
24		21		18		lb/ft		24[f]		21		18[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
297	446	258	388	220	331	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	79.8	120	71.3	107	59.0	88.7
242	363	185	278	155	233		6	77.1	116	63.6	95.6	52.0	78.2
225	338	164	246	137	206		7	74.1	111	60.1	90.4	48.9	73.5
206	310	143	214	118	178		8	71.1	107	56.7	85.2	45.7	68.7
187	281	122	183	100	151		9	68.1	102	53.3	80.1	42.6	64.0
168	253	102	153	83.1	125		10	65.1	97.9	49.9	74.9	39.4	59.3
149	224	84.4	127	68.6	103		11	62.1	93.4	46.4	69.8	35.7	53.7
131	197	70.9	107	57.7	86.7		12	59.1	88.9	42.2	63.4	31.4	47.1
113	170	60.4	90.8	49.2	73.9		13	56.1	84.4	37.8	56.8	27.9	42.0
97.7	147	52.1	78.3	42.4	63.7		14	53.1	79.9	34.2	51.4	25.2	37.8
85.1	128	45.4	68.2	36.9	55.5		15	49.6	74.5	31.2	46.9	22.9	34.4
74.8	112	39.9	59.9	32.4	48.8		16	45.4	68.2	28.7	43.2	21.0	31.5
66.3	99.6	35.3	53.1	28.7	43.2		17	41.9	63.0	26.6	40.0	19.4	29.1
59.1	88.9	31.5	47.4	25.6	38.5		18	38.9	58.4	24.8	37.3	18.0	27.1
53.1	79.8	28.3	42.5	23.0	34.6		19	36.3	54.5	23.2	34.9	16.8	25.3
47.9	72.0	25.5	38.4	20.8	31.2		20	34.0	51.1	21.8	32.8	15.8	23.7
39.6	59.5						22	30.3	45.5	19.5	29.3	14.0	21.1
33.3	50.0						24	27.2	41.0	17.6	26.5	12.6	19.0
28.3	42.6						26	24.8	37.3	16.1	24.2	11.5	17.3
							28	22.8	34.2	14.8	22.3	10.6	15.9
							30	21.1	31.6	13.7	20.6	9.79	14.7
							32	19.6	29.4	12.8	19.2	9.11	13.7
							34	18.3	27.5	12.0	18.0	8.52	12.8
							36	17.2	25.8	11.3	17.0	8.00	12.0
							38	16.2	24.4	10.6	16.0	7.55	11.3
							40	15.3	23.1	10.1	15.2	7.14	10.7
							42	14.6	21.9	9.58	14.4	6.78	10.2
							44	13.9	20.8	9.12	13.7	6.45	9.69
							46	13.2	19.9	8.71	13.1	6.15	9.25
							48	12.6	19.0	8.33	12.5	5.88	8.84
							50	12.1	18.2	7.98	12.0	5.64	8.47

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
297	446	258	388	220	331	5.11	14.7	3.76	11.6	3.79	10.7
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	7.08		6.16		5.26	
239	358	208	312	178	266	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	82.7	18.3	75.3	9.77	61.9	7.97
54.4	81.6	58.0	86.9	52.4	78.6	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						1.61		1.26		1.23	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
29.4	44.3	19.9	29.9	16.1	24.2	2.12		2.77		2.79	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W8

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W8×						Shape		W8×					
15		13		10[c]		lb/ft		15		13[f]		10[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
186	280	161	242	115	172	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	47.5	71.4	39.7	59.7	29.2	43.9
93.2	140	76.3	115	58.6	88.1		6	35.7	53.7	28.8	43.3	21.7	32.6
72.6	109	58.1	87.4	44.6	67.0		7	32.3	48.5	25.7	38.6	19.0	28.5
55.6	83.5	44.5	66.9	34.1	51.3		8	28.7	43.2	21.7	32.6	15.1	22.7
43.9	66.0	35.2	52.9	27.0	40.5		9	24.1	36.2	18.1	27.2	12.5	18.7
35.6	53.5	28.5	42.8	21.9	32.8		10	20.7	31.2	15.5	23.3	10.5	15.8
29.4	44.2	23.5	35.4	18.1	27.1		11	18.2	27.3	13.5	20.3	9.11	13.7
24.7	37.1	19.8	29.7	15.2	22.8		12	16.2	24.3	12.0	18.0	8.00	12.0
21.0	31.6	16.9	25.3	12.9	19.4		13	14.6	21.9	10.7	16.1	7.12	10.7
18.1	27.3	14.5	21.8	11.1	16.8		14	13.3	20.0	9.75	14.6	6.41	9.64
							15	12.2	18.3	8.92	13.4	5.83	8.76
							16	11.3	16.9	8.23	12.4	5.35	8.03
							17	10.5	15.7	7.63	11.5	4.93	7.42
							18	9.79	14.7	7.12	10.7	4.58	6.89
							19	9.19	13.8	6.67	10.0	4.28	6.43
							20	8.67	13.0	6.28	9.44	4.01	6.03
							22	7.78	11.7	5.63	8.46	3.57	5.36
							24	7.06	10.6	5.10	7.66	3.22	4.83
							26	6.47	9.72	4.66	7.00	2.93	4.40
							28	5.97	8.97	4.29	6.45	2.69	4.04
							30	5.54	8.33	3.98	5.99	2.49	3.74
							32	5.17	7.78	3.72	5.58	2.31	3.48
							34	4.85	7.29	3.48	5.23	2.16	3.25
							36	4.57	6.87	3.28	4.92	2.03	3.06
							38	4.32	6.49	3.09	4.65	1.92	2.88
							40	4.09	6.15	2.93	4.41	1.81	2.73
							42	3.89	5.85	2.79	4.19	1.72	2.59
							44	3.71	5.57	2.65	3.99	1.64	2.46
							46	3.54	5.32	2.53	3.81	1.56	2.35
							48	3.39	5.10	2.42	3.64	1.49	2.25
							50	3.25	4.89	2.32	3.49	1.43	2.15

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
186	280	161	242	124	186	2.62	7.98	2.56	7.46	3.17	6.98
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	4.44		3.84		2.96	
150	225	130	194	99.9	150	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	48.0	3.41	39.6	2.73	30.8	2.09
55.6	83.5	51.5	77.2	37.6	56.3	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						0.876		0.843		0.841	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
9.33	14.0	7.48	11.2	5.32	8.00	3.76		3.81		3.83	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W6

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W6×						Shape		W6×					
25		20		16		lb/ft		25		20[f]		16	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
308	462	246	370	199	299	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	66.0	99.2	51.3	77.0	40.9	61.4
245	368	194	292	113	169		6	63.2	95.0	49.3	74.0	34.4	51.7
225	338	178	268	91.8	138		7	61.3	92.1	47.4	71.3	32.3	48.6
205	307	162	243	72.3	109		8	59.3	89.2	45.6	68.5	30.3	45.5
184	276	145	218	57.1	85.8		9	57.4	86.3	43.8	65.8	28.2	42.4
163	244	128	192	46.3	69.5		10	55.5	83.4	41.9	63.0	26.1	39.3
142	214	111	167	38.2	57.5		11	53.6	80.5	40.1	60.3	23.8	35.7
123	185	95.7	144	32.1	48.3		12	51.6	77.6	38.3	57.5	21.4	32.2
105	157	81.6	123	27.4	41.1		13	49.7	74.7	36.4	54.8	19.5	29.4
90.3	136	70.3	106	23.6	35.5		14	47.8	71.8	34.6	52.0	17.9	27.0
78.7	118	61.3	92.1	20.6	30.9		15	45.8	68.9	32.8	49.3	16.6	24.9
69.1	104	53.9	80.9	18.1	27.2		16	43.9	66.0	30.2	45.4	15.4	23.2
61.2	92.1	47.7	71.7				17	42.0	63.1	28.0	42.1	14.5	21.7
54.6	82.1	42.5	64.0				18	39.7	59.7	26.1	39.3	13.6	20.4
49.0	73.7	38.2	57.4				19	37.4	56.2	24.5	36.8	12.8	19.2
44.3	66.5	34.5	51.8				20	35.3	53.0	23.1	34.7	12.1	18.2
36.6	55.0	28.5	42.8				22	31.7	47.6	20.6	31.0	10.9	16.5
30.7	46.2	23.9	36.0				24	28.8	43.3	18.7	28.1	9.99	15.0
							26	26.4	39.7	17.1	25.7	9.19	13.8
							28	24.4	36.7	15.8	23.7	8.50	12.8
							30	22.7	34.1	14.6	22.0	7.92	11.9
							32	21.2	31.8	13.6	20.5	7.41	11.1
							34	19.9	29.9	12.8	19.2	6.96	10.5
							36	18.7	28.1	12.0	18.1	6.57	9.87
							38	17.7	26.6	11.4	17.1	6.21	9.34
							40	16.8	25.2	10.8	16.2	5.90	8.86
							42	15.9	24.0	10.2	15.4	5.61	8.43
							44	15.2	22.8	9.73	14.6	5.35	8.04
							46	14.5	21.8	9.30	14.0	5.12	7.69
							48	13.9	20.9	8.89	13.4	4.90	7.36
							50	13.3	20.0	8.53	12.8	4.70	7.07
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
308	462	246	370	199	299			4.54	17.6	4.91	15.0	2.89	10.6
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			7.34		5.87		4.74	
248	372	198	297	160	240			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			53.4	17.1	41.4	13.3	32.1	4.43
57.2	85.7	45.1	67.7	45.7	68.6			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								1.52		1.50		0.967	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
29.9	44.9	23.0	34.5	11.8	17.8			1.78		1.77		2.69	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W6

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W6×						Shape		W6×					
15[c]		12		9		lb/ft		15[f]		12		9[f]	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
185	279	149	224	112	169	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	33.6	50.4	29.0	43.6	20.8	31.3
144	217	79.3	119	58.8	88.3		6	33.6	50.4	22.9	34.5	16.5	24.8
132	198	63.2	94.9	46.5	69.9		7	33.4	50.2	21.1	31.7	14.9	22.4
119	178	48.8	73.3	35.8	53.8		8	31.8	47.8	19.2	28.9	13.1	19.6
105	158	38.6	57.9	28.3	42.5		9	30.1	45.3	17.1	25.7	10.9	16.4
92.1	138	31.2	46.9	22.9	34.4		10	28.5	42.9	14.8	22.3	9.36	14.1
79.5	119	25.8	38.8	18.9	28.5		11	26.9	40.4	13.1	19.7	8.17	12.3
67.5	101	21.7	32.6	15.9	23.9		12	25.3	38.0	11.7	17.6	7.25	10.9
57.5	86.5	18.5	27.8	13.6	20.4		13	23.6	35.4	10.6	15.9	6.52	9.80
49.6	74.6	15.9	23.9	11.7	17.6		14	21.2	31.9	9.70	14.6	5.92	8.90
43.2	64.9	13.9	20.9	10.2	15.3		15	19.3	29.0	8.94	13.4	5.42	8.15
38.0	57.1						16	17.6	26.5	8.29	12.5	5.01	7.52
33.6	50.6						17	16.3	24.5	7.73	11.6	4.65	6.98
30.0	45.1						18	15.1	22.7	7.24	10.9	4.34	6.52
26.9	40.5						19	14.1	21.2	6.82	10.2	4.07	6.12
24.3	36.5						20	13.2	19.9	6.44	9.68	3.83	5.76
20.1	30.2						22	11.7	17.7	5.80	8.71	3.43	5.16
16.9	25.4						24	10.6	15.9	5.28	7.93	3.11	4.68
							26	9.62	14.5	4.84	7.28	2.85	4.28
							28	8.83	13.3	4.48	6.73	2.63	3.95
							30	8.17	12.3	4.16	6.26	2.44	3.66
							32	7.59	11.4	3.89	5.85	2.27	3.42
							34	7.10	10.7	3.65	5.49	2.13	3.20
							36	6.67	10.0	3.44	5.17	2.00	3.01
							38	6.29	9.45	3.25	4.89	1.89	2.85
							40	5.95	8.94	3.09	4.64	1.79	2.70
							42	5.64	8.48	2.94	4.41	1.71	2.56
							44	5.37	8.07	2.80	4.21	1.62	2.44
							46	5.12	7.70	2.67	4.02	1.55	2.33
							48	4.90	7.36	2.56	3.85	1.48	2.23
							50	4.69	7.05	2.46	3.69	1.42	2.14

Strength						Properties					
Available Strength in Tensile Yielding, kips						Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	L_p	L_r	L_p	L_r	L_p	L_r
186	279	149	224	112	169	6.90	12.9	2.74	8.71	3.28	7.80
Available Strength in Tensile Rupture, kips						Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	4.43		3.55		2.68	
150	224	120	180	90.5	136	Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips						I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	29.1	9.32	22.1	2.99	16.4	2.20
38.6	57.9	38.8	58.2	28.1	42.1	r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft						1.45		0.918		0.905	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y					
13.9	20.9	8.10	12.2	5.64	8.47	1.77		2.71		2.73	

[c] Shape is slender for compression with F_y = 70 ksi.
[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.
Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W6–W5

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W6×		W5×				Shape		W6×		W5×			
8.5		19		16		lb/ft		8.5[f]		19		16	
P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips								Available Flexural Strength, kip-ft					
ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD	ASD	LRFD
106	159	233	350	197	297	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending	0	18.6	28.0	40.5	60.9	33.6	50.6
54.1	81.2	169	253	141	212		6	14.9	22.5	37.9	57.0	31.0	46.6
42.4	63.8	150	225	125	188		7	13.4	20.2	36.7	55.2	29.9	44.9
32.6	48.9	131	197	109	164		8	11.5	17.3	35.5	53.3	28.7	43.1
25.7	38.7	112	169	93.1	140		9	9.63	14.5	34.3	51.5	27.5	41.4
20.8	31.3	94.8	142	78.0	117		10	8.23	12.4	33.1	49.7	26.3	39.6
17.2	25.9	78.6	118	64.5	97.0		11	7.18	10.8	31.9	47.9	25.2	37.8
14.5	21.7	66.0	99.2	54.2	81.5		12	6.36	9.56	30.7	46.1	24.0	36.1
12.3	18.5	56.3	84.6	46.2	69.4		13	5.71	8.58	29.5	44.3	22.8	34.3
10.6	16.0	48.5	72.9	39.8	59.9		14	5.18	7.78	28.3	42.5	21.7	32.6
		42.3	63.5	34.7	52.1		15	4.74	7.12	27.1	40.7	20.3	30.6
		37.1	55.8	30.5	45.8		16	4.37	6.56	25.9	38.9	18.9	28.4
		32.9	49.5	27.0	40.6		17	4.05	6.09	24.6	36.9	17.7	26.5
		29.3	44.1	24.1	36.2		18	3.78	5.68	23.1	34.7	16.6	24.9
		26.3	39.6	21.6	32.5		19	3.54	5.32	21.8	32.7	15.6	23.5
		23.8	35.7	19.5	29.3		20	3.33	5.01	20.6	31.0	14.8	22.2
							22	2.98	4.49	18.6	28.0	13.3	20.0
							24	2.70	4.06	17.0	25.6	12.1	18.3
							26	2.47	3.71	15.6	23.5	11.2	16.8
							28	2.28	3.42	14.5	21.8	10.3	15.5
							30	2.11	3.17	13.5	20.3	9.61	14.4
							32	1.97	2.96	12.6	19.0	8.99	13.5
							34	1.85	2.77	11.9	17.8	8.44	12.7
							36	1.74	2.61	11.2	16.8	7.96	12.0
							38	1.64	2.46	10.6	15.9	7.53	11.3
							40	1.55	2.34	10.0	15.1	7.14	10.7
							42	1.48	2.22	9.56	14.4	6.80	10.2
							44	1.41	2.11	9.12	13.7	6.48	9.74
							46	1.34	2.02	8.72	13.1	6.19	9.31
							48	1.28	1.93	8.35	12.5	5.93	8.92
							50	1.23	1.85	8.01	12.0	5.69	8.55
Strength								Properties					
Available Strength in Tensile Yielding, kips								Limiting Unbraced Lengths, ft					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			L_p	L_r	L_p	L_r	L_p	L_r
106	159	233	350	197	297			3.59	7.62	3.82	16.8	3.76	14.7
Available Strength in Tensile Rupture, kips								Area, in.^{2}					
P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$			2.52		5.56		4.71	
85.1	128	188	281	159	238			Moment of Inertia, in.^{4}					
Available Strength in Major Axis Shear, kips								I_x	I_y	I_x	I_y	I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$			14.9	1.99	26.3	9.13	21.4	7.51
27.8	41.6	38.9	58.4	33.7	50.5			r_y, in.					
Available Strength in Flexure about Y-Y Axis, kip-ft								0.890		1.28		1.26	
M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$			r_x/r_y					
4.89	7.35	19.3	29.0	16.0	24.0			2.73		1.70		1.69	

[f] Shape exceeds the compact limit for flexure with F_y = 70 ksi.

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

W4

Table 6-B (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, or Combined Forces

ASTM A913/A913M
Grade 70
F_y = 70 ksi
F_u = 90 ksi

W4×		Shape		W4×	
13		lb/ft		13	
P_n/Ω_c	$\phi_c P_n$	Design		M_{nx}/Ω_b	$\phi_b M_{nx}$
Available Compressive Strength, kips				Available Flexural Strength, kip-ft	
ASD	LRFD	Effective Length, L_c (ft), with respect to least radius of gyration, r_y, or unbraced length, L_b (ft), for X-X axis bending		ASD	LRFD
161	241		0	21.9	33.0
94.4	142		6	19.6	29.4
78.0	117		7	18.8	28.3
62.5	93.9		8	18.0	27.1
49.4	74.2		9	17.2	25.9
40.0	60.1		10	16.5	24.7
33.0	49.7		11	15.7	23.6
27.8	41.7		12	14.9	22.4
23.7	35.6		13	14.1	21.2
20.4	30.7		14	13.3	20.0
17.8	26.7		15	12.4	18.6
15.6	23.5		16	11.6	17.4
			17	10.8	16.3
			18	10.2	15.3
			19	9.64	14.5
			20	9.14	13.7
			22	8.28	12.4
			24	7.57	11.4
			26	6.97	10.5
			28	6.46	9.72
			30	6.03	9.06
			32	5.64	8.48
			34	5.31	7.98
			36	5.01	7.53
			38	4.74	7.13
			40	4.50	6.77
			42	4.29	6.44
			44	4.09	6.15
			46	3.91	5.88
			48	3.75	5.63
			50	3.59	5.40

Strength		Properties	
Available Strength in Tensile Yielding, kips		Limiting Unbraced Lengths, ft	
P_n/Ω_t	$\phi_t P_n$	L_p	L_r
161	241	2.99	14.0
Available Strength in Tensile Rupture, kips		Area, in.^{2}	
P_n/Ω_t	$\phi_t P_n$	3.83	
129	194	Moment of Inertia, in.^{4}	
Available Strength in Major Axis Shear, kips		I_x	I_y
V_{nx}/Ω_v	$\phi_v V_{nx}$	11.3	3.86
32.6	48.9	r_y, in.	
Available Strength in Flexure about Y-Y Axis, kip-ft		1.00	
M_{ny}/Ω_b	$\phi_b M_{ny}$	r_x/r_y	
10.2	15.3	1.72	

Notes:
1. Heavy line indicates L_c/r equal to or greater than 200.
2. Confirm ASTM A913/A913M material availability before specifying.

HSS34–HSS30

Table 6-C
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS34×10×								HSS30×10×	
		1[a]		⅞[a], [c]		¾[a], [c]		⅝[a], [c]		1[a]	
t_{des}, in.		1.00		0.875		0.750		0.625		1.00	
Nom. Weight, lb/ft		277.07		244.88		212.00		178.41		249.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	2440	3660	2090	3140	1660	2500	1260	1890	2200	3300
	6	2380	3580	2060	3090	1640	2460	1240	1860	2150	3230
	7	2370	3560	2040	3070	1630	2450	1230	1850	2130	3200
	8	2340	3520	2030	3050	1620	2430	1230	1840	2110	3170
	9	2320	3490	2020	3030	1610	2410	1220	1830	2090	3140
	10	2290	3450	2000	3000	1590	2400	1210	1820	2070	3100
	11	2260	3400	1980	2980	1580	2370	1200	1800	2040	3060
	12	2230	3360	1960	2950	1560	2350	1190	1780	2010	3020
	13	2200	3310	1940	2910	1550	2330	1170	1760	1980	2970
	14	2160	3250	1910	2880	1530	2300	1160	1750	1950	2920
	15	2130	3190	1890	2840	1510	2270	1150	1730	1910	2870
	16	2090	3130	1850	2780	1490	2240	1130	1700	1870	2820
	17	2040	3070	1820	2730	1470	2210	1120	1680	1840	2760
	18	2000	3010	1780	2680	1450	2180	1100	1660	1800	2700
	19	1960	2940	1740	2620	1420	2140	1090	1630	1760	2640
	20	1910	2870	1700	2560	1400	2110	1070	1610	1710	2580
	22	1820	2730	1620	2430	1350	2030	1030	1550	1630	2450
	24	1720	2580	1530	2300	1300	1950	994	1490	1540	2310
	26	1620	2430	1450	2170	1240	1870	954	1430	1440	2170
	28	1510	2270	1360	2040	1190	1780	912	1370	1350	2030
	30	1410	2120	1270	1900	1110	1670	869	1310	1260	1890
	32	1310	1960	1180	1770	1030	1550	826	1240	1160	1750
	34	1210	1810	1090	1640	957	1440	781	1170	1070	1610
	36	1110	1660	1000	1510	883	1330	736	1110	984	1480
	38	1010	1520	918	1380	810	1220	691	1040	897	1350
	40	919	1380	836	1260	740	1110	639	960	813	1220
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2440	3660	2160	3240	1870	2800	1570	2360	2200	3300
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1980	2980	1760	2630	1520	2280	1280	1920	1790	2680
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		1110	1670	987	1480	857	1290	721	1080	970	1460
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		251	378	232	349	209	314	183	274	251	378
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1990	3000	1780	2670	1550	2330	1310	1980	1610	2420
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		748	1120	618	929	503	756	385	579	723	1090
Properties											
Area, in.^{2}		81.4		72.0		62.3		52.4		73.4	
r_y, in.		4.16		4.22		4.27		4.33		4.12	
r_x/r_y		2.69		2.68		2.67		2.63		2.42	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS30–HSS24

Table 6-C (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS30×10×								HSS24×20×	
		⅞[a]		¾[a], [c]		⅝[a], [c]		½[a], [c]		¾[a]	
t_{des}, in.		0.875		0.750		0.625		0.500		0.750	
Nom. Weight, lb/ft		221.06		191.58		161.40		130.52		212.00	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1950	2930	1610	2420	1230	1850	879	1320	1870	2800
	6	1900	2860	1590	2380	1210	1820	866	1300	1850	2790
	7	1890	2840	1580	2370	1200	1810	862	1300	1850	2780
	8	1870	2810	1570	2360	1200	1800	856	1290	1850	2770
	9	1850	2790	1560	2340	1190	1790	851	1280	1840	2770
	10	1830	2750	1540	2320	1180	1770	844	1270	1830	2760
	11	1810	2720	1530	2300	1170	1760	837	1260	1830	2750
	12	1780	2680	1510	2270	1160	1740	829	1250	1820	2740
	13	1760	2640	1490	2250	1140	1720	820	1230	1810	2730
	14	1730	2600	1480	2220	1130	1700	811	1220	1810	2710
	15	1700	2550	1460	2190	1120	1680	802	1210	1800	2700
	16	1670	2510	1440	2160	1100	1660	792	1190	1790	2690
	17	1640	2460	1420	2130	1090	1630	781	1170	1780	2670
	18	1600	2410	1390	2090	1070	1610	770	1160	1770	2660
	19	1570	2350	1360	2050	1050	1590	758	1140	1760	2640
	20	1530	2300	1330	2000	1040	1560	746	1120	1750	2620
	22	1450	2190	1270	1910	1000	1500	721	1080	1720	2590
	24	1380	2070	1200	1810	962	1450	694	1040	1700	2550
	26	1290	1950	1130	1700	921	1380	666	1000	1670	2510
	28	1210	1820	1060	1600	879	1320	637	957	1640	2460
	30	1130	1700	993	1490	835	1260	607	913	1610	2420
	32	1050	1580	923	1390	790	1190	577	867	1580	2370
	34	970	1460	854	1280	733	1100	546	820	1540	2320
	36	891	1340	786	1180	676	1020	515	774	1510	2270
	38	815	1230	721	1080	621	934	484	727	1470	2210
	40	741	1110	657	988	568	854	453	681	1430	2150
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1950	2930	1690	2530	1420	2130	1150	1730	1870	2800
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1580	2380	1370	2060	1160	1730	936	1400	1520	2280
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		861	1290	749	1130	631	948	512	770	587	883
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		232	349	209	314	183	274	153	230	480	721
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1430	2160	1250	1880	1070	1600	868	1310	1300	1950
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		594	893	480	722	372	559	268	402	1100	1660
Properties											
Area, in.^{2}		65.0		56.3		47.4		38.4		62.3	
r_y, in.		4.18		4.23		4.29		4.34		8.00	
r_x/r_y		2.42		2.39		2.38		2.37		1.15	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24×20×								HSS24×18×	
		5/8[a], [b], [c]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.750	
Nom. Weight, lb/ft		178.41		144.13		109.15		91.39		201.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1540	2320	1120	1680	675	1010	486	730	1780	2670
	6	1540	2310	1110	1670	673	1010	484	727	1760	2650
	7	1530	2300	1110	1670	672	1010	483	726	1760	2640
	8	1530	2300	1110	1670	671	1010	483	725	1750	2630
	9	1530	2290	1110	1660	670	1010	482	724	1750	2630
	10	1520	2290	1100	1660	669	1010	481	723	1740	2620
	11	1520	2280	1100	1660	667	1000	480	722	1730	2600
	12	1510	2270	1100	1650	666	1000	479	720	1730	2590
	13	1510	2270	1100	1650	664	998	478	718	1720	2580
	14	1500	2260	1090	1640	662	996	477	717	1710	2570
	15	1500	2250	1090	1640	661	993	475	715	1700	2550
	16	1490	2240	1090	1630	659	990	474	713	1690	2540
	17	1480	2230	1080	1630	656	987	473	710	1680	2520
	18	1480	2220	1080	1620	654	983	471	708	1660	2500
	19	1470	2210	1070	1610	652	980	469	706	1650	2480
	20	1460	2200	1070	1610	649	976	468	703	1640	2460
	22	1450	2170	1060	1590	644	968	464	697	1610	2420
	24	1430	2150	1050	1580	638	959	460	691	1580	2380
	26	1410	2110	1040	1560	632	950	456	685	1550	2330
	28	1380	2080	1030	1540	625	940	451	678	1520	2280
	30	1360	2040	1010	1520	618	929	446	671	1480	2230
	32	1330	2000	1000	1500	611	918	441	663	1450	2170
	34	1300	1960	986	1480	603	906	436	655	1410	2120
	36	1270	1910	968	1460	595	894	430	646	1370	2060
	38	1240	1870	950	1430	586	881	424	637	1330	2000
	40	1210	1820	930	1400	577	867	418	628	1290	1940
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1570	2360	1270	1910	961	1440	805	1210	1780	2670
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1280	1920	1030	1550	782	1170	656	984	1450	2170
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		496	746	404	608	300	450	209	314	587	883
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		406	611	332	500	255	383	209	314	426	640
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1050	1580	740	1110	506	760	396	595	1220	1830
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		831	1250	615	924	410	616	318	477	959	1440
Properties											
Area, in.^{2}		52.4		42.4		32.1		26.9		59.3	
r_y, in.		8.06		8.12		8.17		8.20		7.26	
r_x/r_y		1.15		1.15		1.15		1.15		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24×18×								HSS24×16×	
		5/8[a], [c]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.750	
Nom. Weight, lb/ft		169.91		137.32		104.04		87.14		191.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1470	2210	1090	1640	666	1000	479	720	1690	2530
	6	1460	2190	1080	1630	664	997	477	717	1670	2510
	7	1460	2190	1080	1620	663	996	477	716	1670	2500
	8	1450	2180	1080	1620	661	994	476	715	1660	2490
	9	1450	2180	1070	1620	660	992	475	714	1650	2480
	10	1440	2170	1070	1610	659	990	474	712	1640	2470
	11	1440	2160	1070	1610	657	987	473	710	1640	2460
	12	1430	2160	1060	1600	655	985	471	709	1630	2440
	13	1430	2150	1060	1590	653	982	470	707	1620	2430
	14	1420	2140	1060	1590	651	978	469	704	1610	2410
	15	1420	2130	1050	1580	649	975	467	702	1590	2400
	16	1410	2120	1050	1570	646	971	465	700	1580	2380
	17	1400	2110	1040	1560	644	968	464	697	1570	2360
	18	1390	2090	1030	1550	641	964	462	694	1560	2340
	19	1380	2080	1030	1550	638	959	460	691	1540	2320
	20	1380	2070	1020	1540	635	955	458	688	1530	2290
	22	1360	2040	1010	1520	629	945	454	682	1490	2250
	24	1330	2010	994	1490	622	935	449	675	1460	2200
	26	1310	1970	979	1470	615	924	444	667	1430	2140
	28	1280	1920	962	1450	607	912	438	659	1390	2090
	30	1250	1880	945	1420	598	899	432	650	1350	2030
	32	1220	1840	927	1390	589	886	426	641	1310	1960
	34	1190	1790	907	1360	580	872	420	631	1260	1900
	36	1160	1740	888	1330	570	857	413	621	1220	1840
	38	1120	1690	867	1300	560	842	406	610	1180	1770
	40	1090	1640	846	1270	549	826	399	599	1130	1700
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1490	2250	1210	1820	916	1380	766	1150	1690	2530
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1220	1820	985	1480	746	1120	624	936	1370	2060
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		496	746	404	608	300	450	209	314	587	883
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		362	543	296	446	228	342	192	289	372	559
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1030	1550	722	1090	491	738	386	580	1130	1700
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		728	1090	536	806	356	535	275	413	821	1230
Properties											
Area, in.^{2}		49.9		40.4		30.6		25.6		56.3	
r_y, in.		7.32		7.38		7.43		7.46		6.51	
r_x/r_y		1.25		1.25		1.24		1.24		1.37	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24×16×								HSS24×14×	
		5/8[a], [c]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.750	
Nom. Weight, lb/ft		161.40		130.52		98.94		82.88		181.37	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1390	2090	1030	1550	655	985	475	713	1600	2400
	6	1380	2080	1020	1540	652	980	472	710	1580	2370
	7	1380	2070	1020	1530	651	978	471	708	1570	2360
	8	1380	2070	1020	1530	649	976	470	707	1560	2350
	9	1370	2060	1010	1520	647	973	469	705	1560	2340
	10	1370	2050	1010	1520	646	970	468	703	1550	2320
	11	1360	2040	1000	1510	644	967	467	701	1540	2310
	12	1350	2040	1000	1500	641	964	465	699	1520	2290
	13	1350	2020	996	1500	639	960	463	696	1510	2270
	14	1340	2010	990	1490	636	956	462	694	1500	2250
	15	1330	2000	985	1480	634	952	460	691	1490	2230
	16	1320	1990	979	1470	631	948	458	688	1470	2210
	17	1320	1980	973	1460	627	943	455	685	1460	2190
	18	1310	1960	966	1450	624	938	453	681	1440	2160
	19	1300	1950	959	1440	621	933	451	678	1420	2140
	20	1290	1930	952	1430	617	927	448	674	1400	2110
	22	1260	1900	937	1410	609	916	443	666	1370	2050
	24	1230	1850	920	1380	601	903	437	657	1330	2000
	26	1200	1810	903	1360	592	889	431	648	1290	1930
	28	1170	1760	884	1330	582	875	424	637	1240	1870
	30	1140	1710	865	1300	572	860	417	627	1200	1800
	32	1110	1660	844	1270	561	843	410	616	1150	1730
	34	1070	1610	823	1240	550	826	402	604	1100	1660
	36	1030	1550	801	1200	538	809	394	592	1050	1590
	38	998	1500	778	1170	525	789	385	579	1010	1510
	40	961	1440	755	1130	510	766	377	566	957	1440
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1420	2130	1150	1730	871	1310	731	1100	1600	2400
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1160	1730	936	1400	709	1060	595	892	1300	1950
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		496	746	404	608	300	450	209	314	587	883
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		317	476	260	392	201	302	170	255	318	478
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		958	1440	742	1120	474	713	376	565	1040	1560
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		626	940	459	689	305	458	234	352	689	1040
Properties											
Area, in.^{2}		47.4		38.4		29.1		24.4		53.3	
r_y, in.		6.57		6.62		6.68		6.71		5.74	
r_x/r_y		1.37		1.37		1.36		1.36		1.52	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24×14×									
		5/8[a], [c]		1/2[a], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		152.89		123.71		93.83		78.63		63.25	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1320	1980	969	1460	641	964	465	699	311	467
	6	1310	1960	960	1440	637	957	462	695	309	464
	7	1300	1960	957	1440	635	955	461	693	308	463
	8	1300	1950	954	1430	633	952	460	691	307	462
	9	1290	1940	950	1430	631	949	458	689	306	460
	10	1290	1930	946	1420	629	945	457	686	305	459
	11	1280	1920	941	1410	626	942	455	684	304	457
	12	1270	1910	935	1410	623	936	453	681	303	455
	13	1260	1900	930	1400	619	931	451	678	302	453
	14	1250	1890	924	1390	615	925	449	674	300	451
	15	1250	1870	917	1380	611	919	446	671	299	449
	16	1240	1860	910	1370	607	912	444	667	297	446
	17	1230	1840	903	1360	602	905	441	663	295	444
	18	1210	1830	896	1350	597	897	438	658	294	441
	19	1200	1800	888	1330	592	889	435	654	292	438
	20	1190	1780	879	1320	586	881	432	649	290	435
	22	1160	1740	861	1290	575	864	425	639	285	429
	24	1120	1690	842	1270	562	845	418	628	281	422
	26	1090	1640	822	1240	549	825	410	616	276	414
	28	1050	1580	801	1200	535	804	402	604	270	407
	30	1010	1520	779	1170	521	783	393	591	265	398
	32	976	1470	755	1140	506	760	384	577	259	389
	34	936	1410	731	1100	490	737	374	563	253	380
	36	896	1350	707	1060	474	713	364	548	247	371
	38	855	1290	681	1020	458	688	354	532	240	361
	40	815	1220	656	986	441	663	341	513	233	351
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1340	2020	1090	1640	826	1240	692	1040	557	837
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1090	1640	887	1330	673	1010	563	845	453	680
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		496	746	404	608	300	450	209	314	106	159
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		272	408	225	338	174	261	147	221	119	180
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		883	1330	721	1080	455	684	362	543	269	405
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		526	791	388	583	255	384	195	293	140	210
Properties											
Area, in.^{2}		44.9		36.4		27.6		23.1		18.6	
r_y, in.		5.80		5.86		5.91		5.94		5.97	
r_x/r_y		1.52		1.51		1.51		1.51		1.51	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24×12×									
		1		⅞		¾[a]		⅝[a], [c]		½[a], [c]	
t_{des}, in.		1.00		0.875		0.750		0.625		0.500	
Nom. Weight, lb/ft		222.63		197.24		171.16		144.39		116.91	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1960	2940	1740	2610	1510	2260	1240	1870	909	1370
	6	1930	2900	1710	2570	1480	2230	1230	1850	898	1350
	7	1920	2880	1700	2550	1470	2220	1220	1840	895	1340
	8	1900	2860	1690	2540	1470	2200	1220	1830	890	1340
	9	1890	2840	1680	2520	1450	2190	1210	1820	886	1330
	10	1870	2810	1660	2500	1440	2170	1200	1810	880	1320
	11	1850	2790	1650	2480	1430	2150	1190	1800	875	1310
	12	1840	2760	1630	2450	1420	2130	1190	1780	868	1300
	13	1820	2730	1610	2420	1400	2110	1180	1770	861	1290
	14	1790	2700	1590	2400	1380	2080	1160	1750	854	1280
	15	1770	2660	1570	2360	1370	2060	1150	1730	846	1270
	16	1750	2620	1550	2330	1350	2030	1140	1710	838	1260
	17	1720	2590	1530	2300	1330	2000	1120	1690	829	1250
	18	1690	2550	1510	2260	1310	1970	1110	1670	820	1230
	19	1670	2500	1480	2230	1290	1940	1090	1640	810	1220
	20	1640	2460	1460	2190	1270	1910	1070	1610	800	1200
	22	1580	2370	1400	2110	1220	1840	1040	1560	779	1170
	24	1510	2270	1350	2030	1180	1770	997	1500	756	1140
	26	1450	2170	1290	1940	1130	1690	956	1440	733	1100
	28	1380	2070	1230	1850	1080	1620	914	1370	708	1060
	30	1310	1970	1170	1760	1020	1540	870	1310	682	1020
	32	1240	1860	1110	1670	972	1460	826	1240	655	984
	34	1170	1750	1050	1570	918	1380	782	1170	628	943
	36	1100	1650	984	1480	865	1300	737	1110	600	901
	38	1030	1540	922	1390	812	1220	693	1040	570	857
	40	957	1440	861	1290	759	1140	649	975	535	804
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1960	2940	1740	2610	1510	2260	1270	1910	1030	1550
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1590	2390	1410	2120	1230	1840	1030	1550	839	1260
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		754	1130	673	1010	587	883	496	746	404	608
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		323	486	295	443	263	395	227	341	189	284
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1220	1830	1090	1640	953	1430	811	1220	664	998
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		746	1120	669	1010	565	850	435	653	318	478
Properties											
Area, in.^{2}		65.4		58.0		50.3		42.4		34.4	
r_y, in.		4.85		4.90		4.96		5.01		5.07	
r_x/r_y		1.73		1.72		1.72		1.71		1.71	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24×12×						HSS24×8×			
		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		1/2[a], [c]		3/8[a], [b], [c]	
t_{des}, in.		0.375		0.313		0.250		0.500		0.375	
Nom. Weight, lb/ft		88.73		74.38		59.85		103.30		78.52	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	600	902	456	685	305	459	789	1190	510	767
	6	593	891	452	679	303	455	770	1160	498	749
	7	591	888	450	677	302	454	764	1150	494	743
	8	588	884	448	674	301	452	756	1140	490	736
	9	585	879	447	671	299	450	748	1120	484	728
	10	581	874	444	668	298	448	738	1110	479	719
	11	578	868	442	664	297	446	728	1090	472	710
	12	574	862	439	661	295	443	717	1080	465	699
	13	569	855	437	656	293	441	705	1060	458	688
	14	564	848	434	652	291	438	692	1040	450	677
	15	559	841	431	647	289	435	679	1020	442	664
	16	554	833	427	641	287	432	665	1000	433	651
	17	548	824	422	635	285	428	651	978	424	638
	18	542	815	418	628	283	425	635	955	415	623
	19	536	806	413	621	280	421	620	932	405	609
	20	530	796	408	614	278	417	604	907	395	594
	22	516	776	398	598	272	409	570	857	375	563
	24	502	754	387	581	266	400	535	805	353	531
	26	486	731	375	564	260	390	497	747	331	498
	28	470	707	363	545	253	380	451	678	309	464
	30	454	682	350	526	246	369	407	611	287	431
	32	437	656	337	507	238	358	364	547	264	397
	34	419	630	324	486	231	347	323	485	242	364
	36	401	603	310	466	223	335	288	433	222	333
	38	383	576	296	445	215	323	259	389	202	304
	40	365	549	283	425	205	309	233	351	183	274
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		781	1170	656	986	527	792	910	1370	692	1040
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		636	954	534	801	429	644	741	1110	563	845
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		300	450	209	314	106	159	404	608	300	450
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		147	221	125	188	101	153	117	176	92.7	139
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		479	720	345	518	260	390	546	821	416	625
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		209	314	159	239	113	170	191	286	124	187
Properties											
Area, in.^{2}		26.1		21.9		17.6		30.4		23.1	
r_y, in.		5.12		5.15		5.18		3.43		3.48	
r_x/r_y		1.71		1.70		1.70		2.38		2.37	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24–HSS22

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24×8×				HSS22×20×					
		5/16[a], [b], [c]		1/4[a], [b], [c]		3/4		5/8[a], [b]		1/2[a], [b], [c]	
t_{des}, in.		0.313		0.250		0.750		0.625		0.500	
Nom. Weight, lb/ft		65.87		53.05		201.79		169.91		137.32	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	387	582	276	414	1780	2670	1490	2250	1100	1660
	6	378	569	270	405	1760	2650	1490	2230	1100	1650
	7	375	564	267	402	1760	2650	1480	2230	1100	1650
	8	372	559	265	398	1760	2640	1480	2220	1090	1640
	9	368	553	262	394	1750	2630	1470	2220	1090	1640
	10	363	546	259	389	1750	2620	1470	2210	1090	1640
	11	359	539	256	384	1740	2610	1460	2200	1090	1630
	12	353	531	252	379	1730	2600	1460	2190	1080	1630
	13	348	523	248	373	1730	2590	1450	2180	1080	1630
	14	342	514	244	367	1720	2580	1450	2170	1080	1620
	15	336	505	240	360	1710	2570	1440	2160	1070	1620
	16	330	495	235	353	1700	2560	1430	2150	1070	1610
	17	323	485	230	346	1690	2540	1420	2140	1070	1600
	18	316	475	225	338	1680	2530	1420	2130	1060	1600
	19	309	464	220	331	1670	2510	1410	2120	1060	1590
	20	301	453	215	323	1660	2490	1400	2100	1050	1580
	22	286	429	204	306	1640	2460	1380	2070	1040	1570
	24	270	405	193	290	1610	2420	1360	2040	1030	1550
	26	253	381	181	272	1580	2380	1340	2010	1020	1540
	28	237	356	169	255	1560	2340	1310	1970	1010	1520
	30	220	331	158	237	1530	2290	1290	1930	997	1500
	32	204	306	146	220	1490	2250	1260	1890	984	1480
	34	187	281	135	202	1460	2200	1230	1850	969	1460
	36	172	258	124	186	1430	2150	1210	1810	951	1430
	38	159	238	114	172	1390	2090	1180	1770	932	1400
	40	147	221	106	159	1360	2040	1150	1720	912	1370
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		581	873	467	702	1780	2670	1490	2250	1210	1820
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		473	709	380	570	1450	2170	1220	1820	985	1480
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		209	314	106	159	534	802	451	678	368	554
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		79.4	119	65.1	97.9	480	721	406	611	332	500
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		339	510	260	390	1150	1730	932	1400	659	991
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		93.7	141	65.4	98.3	1080	1620	818	1230	599	900
Properties											
Area, in.^{2}		19.4		15.6		59.3		49.9		40.4	
r_y, in.		3.51		3.54		7.91		7.97		8.03	
r_x/r_y		2.36		2.35		1.08		1.08		1.07	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS22×20×				HSS22×18×					
		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4		5/8[a]		1/2[a], [b], [c]	
t_{des}, in.		0.375		0.313		0.750		0.625		0.500	
Nom. Weight, lb/ft		104.04		87.14		191.58		161.40		130.52	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	669	1010	481	723	1690	2530	1420	2130	1070	1610
	6	667	1000	479	720	1670	2510	1410	2120	1070	1610
	7	666	1000	479	719	1670	2510	1410	2110	1070	1600
	8	665	999	478	718	1660	2500	1400	2110	1060	1600
	9	664	998	477	717	1660	2490	1400	2100	1060	1590
	10	663	996	476	716	1650	2480	1390	2090	1060	1590
	11	661	994	475	714	1640	2470	1390	2080	1050	1580
	12	660	991	474	713	1640	2460	1380	2070	1050	1580
	13	658	989	473	711	1630	2450	1370	2060	1050	1570
	14	656	986	472	709	1620	2430	1360	2050	1040	1560
	15	654	983	471	707	1610	2420	1360	2040	1040	1560
	16	652	980	469	705	1600	2400	1350	2030	1030	1550
	17	650	977	468	703	1590	2390	1340	2010	1030	1540
	18	648	974	466	701	1580	2370	1330	2000	1020	1530
	19	645	970	464	698	1570	2350	1320	1980	1010	1520
	20	643	966	463	696	1550	2330	1310	1970	1010	1510
	22	638	958	459	690	1530	2300	1290	1940	993	1490
	24	632	949	455	684	1500	2250	1260	1900	978	1470
	26	625	940	451	677	1470	2210	1240	1860	962	1450
	28	619	930	446	670	1440	2160	1210	1820	946	1420
	30	611	919	441	663	1400	2110	1180	1780	928	1390
	32	604	907	436	655	1370	2060	1160	1740	909	1370
	34	596	895	430	647	1330	2000	1130	1690	890	1340
	36	587	883	424	638	1290	1940	1090	1640	870	1310
	38	578	869	418	629	1260	1890	1060	1600	849	1280
	40	569	856	412	619	1220	1830	1030	1550	827	1240
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		916	1380	766	1150	1690	2530	1420	2130	1150	1730
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		746	1120	624	936	1370	2060	1160	1730	936	1400
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		282	423	209	314	534	802	451	678	368	554
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		255	383	209	314	426	640	362	543	296	446
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		448	673	349	525	1070	1610	908	1370	641	963
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		402	605	312	470	933	1400	714	1070	520	782
Properties											
Area, in.^{2}		30.6		25.6		56.3		47.4		38.4	
r_y, in.		8.09		8.11		7.18		7.24		7.30	
r_x/r_y		1.07		1.08		1.17		1.17		1.17	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS22×18×				HSS22×16×					
		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4		5/8[a]		1/2[a], [b], [c]	
t_{des}, in.		0.375		0.313		0.750		0.625		0.500	
Nom. Weight, lb/ft		98.94		82.88		181.37		152.89		123.71	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	660	993	478	718	1600	2400	1340	2020	1010	1520
	6	658	988	476	715	1580	2380	1330	2000	1010	1510
	7	656	987	475	714	1580	2370	1330	2000	1000	1510
	8	655	985	474	712	1570	2360	1320	1990	1000	1510
	9	654	983	473	711	1560	2350	1320	1980	998	1500
	10	652	981	472	709	1560	2340	1310	1970	995	1490
	11	651	978	471	708	1550	2330	1300	1960	990	1490
	12	649	975	470	706	1540	2310	1300	1950	986	1480
	13	647	972	468	704	1530	2300	1290	1940	981	1470
	14	645	969	467	702	1520	2280	1280	1920	976	1470
	15	642	966	465	699	1510	2270	1270	1910	970	1460
	16	640	962	463	697	1500	2250	1260	1900	964	1450
	17	637	958	462	694	1480	2230	1250	1880	958	1440
	18	635	954	460	691	1470	2210	1240	1860	951	1430
	19	632	950	458	688	1460	2190	1230	1850	944	1420
	20	629	945	456	685	1440	2170	1220	1830	937	1410
	22	622	935	451	678	1410	2120	1190	1790	921	1380
	24	615	925	446	671	1380	2070	1160	1750	905	1360
	26	608	913	441	663	1340	2020	1140	1710	887	1330
	28	600	901	436	655	1310	1970	1110	1660	868	1300
	30	591	888	430	646	1270	1910	1070	1610	848	1270
	32	582	875	423	636	1230	1850	1040	1570	827	1240
	34	572	860	417	626	1190	1790	1010	1510	805	1210
	36	563	845	410	616	1150	1730	973	1460	783	1180
	38	552	830	403	605	1110	1660	938	1410	760	1140
	40	541	814	395	594	1060	1600	902	1360	737	1110
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		871	1310	731	1100	1600	2400	1340	2020	1090	1640
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		709	1060	595	892	1300	1950	1090	1640	887	1330
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		282	423	209	314	534	802	451	678	368	554
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		228	342	192	289	372	559	317	476	260	392
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		434	652	340	511	991	1490	841	1260	653	982
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		348	523	270	406	796	1200	612	920	446	671
Properties											
Area, in.^{2}		29.1		24.4		53.3		44.9		36.4	
r_y, in.		7.36		7.39		6.44		6.50		6.56	
r_x/r_y		1.16		1.16		1.28		1.28		1.28	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS22×16×						HSS22×14×			
		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		3/4		5/8[a]	
t_{des}, in.		0.375		0.313		0.250		0.750		0.625	
Nom. Weight, lb/ft		93.83		78.63		63.25		171.16		144.39	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	649	976	470	706	313	471	1510	2260	1270	1910
	6	646	971	468	703	312	468	1490	2240	1250	1890
	7	644	969	467	701	311	467	1480	2230	1250	1880
	8	643	966	466	700	310	466	1470	2220	1240	1870
	9	641	964	464	698	310	465	1470	2200	1240	1860
	10	639	961	463	696	309	464	1460	2190	1230	1850
	11	637	958	462	694	308	463	1450	2180	1220	1840
	12	635	954	460	692	307	461	1440	2160	1210	1820
	13	633	951	459	689	306	460	1430	2140	1200	1810
	14	630	947	457	686	305	458	1410	2120	1190	1790
	15	627	943	455	684	303	456	1400	2100	1180	1780
	16	624	938	453	680	302	454	1390	2080	1170	1760
	17	621	933	451	677	301	452	1370	2060	1160	1740
	18	618	928	448	674	299	450	1360	2040	1140	1720
	19	614	923	446	670	298	447	1340	2010	1130	1700
	20	610	917	443	666	296	445	1320	1990	1120	1680
	22	602	905	438	658	293	440	1290	1930	1090	1630
	24	594	892	432	649	289	434	1250	1880	1060	1590
	26	585	879	425	639	285	428	1210	1820	1020	1540
	28	575	864	419	629	280	422	1170	1750	988	1490
	30	564	848	412	619	276	415	1120	1690	952	1430
	32	553	832	404	607	271	407	1080	1620	915	1380
	34	542	814	396	595	266	400	1030	1550	877	1320
	36	530	796	388	583	261	392	988	1490	839	1260
	38	516	776	379	570	255	384	942	1420	800	1200
	40	501	752	370	557	250	375	895	1350	761	1140
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		826	1240	692	1040	557	837	1510	2260	1270	1910
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		673	1010	563	845	453	680	1230	1840	1030	1550
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		282	423	209	314	116	174	534	802	451	678
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		201	302	170	255	133	201	318	478	272	408
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		420	631	332	499	245	369	911	1370	776	1170
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		299	450	230	345	166	250	666	1000	515	774
Properties											
Area, in.^{2}		27.6		23.1		18.6		50.3		42.4	
r_y, in.		6.61		6.64		6.67		5.69		5.74	
r_x/r_y		1.28		1.27		1.27		1.42		1.42	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS22×14×								HSS22×10×	
		½[a], [c]		⅜[a], [b], [c]		5⁄16[a], [b], [c]		¼[a], [b], [c]		⅝[a]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.625	
Nom. Weight, lb/ft		116.91		88.73		74.38		59.85		127.37	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	955	1430	635	955	464	697	309	465	1120	1680
	6	946	1420	631	948	460	692	307	462	1100	1650
	7	943	1420	629	946	459	690	306	461	1090	1630
	8	939	1410	627	943	458	688	306	459	1080	1620
	9	935	1410	625	940	456	686	305	458	1070	1600
	10	931	1400	623	936	455	684	304	456	1050	1580
	11	926	1390	620	932	453	681	302	455	1040	1560
	12	921	1380	617	927	451	678	301	453	1030	1540
	13	915	1380	613	921	449	675	300	451	1010	1520
	14	909	1370	609	915	447	671	298	448	994	1490
	15	902	1360	605	909	444	667	297	446	977	1470
	16	895	1350	600	902	441	663	295	444	959	1440
	17	888	1330	595	895	439	659	293	441	940	1410
	18	880	1320	590	887	436	655	292	438	920	1380
	19	872	1310	585	879	433	650	290	435	900	1350
	20	863	1300	579	871	429	645	288	432	879	1320
	22	845	1270	568	853	422	635	283	426	835	1260
	24	826	1240	555	834	415	624	278	419	790	1190
	26	805	1210	542	814	407	612	273	411	744	1120
	28	784	1180	528	793	399	599	268	403	697	1050
	30	761	1140	513	771	390	586	262	394	649	976
	32	737	1110	498	748	380	572	257	386	602	905
	34	713	1070	482	724	371	557	250	376	556	836
	36	687	1030	466	700	360	542	244	367	511	768
	38	655	985	449	675	349	525	237	357	467	702
	40	624	938	432	650	336	506	230	346	424	638
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1030	1550	781	1170	656	986	527	792	1120	1680
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		839	1260	636	954	534	801	429	644	912	1370
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		368	554	282	423	209	314	116	174	451	678
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		225	338	174	261	147	221	119	180	183	274
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		634	953	401	603	319	480	238	357	641	964
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		378	568	250	376	192	289	138	208	334	503
Properties											
Area, in.^{2}		34.4		26.1		21.9		17.6		37.4	
r_y, in.		5.80		5.86		5.88		5.91		4.17	
r_x/r_y		1.42		1.41		1.41		1.41		1.86	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22–HSS20

Table 6-C (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS22×10×								HSS20×16×	
		½[a], [c]		⅜[a], [c]		5⁄16[a], [b], [c]		¼[a], [b], [c]		¾	
t_{des}, in.		0.500		0.375		0.313		0.250		0.750	
Nom. Weight, lb/ft		103.30		78.52		65.87		53.05		171.16	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	835	1250	549	825	421	633	296	445	1510	2260
	6	821	1230	540	812	415	623	292	439	1490	2240
	7	816	1230	537	808	412	620	291	437	1490	2230
	8	811	1220	534	802	410	616	289	435	1480	2230
	9	805	1210	530	796	407	611	288	432	1470	2220
	10	798	1200	525	790	403	606	286	429	1470	2210
	11	790	1190	521	782	400	601	284	426	1460	2190
	12	782	1180	515	775	396	595	281	423	1450	2180
	13	773	1160	510	766	391	588	279	419	1440	2170
	14	764	1150	504	757	387	582	276	415	1430	2150
	15	753	1130	497	748	382	574	273	411	1420	2130
	16	743	1120	491	737	377	567	270	406	1410	2120
	17	732	1100	484	727	372	559	267	402	1400	2100
	18	720	1080	476	716	366	550	264	397	1380	2080
	19	708	1060	469	704	360	541	260	391	1370	2060
	20	695	1050	461	692	354	532	256	384	1360	2040
	22	669	1010	444	667	342	513	247	371	1330	2000
	24	641	964	426	641	328	493	237	356	1300	1950
	26	611	919	408	613	314	473	227	341	1260	1900
	28	574	862	389	585	300	451	217	326	1230	1850
	30	536	806	370	556	285	429	206	310	1190	1790
	32	498	749	350	526	271	407	196	294	1150	1730
	34	461	693	330	496	256	384	185	278	1110	1680
	36	425	638	310	466	241	362	174	262	1070	1620
	38	389	585	290	436	226	339	164	246	1030	1550
	40	355	534	271	407	211	317	153	230	993	1490
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		910	1370	692	1040	581	873	467	702	1510	2260
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		741	1110	563	845	473	709	380	570	1230	1840
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		368	554	282	423	209	314	116	174	480	721
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		153	230	120	180	102	153	83.1	125	372	559
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		526	791	404	608	323	485	218	328	861	1290
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		245	369	162	243	123	185	87.3	131	739	1110
Properties											
Area, in.^{2}		30.4		23.1		19.4		15.6		50.3	
r_y, in.		4.23		4.28		4.31		4.34		6.36	
r_x/r_y		1.85		1.84		1.84		1.83		1.19	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×16×									
		5/8[a]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		144.39		116.91		88.73		74.38		59.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1270	1910	997	1500	643	966	468	703	311	468
	6	1260	1890	990	1490	639	961	465	699	310	465
	7	1250	1880	987	1480	638	959	464	698	309	464
	8	1250	1880	984	1480	636	956	463	696	308	463
	9	1240	1870	981	1470	635	954	462	694	308	462
	10	1240	1860	977	1470	633	951	461	692	307	461
	11	1230	1850	973	1460	631	948	459	690	306	460
	12	1220	1840	968	1450	628	944	458	688	305	458
	13	1220	1830	963	1450	626	941	456	685	304	456
	14	1210	1810	958	1440	623	936	454	682	303	455
	15	1200	1800	952	1430	620	932	452	679	301	453
	16	1190	1790	946	1420	617	928	450	676	300	451
	17	1180	1770	939	1410	614	923	448	673	298	449
	18	1170	1760	933	1400	610	917	445	669	297	446
	19	1160	1740	925	1390	607	912	443	665	295	444
	20	1150	1720	918	1380	603	906	440	662	294	441
	22	1120	1690	902	1360	595	894	435	653	290	436
	24	1100	1650	885	1330	586	881	428	644	286	430
	26	1070	1610	867	1300	577	867	422	634	282	424
	28	1040	1560	846	1270	567	852	415	624	278	418
	30	1010	1520	822	1240	556	836	408	613	273	411
	32	977	1470	797	1200	545	819	400	601	268	403
	34	945	1420	771	1160	533	801	392	589	263	396
	36	912	1370	744	1120	521	783	383	576	258	388
	38	878	1320	717	1080	506	761	375	563	252	379
	40	844	1270	690	1040	491	737	366	550	247	371
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1270	1910	1030	1550	781	1170	656	986	527	792
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1030	1550	839	1260	636	954	534	801	429	644
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		406	611	332	500	255	383	209	314	128	192
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		317	476	260	392	201	302	170	255	133	201
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		734	1100	571	858	369	555	291	437	213	321
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		604	908	432	649	290	436	225	339	164	246
Properties											
Area, in.^{2}		42.4		34.4		26.1		21.9		17.6	
r_y, in.		6.42		6.48		6.54		6.57		6.60	
r_x/r_y		1.19		1.19		1.19		1.18		1.18	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×12×									
		1		⅞		¾		⅝[a]		½[a], [c]	
t_{des}, in.		1.00		0.875		0.750		0.625		0.500	
Nom. Weight, lb/ft		195.40		173.43		150.75		127.37		103.30	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1720	2580	1530	2300	1330	1990	1120	1680	878	1320
	6	1690	2540	1500	2260	1310	1960	1100	1660	867	1300
	7	1680	2520	1490	2240	1300	1950	1100	1650	863	1300
	8	1670	2510	1480	2230	1290	1940	1090	1640	859	1290
	9	1650	2490	1470	2210	1280	1920	1080	1620	854	1280
	10	1640	2470	1460	2190	1270	1910	1070	1610	848	1270
	11	1620	2440	1440	2170	1260	1890	1060	1600	842	1270
	12	1610	2420	1430	2150	1240	1870	1050	1580	835	1260
	13	1590	2390	1410	2120	1230	1850	1040	1560	828	1240
	14	1570	2360	1400	2100	1220	1830	1030	1550	821	1230
	15	1550	2330	1380	2070	1200	1800	1020	1530	812	1220
	16	1530	2290	1360	2040	1180	1780	1000	1510	804	1210
	17	1500	2260	1340	2010	1170	1750	987	1480	795	1190
	18	1480	2220	1320	1980	1150	1730	973	1460	785	1180
	19	1450	2180	1290	1950	1130	1700	957	1440	775	1170
	20	1430	2140	1270	1910	1110	1670	941	1410	765	1150
	22	1370	2060	1220	1840	1070	1610	907	1360	741	1110
	24	1310	1970	1170	1760	1030	1540	872	1310	712	1070
	26	1250	1880	1120	1690	981	1470	835	1250	682	1030
	28	1190	1790	1070	1600	935	1410	796	1200	652	979
	30	1130	1700	1010	1520	888	1330	757	1140	620	932
	32	1070	1600	956	1440	840	1260	717	1080	588	884
	34	1000	1510	900	1350	792	1190	677	1020	556	836
	36	939	1410	845	1270	744	1120	637	958	524	787
	38	876	1320	789	1190	697	1050	598	898	492	739
	40	815	1220	735	1100	650	977	558	839	460	692
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1720	2580	1530	2300	1330	1990	1120	1680	910	1370
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1400	2100	1240	1860	1080	1620	912	1370	741	1110
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		611	918	547	822	480	721	406	611	332	500
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		323	486	295	443	263	395	227	341	189	284
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		911	1370	816	1230	716	1080	611	919	501	754
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		636	956	571	859	504	758	413	621	299	449
Properties											
Area, in.^{2}		57.4		51.0		44.3		37.4		30.4	
r_y, in.		4.75		4.80		4.86		4.92		4.97	
r_x/r_y		1.49		1.49		1.49		1.48		1.48	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×12×				HSS20×8×					
		3/8[a], [b], [c]		5/16[a], [b], [c]		1		7/8		3/4	
t_{des}, in.		0.375		0.313		1.00		0.875		0.750	
Nom. Weight, lb/ft		78.52		65.87		168.18		149.61		130.33	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	587	883	449	674	1480	2220	1320	1980	1150	1720
	6	580	872	444	668	1420	2140	1270	1910	1110	1660
	7	578	869	443	666	1400	2110	1250	1880	1090	1640
	8	575	864	441	663	1380	2080	1230	1850	1080	1620
	9	572	860	439	660	1360	2040	1210	1820	1060	1590
	10	568	854	437	657	1330	2000	1190	1790	1040	1560
	11	564	848	435	653	1300	1960	1160	1750	1020	1530
	12	560	842	432	649	1270	1910	1140	1710	995	1500
	13	556	835	429	645	1240	1860	1110	1670	971	1460
	14	551	828	426	640	1200	1810	1080	1620	945	1420
	15	545	820	423	635	1170	1750	1050	1570	919	1380
	16	540	812	418	629	1130	1700	1010	1520	891	1340
	17	534	803	414	622	1090	1640	981	1470	863	1300
	18	528	794	409	615	1050	1580	946	1420	833	1250
	19	522	784	404	608	1010	1520	911	1370	804	1210
	20	515	774	399	600	970	1460	875	1320	773	1160
	22	501	753	389	584	888	1330	803	1210	712	1070
	24	486	730	377	567	806	1210	731	1100	650	977
	26	470	707	365	549	725	1090	660	992	589	886
	28	454	682	353	530	647	973	591	889	530	796
	30	437	656	340	510	572	860	525	789	473	710
	32	419	630	326	490	503	756	462	695	417	627
	34	401	603	312	470	445	669	409	615	370	556
	36	383	576	299	449	397	597	365	549	330	496
	38	365	548	285	428	357	536	328	493	296	445
	40	346	520	271	407	322	484	296	445	267	402
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		692	1040	581	873	1480	2220	1320	1980	1150	1720
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		563	845	473	709	1200	1810	1070	1610	934	1400
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		255	383	209	314	611	918	547	822	480	721
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		147	221	125	188	180	270	169	254	155	233
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		365	548	266	399	721	1080	649	975	574	863
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		200	300	153	230	369	555	334	503	297	446
Properties											
Area, in.^{2}		23.1		19.4		49.4		44.0		38.3	
r_y, in.		5.03		5.06		3.16		3.21		3.27	
r_x/r_y		1.48		1.48		2.10		2.09		2.07	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×8×								HSS20×6×	
		5/8[a]		1/2[a], [c]		3/8[a], [c]		5/16[a], [b], [c]		5/8[a]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.625	
Nom. Weight, lb/ft		110.36		89.68		68.31		57.36		101.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	970	1460	758	1140	498	748	380	571	895	1350
	6	937	1410	739	1110	486	730	371	558	842	1270
	7	926	1390	732	1100	481	724	368	553	823	1240
	8	913	1370	724	1090	477	716	364	547	802	1210
	9	898	1350	715	1080	471	708	360	541	779	1170
	10	882	1330	706	1060	465	699	356	535	754	1130
	11	864	1300	695	1040	459	689	351	527	728	1090
	12	845	1270	684	1030	452	679	346	519	700	1050
	13	825	1240	672	1010	444	667	340	511	670	1010
	14	804	1210	659	990	436	655	334	502	640	962
	15	782	1180	642	966	428	643	328	492	609	915
	16	760	1140	624	938	419	629	321	482	578	868
	17	736	1110	606	910	409	615	314	472	546	820
	18	712	1070	586	881	400	601	307	461	514	773
	19	687	1030	567	852	390	586	299	450	483	725
	20	662	995	547	822	380	571	292	439	451	678
	22	611	918	506	760	359	539	276	415	391	588
	24	560	841	465	699	337	506	260	390	333	501
	26	509	764	424	637	314	473	243	365	284	427
	28	459	689	384	577	292	439	226	340	245	368
	30	411	617	345	518	269	404	209	315	213	321
	32	364	547	307	462	241	362	193	290	187	282
	34	322	485	272	409	214	321	176	265	166	250
	36	288	432	243	365	190	286	161	242	148	223
	38	258	388	218	328	171	257	146	220	133	200
	40	233	350	197	296	154	232	132	198	120	180
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		970	1460	790	1190	602	905	506	761	895	1350
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		790	1180	644	965	490	735	412	618	729	1090
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		406	611	332	500	255	383	209	314	406	611
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		138	207	117	176	92.7	139	79.4	119	92.7	139
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		492	739	404	608	312	469	263	395	432	649
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		247	371	179	268	119	179	90.8	136	170	256
Properties											
Area, in.^{2}		32.4		26.4		20.1		16.9		29.9	
r_y, in.		3.32		3.38		3.43		3.46		2.48	
r_x/r_y		2.07		2.05		2.05		2.04		2.65	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×6×								HSS20×4×	
		½[a], [c]		⅜[a], [c]		5⁄16[a], [b], [c]		¼[a], [b], [c]		½[a], [c]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.500	
Nom. Weight, lb/ft		82.88		63.21		53.11		42.84		76.07	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	698	1050	453	680	341	513	242	364	638	959
	6	668	1000	434	653	328	493	233	350	577	867
	7	657	988	428	643	323	486	230	345	556	836
	8	645	969	421	632	318	478	226	339	525	789
	9	632	949	413	620	312	469	222	333	492	740
	10	617	927	404	607	305	459	217	326	458	688
	11	600	901	394	592	298	448	212	319	422	635
	12	578	868	384	577	291	437	207	311	387	581
	13	554	833	373	560	283	425	202	303	352	528
	14	531	797	361	543	274	412	196	294	317	477
	15	506	761	350	525	266	399	190	285	284	427
	16	481	723	337	507	257	386	183	276	252	378
	17	456	685	325	488	247	372	177	266	223	335
	18	431	647	312	468	238	358	170	256	199	299
	19	405	609	298	448	228	343	164	246	178	268
	20	380	572	285	428	219	329	157	236	161	242
	22	332	498	258	388	199	299	143	215	133	200
	24	285	429	225	339	179	269	130	195	112	168
	26	243	365	193	290	160	240	116	174	95.3	143
	28	210	315	166	250	143	214	104	156		
	30	183	274	145	217	124	187	94.0	141		
	32	160	241	127	191	109	164	85.4	128		
	34	142	214	113	169	96.7	145	78.0	117		
	36	127	191	100	151	86.2	130	71.3	107		
	38	114	171	90.2	136	77.4	116	64.0	96.1		
	40	103	154	81.4	122	69.9	105	57.7	86.8		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		731	1100	557	837	467	702	377	567	671	1010
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		595	892	453	680	380	570	307	461	546	819
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		332	500	255	383	209	314	128	192	332	500
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		80.8	122	65.7	98.8	56.9	85.5	47.2	70.9	44.9	67.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		354	533	274	413	231	347	179	268	307	461
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		124	187	83.0	125	62.8	94.4	44.3	66.6	73.1	110
Properties											
Area, in.^{2}		24.4		18.6		15.6		12.6		22.4	
r_y, in.		2.54		2.59		2.62		2.65		1.66	
r_x/r_y		2.62		2.60		2.59		2.57		3.80	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS20–HSS18

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×4×						HSS18×10×			
		3/8[a], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		5/8		1/2[a]	
t_{des}, in.		0.375		0.313		0.250		0.625		0.500	
Nom. Weight, lb/ft		58.10		48.86		39.43		110.36		89.68	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	408	613	305	459	212	319	970	1460	790	1190
	6	373	560	280	421	195	293	948	1430	773	1160
	7	361	542	271	408	189	285	940	1410	767	1150
	8	348	522	262	393	183	275	932	1400	760	1140
	9	333	500	251	377	176	264	922	1390	752	1130
	10	317	477	240	361	168	253	911	1370	743	1120
	11	301	452	228	343	160	241	899	1350	734	1100
	12	284	426	216	324	152	229	886	1330	724	1090
	13	266	400	203	305	144	216	872	1310	712	1070
	14	248	373	190	285	135	203	857	1290	701	1050
	15	230	345	177	266	126	189	841	1260	688	1030
	16	206	309	164	246	117	176	825	1240	675	1020
	17	183	275	150	226	108	163	808	1210	662	995
	18	163	245	138	208	100	150	790	1190	648	974
	19	146	220	126	189	92.6	139	772	1160	633	952
	20	132	198	114	171	86.1	129	753	1130	618	929
	22	109	164	94.0	141	75.0	113	714	1070	587	882
	24	91.7	138	79.0	119	65.9	99.0	674	1010	555	834
	26	78.1	117	67.3	101	56.1	84.3	633	951	522	784
	28	67.4	101	58.0	87.2	48.4	72.7	591	888	488	734
	30							549	825	455	683
	32							508	763	421	633
	34							467	702	389	584
	36							427	642	357	536
	38							389	585	326	489
	40							352	529	295	444
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		512	770	431	648	347	522	970	1460	790	1190
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		417	625	351	527	283	424	790	1180	644	965
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		255	383	209	314	128	192	362	543	296	446
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		38.8	58.3	34.4	51.7	29.2	43.9	183	274	153	230
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		238	357	200	301	154	231	467	701	384	578
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		49.5	74.4	37.7	56.7	26.4	39.7	309	465	229	344
Properties											
Area, in.^{2}		17.1		14.4		11.6		32.4		26.4	
r_y, in.		1.72		1.74		1.77		4.08		4.14	
r_x/r_y		3.72		3.70		3.67		1.58		1.58	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS18

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS18×10×						HSS18×8×			
		3/8[a], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		5/8		1/2[a]	
t_{des}, in.		0.375		0.313		0.250		0.625		0.500	
Nom. Weight, lb/ft		68.31		57.36		46.24		101.85		82.88	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	534	802	413	620	291	438	895	1350	731	1100
	6	525	789	406	610	288	432	864	1300	706	1060
	7	522	784	403	606	286	430	854	1280	698	1050
	8	518	778	401	602	285	428	841	1260	688	1030
	9	514	772	397	597	283	425	827	1240	677	1020
	10	509	765	394	592	281	422	812	1220	665	999
	11	504	758	390	586	279	419	796	1200	652	980
	12	499	750	386	580	276	415	778	1170	638	958
	13	493	741	382	574	274	411	760	1140	623	936
	14	487	732	377	566	271	407	740	1110	607	913
	15	480	722	372	559	268	403	719	1080	591	888
	16	473	711	367	551	265	398	698	1050	574	862
	17	466	700	361	543	262	393	676	1020	556	836
	18	458	689	355	534	258	388	653	982	538	809
	19	450	677	349	525	254	382	630	947	520	781
	20	442	665	343	515	249	375	607	912	501	753
	22	425	639	330	496	240	361	559	840	463	695
	24	407	612	316	475	230	346	511	768	424	638
	26	388	583	302	454	220	331	464	697	386	580
	28	369	554	287	431	209	315	418	628	349	524
	30	349	524	272	409	199	299	373	561	312	470
	32	327	491	257	386	188	282	330	496	277	417
	34	302	454	241	363	177	266	292	439	246	369
	36	278	417	226	340	166	249	261	392	219	329
	38	254	382	211	317	155	233	234	352	197	296
	40	231	348	196	294	144	217	211	317	178	267
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		602	905	506	761	407	612	895	1350	731	1100
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		490	735	412	618	332	497	729	1090	595	892
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		228	342	192	289	133	201	362	543	296	446
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		120	180	102	153	83.1	125	138	207	117	176
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		297	446	237	356	163	245	414	623	342	514
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		154	231	118	177	84.9	128	233	350	172	259
Properties											
Area, in.^{2}		20.1		16.9		13.6		29.9		24.4	
r_y, in.		4.20		4.22		4.25		3.29		3.34	
r_x/r_y		1.57		1.57		1.57		1.90		1.89	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS18

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS18×8×						HSS18×6×			
		3/8[a], [c]		5/16[a], [c]		1/4[a], [b], [c]		3/4		5/8	
t_{des}, in.		0.375		0.313		0.250		0.750		0.625	
Nom. Weight, lb/ft		63.21		53.11		42.84		109.91		93.34	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	489	735	374	562	270	405	967	1450	820	1230
	6	477	716	365	548	263	396	906	1360	771	1160
	7	472	710	361	543	261	392	885	1330	753	1130
	8	467	703	358	538	258	388	861	1290	734	1100
	9	462	694	354	532	255	384	835	1260	713	1070
	10	456	685	349	525	252	379	807	1210	689	1040
	11	449	675	344	517	249	374	777	1170	665	999
	12	442	664	339	509	245	368	745	1120	639	960
	13	434	653	333	501	241	362	712	1070	611	919
	14	426	641	327	492	236	355	678	1020	583	877
	15	418	628	321	482	232	348	643	967	555	834
	16	409	614	314	472	227	341	608	914	525	790
	17	399	600	307	461	222	334	573	861	496	746
	18	390	585	300	451	217	326	537	808	467	702
	19	379	570	292	439	211	318	503	755	438	658
	20	369	555	285	428	206	310	468	704	409	615
	22	348	523	269	404	195	293	402	604	353	531
	24	326	490	252	379	183	275	340	511	300	452
	26	301	452	236	354	171	257	290	435	256	385
	28	273	410	219	329	159	239	250	375	221	332
	30	245	369	202	303	147	221	218	327	192	289
	32	219	329	185	278	135	203	191	287	169	254
	34	194	292	166	249	124	186	169	255	150	225
	36	173	260	148	222	113	170	151	227	134	201
	38	155	234	133	199	104	156	136	204	120	180
	40	140	211	120	180	96.1	144	122	184	108	163
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		557	837	467	702	377	567	967	1450	820	1230
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		453	680	380	570	307	461	787	1180	668	1000
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		228	342	192	289	133	201	426	640	362	543
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		92.7	139	79.4	119	65.1	97.9	101	152	92.7	139
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		262	394	223	335	170	255	417	626	359	540
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		116	174	88.9	134	63.1	94.9	185	279	161	242
Properties											
Area, in.^{2}		18.6		15.6		12.6		32.3		27.4	
r_y, in.		3.40		3.43		3.45		2.41		2.46	
r_x/r_y		1.88		1.87		1.87		2.44		2.43	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS18–HSS16

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS18×6×								HSS16×12×	
		½[a]		⅜[a], [c]		5⁄16[a], [c]		¼[a], [b], [c]		1	
t_{des}, in.		0.500		0.375		0.313		0.250		1.00	
Nom. Weight, lb/ft		76.07		58.10		48.86		39.43		168.18	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	671	1010	444	667	338	508	240	360	1480	2220
	6	632	950	425	639	324	487	230	346	1450	2180
	7	618	929	419	629	319	480	227	341	1440	2170
	8	603	907	411	618	314	472	223	335	1430	2150
	9	586	881	403	606	308	463	219	329	1420	2140
	10	568	854	394	592	301	453	214	322	1410	2120
	11	549	825	384	578	294	442	209	315	1390	2090
	12	528	794	374	562	286	430	204	307	1380	2070
	13	507	762	363	546	278	418	199	298	1360	2040
	14	485	728	351	528	270	406	193	289	1340	2020
	15	462	694	339	510	261	392	186	280	1320	1990
	16	439	659	327	491	252	378	180	271	1300	1960
	17	415	624	314	472	242	364	174	261	1280	1930
	18	392	589	301	452	233	350	167	251	1260	1890
	19	369	554	288	432	223	335	160	241	1240	1860
	20	346	519	271	407	213	320	153	231	1210	1820
	22	301	452	237	356	193	290	140	210	1160	1750
	24	258	387	204	307	173	260	126	189	1110	1670
	26	220	330	174	262	150	226	112	169	1060	1590
	28	189	285	150	226	130	195	100	151	1000	1510
	30	165	248	131	197	113	170	90.5	136	947	1420
	32	145	218	115	173	99.2	149	81.8	123	891	1340
	34	128	193	102	153	87.9	132	72.4	109	834	1250
	36	115	172	91.0	137	78.4	118	64.6	97.1	778	1170
	38	103	155	81.6	123	70.4	106	58.0	87.2	723	1090
	40	92.8	139	73.7	111	63.5	95.4	52.3	78.7	669	1010
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		671	1010	512	770	431	648	347	522	1480	2220
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		546	819	417	625	351	527	283	424	1200	1810
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		296	446	228	342	192	289	133	201	467	702
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		80.8	122	65.7	98.8	56.9	85.5	47.2	70.9	323	486
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		297	446	230	346	195	293	154	231	644	968
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		120	180	80.4	121	61.6	92.6	43.7	65.7	526	791
Properties											
Area, in.^{2}		22.4		17.1		14.4		11.6		49.4	
r_y, in.		2.52		2.57		2.60		2.63		4.61	
r_x/r_y		2.40		2.39		2.37		2.36		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×12×									
		⅞		¾		⅝		½[a]		⅜[a], [b], [c]	
t_{des}, in.		0.875		0.750		0.625		0.500		0.375	
Nom. Weight, lb/ft		149.61		130.33		110.36		89.68		68.31	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1320	1980	1150	1720	970	1460	790	1190	567	853
	6	1290	1950	1130	1690	954	1430	778	1170	560	842
	7	1290	1930	1120	1680	948	1430	773	1160	558	838
	8	1280	1920	1110	1670	942	1420	768	1150	555	834
	9	1270	1900	1100	1660	935	1400	762	1150	551	828
	10	1260	1890	1090	1640	926	1390	756	1140	547	823
	11	1240	1870	1080	1630	917	1380	749	1130	543	817
	12	1230	1850	1070	1610	908	1360	741	1110	539	810
	13	1210	1820	1060	1590	897	1350	733	1100	534	803
	14	1200	1800	1050	1570	886	1330	724	1090	529	795
	15	1180	1780	1030	1550	875	1310	714	1070	523	787
	16	1160	1750	1020	1530	862	1300	705	1060	518	778
	17	1150	1720	1000	1500	849	1280	694	1040	512	769
	18	1130	1690	985	1480	836	1260	683	1030	505	759
	19	1110	1660	968	1450	821	1230	672	1010	498	749
	20	1090	1630	950	1430	807	1210	660	993	492	739
	22	1040	1570	913	1370	776	1170	636	956	477	717
	24	998	1500	874	1310	744	1120	610	917	461	693
	26	951	1430	834	1250	710	1070	583	877	445	669
	28	902	1360	793	1190	676	1020	556	835	427	641
	30	853	1280	751	1130	641	963	527	793	406	610
	32	804	1210	708	1060	605	910	499	750	384	577
	34	754	1130	666	1000	569	856	470	707	362	545
	36	705	1060	623	937	534	802	441	663	341	512
	38	656	986	581	874	499	749	413	621	319	480
	40	608	915	540	812	464	698	385	579	298	448
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1320	1980	1150	1720	970	1460	790	1190	602	905
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1070	1610	934	1400	790	1180	644	965	490	735
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		421	633	372	559	317	476	260	392	201	302
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		295	443	263	395	227	341	189	284	147	221
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		579	870	511	769	437	656	359	540	264	397
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		474	713	419	630	359	540	283	426	187	281
Properties											
Area, in.^{2}		44.0		38.3		32.4		26.4		20.1	
r_y, in.		4.67		4.73		4.78		4.84		4.90	
r_x/r_y		1.25		1.25		1.25		1.25		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×12×		HSS16×10×							
		5/16[a], [b], [c]		5/8		1/2[a]		3/8[a], [c]		5/16[a], [b], [c]	
t_{des}, in.		0.313		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		57.36		101.85		82.88		63.21		53.11	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	438	658	895	1350	731	1100	523	785	405	609
	6	433	651	875	1310	714	1070	513	772	398	598
	7	432	649	867	1300	708	1060	510	767	396	595
	8	430	646	859	1290	702	1050	506	761	393	590
	9	428	643	849	1280	694	1040	502	755	390	586
	10	425	639	839	1260	686	1030	497	748	386	580
	11	423	636	828	1240	677	1020	492	740	382	574
	12	420	631	815	1230	667	1000	487	732	378	568
	13	417	627	802	1210	657	987	481	723	373	561
	14	414	622	788	1180	646	971	474	713	369	554
	15	410	617	774	1160	634	953	468	703	364	546
	16	406	610	758	1140	622	935	461	692	358	538
	17	401	603	742	1120	609	915	453	681	352	530
	18	396	595	726	1090	596	895	445	669	347	521
	19	391	588	708	1060	582	875	437	657	340	512
	20	386	580	691	1040	568	854	429	644	334	502
	22	374	563	654	983	539	810	411	618	321	482
	24	363	545	616	926	508	764	391	588	307	461
	26	350	526	578	868	477	717	368	553	292	440
	28	337	506	539	809	446	670	344	517	277	417
	30	323	486	499	751	415	623	320	482	262	394
	32	309	465	461	693	383	576	297	446	247	371
	34	295	444	423	636	353	530	274	411	231	348
	36	281	422	386	581	323	486	251	378	213	320
	38	267	401	351	528	294	442	229	345	195	293
	40	252	379	317	476	266	400	208	313	177	266
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		506	761	895	1350	731	1100	557	837	467	702
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		412	618	729	1090	595	892	453	680	380	570
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		170	255	317	476	260	392	201	302	170	255
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		125	188	183	274	153	230	120	180	102	153
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		195	293	389	585	322	484	248	372	200	300
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		145	218	282	424	224	336	148	222	115	172
Properties											
Area, in.^{2}		16.9		29.9		24.4		18.6		15.6	
r_y, in.		4.93		4.03		4.09		4.14		4.17	
r_x/r_y		1.25		1.44		1.44		1.44		1.43	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×10×		HSS16×8×							
		¼[a], [b], [c]		⅞		¾		⅝		½[a]	
t_{des}, in.		0.250		0.875		0.750		0.625		0.500	
Nom. Weight, lb/ft		42.84		125.79		109.91		93.34		76.07	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	288	433	1110	1670	967	1450	820	1230	671	1010
	6	284	428	1070	1600	932	1400	791	1190	648	974
	7	283	425	1050	1580	919	1380	781	1170	640	961
	8	281	423	1030	1560	905	1360	770	1160	630	948
	9	280	420	1020	1530	889	1340	757	1140	620	932
	10	278	417	996	1500	872	1310	743	1120	609	915
	11	275	414	974	1460	853	1280	727	1090	597	897
	12	273	410	950	1430	833	1250	711	1070	583	877
	13	270	406	925	1390	812	1220	693	1040	570	856
	14	267	402	899	1350	790	1190	675	1010	555	834
	15	264	397	871	1310	766	1150	656	985	540	811
	16	261	393	843	1270	742	1120	636	955	524	787
	17	258	388	814	1220	717	1080	615	924	507	762
	18	254	382	784	1180	692	1040	594	893	490	737
	19	250	376	753	1130	666	1000	572	860	473	711
	20	245	369	723	1090	639	961	551	828	456	685
	22	236	354	661	993	586	881	506	761	420	631
	24	226	339	599	900	533	801	462	694	384	578
	26	215	324	538	809	481	722	418	629	349	524
	28	205	307	480	721	430	646	375	564	314	472
	30	194	291	423	636	381	573	334	503	281	422
	32	183	274	372	559	335	504	295	443	249	374
	34	171	258	329	495	297	446	261	393	220	331
	36	160	241	294	442	265	398	233	350	196	295
	38	150	225	264	396	238	357	209	314	176	265
	40	139	208	238	358	214	322	189	284	159	239
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		377	567	1110	1670	967	1450	820	1230	671	1010
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		307	461	902	1350	787	1180	668	1000	546	819
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		133	201	421	633	372	559	317	476	260	392
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		83.1	125	169	254	155	233	138	207	117	176
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		138	207	447	671	397	596	342	514	282	424
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		82.8	124	272	409	243	365	210	315	167	252
Properties											
Area, in.^{2}		12.6		37.0		32.3		27.4		22.4	
r_y, in.		4.20		3.14		3.19		3.25		3.30	
r_x/r_y		1.43		1.74		1.74		1.73		1.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×8×						HSS16×6×			
		3/8[a], [c]		5/16[a], [c]		1/4[a], [b], [c]		5/8		1/2[a]	
t_{des}, in.		0.375		0.313		0.250		0.625		0.500	
Nom. Weight, lb/ft		58.10		48.86		39.43		84.84		69.27	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	478	718	369	555	267	401	746	1120	611	918
	6	465	699	360	541	260	391	700	1050	575	864
	7	461	693	357	536	258	387	684	1030	562	845
	8	456	685	353	530	255	383	666	1000	548	823
	9	450	677	349	524	252	379	646	971	532	800
	10	444	667	344	517	249	374	625	939	515	775
	11	437	657	339	509	245	368	602	905	497	747
	12	430	646	333	501	241	363	578	869	478	719
	13	422	634	327	492	237	356	553	831	458	689
	14	414	622	321	483	233	350	527	792	438	658
	15	405	609	315	473	228	343	501	753	417	626
	16	396	595	308	463	223	335	474	713	395	594
	17	386	581	301	452	218	328	447	672	374	562
	18	376	566	293	441	213	320	420	632	352	530
	19	366	550	286	429	207	312	394	592	331	497
	20	353	530	278	417	202	303	367	552	310	465
	22	326	490	261	393	190	286	317	476	268	404
	24	299	450	245	368	179	269	269	404	229	344
	26	273	410	228	342	167	250	229	344	195	294
	28	246	370	210	316	155	232	197	297	168	253
	30	221	332	189	284	143	214	172	258	147	220
	32	197	296	169	254	131	196	151	227	129	194
	34	174	262	149	225	119	179	134	201	114	172
	36	155	234	133	200	109	163	119	179	102	153
	38	140	210	120	180	98.1	147	107	161	91.4	137
	40	126	189	108	162	88.5	133	96.7	145	82.5	124
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		512	770	431	648	347	522	746	1120	611	918
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		417	625	351	527	283	424	607	910	497	746
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		201	302	170	255	133	201	317	476	260	392
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		92.7	139	79.4	119	65.1	97.9	92.7	139	80.8	122
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		219	329	185	279	142	214	294	443	244	366
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		111	167	86.0	129	61.7	92.7	144	217	116	174
Properties											
Area, in.^{2}		17.1		14.4		11.6		24.9		20.4	
r_y, in.		3.36		3.39		3.42		2.44		2.49	
r_x/r_y		1.71		1.71		1.70		2.20		2.18	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×6×								HSS16×4×	
		3/8[a], [c]		5/16[a], [c]		1/4[a], [b], [c]		3/16[a], [b], [c]		5/8	
t_{des}, in.		0.375		0.313		0.250		0.188		0.625	
Nom. Weight, lb/ft		53.00		44.60		36.03		27.29		76.33	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	433	650	330	496	237	356	154	232	671	1010
	6	414	622	316	475	227	341	148	223	577	868
	7	407	612	311	468	224	336	146	219	547	822
	8	400	601	306	460	220	330	143	215	514	772
	9	392	588	300	451	215	324	141	211	479	719
	10	382	575	293	440	211	317	138	207	442	665
	11	373	560	286	430	206	309	134	202	405	609
	12	362	544	278	418	200	301	131	197	368	553
	13	351	527	270	406	195	292	127	191	332	499
	14	339	510	261	393	189	283	123	185	296	446
	15	324	488	252	379	182	274	119	179	263	395
	16	309	464	243	365	176	264	115	173	231	347
	17	293	440	233	351	169	254	111	167	205	307
	18	276	415	224	336	163	244	107	160	182	274
	19	260	391	214	321	156	234	102	154	164	246
	20	244	367	204	306	149	224	97.9	147	148	222
	22	213	321	181	273	135	203	89.0	134	122	184
	24	184	276	157	235	121	182	80.2	121	103	154
	26	157	235	134	201	107	161	71.5	108	87.4	131
	28	135	203	115	173	95.4	143	64.0	96.3		
	30	118	177	100	151	83.1	125	57.8	86.8		
	32	103	155	88.2	133	73.0	110	52.4	78.7		
	34	91.6	138	78.1	117	64.7	97.2	47.8	71.8		
	36	81.7	123	69.7	105	57.7	86.7	43.8	65.8		
	38	73.3	110	62.5	94.0	51.8	77.9	40.2	60.4		
	40	66.2	99.5	56.4	84.8	46.7	70.3	36.3	54.5		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		467	702	392	590	317	477	241	362	671	1010
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		380	570	319	479	258	388	196	294	546	819
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		201	302	170	255	133	201	67.6	102	317	476
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		65.7	98.8	56.9	85.5	47.2	70.9	36.7	55.2	47.8	71.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		189	285	161	242	130	195	93.8	141	246	369
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		77.2	116	59.8	89.8	42.7	64.2	27.5	41.3	85.3	128
Properties											
Area, in.^{2}		15.6		13.1		10.6		8.04		22.4	
r_y, in.		2.55		2.57		2.60		2.63		1.59	
r_x/r_y		2.16		2.16		2.15		2.14		3.16	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS16

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×4×									
		½[a]		3/8[a], [c]		5/16[a], [c]		¼[a], [b], [c]		3/16[a], [b], [c]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		62.46		47.90		40.35		32.63		24.73	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	551	828	388	583	294	442	206	310	132	198
	6	478	719	352	529	268	403	189	284	121	182
	7	455	683	339	510	260	390	183	275	117	176
	8	429	644	326	490	250	375	177	265	113	170
	9	401	603	311	467	239	359	169	255	109	164
	10	372	560	292	439	228	342	162	243	104	157
	11	343	516	270	406	215	324	154	231	99.1	149
	12	314	471	248	373	203	305	145	218	93.9	141
	13	284	427	226	340	190	285	137	205	88.6	133
	14	256	384	205	308	177	266	128	192	83.1	125
	15	228	343	184	277	160	240	119	179	77.7	117
	16	202	303	164	247	143	215	110	165	72.2	109
	17	179	269	145	219	127	191	101	152	66.7	100
	18	159	240	130	195	113	170	92.8	139	61.5	92.4
	19	143	215	116	175	102	153	84.9	128	56.9	85.6
	20	129	194	105	158	91.9	138	76.6	115	52.9	79.5
	22	107	160	86.8	131	75.9	114	63.3	95.2	46.0	69.2
	24	89.7	135	73.0	110	63.8	95.9	53.2	80.0	40.5	60.9
	26	76.4	115	62.2	93.5	54.4	81.7	45.3	68.2	35.7	53.6
	28			53.6	80.6	46.9	70.4	39.1	58.8	30.8	46.2
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		551	828	422	635	356	536	287	432	218	328
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		449	673	344	516	290	435	234	351	178	267
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		260	392	201	302	170	255	133	201	67.6	102
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		44.9	67.5	38.8	58.3	34.4	51.7	29.2	43.9	23.2	34.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		205	308	160	241	136	205	110	165	79.0	119
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		69.1	104	46.1	69.3	35.8	53.9	25.5	38.3	16.2	24.4
Properties											
Area, in.^{2}		18.4		14.1		11.9		9.59		7.29	
r_y, in.		1.64		1.69		1.72		1.75		1.78	
r_x/r_y		3.12		3.08		3.05		3.03		3.00	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS14

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×12×									
		⅝		½		⅜[a], [b], [c]		5/16[a], [b], [c]		¼[a], [b], [c]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		101.85		82.88		63.21		53.11		42.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	895	1350	731	1100	554	832	428	644	292	439
	6	880	1320	718	1080	546	821	424	637	289	435
	7	875	1310	714	1070	543	817	422	634	288	433
	8	868	1310	709	1070	540	812	420	632	287	431
	9	861	1290	704	1060	537	807	418	628	286	429
	10	854	1280	697	1050	532	800	416	625	284	427
	11	845	1270	691	1040	527	792	413	621	282	424
	12	836	1260	683	1030	522	784	410	616	281	422
	13	826	1240	675	1020	516	775	407	612	279	419
	14	815	1230	667	1000	510	766	404	607	277	416
	15	804	1210	658	989	503	756	400	601	274	412
	16	792	1190	649	975	496	745	395	594	272	409
	17	780	1170	639	960	489	734	390	587	269	405
	18	767	1150	628	945	481	723	385	579	267	401
	19	754	1130	618	928	473	711	380	571	264	397
	20	740	1110	607	912	465	698	375	563	261	392
	22	711	1070	583	877	447	672	363	546	255	383
	24	680	1020	559	840	429	645	351	527	248	373
	26	649	975	534	802	410	616	338	508	241	362
	28	616	926	507	763	390	587	325	488	234	351
	30	583	876	481	723	370	557	311	467	226	340
	32	549	826	454	682	350	526	295	444	218	327
	34	516	776	427	642	330	496	278	418	209	315
	36	483	725	400	601	310	465	261	393	201	302
	38	450	676	373	561	289	435	245	368	190	286
	40	418	628	347	522	270	405	228	343	180	270
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		895	1350	731	1100	557	837	467	702	377	567
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		729	1090	595	892	453	680	380	570	307	461
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		272	408	225	338	174	261	147	221	119	180
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		227	341	189	284	147	221	125	188	101	153
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		359	540	297	446	219	328	163	245	121	181
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		324	488	267	401	178	267	140	210	102	153
Properties											
Area, in.^{2}		29.9		24.4		18.6		15.6		12.6	
r_y, in.		4.70		4.76		4.82		4.85		4.88	
r_x/r_y		1.13		1.13		1.12		1.12		1.12	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×10×									
		⅞		¾		⅝		½		⅜[a], [c]	
t_{des}, in.		0.875		0.750		0.625		0.500		0.375	
Nom. Weight, lb/ft		125.79		109.91		93.34		76.07		58.10	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1110	1670	967	1450	820	1230	671	1010	509	765
	6	1080	1620	943	1420	801	1200	655	985	499	750
	7	1070	1610	935	1410	794	1190	650	976	496	745
	8	1060	1590	925	1390	786	1180	643	967	492	739
	9	1050	1570	915	1370	777	1170	636	956	486	731
	10	1030	1550	903	1360	767	1150	628	944	481	722
	11	1020	1530	890	1340	756	1140	620	932	474	713
	12	1000	1500	876	1320	745	1120	611	918	467	703
	13	982	1480	861	1290	732	1100	601	903	460	691
	14	964	1450	845	1270	719	1080	590	887	452	680
	15	944	1420	828	1240	705	1060	579	871	444	667
	16	924	1390	811	1220	691	1040	568	853	435	654
	17	902	1360	793	1190	676	1020	556	835	426	641
	18	880	1320	774	1160	660	992	543	816	417	627
	19	857	1290	754	1130	644	968	530	797	407	612
	20	834	1250	734	1100	627	943	517	777	398	597
	22	785	1180	693	1040	593	891	489	735	377	567
	24	736	1110	650	978	557	838	461	693	356	535
	26	685	1030	607	912	521	783	432	649	334	502
	28	635	954	564	847	485	728	402	605	312	469
	30	585	879	520	782	448	674	373	561	290	435
	32	535	804	478	718	412	620	344	517	268	403
	34	487	732	436	656	378	567	316	475	246	370
	36	441	663	396	595	344	516	288	433	226	339
	38	396	596	357	536	311	467	262	393	205	309
	40	358	538	322	484	280	421	236	355	186	279
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1110	1670	967	1450	820	1230	671	1010	512	770
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		902	1350	787	1180	668	1000	546	819	417	625
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		358	539	318	478	272	408	225	338	174	261
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		232	349	209	314	183	274	153	230	120	180
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		417	626	369	555	317	476	262	394	203	306
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		329	495	292	439	252	379	209	314	141	211
Properties											
Area, in.^{2}		37.0		32.3		27.4		22.4		17.1	
r_y, in.		3.85		3.91		3.96		4.02		4.08	
r_x/r_y		1.30		1.30		1.30		1.30		1.29	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×10×				HSS14×8×					
		5/16[a], [b], [c]		1/4[a], [b], [c]		5/8		1/2		3/8[a], [c]	
t_{des}, in.		0.313		0.250		0.625		0.500		0.375	
Nom. Weight, lb/ft		48.86		39.43		84.84		69.27		53.00	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	399	599	284	427	746	1120	611	918	464	697
	6	391	588	280	421	718	1080	589	886	451	678
	7	389	584	279	419	709	1070	582	875	446	670
	8	386	580	277	417	698	1050	573	862	439	660
	9	383	575	275	414	686	1030	564	847	432	649
	10	379	569	273	411	673	1010	553	831	424	638
	11	375	563	271	407	658	989	542	814	416	625
	12	371	557	268	403	643	966	530	796	407	611
	13	366	550	266	399	627	942	517	776	397	597
	14	361	542	263	395	609	916	503	756	387	581
	15	356	535	260	390	592	889	489	735	376	565
	16	350	526	257	386	573	861	474	712	365	549
	17	344	517	253	380	554	832	459	689	354	532
	18	338	508	249	374	534	803	443	666	342	514
	19	332	499	245	368	514	773	427	642	330	496
	20	325	489	240	361	494	743	411	618	318	478
	22	312	469	230	346	453	681	378	568	293	441
	24	297	447	220	330	412	620	345	519	269	404
	26	283	425	209	314	372	559	313	470	244	367
	28	264	398	198	298	333	500	281	422	220	330
	30	246	370	187	281	296	444	250	376	197	296
	32	228	342	176	264	260	391	221	332	174	262
	34	210	315	165	248	230	346	196	294	154	232
	36	192	289	154	231	205	309	175	262	138	207
	38	175	263	143	214	184	277	157	236	124	186
	40	159	239	130	195	166	250	141	213	112	168
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		431	648	347	522	746	1120	611	918	467	702
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		351	527	283	424	607	910	497	746	380	570
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		147	221	119	180	272	408	225	338	174	261
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		102	153	83.1	125	138	207	117	176	92.7	139
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		164	247	114	172	277	416	229	344	178	267
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		110	165	80.1	120	187	281	155	233	106	159
Properties											
Area, in.^{2}		14.4		11.6		24.9		20.4		15.6	
r_y, in.		4.11		4.14		3.20		3.26		3.31	
r_x/r_y		1.29		1.29		1.55		1.55		1.54	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×8×						HSS14×6×			
		5/16[a], [c]		1/4[a], [b], [c]		3/16[a], [b], [c]		5/8		1/2	
t_{des}, in.		0.313		0.250		0.188		0.625		0.500	
Nom. Weight, lb/ft		44.60		36.03		27.29		76.33		62.46	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	360	541	263	395	167	250	671	1010	551	828
	6	350	526	256	384	163	245	628	944	517	778
	7	347	521	253	381	162	243	614	922	506	760
	8	343	515	251	377	161	241	597	898	493	741
	9	339	509	248	372	159	239	579	870	478	719
	10	334	502	244	367	157	236	559	841	463	696
	11	329	494	240	361	155	234	539	809	446	671
	12	323	485	236	355	153	231	517	776	429	644
	13	317	476	232	349	151	227	494	742	411	617
	14	311	467	228	342	149	224	470	707	392	589
	15	304	457	223	335	146	220	446	670	372	560
	16	297	446	218	328	144	216	422	634	353	530
	17	290	435	213	320	141	212	397	597	333	501
	18	282	424	207	312	138	208	373	560	314	471
	19	274	412	202	303	135	203	349	524	294	442
	20	266	400	196	295	131	197	325	488	275	413
	22	248	373	185	277	124	186	279	419	237	357
	24	228	342	173	259	116	174	236	354	202	303
	26	207	311	160	241	108	162	201	302	172	258
	28	187	281	148	222	99.9	150	173	260	148	223
	30	168	252	136	204	91.9	138	151	227	129	194
	32	149	224	123	184	84.1	126	133	199	114	171
	34	132	198	109	163	76.5	115	117	177	101	151
	36	118	177	97.0	146	69.9	105	105	157	89.7	135
	38	106	159	87.0	131	64.2	96.4	94.0	141	80.5	121
	40	95.3	143	78.5	118	59.1	88.9	84.9	128	72.6	109
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		392	590	317	477	241	362	671	1010	551	828
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		319	479	258	388	196	294	546	819	449	673
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		147	221	119	180	75.0	113	272	408	225	338
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		79.4	119	65.1	97.9	50.3	75.5	92.7	139	80.8	122
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		151	227	116	175	73.9	111	235	353	195	294
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		82.9	125	59.8	89.9	39.4	59.2	128	192	107	161
Properties											
Area, in.^{2}		13.1		10.6		8.04		22.4		18.4	
r_y, in.		3.34		3.37		3.40		2.41		2.46	
r_x/r_y		1.54		1.54		1.53		1.97		1.96	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×6×								HSS14×4×	
		3/8[a], [c]		5/16[a], [c]		1/4[a], [c]		3/16[a], [b], [c]		5/8	
t_{des}, in.		0.375		0.313		0.250		0.188		0.625	
Nom. Weight, lb/ft		47.90		40.35		32.63		24.73		67.82	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	419	630	324	487	232	349	153	229	596	895
	6	398	598	309	465	222	334	146	220	511	768
	7	389	585	304	458	219	329	144	216	483	726
	8	380	571	299	449	215	323	141	213	453	681
	9	369	555	292	440	211	317	139	208	422	634
	10	358	538	286	429	206	309	136	204	389	584
	11	345	519	278	418	201	302	132	199	355	534
	12	332	500	270	406	195	293	129	193	322	484
	13	319	479	262	393	189	285	125	188	289	435
	14	305	458	253	380	183	276	121	182	258	388
	15	291	437	244	366	177	266	117	176	228	342
	16	276	415	234	352	170	256	113	170	200	301
	17	261	393	222	334	164	246	108	163	177	266
	18	247	371	210	316	157	236	104	156	158	238
	19	232	349	198	297	150	225	99.7	150	142	213
	20	217	327	185	279	143	215	95.2	143	128	192
	22	189	284	162	243	129	194	86.2	130	106	159
	24	162	244	139	209	115	172	77.4	116	88.9	134
	26	138	208	119	178	97.8	147	68.7	103	75.7	114
	28	119	179	102	154	84.3	127	61.3	92.1		
	30	104	156	89.0	134	73.5	110	55.1	82.8		
	32	91.3	137	78.3	118	64.6	97.0	49.8	74.9		
	34	80.9	122	69.3	104	57.2	86.0	44.5	66.9		
	36	72.1	108	61.8	92.9	51.0	76.7	39.7	59.7		
	38	64.7	97.3	55.5	83.4	45.8	68.8	35.6	53.5		
	40	58.4	87.8	50.1	75.3	41.3	62.1	32.1	48.3		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		422	635	356	536	287	432	218	328	596	896
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		344	516	290	435	234	351	178	267	485	728
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		174	261	147	221	119	180	75.0	113	272	408
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		65.7	98.8	56.9	85.5	47.2	70.9	36.7	55.2	47.8	71.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		152	229	129	195	106	159	76.3	115	193	290
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		73.5	110	57.4	86.3	41.4	62.3	26.9	40.4	74.9	113
Properties											
Area, in.^{2}		14.1		11.9		9.59		7.29		19.9	
r_y, in.		2.52		2.54		2.57		2.60		1.57	
r_x/r_y		1.94		1.94		1.93		1.92		2.83	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS14

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×4×									
		½		3/8[a], [c]		5/16[a], [c]		¼[a], [c]		3/16[a], [b], [c]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		55.66		42.79		36.10		29.23		22.18	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	491	738	374	562	285	428	202	304	130	196
	6	425	639	330	496	259	389	185	278	119	179
	7	403	606	314	472	250	376	179	269	115	174
	8	380	571	297	447	240	361	172	259	111	167
	9	355	533	279	419	229	345	165	248	107	160
	10	329	494	260	390	218	327	157	236	102	153
	11	302	454	240	361	205	309	149	223	96.8	146
	12	276	414	220	331	189	284	140	210	91.5	138
	13	249	375	201	302	173	260	131	197	86.1	129
	14	224	336	182	273	157	236	122	184	80.6	121
	15	199	299	163	245	141	212	113	170	75.1	113
	16	175	264	145	218	126	190	104	157	69.6	105
	17	155	234	128	193	112	168	92.9	140	64.0	96.2
	18	139	208	115	172	99.9	150	82.8	124	58.9	88.5
	19	124	187	103	155	89.6	135	74.3	112	54.4	81.7
	20	112	169	92.8	139	80.9	122	67.1	101	50.4	75.7
	22	92.8	140	76.7	115	66.8	100	55.4	83.3	43.6	65.6
	24	78.0	117	64.4	96.9	56.2	84.4	46.6	70.0	36.7	55.2
	26	66.5	99.9	54.9	82.5	47.9	71.9	39.7	59.7	31.3	47.0
	28			47.3	71.2	41.3	62.0	34.2	51.4	27.0	40.5
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		491	738	377	567	317	477	257	387	196	294
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		400	600	307	461	258	388	209	314	159	239
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		225	338	174	261	147	221	119	180	75.0	113
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		44.9	67.5	38.8	58.3	34.4	51.7	29.2	43.9	23.2	34.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		162	243	127	191	108	163	88.3	133	65.2	98.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		63.6	95.6	43.8	65.8	34.3	51.6	24.8	37.3	16.0	24.1
Properties											
Area, in.^{2}		16.4		12.6		10.6		8.59		6.54	
r_y, in.		1.62		1.68		1.71		1.73		1.76	
r_x/r_y		2.79		2.74		2.72		2.71		2.69	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12×10×									
		5/8		1/2		3/8[a]		5/16[a], [b], [c]		1/4[a], [b], [c]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		84.84		69.27		53.00		44.60		36.03	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	746	1120	611	918	467	702	386	580	279	419
	6	727	1090	596	896	456	686	379	569	275	413
	7	720	1080	591	888	452	680	376	565	273	411
	8	713	1070	585	879	448	673	373	561	271	408
	9	704	1060	578	869	443	666	370	555	270	405
	10	695	1040	571	858	437	657	366	550	267	402
	11	685	1030	563	846	431	648	362	544	265	398
	12	674	1010	554	833	425	639	357	537	262	394
	13	662	996	545	819	418	628	352	528	260	390
	14	650	977	535	804	411	617	345	519	257	386
	15	637	957	524	788	403	605	339	509	253	381
	16	623	937	513	772	395	593	332	499	250	376
	17	609	915	502	755	386	580	325	489	246	370
	18	594	893	490	737	377	567	318	478	242	364
	19	579	870	478	719	368	554	310	466	237	357
	20	564	847	466	700	359	540	303	455	233	350
	22	531	799	440	661	340	511	287	431	223	334
	24	498	749	413	621	320	481	270	406	212	319
	26	465	698	386	580	299	450	253	380	201	302
	28	431	648	359	539	279	419	236	355	190	285
	30	397	597	332	499	258	388	219	329	178	268
	32	364	547	305	458	238	358	202	304	165	248
	34	332	499	279	419	218	328	185	279	152	228
	36	301	453	254	381	199	299	169	254	139	208
	38	271	407	229	344	180	271	154	231	126	190
	40	245	368	207	311	163	245	139	209	114	171
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		746	1120	611	918	467	702	392	590	317	477
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		607	910	497	746	380	570	319	479	258	388
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		227	341	189	284	147	221	125	188	101	153
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		183	274	153	230	120	180	102	153	83.1	125
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		252	379	209	315	163	245	132	198	92.5	139
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		223	335	185	278	138	207	104	157	76.7	115
Properties											
Area, in.^{2}		24.9		20.4		15.6		13.1		10.6	
r_y, in.		3.88		3.94		4.00		4.03		4.06	
r_x/r_y		1.15		1.15		1.15		1.15		1.15	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS12

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12×10×		HSS12×8×							
		3/16[a], [b], [c]		5/8		1/2		3/8[a]		5/16[a], [c]	
t_{des}, in.		0.188		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		27.29		76.33		62.46		47.90		40.35	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	169	255	671	1010	551	828	422	634	350	526
	6	167	251	645	970	531	798	407	612	340	511
	7	166	250	636	957	524	787	402	604	337	506
	8	165	248	626	941	516	775	396	596	333	500
	9	164	247	615	924	507	762	390	586	328	493
	10	163	245	603	906	497	747	382	575	323	486
	11	162	243	589	886	486	731	374	563	316	476
	12	160	241	575	864	475	714	366	550	309	465
	13	159	238	560	842	463	696	357	537	302	454
	14	157	236	544	818	450	677	348	523	294	442
	15	155	233	527	793	437	657	338	508	286	430
	16	153	230	510	767	423	636	328	492	277	417
	17	151	227	493	740	409	615	317	477	269	404
	18	149	224	475	713	395	593	306	460	259	390
	19	147	221	456	686	380	571	295	444	250	376
	20	145	218	438	658	365	549	284	427	241	362
	22	140	211	400	601	335	503	261	393	222	333
	24	135	203	363	545	305	458	239	359	203	305
	26	130	195	326	490	275	413	216	325	184	276
	28	124	187	290	436	246	370	194	292	165	249
	30	118	178	256	385	218	328	173	260	148	222
	32	112	169	225	338	192	289	153	230	131	196
	34	106	160	199	300	170	256	135	203	116	174
	36	100	150	178	267	152	228	121	181	103	155
	38	92.6	139	160	240	136	205	108	163	92.5	139
	40	85.2	128	144	217	123	185	97.8	147	83.5	126
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		241	362	671	1010	551	828	422	635	356	536
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		196	294	546	819	449	673	344	516	290	435
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		75.0	113	227	341	189	284	147	221	125	188
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		63.8	95.8	138	207	117	176	92.7	139	79.4	119
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		63.3	95.1	217	327	181	272	141	212	120	180
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		51.4	77.3	164	246	136	205	102	154	78.2	118
Properties											
Area, in.^{2}		8.04		22.4		18.4		14.1		11.9	
r_y, in.		4.09		3.14		3.20		3.26		3.28	
r_x/r_y		1.15		1.38		1.37		1.37		1.37	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS12

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12×8×				HSS12×6×					
		¼[a], [b], [c]		3/16[a], [b], [c]		⅝		½		3/8[a]	
t_{des}, in.		0.250		0.188		0.625		0.500		0.375	
Nom. Weight, lb/ft		32.63		24.73		67.82		55.66		42.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	257	386	165	247	596	895	491	738	377	567
	6	250	375	161	242	557	837	460	692	355	533
	7	247	372	160	240	544	817	450	676	347	521
	8	244	367	158	238	528	794	438	658	338	508
	9	241	363	157	236	512	769	424	638	328	494
	10	238	357	155	233	494	742	410	617	318	478
	11	234	352	153	230	475	714	395	594	307	461
	12	230	345	151	227	455	684	379	570	295	443
	13	225	339	149	223	434	652	362	545	282	425
	14	221	332	146	220	413	620	345	519	270	405
	15	216	325	144	216	391	587	328	492	257	386
	16	211	317	141	212	369	554	310	466	243	366
	17	205	309	138	207	347	521	292	439	230	346
	18	200	301	135	203	325	488	274	412	217	326
	19	194	292	132	198	303	455	257	386	203	306
	20	189	283	128	192	281	423	239	360	190	286
	22	177	265	120	180	240	361	206	309	165	248
	24	164	247	112	168	203	304	174	262	140	211
	26	150	225	104	156	173	259	148	223	120	180
	28	135	203	95.7	144	149	224	128	192	103	155
	30	121	182	87.6	132	130	195	111	167	89.9	135
	32	107	161	79.6	120	114	171	97.9	147	79.0	119
	34	94.9	143	72.2	108	101	152	86.7	130	70.0	105
	36	84.6	127	65.5	98.4	90.0	135	77.4	116	62.4	93.8
	38	75.9	114	58.8	88.4	80.8	121	69.4	104	56.0	84.2
	40	68.5	103	53.1	79.7			62.7	94.2	50.6	76.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		287	432	218	328	596	896	491	738	377	567
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		234	351	178	267	485	728	400	600	307	461
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		101	153	75.0	113	227	341	189	284	147	221
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		65.1	97.9	50.3	75.5	92.7	139	80.8	122	65.7	98.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		92.7	139	59.5	89.4	182	273	152	228	119	179
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		57.3	86.1	38.2	57.4	111	167	93.3	140	70.7	106
Properties											
Area, in.^{2}		9.59		7.29		19.9		16.4		12.6	
r_y, in.		3.31		3.34		2.37		2.42		2.48	
r_x/r_y		1.37		1.36		1.74		1.73		1.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12×6×						HSS12×4×			
		5/16[a], [c]		1/4[a], [c]		3/16[a], [b], [c]		5/8		1/2	
t_{des}, in.		0.313		0.250		0.188		0.625		0.500	
Nom. Weight, lb/ft		36.10		29.23		22.18		59.32		48.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	311	468	227	341	151	226	521	783	431	648
	6	297	446	217	326	144	216	445	669	372	559
	7	292	438	213	320	142	213	420	632	352	530
	8	285	429	209	314	139	209	394	591	331	498
	9	277	417	205	308	136	205	365	549	309	464
	10	269	404	200	300	133	200	336	505	286	429
	11	259	390	194	292	130	195	307	461	262	394
	12	249	375	189	284	126	189	277	417	238	358
	13	239	360	183	275	122	183	248	373	215	323
	14	229	344	177	265	118	177	221	332	193	289
	15	218	328	170	256	114	171	194	291	171	257
	16	207	311	163	245	110	165	170	256	150	226
	17	196	294	156	235	105	158	151	227	133	200
	18	185	278	149	225	101	151	135	202	119	178
	19	174	261	142	213	96.2	145	121	182	107	160
	20	163	244	133	200	91.6	138	109	164	96.2	145
	22	141	212	116	174	82.5	124	90.2	136	79.5	119
	24	121	182	99.6	150	73.5	111	75.8	114	66.8	100
	26	103	155	84.9	128	64.9	97.5			56.9	85.6
	28	88.9	134	73.2	110	57.1	85.8				
	30	77.5	116	63.8	95.8	49.7	74.7				
	32	68.1	102	56.0	84.2	43.7	65.7				
	34	60.3	90.6	49.6	74.6	38.7	58.2				
	36	53.8	80.8	44.3	66.6	34.5	51.9				
	38	48.3	72.6	39.7	59.7	31.0	46.6				
	40	43.6	65.5	35.9	53.9	28.0	42.0				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		317	477	257	387	196	294	521	783	431	648
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		258	388	209	314	159	239	424	636	351	527
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		125	188	101	153	75.0	113	227	341	189	284
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		56.9	85.5	47.2	70.9	36.7	55.2	47.8	71.9	44.9	67.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		102	153	82.8	125	60.3	90.6	146	220	123	185
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		54.3	81.6	39.8	59.8	26.2	39.4	64.4	96.8	54.9	82.5
Properties											
Area, in.^{2}		10.6		8.59		6.54		17.4		14.4	
r_y, in.		2.51		2.53		2.56		1.55		1.60	
r_x/r_y		1.71		1.71		1.71		2.48		2.45	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12×4×								HSS12×3×	
		3/8[a]		5/16[a], [c]		1/4[a], [c]		3/16[a], [b], [c]		5/16[a], [c]	
t_{des}, in.		0.375		0.313		0.250		0.188		0.313	
Nom. Weight, lb/ft		37.69		31.84		25.82		19.63		29.72	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	332	499	274	413	197	296	128	192	256	385
	6	290	435	246	369	179	269	117	175	206	310
	7	276	414	234	352	173	260	113	170	189	285
	8	260	391	222	333	166	249	109	163	171	258
	9	244	367	208	313	158	238	104	156	153	230
	10	227	341	194	292	150	226	99.0	149	135	203
	11	209	315	180	270	142	214	93.9	141	117	176
	12	192	288	165	248	133	200	88.5	133	101	151
	13	174	262	150	226	124	186	83.0	125	85.8	129
	14	157	236	136	205	112	169	77.4	116	74.0	111
	15	141	211	122	184	101	152	71.8	108	64.4	96.9
	16	125	187	109	164	90.4	136	66.2	99.6	56.6	85.1
	17	110	166	96.7	145	80.2	120	60.6	91.2	50.2	75.4
	18	98.5	148	86.2	130	71.5	107	55.6	83.6	44.8	67.3
	19	88.4	133	77.4	116	64.2	96.5	50.6	76.0	40.2	60.4
	20	79.8	120	69.8	105	57.9	87.0	45.7	68.6	36.2	54.5
	22	66.0	99.1	57.7	86.7	47.9	71.9	37.7	56.7		
	24	55.4	83.3	48.5	72.9	40.2	60.4	31.7	47.7		
	26	47.2	71.0	41.3	62.1	34.3	51.5	27.0	40.6		
	28			35.6	53.6	29.5	44.4	23.3	35.0		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		332	500	281	422	227	342	173	260	262	394
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		271	406	228	343	185	278	141	211	213	320
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		147	221	125	188	101	153	75.0	113	125	188
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		38.8	58.3	34.4	51.7	29.2	43.9	23.2	34.9	23.2	34.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		97.3	146	83.3	125	68.1	102	52.0	78.2	74.1	111
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		42.2	63.4	32.5	48.9	23.8	35.8	15.5	23.4	22.4	33.7
Properties											
Area, in.^{2}		11.1		9.37		7.59		5.78		8.75	
r_y, in.		1.66		1.69		1.71		1.74		1.26	
r_x/r_y		2.42		2.40		2.39		2.37		3.09	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12×3×				HSS12×2×					
		¼[a], [c]		3/16[a], [b], [c]		5/16[a], [c]		¼[a], [c]		3/16[a], [b], [c]	
t_{des}, in.		0.250		0.188		0.313		0.250		0.188	
Nom. Weight, lb/ft		24.12		18.35		27.59		22.42		17.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	182	274	117	175	237	356	167	251	105	158
	6	154	231	99.8	150	136	205	114	171	74.6	112
	7	145	218	94.3	142	111	166	94.6	142	65.7	98.7
	8	135	203	88.3	133	86.9	131	75.5	113	56.6	85.1
	9	124	187	82.0	123	68.7	103	59.6	89.6	47.9	71.9
	10	112	168	75.4	113	55.6	83.6	48.3	72.6	39.3	59.0
	11	97.5	147	68.7	103	46.0	69.1	39.9	60.0	32.5	48.8
	12	84.1	126	62.0	93.2	38.6	58.0	33.5	50.4	27.3	41.0
	13	71.7	108	55.3	83.1	32.9	49.5	28.6	43.0	23.2	34.9
	14	61.9	93.0	49.4	74.3					20.0	30.1
	15	53.9	81.0	43.1	64.7						
	16	47.4	71.2	37.9	56.9						
	17	42.0	63.1	33.5	50.4						
	18	37.4	56.2	29.9	45.0						
	19	33.6	50.5	26.8	40.3						
	20	30.3	45.6	24.2	36.4						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		212	319	162	243	243	365	197	297	151	226
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		173	259	132	198	198	297	161	241	123	184
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		101	153	75.0	113	125	188	101	153	75.0	113
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		20.2	30.4	16.5	24.8	11.9	17.9	11.2	16.9	9.73	14.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		60.9	91.5	46.5	69.9	65.1	97.9	53.4	80.3	41.1	61.7
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		16.5	24.9	10.8	16.3	13.0	19.5	9.74	14.6	6.47	9.73
Properties											
Area, in.^{2}		7.09		5.41		8.12		6.59		5.03	
r_y, in.		1.28		1.31		0.810		0.838		0.865	
r_x/r_y		3.07		3.03		4.56		4.46		4.38	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×8×									
		⅝		½		⅜		5⁄16[a]		¼[a], [b], [c]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		67.82		55.66		42.79		36.10		29.23	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	596	895	491	738	377	567	317	477	249	374
	6	572	860	472	710	363	546	306	460	242	363
	7	564	848	466	700	358	539	302	454	239	359
	8	555	834	458	689	353	530	297	447	236	355
	9	544	818	450	676	347	521	292	439	233	350
	10	533	801	441	662	340	511	287	431	229	344
	11	520	782	431	647	333	500	280	422	225	339
	12	507	762	420	632	325	488	274	412	221	332
	13	493	741	409	615	316	476	267	401	216	325
	14	479	719	397	597	308	462	260	390	211	318
	15	463	696	385	579	298	449	252	379	205	308
	16	448	673	372	560	289	434	244	367	199	299
	17	431	648	359	540	279	420	236	355	192	289
	18	415	624	346	520	269	405	228	343	186	279
	19	398	598	332	499	259	389	219	330	179	269
	20	381	573	319	479	249	374	211	317	172	259
	22	347	521	291	437	228	343	194	291	158	238
	24	313	471	263	396	207	311	176	265	144	217
	26	280	421	236	355	187	280	159	239	131	196
	28	248	373	210	316	167	251	142	214	117	176
	30	218	327	185	278	148	222	127	190	104	157
	32	191	287	163	245	130	195	111	167	91.9	138
	34	169	255	144	217	115	173	98.6	148	81.4	122
	36	151	227	129	193	103	154	88.0	132	72.6	109
	38	136	204	115	173	92.1	138	79.0	119	65.2	98.0
	40	122	184	104	157	83.1	125	71.3	107	58.8	88.4
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		596	896	491	738	377	567	317	477	257	387
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		485	728	400	600	307	461	258	388	209	314
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		183	274	153	230	120	180	102	153	83.1	125
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		138	207	117	176	92.7	139	79.4	119	65.1	97.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		164	247	137	207	108	162	91.8	138	71.4	107
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		141	212	118	177	92.3	139	75.9	114	54.1	81.3
Properties											
Area, in.^{2}		19.9		16.4		12.6		10.6		8.59	
r_y, in.		3.07		3.12		3.18		3.21		3.24	
r_x/r_y		1.19		1.19		1.19		1.19		1.19	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS10

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×8×		HSS10×6×							
		3/16[a], [b], [c]		5/8		1/2		3/8		5/16[a]	
t_{des}, in.		0.188		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		22.18		59.32		48.85		37.69		31.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	161	242	521	783	431	648	332	499	281	422
	6	158	237	486	730	403	606	312	468	264	396
	7	156	235	473	711	393	591	305	458	258	387
	8	155	233	460	691	382	575	296	446	251	377
	9	153	230	445	668	370	557	288	432	244	366
	10	151	227	428	644	357	537	278	418	236	354
	11	149	224	411	618	344	517	268	403	227	342
	12	147	221	393	591	329	495	257	386	218	328
	13	145	217	374	563	314	472	246	370	209	314
	14	142	214	355	534	299	449	234	352	199	300
	15	140	210	335	504	283	425	223	334	190	285
	16	137	205	316	475	267	401	211	316	180	270
	17	134	201	296	445	251	377	199	298	170	255
	18	131	196	276	415	235	353	186	280	160	240
	19	127	191	257	386	219	329	175	262	150	225
	20	123	185	238	358	204	306	163	245	140	210
	22	115	173	202	304	174	262	140	211	121	182
	24	107	160	170	255	147	220	119	179	103	154
	26	98.4	148	145	217	125	188	101	152	87.6	132
	28	90.1	135	125	187	108	162	87.3	131	75.5	113
	30	80.7	121	109	163	93.8	141	76.0	114	65.8	98.8
	32	71.3	107	95.5	143	82.4	124	66.8	100	57.8	86.9
	34	63.1	94.9	84.6	127	73.0	110	59.2	89.0	51.2	77.0
	36	56.3	84.7	75.4	113	65.1	97.9	52.8	79.3	45.7	68.6
	38	50.6	76.0	67.7	102	58.5	87.9	47.4	71.2	41.0	61.6
	40	45.6	68.6					42.8	64.3	37.0	55.6
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		196	294	521	783	431	648	332	500	281	422
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		159	239	424	636	351	527	271	406	228	343
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		63.8	95.8	183	274	153	230	120	180	102	153
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		50.3	75.5	92.7	139	80.8	122	65.7	98.8	56.9	85.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		46.2	69.4	135	203	114	171	89.6	135	76.6	115
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		36.5	54.8	94.1	141	79.6	120	62.9	94.5	52.0	78.1
Properties											
Area, in.^{2}		6.54		17.4		14.4		11.1		9.37	
r_y, in.		3.27		2.32		2.37		2.43		2.46	
r_x/r_y		1.18		1.50		1.50		1.49		1.48	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×6×				HSS10×5×					
		¼[a], [c]		3/16[a], [b], [c]		⅜		5/16[a]		¼[a], [c]	
t_{des}, in.		0.250		0.188		0.375		0.313		0.250	
Nom. Weight, lb/ft		25.82		19.63		35.13		29.72		24.12	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	219	329	147	221	308	463	262	394	204	307
	6	209	314	140	211	282	423	240	360	191	286
	7	205	308	138	207	272	409	232	349	186	279
	8	201	302	135	203	262	394	224	336	181	272
	9	196	295	132	199	251	378	215	323	175	262
	10	191	287	129	194	239	360	205	308	167	251
	11	185	278	125	188	227	341	195	292	159	238
	12	178	267	122	183	214	322	184	276	150	225
	13	171	256	118	177	201	302	173	260	141	212
	14	163	245	113	171	188	282	162	243	132	199
	15	155	233	109	164	175	262	151	227	123	185
	16	147	221	105	158	161	243	140	210	115	172
	17	139	209	100	151	148	223	129	194	106	159
	18	131	197	95.7	144	136	204	118	178	97.2	146
	19	123	185	91.1	137	124	186	108	162	88.9	134
	20	115	173	86.5	130	112	168	97.8	147	80.8	121
	22	99.9	150	77.1	116	92.4	139	80.9	122	66.8	100
	24	85.3	128	66.0	99.2	77.7	117	67.9	102	56.1	84.4
	26	72.7	109	56.2	84.5	66.2	99.5	57.9	87.0	47.8	71.9
	28	62.7	94.2	48.5	72.9	57.1	85.8	49.9	75.0	41.2	62.0
	30	54.6	82.0	42.2	63.5	49.7	74.7	43.5	65.4	35.9	54.0
	32	48.0	72.1	37.1	55.8	43.7	65.7	38.2	57.4	31.6	47.4
	34	42.5	63.9	32.9	49.4	38.7	58.2	33.9	50.9	28.0	42.0
	36	37.9	57.0	29.3	44.1						
	38	34.0	51.1	26.3	39.6						
	40	30.7	46.1	23.8	35.7						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		227	342	173	260	308	464	262	394	212	319
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		185	278	141	211	251	377	213	320	173	259
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		83.1	125	63.8	95.8	120	180	102	153	83.1	125
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		47.2	70.9	36.7	55.2	52.3	78.6	45.7	68.6	38.2	57.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		62.6	94.1	45.8	68.8	80.6	121	69.1	104	56.6	85.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		37.4	56.2	25.0	37.6	49.7	74.6	40.9	61.5	29.7	44.6
Properties											
Area, in.^{2}		7.59		5.78		10.3		8.75		7.09	
r_y, in.		2.49		2.51		2.04		2.07		2.09	
r_x/r_y		1.48		1.48		1.73		1.71		1.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×4×									
		⅝		½		⅜		5⁄16[a]		¼[a], [c]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		50.81		42.05		32.58		27.59		22.42	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	446	670	371	558	287	431	243	365	189	284
	6	379	570	319	479	249	374	212	318	171	257
	7	358	538	302	454	236	355	202	303	164	247
	8	335	503	283	426	223	335	190	286	156	234
	9	310	466	264	397	208	313	178	268	146	220
	10	285	428	244	366	193	290	166	249	136	205
	11	259	389	223	335	178	267	153	230	126	190
	12	233	351	202	304	162	244	140	211	116	174
	13	209	314	182	274	147	221	127	192	106	159
	14	185	278	162	244	132	198	115	173	95.8	144
	15	162	243	144	216	118	177	103	155	86.1	129
	16	142	214	126	190	104	156	91.2	137	76.7	115
	17	126	189	112	168	91.9	138	80.8	121	68.0	102
	18	112	169	99.7	150	82.0	123	72.1	108	60.6	91.1
	19	101	152	89.5	135	73.6	111	64.7	97.2	54.4	81.8
	20	91.0	137	80.8	121	66.4	99.8	58.4	87.8	49.1	73.8
	22	75.2	113	66.8	100	54.9	82.5	48.3	72.5	40.6	61.0
	24	63.2	95.0	56.1	84.3	46.1	69.3	40.5	60.9	34.1	51.3
	26			47.8	71.8	39.3	59.1	34.5	51.9	29.1	43.7
	28									25.1	37.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		446	671	371	558	287	431	243	365	197	297
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		363	545	302	453	234	350	198	297	161	241
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		183	274	153	230	120	180	102	153	83.1	125
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		47.8	71.9	44.9	67.5	38.8	58.3	34.4	51.7	29.2	43.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		106	159	90.1	135	71.6	108	61.4	92.3	50.4	75.8
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		53.9	81.0	46.2	69.4	37.2	55.9	30.8	46.3	22.4	33.7
Properties											
Area, in.^{2}		14.9		12.4		9.58		8.12		6.59	
r_y, in.		1.53		1.58		1.63		1.66		1.69	
r_x/r_y		2.11		2.09		2.08		2.07		2.05	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×4×		HSS10×3½×							
		3/16[a], [c]		3/8		5/16[a]		1/4[a], [c]		3/16[a], [c]	
t_{des}, in.		0.188		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		17.08		31.31		26.53		21.57		16.44	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	125	187	275	414	234	351	182	273	119	179
	6	113	170	229	344	195	293	159	239	105	158
	7	109	164	214	322	183	275	150	225	101	151
	8	105	158	198	298	170	255	140	210	95.5	143
	9	100	151	182	273	156	234	129	193	90.0	135
	10	95.2	143	165	247	142	213	117	176	84.3	127
	11	90.0	135	148	222	128	192	106	159	78.3	118
	12	84.5	127	131	197	114	171	95.0	143	72.3	109
	13	79.0	119	115	173	100	151	84.2	127	66.1	99.4
	14	73.3	110	100	151	87.4	131	74.0	111	58.6	88.1
	15	67.6	102	87.3	131	76.2	114	64.4	96.8	51.2	76.9
	16	60.6	91.0	76.7	115	67.0	101	56.6	85.1	45.0	67.6
	17	53.7	80.8	67.9	102	59.3	89.1	50.2	75.4	39.9	59.9
	18	47.9	72.1	60.6	91.1	52.9	79.5	44.7	67.2	35.6	53.4
	19	43.0	64.7	54.4	81.8	47.5	71.4	40.2	60.4	31.9	48.0
	20	38.8	58.4	49.1	73.8	42.8	64.4	36.2	54.5	28.8	43.3
	22	32.1	48.2	40.6	61.0	35.4	53.2	29.9	45.0	23.8	35.8
	24	27.0	40.5			29.8	44.7	25.2	37.8	20.0	30.1
	26	23.0	34.5								
	28	19.8	29.8								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		151	226	275	414	234	351	190	285	145	218
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		123	184	224	336	190	286	155	232	118	177
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		63.8	95.8	120	180	102	153	83.1	125	63.8	95.8
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		23.2	34.9	32.1	48.2	28.8	43.3	24.7	37.1	19.9	29.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		38.9	58.5	67.1	101	57.6	86.6	47.4	71.3	36.7	55.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		14.9	22.4	31.2	46.9	26.0	39.0	18.9	28.4	12.6	18.9
Properties											
Area, in.^{2}		5.03		9.20		7.81		6.34		4.84	
r_y, in.		1.72		1.43		1.45		1.48		1.51	
r_x/r_y		2.04		2.32		2.32		2.30		2.28	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×3×								HSS10×2×	
		⅜		5⁄16[a]		¼[a], [c]		3⁄16[a], [c]		⅜	
t_{des}, in.		0.375		0.313		0.250		0.188		0.375	
Nom. Weight, lb/ft		30.03		25.46		20.72		15.80		27.48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	264	397	224	337	174	262	113	171	242	364
	6	204	307	175	263	144	217	96.4	145	129	194
	7	186	279	160	241	132	199	90.8	136	103	154
	8	167	251	145	217	120	180	84.8	127	79.4	119
	9	148	222	129	194	107	162	78.3	118	62.7	94.2
	10	129	194	113	170	94.9	143	71.7	108	50.8	76.3
	11	111	166	97.9	147	82.8	124	65.0	97.6	42.0	63.1
	12	93.7	141	83.5	125	71.2	107	56.9	85.5	35.3	53.0
	13	79.8	120	71.1	107	60.7	91.2	48.6	73.1		
	14	68.8	103	61.3	92.2	52.3	78.6	41.9	63.0		
	15	60.0	90.1	53.4	80.3	45.6	68.5	36.5	54.9		
	16	52.7	79.2	47.0	70.6	40.1	60.2	32.1	48.3		
	17	46.7	70.2	41.6	62.5	35.5	53.3	28.4	42.8		
	18	41.6	62.6	37.1	55.8	31.6	47.6	25.4	38.1		
	19	37.4	56.2	33.3	50.0	28.4	42.7	22.8	34.2		
	20	33.7	50.7	30.1	45.2	25.6	38.5	20.6	30.9		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		264	397	224	337	182	274	140	210	242	364
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		215	323	183	274	148	223	114	170	197	295
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		120	180	102	153	83.1	125	63.8	95.8	120	180
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		25.3	38.1	23.2	34.8	20.2	30.4	16.5	24.8	11.8	17.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		62.6	94.1	53.9	81.0	44.4	66.8	34.4	51.8	53.6	80.6
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		25.7	38.6	21.4	32.1	15.5	23.3	10.4	15.6	15.1	22.7
Properties											
Area, in.^{2}		8.83		7.49		6.09		4.66		8.08	
r_y, in.		1.21		1.24		1.27		1.30		0.776	
r_x/r_y		2.68		2.65		2.62		2.59		3.94	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS10–HSS9

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×2×						HSS9×7×			
		5/16[a]		1/4[a], [c]		3/16[a], [c]		5/8		1/2	
t_{des}, in.		0.313		0.250		0.188		0.625		0.500	
Nom. Weight, lb/ft		23.34		19.02		14.53		59.32		48.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	206	309	159	239	102	153	521	783	431	648
	6	114	172	96.5	145	71.0	107	494	742	410	616
	7	92.4	139	79.1	119	62.0	93.2	484	728	402	604
	8	72.2	109	62.8	94.4	51.3	77.1	474	712	394	592
	9	57.1	85.8	49.6	74.6	40.6	61.0	462	694	384	577
	10	46.2	69.5	40.2	60.4	32.9	49.4	449	675	374	562
	11	38.2	57.4	33.2	49.9	27.2	40.9	435	654	363	545
	12	32.1	48.3	27.9	42.0	22.8	34.3	420	632	351	528
	13	27.4	41.1	23.8	35.7	19.5	29.2	405	609	339	509
	14					16.8	25.2	389	585	326	490
	15							373	560	313	470
	16							356	535	299	450
	17							339	509	286	429
	18							322	483	272	409
	19							304	458	258	388
	20							287	432	244	367
	22							254	381	217	325
	24							221	332	190	285
	26							190	286	165	247
	28							164	246	142	213
	30							143	215	124	186
	32							125	189	109	163
	34							111	167	96.2	145
	36							99.2	149	85.8	129
	38							89.0	134	77.0	116
	40							80.3	121	69.5	104
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		206	309	167	252	128	193	521	783	431	648
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		167	251	136	204	104	156	424	636	351	527
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		102	153	83.1	125	63.8	95.8	160	241	135	203
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.9	17.9	11.2	16.9	9.73	14.6	115	173	98.8	149
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		46.4	69.8	38.4	57.8	29.7	44.6	127	191	107	161
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		12.7	19.0	9.13	13.7	6.20	9.33	107	161	90.1	135
Properties											
Area, in.^{2}		6.87		5.59		4.28		17.4		14.4	
r_y, in.		0.803		0.830		0.858		2.66		2.72	
r_x/r_y		3.86		3.80		3.73		1.22		1.22	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS9

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS9×7×								HSS9×5×	
		3/8		5/16		1/4[a]		3/16[a], [b], [c]		5/8	
t_{des}, in.		0.375		0.313		0.250		0.188		0.625	
Nom. Weight, lb/ft		37.69		31.84		25.82		19.63		50.81	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	332	499	281	422	227	342	155	234	446	670
	6	316	475	267	402	217	326	150	226	402	604
	7	311	467	263	395	213	320	148	223	387	581
	8	304	458	257	387	209	314	146	219	370	556
	9	297	447	252	378	204	307	143	215	352	529
	10	290	435	245	369	199	299	141	211	333	501
	11	281	423	238	358	194	291	137	207	313	471
	12	273	410	231	348	188	283	134	202	293	441
	13	264	396	224	336	182	274	131	196	273	410
	14	254	382	216	324	176	264	127	191	252	379
	15	244	367	207	312	169	254	123	185	231	348
	16	234	352	199	299	162	244	119	179	211	318
	17	224	336	190	286	155	234	115	173	192	289
	18	213	320	182	273	148	223	111	167	173	260
	19	203	304	173	260	141	212	107	160	156	234
	20	192	289	164	246	134	202	102	154	140	211
	22	171	257	146	220	120	181	92.8	139	116	174
	24	151	227	129	195	107	160	82.4	124	97.5	147
	26	131	198	113	170	93.4	140	72.5	109	83.1	125
	28	113	170	97.8	147	80.9	122	62.9	94.6	71.6	108
	30	98.8	148	85.2	128	70.5	106	54.8	82.4	62.4	93.8
	32	86.8	130	74.9	113	62.0	93.1	48.2	72.4		
	34	76.9	116	66.3	99.7	54.9	82.5	42.7	64.2		
	36	68.6	103	59.2	88.9	49.0	73.6	38.1	57.2		
	38	61.6	92.5	53.1	79.8	43.9	66.0	34.2	51.4		
	40	55.6	83.5	47.9	72.0	39.7	59.6	30.8	46.4		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		332	500	281	422	227	342	173	260	446	671
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		271	406	228	343	185	278	141	211	363	545
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		106	160	90.6	136	74.1	111	57.0	85.7	160	241
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		79.2	119	68.1	102	56.1	84.4	43.5	65.4	70.3	106
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		84.3	127	72.1	108	58.9	88.5	38.3	57.5	101	152
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		70.9	107	60.6	91.1	44.1	66.2	29.7	44.7	66.4	99.8
Properties											
Area, in.^{2}		11.1		9.37		7.59		5.78		14.9	
r_y, in.		2.77		2.80		2.83		2.86		1.90	
r_x/r_y		1.22		1.21		1.21		1.21		1.61	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS9

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS9×5×									
		½		⅜		5⁄16		¼[a]		3⁄16[a], [c]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		42.05		32.58		27.59		22.42		17.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	371	558	287	431	243	365	197	297	134	201
	6	336	506	261	392	222	334	181	271	125	188
	7	325	488	252	379	215	323	175	263	122	183
	8	312	468	243	365	207	311	169	253	119	178
	9	297	447	232	349	198	298	162	243	115	173
	10	282	424	221	332	189	284	154	232	111	166
	11	266	401	209	315	179	269	147	220	106	160
	12	250	376	197	296	169	254	139	208	102	153
	13	234	351	185	278	159	238	130	196	97.2	146
	14	217	326	172	259	148	223	122	183	92.3	139
	15	200	301	160	240	138	207	114	171	87.3	131
	16	184	277	147	221	127	191	105	158	81.7	123
	17	168	253	135	203	117	176	97.0	146	75.5	114
	18	153	230	123	185	107	161	89.0	134	69.5	104
	19	138	207	112	168	97.5	147	81.3	122	63.6	95.6
	20	124	187	101	152	88.2	133	73.7	111	57.9	87.0
	22	103	154	83.5	125	72.9	110	60.9	91.5	47.8	71.9
	24	86.3	130	70.1	105	61.2	92.0	51.2	76.9	40.2	60.4
	26	73.6	111	59.8	89.8	52.2	78.4	43.6	65.5	34.3	51.5
	28	63.4	95.3	51.5	77.4	45.0	67.6	37.6	56.5	29.5	44.4
	30	55.2	83.0	44.9	67.5	39.2	58.9	32.7	49.2	25.7	38.7
	32	48.6	73.0	39.5	59.3	34.4	51.8	28.8	43.3	22.6	34.0
	34					30.5	45.9	25.5	38.3	20.0	30.1
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		371	558	287	431	243	365	197	297	151	226
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		302	453	234	350	198	297	161	241	123	184
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		135	203	106	160	90.6	136	74.1	111	57.0	85.7
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		62.9	94.5	52.3	78.6	45.7	68.6	38.2	57.4	30.0	45.1
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		85.8	129	68.1	102	58.4	87.8	48.2	72.4	37.2	55.9
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		56.6	85.1	45.2	67.9	38.9	58.5	28.6	43.0	19.2	28.8
Properties											
Area, in.^{2}		12.4		9.58		8.12		6.59		5.03	
r_y, in.		1.96		2.01		2.04		2.07		2.10	
r_x/r_y		1.59		1.59		1.58		1.58		1.57	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS9

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS9×3×									
		½		⅜		5⁄16		¼[a]		3⁄16[a], [c]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		35.24		27.48		23.34		19.02		14.53	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	311	468	242	364	206	309	167	252	111	167
	6	234	351	186	279	160	241	132	198	93.8	141
	7	211	317	169	254	146	220	121	182	88.2	133
	8	187	281	152	228	132	198	109	165	82.1	123
	9	163	246	134	201	117	176	97.8	147	75.6	114
	10	140	211	116	175	103	154	86.2	130	68.1	102
	11	119	178	99.9	150	88.6	133	75.0	113	59.6	89.6
	12	99.7	150	84.3	127	75.3	113	64.3	96.7	51.5	77.4
	13	84.9	128	71.9	108	64.2	96.5	54.8	82.4	44.0	66.1
	14	73.2	110	62.0	93.1	55.4	83.2	47.3	71.0	37.9	57.0
	15	63.8	95.9	54.0	81.1	48.2	72.5	41.2	61.9	33.0	49.7
	16	56.1	84.3	47.4	71.3	42.4	63.7	36.2	54.4	29.0	43.6
	17	49.7	74.7	42.0	63.2	37.5	56.4	32.1	48.2	25.7	38.7
	18	44.3	66.6	37.5	56.3	33.5	50.3	28.6	43.0	22.9	34.5
	19	39.8	59.8	33.6	50.6	30.1	45.2	25.7	38.6	20.6	31.0
	20			30.4	45.6	27.1	40.8	23.2	34.8	18.6	27.9
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		311	468	242	364	206	309	167	252	128	193
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		254	380	197	295	167	251	136	204	104	156
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		135	203	106	160	90.6	136	74.1	111	57.0	85.7
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		26.9	40.5	25.3	38.1	23.2	34.8	20.2	30.4	16.5	24.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		64.6	97.1	52.1	78.4	44.9	67.5	37.2	55.9	28.9	43.5
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		28.2	42.4	23.2	34.8	20.2	30.3	14.9	22.5	10.1	15.1
Properties											
Area, in.^{2}		10.4		8.08		6.87		5.59		4.28	
r_y, in.		1.15		1.20		1.23		1.26		1.29	
r_x/r_y		2.49		2.45		2.42		2.40		2.37	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS8×6×									
		⅝		½		⅜		5⁄16		¼[a]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		50.81		42.05		32.58		27.59		22.42	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	446	670	371	558	287	431	243	365	197	297
	6	414	622	346	520	268	403	228	342	185	278
	7	403	606	337	507	261	393	222	334	181	272
	8	391	587	327	492	254	382	216	325	176	264
	9	377	567	316	476	246	370	209	315	171	256
	10	362	545	305	458	237	357	202	304	165	248
	11	347	521	292	439	228	343	195	292	159	239
	12	331	497	279	420	218	328	186	280	152	229
	13	314	472	266	400	208	313	178	268	146	219
	14	297	446	252	379	198	298	169	255	139	208
	15	279	420	238	358	187	282	161	241	132	198
	16	262	394	224	337	177	266	152	228	125	187
	17	245	368	210	315	166	250	143	214	117	176
	18	227	342	196	294	155	234	134	201	110	166
	19	211	316	182	274	145	218	125	188	103	155
	20	194	292	169	253	135	202	116	175	96.1	144
	22	163	245	143	214	115	173	99.6	150	82.6	124
	24	137	205	120	180	96.7	145	84.1	126	69.9	105
	26	116	175	102	154	82.4	124	71.6	108	59.6	89.6
	28	100	151	88.1	132	71.0	107	61.8	92.8	51.4	77.2
	30	87.5	131	76.7	115	61.9	93.0	53.8	80.9	44.8	67.3
	32	76.9	116	67.4	101	54.4	81.7	47.3	71.1	39.3	59.1
	34	68.1	102	59.7	89.8	48.2	72.4	41.9	62.9	34.8	52.4
	36	60.8	91.3	53.3	80.1	43.0	64.6	37.4	56.1	31.1	46.7
	38			47.8	71.9	38.6	58.0	33.5	50.4	27.9	41.9
	40									25.2	37.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		446	671	371	558	287	431	243	365	197	297
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		363	545	302	453	234	350	198	297	161	241
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		138	207	117	176	92.7	139	79.4	119	65.1	97.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		92.7	139	80.8	122	65.7	98.8	56.9	85.5	47.2	70.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		94.8	143	80.3	121	63.9	96.0	54.9	82.5	44.9	67.5
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		77.3	116	65.9	99.0	52.4	78.8	44.9	67.5	35.5	53.4
Properties											
Area, in.^{2}		14.9		12.4		9.58		8.12		6.59	
r_y, in.		2.25		2.31		2.36		2.39		2.42	
r_x/r_y		1.26		1.25		1.25		1.25		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS8×6×		HSS8×4×							
		3/16[a], [b], [c]		5/8		1/2		3/8		5/16	
t_{des}, in.		0.188		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		17.08		42.30		35.24		27.48		23.34	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	142	214	371	558	311	468	242	364	206	309
	6	135	203	313	470	265	399	209	314	178	268
	7	132	199	294	442	251	377	198	297	169	254
	8	130	195	274	412	234	352	186	279	159	239
	9	127	190	253	380	217	327	173	261	149	223
	10	123	185	231	347	200	300	160	241	138	207
	11	119	180	209	314	182	273	147	221	127	190
	12	116	174	188	282	164	247	134	201	115	173
	13	111	167	167	250	147	221	121	181	104	157
	14	107	160	147	220	130	196	108	162	93.7	141
	15	101	153	128	192	114	172	95.9	144	83.4	125
	16	96.1	144	112	169	101	151	84.3	127	73.5	110
	17	90.7	136	99.4	149	89.1	134	74.7	112	65.1	97.9
	18	85.3	128	88.7	133	79.5	119	66.6	100	58.1	87.3
	19	79.9	120	79.6	120	71.3	107	59.8	89.9	52.1	78.4
	20	74.7	112	71.8	108	64.4	96.7	54.0	81.1	47.0	70.7
	22	64.4	96.8	59.4	89.2	53.2	79.9	44.6	67.0	38.9	58.4
	24	54.7	82.2	49.9	75.0	44.7	67.2	37.5	56.3	32.7	49.1
	26	46.6	70.1					31.9	48.0	27.8	41.8
	28	40.2	60.4								
	30	35.0	52.6								
	32	30.8	46.3								
	34	27.3	41.0								
	36	24.3	36.5								
	38	21.8	32.8								
	40	19.7	29.6								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		151	226	371	558	311	468	242	364	206	309
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		123	184	302	453	254	380	197	295	167	251
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		50.3	75.5	138	207	117	176	92.7	139	79.4	119
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		36.7	55.2	47.8	71.9	44.9	67.5	38.8	58.3	34.4	51.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		33.1	49.8	71.9	108	61.6	92.6	49.7	74.6	42.7	64.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		23.4	35.2	43.2	64.9	37.4	56.3	30.4	45.8	26.2	39.4
Properties											
Area, in.^{2}		5.03		12.4		10.4		8.08		6.87	
r_y, in.		2.45		1.49		1.54		1.60		1.62	
r_x/r_y		1.24		1.76		1.75		1.73		1.73	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS8×4×				HSS8×3×					
		¼[a]		3/16[a], [c]		½		⅜		5/16	
t_{des}, in.		0.250		0.188		0.500		0.375		0.313	
Nom. Weight, lb/ft		19.02		14.53		31.84		24.93		21.21	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	167	252	120	180	280	421	219	330	187	281
	6	146	219	108	162	209	315	168	252	145	218
	7	138	208	104	156	188	283	152	229	132	199
	8	131	196	99.2	149	167	251	136	205	119	179
	9	122	184	94.3	142	145	219	120	181	105	158
	10	114	171	88.2	133	125	187	104	157	92.1	138
	11	105	158	81.6	123	105	158	89.3	134	79.4	119
	12	95.9	144	74.9	113	88.2	133	75.2	113	67.3	101
	13	87.1	131	68.2	103	75.1	113	64.1	96.4	57.4	86.2
	14	78.4	118	61.7	92.7	64.8	97.4	55.3	83.1	49.5	74.3
	15	70.1	105	55.4	83.2	56.4	84.8	48.2	72.4	43.1	64.8
	16	62.1	93.3	49.3	74.0	49.6	74.5	42.3	63.6	37.9	56.9
	17	55.0	82.6	43.6	65.6	43.9	66.0	37.5	56.3	33.5	50.4
	18	49.0	73.7	38.9	58.5	39.2	58.9	33.4	50.3	29.9	45.0
	19	44.0	66.1	34.9	52.5			30.0	45.1	26.9	40.4
	20	39.7	59.7	31.5	47.4					24.2	36.4
	22	32.8	49.3	26.1	39.2						
	24	27.6	41.5	21.9	32.9						
	26	23.5	35.3	18.7	28.0						
	28			16.1	24.2						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		167	252	128	193	280	421	219	330	187	281
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		136	204	104	156	228	342	179	268	152	228
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		65.1	97.9	50.3	75.5	117	176	92.7	139	79.4	119
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		29.2	43.9	23.2	34.9	26.9	40.5	25.3	38.1	23.2	34.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		35.2	52.9	27.4	41.3	52.4	78.8	42.4	63.8	36.7	55.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		21.0	31.5	14.0	21.0	25.2	37.9	20.7	31.2	18.1	27.2
Properties											
Area, in.^{2}		5.59		4.28		9.36		7.33		6.24	
r_y, in.		1.65		1.68		1.14		1.19		1.22	
r_x/r_y		1.72		1.71		2.24		2.22		2.20	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS8×3×				HSS8×2×					
		¼[a]		3/16[a], [c]		½		⅜		5/16	
t_{des}, in.		0.250		0.188		0.500		0.375		0.313	
Nom. Weight, lb/ft		17.32		13.25		28.43		22.37		19.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	152	229	108	163	250	376	197	296	168	253
	6	120	180	90.5	136	119	180	103	155	92.0	138
	7	110	165	84.7	127	91.3	137	81.8	123	73.9	111
	8	99.0	149	76.9	116	69.9	105	63.0	94.6	57.5	86.4
	9	88.3	133	68.8	103	55.2	83.0	49.8	74.8	45.4	68.3
	10	77.7	117	60.8	91.4	44.7	67.2	40.3	60.6	36.8	55.3
	11	67.4	101	53.0	79.7	37.0	55.6	33.3	50.1	30.4	45.7
	12	57.6	86.6	45.6	68.6			28.0	42.1	25.6	38.4
	13	49.1	73.8	38.9	58.4					21.8	32.7
	14	42.4	63.7	33.5	50.3						
	15	36.9	55.5	29.2	43.9						
	16	32.4	48.7	25.6	38.5						
	17	28.7	43.2	22.7	34.1						
	18	25.6	38.5	20.3	30.5						
	19	23.0	34.6	18.2	27.3						
	20	20.8	31.2	16.4	24.7						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		152	229	117	176	250	376	197	296	168	253
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		124	186	95.1	143	204	306	160	241	137	205
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		65.1	97.9	50.3	75.5	117	176	92.7	139	79.4	119
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		20.2	30.4	16.5	24.8	8.98	13.5	11.8	17.7	11.9	17.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		30.4	45.8	23.7	35.7	42.9	64.5	35.4	53.3	30.7	46.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		14.5	21.8	9.69	14.6	14.1	21.3	12.1	18.1	10.7	16.1
Properties											
Area, in.^{2}		5.09		3.90		8.36		6.58		5.62	
r_y, in.		1.25		1.27		0.716		0.766		0.792	
r_x/r_y		2.18		2.17		3.31		3.22		3.17	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS8–HSS7

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS8×2×				HSS7×5×					
		¼[a]		3/16[a], [c]		½		⅜		5/16	
t_{des}, in.		0.250		0.188		0.500		0.375		0.313	
Nom. Weight, lb/ft		15.62		11.97		35.24		27.48		23.34	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	137	207	97.2	146	311	468	242	364	206	309
	6	78.1	117	62.3	93.7	280	421	219	329	187	281
	7	63.7	95.7	51.5	77.4	270	406	211	317	180	271
	8	50.2	75.5	41.3	62.1	258	388	203	305	173	260
	9	39.7	59.6	32.6	49.0	246	370	193	291	165	249
	10	32.1	48.3	26.4	39.7	233	350	183	276	157	236
	11	26.6	39.9	21.8	32.8	219	329	173	260	149	223
	12	22.3	33.5	18.4	27.6	205	308	162	244	140	210
	13	19.0	28.6	15.6	23.5	190	286	152	228	131	196
	14			13.5	20.3	176	264	141	211	122	183
	15					162	243	130	195	112	169
	16					148	222	119	179	103	155
	17					134	201	109	163	94.7	142
	18					121	182	98.6	148	86.2	129
	19					109	163	88.8	134	77.9	117
	20					98.0	147	80.2	121	70.3	106
	22					81.0	122	66.3	99.6	58.1	87.3
	24					68.0	102	55.7	83.7	48.8	73.4
	26					58.0	87.1	47.4	71.3	41.6	62.5
	28					50.0	75.1	40.9	61.5	35.9	53.9
	30					43.5	65.4	35.6	53.6	31.2	46.9
	32							31.3	47.1	27.5	41.3
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		137	207	106	159	311	468	242	364	206	309
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		112	168	86.0	129	254	380	197	295	167	251
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		65.1	97.9	50.3	75.5	98.8	149	79.2	119	68.1	102
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.2	16.9	9.73	14.6	62.9	94.5	52.3	78.6	45.7	68.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		25.7	38.6	20.1	30.2	57.6	86.6	46.2	69.4	39.9	60.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		8.64	13.0	5.78	8.69	45.4	68.3	36.4	54.8	31.4	47.3
Properties											
Area, in.^{2}		4.59		3.53		10.4		8.08		6.87	
r_y, in.		0.819		0.847		1.90		1.95		1.98	
r_x/r_y		3.13		3.07		1.31		1.30		1.30	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS7

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS7×5×				HSS7×4×					
		¼		3/16[a], [c]		½		⅜		5/16	
t_{des}, in.		0.250		0.188		0.500		0.375		0.313	
Nom. Weight, lb/ft		19.02		14.53		31.84		24.93		21.21	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	167	252	127	192	280	421	219	330	187	281
	6	152	229	117	176	238	357	188	283	161	242
	7	147	221	113	170	224	337	178	268	153	230
	8	142	213	109	164	209	315	167	251	144	216
	9	136	204	104	157	194	291	155	233	134	201
	10	129	194	99.5	150	178	267	143	215	124	186
	11	122	184	94.4	142	161	243	131	197	114	171
	12	115	173	89.0	134	145	219	119	178	103	155
	13	108	162	83.6	126	130	195	107	160	93.2	140
	14	100	151	78.0	117	115	172	95.0	143	83.4	125
	15	93.1	140	72.5	109	100	151	83.8	126	74.1	111
	16	85.9	129	67.1	101	88.2	133	73.7	111	65.1	97.9
	17	78.8	118	61.7	92.7	78.1	117	65.3	98.1	57.7	86.7
	18	71.9	108	56.5	84.9	69.7	105	58.2	87.5	51.5	77.3
	19	65.3	98.2	51.4	77.3	62.5	94.0	52.2	78.5	46.2	69.4
	20	58.9	88.6	46.5	69.9	56.4	84.8	47.1	70.9	41.7	62.7
	22	48.7	73.2	38.4	57.7	46.6	70.1	39.0	58.6	34.5	51.8
	24	40.9	61.5	32.3	48.5	39.2	58.9	32.7	49.2	28.9	43.5
	26	34.9	52.4	27.5	41.3			27.9	41.9	24.7	37.1
	28	30.1	45.2	23.7	35.6						
	30	26.2	39.4	20.7	31.0						
	32	23.0	34.6	18.2	27.3						
	34			16.1	24.2						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		167	252	128	193	280	421	219	330	187	281
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		136	204	104	156	228	342	179	268	152	228
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		56.1	84.4	43.5	65.4	98.8	149	79.2	119	68.1	102
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		38.2	57.4	30.0	45.1	44.9	67.5	38.8	58.3	34.4	51.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		32.9	49.5	25.4	38.3	49.4	74.3	39.9	60.0	34.7	52.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		25.9	39.0	17.6	26.5	33.2	49.9	26.9	40.5	23.4	35.1
Properties											
Area, in.^{2}		5.59		4.28		9.36		7.33		6.24	
r_y, in.		2.01		2.04		1.52		1.57		1.60	
r_x/r_y		1.30		1.29		1.57		1.56		1.55	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS7

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS7×4×				HSS7×3×					
		¼		3/16[a], [c]		½		⅜		5/16	
t_{des}, in.		0.250		0.188		0.500		0.375		0.313	
Nom. Weight, lb/ft		17.32		13.25		28.43		22.37		19.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	152	229	116	174	250	376	197	296	168	253
	6	132	199	102	153	185	278	150	226	129	194
	7	125	189	96.8	146	166	249	136	204	118	177
	8	118	178	91.4	137	146	220	121	182	105	158
	9	111	166	85.7	129	127	191	107	160	93.1	140
	10	103	154	79.7	120	108	163	92.5	139	81.0	122
	11	94.3	142	73.5	111	90.5	136	78.9	119	69.5	104
	12	86.1	129	67.4	101	76.0	114	66.4	99.8	58.7	88.2
	13	78.0	117	61.2	92.0	64.8	97.3	56.6	85.1	50.0	75.1
	14	70.1	105	55.2	83.0	55.8	83.9	48.8	73.3	43.1	64.8
	15	62.5	93.9	49.4	74.3	48.6	73.1	42.5	63.9	37.5	56.4
	16	55.1	82.9	43.8	65.9	42.8	64.3	37.4	56.1	33.0	49.6
	17	48.8	73.4	38.8	58.3	37.9	56.9	33.1	49.7	29.2	43.9
	18	43.6	65.5	34.6	52.0	33.8	50.8	29.5	44.4	26.1	39.2
	19	39.1	58.8	31.1	46.7			26.5	39.8	23.4	35.2
	20	35.3	53.0	28.0	42.2					21.1	31.7
	22	29.2	43.8	23.2	34.8						
	24	24.5	36.8	19.5	29.3						
	26	20.9	31.4	16.6	24.9						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		152	229	117	176	250	376	197	296	168	253
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		124	186	95.1	143	204	306	160	241	137	205
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		56.1	84.4	43.5	65.4	98.8	149	79.2	119	68.1	102
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		29.2	43.9	23.2	34.9	26.9	40.5	25.3	38.1	23.2	34.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		28.7	43.1	22.3	33.5	41.4	62.3	33.7	50.6	29.4	44.3
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		19.4	29.2	13.3	19.9	22.1	33.2	18.3	27.5	16.0	24.0
Properties											
Area, in.^{2}		5.09		3.90		8.36		6.58		5.62	
r_y, in.		1.63		1.66		1.12		1.18		1.20	
r_x/r_y		1.55		1.54		2.01		1.97		1.98	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS7–HSS6

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS7×3×				HSS7×2×				HSS6×5×	
		¼		3/16[a], [c]		¼		3/16[a], [c]		½	
t_{des}, in.		0.250		0.188		0.250		0.188		0.500	
Nom. Weight, lb/ft		15.62		11.97		13.91		10.70		31.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	137	207	105	158	122	184	93.6	141	280	421
	6	107	161	83.2	125	68.9	104	55.0	82.7	251	377
	7	97.7	147	76.4	115	56.0	84.2	45.3	68.1	241	362
	8	88.0	132	69.1	104	44.0	66.1	36.2	54.4	230	346
	9	78.2	118	61.8	92.8	34.8	52.2	28.6	42.9	218	328
	10	68.5	103	54.5	81.8	28.1	42.3	23.1	34.8	206	310
	11	59.2	89.0	47.4	71.2	23.3	35.0	19.1	28.7	193	290
	12	50.3	75.7	40.6	61.1	19.5	29.4	16.1	24.2	180	270
	13	42.9	64.5	34.6	52.0	16.7	25.0	13.7	20.6	167	250
	14	37.0	55.6	29.8	44.9					153	230
	15	32.2	48.4	26.0	39.1					140	211
	16	28.3	42.6	22.9	34.3					127	192
	17	25.1	37.7	20.2	30.4					115	173
	18	22.4	33.6	18.1	27.1					103	155
	19	20.1	30.2	16.2	24.4					92.6	139
	20	18.1	27.2	14.6	22.0					83.6	126
	22									69.1	104
	24									58.1	87.3
	26									49.5	74.3
	28									42.7	64.1
	30									37.2	55.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		137	207	106	159	122	184	94.3	142	280	421
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		112	168	86.0	129	99.7	150	76.8	115	228	342
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		56.1	84.4	43.5	65.4	56.1	84.4	43.5	65.4	80.8	122
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		20.2	30.4	16.5	24.8	11.2	16.9	9.73	14.6	62.9	94.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		24.4	36.7	19.1	28.7	20.2	30.4	15.9	23.9	45.2	67.9
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		13.4	20.1	9.21	13.8	7.96	12.0	5.50	8.26	39.9	60.0
Properties											
Area, in.^{2}		4.59		3.53		4.09		3.15		9.36	
r_y, in.		1.23		1.26		0.812		0.839		1.85	
r_x/r_y		1.96		1.94		2.78		2.74		1.16	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS6

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6×5×								HSS6×4×	
		3/8		5/16		1/4		3/16[a]		1/2	
t_{des}, in.		0.375		0.313		0.250		0.188		0.500	
Nom. Weight, lb/ft		24.93		21.21		17.32		13.25		28.43	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	219	330	187	281	152	229	117	176	250	376
	1	219	329	186	280	152	228	116	175	249	374
	2	217	326	185	278	151	227	116	174	246	369
	3	214	321	182	274	149	224	114	171	240	360
	4	210	315	179	269	146	219	112	168	232	349
	5	204	307	174	262	142	214	109	164	222	334
	6	198	297	169	254	138	208	106	160	211	317
	7	191	286	163	245	133	201	103	154	198	298
	8	182	274	156	235	128	193	98.7	148	185	278
	9	174	261	149	224	122	184	94.3	142	170	256
	10	164	247	141	212	116	175	89.7	135	156	234
	11	155	233	133	200	110	165	84.9	128	141	212
	12	145	218	125	188	103	155	79.9	120	126	190
	13	135	203	116	175	96.3	145	74.8	112	112	169
	14	125	187	108	162	89.5	135	69.7	105	98.8	149
	15	115	172	99.6	150	82.8	124	64.6	97.1	86.1	129
	16	105	158	91.3	137	76.1	114	59.5	89.5	75.7	114
	17	95.3	143	83.2	125	69.6	105	54.6	82.0	67.0	101
	18	86.1	129	75.5	113	63.3	95.1	49.8	74.8	59.8	89.9
	19	77.3	116	67.9	102	57.1	85.8	45.1	67.8	53.7	80.7
	20	69.8	105	61.3	92.1	51.5	77.5	40.7	61.2	48.4	72.8
	21	63.3	95.1	55.6	83.5	46.8	70.3	36.9	55.5	43.9	66.0
	22	57.7	86.7	50.6	76.1	42.6	64.0	33.6	50.6	40.0	60.2
	23	52.8	79.3	46.3	69.6	39.0	58.6	30.8	46.3	36.6	55.0
	24	48.5	72.8	42.6	64.0	35.8	53.8	28.3	42.5	33.6	50.6
	25	44.7	67.1	39.2	59.0	33.0	49.6	26.1	39.2		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		219	330	187	281	152	229	117	176	250	376
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		179	268	152	228	124	186	95.1	143	204	306
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		65.7	98.8	56.9	85.5	47.2	70.9	36.7	55.2	80.8	122
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		52.3	78.6	45.7	68.6	38.2	57.4	30.0	45.1	44.9	67.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		36.7	55.1	31.7	47.6	26.2	39.4	20.4	30.6	38.4	57.8
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		32.2	48.4	27.9	42.0	23.1	34.7	17.3	26.0	28.7	43.1
Properties											
Area, in.^{2}		7.33		6.24		5.09		3.90		8.36	
r_y, in.		1.91		1.94		1.97		2.00		1.49	
r_x/r_y		1.16		1.15		1.15		1.15		1.38	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS6

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6×4×								HSS6×3×	
		⅜		5⁄16		¼		3⁄16[a]		½	
t_{des}, in.		0.375		0.313		0.250		0.188		0.500	
Nom. Weight, lb/ft		22.37		19.08		15.62		11.97		25.03	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	197	296	168	253	137	207	106	159	220	331
	1	196	295	168	252	137	206	105	158	218	328
	2	194	291	165	249	135	203	104	156	213	320
	3	189	285	162	243	132	199	102	153	204	306
	4	183	276	157	236	129	193	99.2	149	192	288
	5	176	265	151	227	124	186	95.7	144	177	266
	6	168	252	144	217	119	178	91.6	138	161	242
	7	158	238	136	205	112	169	87.0	131	144	216
	8	148	223	128	192	106	159	82.0	123	126	190
	9	138	207	119	179	98.5	148	76.7	115	109	164
	10	126	190	110	165	91.1	137	71.1	107	92.3	139
	11	115	173	100	151	83.5	126	65.4	98.3	76.8	115
	12	104	156	91.0	137	76.0	114	59.7	89.8	64.6	97.0
	13	93.0	140	81.7	123	68.6	103	54.1	81.3	55.0	82.7
	14	82.5	124	72.8	109	61.4	92.2	48.6	73.1	47.4	71.3
	15	72.4	109	64.3	96.6	54.5	81.9	43.3	65.1	41.3	62.1
	16	63.6	95.6	56.5	84.9	47.9	72.0	38.2	57.5	36.3	54.6
	17	56.4	84.7	50.0	75.2	42.4	63.8	33.9	50.9	32.2	48.3
	18	50.3	75.6	44.6	67.1	37.9	56.9	30.2	45.4	28.7	43.1
	19	45.1	67.8	40.1	60.2	34.0	51.1	27.1	40.8		
	20	40.7	61.2	36.1	54.3	30.7	46.1	24.5	36.8		
	21	36.9	55.5	32.8	49.3	27.8	41.8	22.2	33.4		
	22	33.7	50.6	29.9	44.9	25.3	38.1	20.2	30.4		
	23	30.8	46.3	27.3	41.1	23.2	34.8	18.5	27.8		
	24	28.3	42.5	25.1	37.7	21.3	32.0	17.0	25.5		
	25	26.1	39.2	23.1	34.8	19.6	29.5	15.7	23.5		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		197	296	168	253	137	207	106	159	220	331
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		160	241	137	205	112	168	86.0	129	179	269
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		65.7	98.8	56.9	85.5	47.2	70.9	36.7	55.2	80.8	122
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		38.8	58.3	34.4	51.7	29.2	43.9	23.2	34.9	26.9	40.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		31.2	46.9	27.2	40.9	22.6	34.0	17.6	26.5	31.4	47.3
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		23.6	35.4	20.5	30.8	17.1	25.7	12.9	19.4	18.9	28.5
Properties											
Area, in.^{2}		6.58		5.62		4.59		3.53		7.36	
r_y, in.		1.54		1.57		1.60		1.63		1.10	
r_x/r_y		1.38		1.38		1.37		1.37		1.76	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS6

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6×3×								HSS6×2×	
		3/8		5/16		1/4		3/16[a]		3/8	
t_{des}, in.		0.375		0.313		0.250		0.188		0.375	
Nom. Weight, lb/ft		19.82		16.96		13.91		10.70		17.27	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	175	262	149	225	122	184	94.3	142	152	229
	1	173	260	148	223	122	183	93.7	141	149	224
	2	169	254	145	218	119	179	91.8	138	141	212
	3	163	245	140	210	115	173	88.7	133	129	193
	4	154	231	132	199	109	164	84.5	127	113	169
	5	144	216	124	186	102	154	79.5	119	95.3	143
	6	132	198	114	171	94.5	142	73.7	111	77.5	117
	7	119	179	103	155	86.1	129	67.4	101	60.8	91.4
	8	106	159	92.1	138	77.3	116	60.8	91.5	46.6	70.0
	9	92.6	139	81.0	122	68.4	103	54.2	81.4	36.8	55.3
	10	79.8	120	70.1	105	59.7	89.7	47.6	71.5	29.8	44.8
	11	67.7	102	59.8	89.9	51.3	77.1	41.2	61.9	24.7	37.0
	12	56.9	85.5	50.4	75.7	43.4	65.2	35.1	52.8	20.7	31.1
	13	48.5	72.8	42.9	64.5	37.0	55.6	29.9	45.0		
	14	41.8	62.8	37.0	55.6	31.9	47.9	25.8	38.8		
	15	36.4	54.7	32.2	48.4	27.8	41.8	22.5	33.8		
	16	32.0	48.1	28.3	42.6	24.4	36.7	19.7	29.7		
	17	28.3	42.6	25.1	37.7	21.6	32.5	17.5	26.3		
	18	25.3	38.0	22.4	33.6	19.3	29.0	15.6	23.5		
	19	22.7	34.1	20.1	30.2	17.3	26.0	14.0	21.0		
	20					15.6	23.5	12.6	19.0		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		175	262	149	225	122	184	94.3	142	152	229
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		142	213	122	182	99.7	150	76.8	115	124	186
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		65.7	98.8	56.9	85.5	47.2	70.9	36.7	55.2	65.7	98.8
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		25.3	38.1	23.2	34.8	20.2	30.4	16.5	24.8	11.8	17.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		25.9	39.0	22.8	34.2	19.0	28.6	14.9	22.4	20.8	31.2
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		15.8	23.8	13.9	20.9	11.7	17.5	8.88	13.3	9.01	13.5
Properties											
Area, in.^{2}		5.83		4.99		4.09		3.15		5.08	
r_y, in.		1.16		1.18		1.21		1.24		0.750	
r_x/r_y		1.74		1.75		1.73		1.72		2.49	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS6–HSS5

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6×2×						HSS5×4×			
		5/16		1/4		3/16[a]		1/2		3/8	
t_{des}, in.		0.313		0.250		0.188		0.500		0.375	
Nom. Weight, lb/ft		14.83		12.21		9.42		25.03		19.82	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	131	196	107	162	83.2	125	220	331	175	262
	1	128	193	106	159	82.0	123	219	330	174	261
	2	122	183	101	151	78.3	118	216	325	171	257
	3	111	168	92.8	139	72.5	109	211	317	167	252
	4	98.6	148	82.7	124	65.1	97.9	203	306	162	243
	5	84.2	127	71.4	107	56.7	85.3	194	292	155	233
	6	69.4	104	59.6	89.6	47.9	72.1	184	277	147	222
	7	55.3	83.1	48.2	72.4	39.3	59.1	172	259	139	209
	8	42.7	64.2	37.7	56.6	31.2	46.8	160	240	129	194
	9	33.7	50.7	29.8	44.7	24.6	37.0	147	221	119	180
	10	27.3	41.1	24.1	36.2	19.9	30.0	134	201	109	164
	11	22.6	34.0	19.9	29.9	16.5	24.8	120	181	99.1	149
	12	19.0	28.5	16.7	25.2	13.8	20.8	107	161	89.0	134
	13			14.3	21.4	11.8	17.7	94.5	142	79.2	119
	14							82.4	124	69.8	105
	15							71.8	108	60.9	91.5
	16							63.1	94.8	53.5	80.4
	17							55.9	84.0	47.4	71.2
	18							49.9	74.9	42.3	63.5
	19							44.7	67.2	37.9	57.0
	20							40.4	60.7	34.2	51.4
	21							36.6	55.0	31.0	46.7
	22							33.4	50.2	28.3	42.5
	23							30.5	45.9	25.9	38.9
	24							28.0	42.1	23.8	35.7
	25									21.9	32.9
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		131	196	107	162	83.2	125	220	331	175	262
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		106	159	87.5	131	67.8	102	179	269	142	213
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		56.9	85.5	47.2	70.9	36.7	55.2	62.9	94.5	52.3	78.6
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.9	17.9	11.2	16.9	9.73	14.6	44.9	67.5	38.8	58.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		18.3	27.5	15.4	23.2	12.2	18.3	28.7	43.1	23.6	35.4
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		8.06	12.1	6.86	10.3	5.28	7.94	24.4	36.6	20.2	30.3
Properties											
Area, in.^{2}		4.36		3.59		2.78		7.36		5.83	
r_y, in.		0.775		0.802		0.829		1.45		1.50	
r_x/r_y		2.48		2.44		2.41		1.19		1.19	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS5

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS5×4×						HSS5×3×			
		5/16		1/4		3/16		1/2		3/8	
t_{des}, in.		0.313		0.250		0.188		0.500		0.375	
Nom. Weight, lb/ft		16.96		13.91		10.70		21.63		17.27	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	149	225	122	184	94.3	142	190	286	152	229
	1	149	224	122	183	93.9	141	189	284	151	227
	2	147	221	120	181	92.8	139	184	276	147	221
	3	143	216	118	177	90.8	137	176	264	141	212
	4	139	209	114	172	88.2	133	165	248	133	200
	5	134	201	110	165	85.0	128	152	228	124	186
	6	127	191	105	158	81.2	122	138	207	113	170
	7	120	180	99.1	149	76.9	116	122	184	102	153
	8	112	168	92.8	140	72.2	109	107	161	89.7	135
	9	104	156	86.3	130	67.3	101	91.7	138	78.0	117
	10	95.3	143	79.4	119	62.2	93.5	77.2	116	66.7	100
	11	86.7	130	72.5	109	57.0	85.6	64.0	96.2	56.0	84.1
	12	78.2	117	65.7	98.7	51.8	77.8	53.8	80.8	47.0	70.7
	13	69.9	105	58.9	88.6	46.7	70.1	45.8	68.9	40.1	60.2
	14	61.9	93.0	52.4	78.8	41.7	62.7	39.5	59.4	34.5	51.9
	15	54.2	81.4	46.2	69.4	36.9	55.5	34.4	51.7	30.1	45.2
	16	47.6	71.6	40.6	61.0	32.5	48.8	30.2	45.5	26.4	39.8
	17	42.2	63.4	35.9	54.0	28.8	43.2	26.8	40.3	23.4	35.2
	18	37.6	56.6	32.1	48.2	25.7	38.6	23.9	35.9	20.9	31.4
	19	33.8	50.8	28.8	43.3	23.0	34.6				
	20	30.5	45.8	26.0	39.0	20.8	31.2				
	21	27.6	41.6	23.6	35.4	18.8	28.3				
	22	25.2	37.9	21.5	32.3	17.2	25.8				
	23	23.0	34.6	19.6	29.5	15.7	23.6				
	24	21.2	31.8	18.0	27.1	14.4	21.7				
	25	19.5	29.3	16.6	25.0	13.3	20.0				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		149	225	122	184	94.3	142	190	286	152	229
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		122	182	99.7	150	76.8	115	155	233	124	186
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		45.7	68.6	38.2	57.4	30.0	45.1	62.9	94.5	52.3	78.6
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		34.4	51.7	29.2	43.9	23.2	34.9	26.9	40.5	25.3	38.1
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		20.6	30.9	17.2	25.8	13.5	20.3	23.0	34.5	19.2	28.9
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		17.6	26.5	14.7	22.1	11.6	17.4	15.8	23.8	13.3	20.1
Properties											
Area, in.^{2}		4.99		4.09		3.15		6.36		5.08	
r_y, in.		1.53		1.56		1.59		1.08		1.13	
r_x/r_y		1.20		1.19		1.19		1.51		1.50	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS5

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS5×3×						HSS5×2½×			
		5/16		1/4		3/16		1/4		3/16	
t_{des}, in.		0.313		0.250		0.188		0.250		0.188	
Nom. Weight, lb/ft		14.83		12.21		9.42		11.36		8.78	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	131	196	107	162	83.2	125	100	150	77.5	117
	1	130	195	107	160	82.6	124	98.9	149	76.8	115
	2	127	190	104	157	80.9	122	95.8	144	74.5	112
	3	122	183	101	151	78.0	117	90.8	136	70.8	106
	4	115	173	95.4	143	74.2	112	84.2	127	66.0	99.1
	5	107	161	89.3	134	69.5	105	76.5	115	60.2	90.5
	6	98.5	148	82.2	124	64.2	96.6	68.0	102	53.9	81.0
	7	89.0	134	74.7	112	58.5	87.9	59.1	88.9	47.2	71.0
	8	79.1	119	66.8	100	52.5	79.0	50.4	75.7	40.6	61.0
	9	69.3	104	58.9	88.5	46.5	69.9	42.0	63.1	34.2	51.3
	10	59.7	89.7	51.1	76.8	40.5	60.9	34.2	51.5	28.1	42.3
	11	50.6	76.1	43.7	65.7	34.9	52.4	28.3	42.5	23.2	34.9
	12	42.5	63.9	36.9	55.4	29.5	44.3	23.8	35.7	19.5	29.4
	13	36.2	54.5	31.4	47.2	25.1	37.8	20.3	30.4	16.6	25.0
	14	31.2	47.0	27.1	40.7	21.7	32.6	17.5	26.3	14.4	21.6
	15	27.2	40.9	23.6	35.4	18.9	28.4	15.2	22.9	12.5	18.8
	16	23.9	36.0	20.7	31.2	16.6	24.9	13.4	20.1	11.0	16.5
	17	21.2	31.8	18.4	27.6	14.7	22.1			9.73	14.6
	18	18.9	28.4	16.4	24.6	13.1	19.7				
	19	17.0	25.5	14.7	22.1	11.8	17.7				
	20					10.6	16.0				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		131	196	107	162	83.2	125	100	150	77.5	117
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		106	159	87.5	131	67.8	102	81.4	122	63.1	94.7
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		45.7	68.6	38.2	57.4	30.0	45.1	38.2	57.4	30.0	45.1
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		23.2	34.8	20.2	30.4	16.5	24.8	15.7	23.6	13.1	19.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		16.9	25.4	14.2	21.4	11.2	16.9	12.7	19.2	10.1	15.2
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		11.8	17.7	9.93	14.9	7.88	11.9	7.78	11.7	6.21	9.34
Properties											
Area, in.^{2}		4.36		3.59		2.78		3.34		2.59	
r_y, in.		1.16		1.19		1.21		0.991		1.02	
r_x/r_y		1.50		1.49		1.50		1.74		1.73	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS5–HSS4

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS5×2×								HSS4×3×	
		3/8		5/16		1/4		3/16		3/8	
t_{des}, in.		0.375		0.313		0.250		0.188		0.375	
Nom. Weight, lb/ft		14.72		12.70		10.51		8.15		14.72	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	130	195	112	168	92.5	139	71.9	108	130	195
	1	127	191	110	165	91.0	137	70.7	106	129	193
	2	120	180	104	157	86.5	130	67.5	101	125	188
	3	109	164	95.2	143	79.5	119	62.3	93.7	120	180
	4	95.1	143	83.8	126	70.6	106	55.8	83.9	113	170
	5	79.9	120	71.2	107	60.6	91.1	48.4	72.7	104	157
	6	64.5	97.0	58.4	87.8	50.3	75.6	40.7	61.1	94.8	142
	7	50.1	75.3	46.2	69.4	40.4	60.7	33.1	49.8	84.6	127
	8	38.4	57.7	35.5	53.4	31.4	47.2	26.1	39.2	74.3	112
	9	30.3	45.6	28.1	42.2	24.8	37.3	20.6	31.0	64.1	96.3
	10	24.5	36.9	22.7	34.2	20.1	30.2	16.7	25.1	54.3	81.6
	11	20.3	30.5	18.8	28.2	16.6	24.9	13.8	20.7	45.2	67.9
	12	17.0	25.6	15.8	23.7	13.9	21.0	11.6	17.4	38.0	57.1
	13					11.9	17.9	9.87	14.8	32.4	48.6
	14									27.9	41.9
	15									24.3	36.5
	16									21.4	32.1
	17									18.9	28.4
	18									16.9	25.4
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		130	195	112	168	92.5	139	71.9	108	130	195
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		106	158	91.2	137	75.3	113	58.5	87.8	106	158
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		52.3	78.6	45.7	68.6	38.2	57.4	30.0	45.1	38.8	58.3
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.8	17.7	11.9	17.9	11.2	16.9	9.73	14.6	25.3	38.1
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		14.9	22.4	13.2	19.9	11.3	16.9	8.96	13.5	13.4	20.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		7.49	11.3	6.74	10.1	5.79	8.70	4.64	6.98	10.9	16.4
Properties											
Area, in.^{2}		4.33		3.74		3.09		2.40		4.33	
r_y, in.		0.737		0.763		0.789		0.816		1.10	
r_x/r_y		2.13		2.12		2.10		2.08		1.25	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS4

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS4×3×						HSS4×2½×			
		5/16		1/4		3/16		1/4		3/16	
t_{des}, in.		0.313		0.250		0.188		0.250		0.188	
Nom. Weight, lb/ft		12.70		10.51		8.15		9.66		7.51	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	112	168	92.5	139	71.9	108	85.0	128	66.2	99.4
	1	111	167	91.8	138	71.3	107	84.1	126	65.5	98.4
	2	108	163	89.6	135	69.7	105	81.3	122	63.4	95.3
	3	104	156	86.1	129	67.1	101	76.8	115	60.1	90.3
	4	97.9	147	81.4	122	63.7	95.7	71.0	107	55.8	83.8
	5	90.8	136	75.8	114	59.5	89.4	64.1	96.3	50.7	76.2
	6	82.8	124	69.5	104	54.7	82.3	56.6	85.1	45.1	67.7
	7	74.2	112	62.6	94.1	49.6	74.6	48.9	73.4	39.2	58.9
	8	65.4	98.4	55.6	83.5	44.3	66.6	41.2	62.0	33.4	50.2
	9	56.7	85.3	48.5	73.0	38.9	58.5	34.0	51.1	27.9	41.9
	10	48.4	72.7	41.7	62.7	33.7	50.7	27.6	41.5	22.7	34.2
	11	40.5	60.8	35.3	53.0	28.8	43.3	22.8	34.3	18.8	28.3
	12	34.0	51.1	29.6	44.5	24.2	36.4	19.2	28.8	15.8	23.7
	13	29.0	43.6	25.2	37.9	20.6	31.0	16.3	24.6	13.5	20.2
	14	25.0	37.6	21.8	32.7	17.8	26.7	14.1	21.2	11.6	17.4
	15	21.8	32.7	19.0	28.5	15.5	23.3	12.3	18.4	10.1	15.2
	16	19.1	28.8	16.7	25.0	13.6	20.5	10.8	16.2	8.89	13.4
	17	16.9	25.5	14.8	22.2	12.1	18.1				
	18	15.1	22.7	13.2	19.8	10.8	16.2				
	19			11.8	17.8	9.66	14.5				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		112	168	92.5	139	71.9	108	85.0	128	66.2	99.5
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		91.2	137	75.3	113	58.5	87.8	69.2	104	53.9	80.8
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		34.4	51.7	29.2	43.9	23.2	34.9	29.2	43.9	23.2	34.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		23.2	34.8	20.2	30.4	16.5	24.8	15.7	23.6	13.1	19.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		11.9	17.8	10.1	15.1	8.01	12.0	8.88	13.4	7.11	10.7
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		9.68	14.6	8.23	12.4	6.56	9.86	6.39	9.60	5.11	7.69
Properties											
Area, in.^{2}		3.74		3.09		2.40		2.84		2.21	
r_y, in.		1.12		1.15		1.18		0.965		0.993	
r_x/r_y		1.26		1.26		1.25		1.45		1.45	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS4

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS4×2×								HSS4×1½×	
		⅜		5⁄16		¼		3⁄16		¼	
t_{des}, in.		0.375		0.313		0.250		0.188		0.250	
Nom. Weight, lb/ft		12.17		10.58		8.81		6.87		7.96	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	107	161	93.1	140	77.5	117	60.5	90.9	70.1	105
	1	105	158	91.4	137	76.2	115	59.5	89.4	67.8	102
	2	98.8	148	86.3	130	72.2	109	56.6	85.1	61.5	92.5
	3	89.2	134	78.5	118	66.1	99.4	52.1	78.3	52.3	78.6
	4	77.3	116	68.7	103	58.4	87.8	46.4	69.8	41.6	62.6
	5	64.3	96.7	57.9	87.0	49.8	74.9	40.0	60.1	31.1	46.7
	6	51.4	77.2	46.9	70.6	41.0	61.6	33.4	50.1	22.0	33.0
	7	39.3	59.1	36.7	55.1	32.6	48.9	26.9	40.4	16.1	24.3
	8	30.1	45.2	28.1	42.2	25.1	37.7	21.0	31.5	12.4	18.6
	9	23.8	35.7	22.2	33.3	19.8	29.8	16.6	24.9	9.76	14.7
	10	19.3	29.0	18.0	27.0	16.1	24.2	13.4	20.2		
	11	15.9	23.9	14.9	22.3	13.3	20.0	11.1	16.7		
	12			12.5	18.8	11.2	16.8	9.32	14.0		
	13							7.94	11.9		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		107	161	93.1	140	77.5	117	60.5	90.9	70.1	105
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		87.3	131	75.8	114	63.1	94.7	49.2	73.9	57.0	85.6
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		38.8	58.3	34.4	51.7	29.2	43.9	23.2	34.9	29.2	43.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.8	17.7	11.9	17.9	11.2	16.9	9.73	14.6	6.74	10.1
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		9.98	15.0	8.98	13.5	7.71	11.6	6.21	9.34	6.54	9.83
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		5.96	8.96	5.41	8.14	4.69	7.05	3.79	5.70	3.14	4.73
Properties											
Area, in.^{2}		3.58		3.11		2.59		2.02		2.34	
r_y, in.		0.718		0.744		0.771		0.798		0.569	
r_x/r_y		1.77		1.76		1.75		1.73		2.25	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS4–HSS3½

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS4×1½×		HSS3½×2½×							
		3/16		3/8		5/16		1/4		3/16	
t_{des}, in.		0.188		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		6.23		12.17		10.58		8.81		6.87	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	55.1	82.8	107	161	93.1	140	77.5	117	60.5	90.9
	1	53.5	80.4	106	159	92.0	138	76.6	115	59.8	89.9
	2	48.9	73.5	102	153	88.6	133	74.0	111	57.9	87.0
	3	42.2	63.4	95.2	143	83.3	125	69.8	105	54.8	82.3
	4	34.2	51.4	86.7	130	76.3	115	64.3	96.6	50.7	76.2
	5	26.2	39.4	77.0	116	68.2	103	57.9	87.0	45.9	69.0
	6	18.9	28.4	66.6	100	59.5	89.4	50.9	76.4	40.7	61.1
	7	13.9	20.9	56.0	84.2	50.6	76.1	43.7	65.6	35.2	52.9
	8	10.6	16.0	46.0	69.1	42.0	63.1	36.6	55.1	29.9	44.9
	9	8.39	12.6	36.7	55.2	33.9	51.0	30.0	45.1	24.8	37.2
	10			29.7	44.7	27.5	41.3	24.3	36.5	20.1	30.2
	11			24.6	36.9	22.7	34.1	20.1	30.2	16.6	25.0
	12			20.6	31.0	19.1	28.7	16.9	25.4	14.0	21.0
	13			17.6	26.4	16.3	24.4	14.4	21.6	11.9	17.9
	14			15.2	22.8	14.0	21.1	12.4	18.6	10.3	15.4
	15					12.2	18.4	10.8	16.2	8.94	13.4
	16									7.86	11.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		55.1	82.8	107	161	93.1	140	77.5	117	60.5	90.9
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		44.9	67.3	87.3	131	75.8	114	63.1	94.7	49.2	73.9
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		23.2	34.9	32.1	48.2	28.8	43.3	24.7	37.1	19.9	29.8
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.32	9.50	18.6	27.9	17.5	26.4	15.7	23.6	13.1	19.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		5.31	7.99	9.33	14.0	8.38	12.6	7.19	10.8	5.79	8.70
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		2.59	3.90	7.34	11.0	6.59	9.90	5.69	8.55	4.57	6.86
Properties											
Area, in.^{2}		1.84		3.58		3.11		2.59		2.02	
r_y, in.		0.595		0.892		0.920		0.948		0.977	
r_x/r_y		2.22		1.31		1.30		1.31		1.30	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS3½–HSS3

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS3½×2×				HSS3½×1½×				HSS3×2½×	
		¼		3/16		¼		3/16		5/16	
t_{des}, in.		0.250		0.188		0.250		0.188		0.313	
Nom. Weight, lb/ft		7.96		6.23		7.11		5.59		9.51	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	70.1	105	55.1	82.8	62.6	94.0	49.4	74.2	83.8	126
	1	68.8	103	54.2	81.4	60.5	91.0	47.9	72.0	82.7	124
	2	65.1	97.9	51.5	77.3	54.8	82.3	43.7	65.7	79.6	120
	3	59.4	89.3	47.3	71.0	46.4	69.7	37.6	56.5	74.5	112
	4	52.3	78.6	41.9	63.0	36.7	55.2	30.3	45.6	68.0	102
	5	44.4	66.7	36.0	54.1	27.2	40.9	23.1	34.7	60.5	90.9
	6	36.3	54.5	29.8	44.8	19.1	28.8	16.5	24.9	52.4	78.7
	7	28.6	43.0	23.9	35.9	14.1	21.1	12.2	18.3	44.2	66.5
	8	22.0	33.0	18.5	27.9	10.8	16.2	9.30	14.0	36.4	54.6
	9	17.4	26.1	14.6	22.0	8.51	12.8	7.35	11.0	29.1	43.7
	10	14.1	21.1	11.9	17.8					23.6	35.4
	11	11.6	17.5	9.81	14.7					19.5	29.3
	12	9.77	14.7	8.24	12.4					16.4	24.6
	13			7.02	10.6					13.9	21.0
	14									12.0	18.1
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		70.1	105	55.1	82.8	62.6	94.1	49.4	74.3	83.8	126
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		57.0	85.6	44.9	67.3	50.9	76.4	40.2	60.3	68.3	102
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		24.7	37.1	19.9	29.8	24.7	37.1	19.9	29.8	23.2	34.8
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.2	16.9	9.73	14.6	6.74	10.1	6.32	9.50	17.5	26.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		6.19	9.30	5.01	7.54	5.16	7.76	4.24	6.38	6.54	9.83
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		4.14	6.23	3.37	5.06	2.77	4.16	2.29	3.44	5.74	8.63
Properties											
Area, in.^{2}		2.34		1.84		2.09		1.65		2.80	
r_y, in.		0.759		0.786		0.562		0.588		0.898	
r_x/r_y		1.57		1.55		2.01		1.99		1.16	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS3

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS3×2½×				HSS3×2×					
		¼		3/16		5/16		¼		3/16	
t_{des}, in.		0.250		0.188		0.313		0.250		0.188	
Nom. Weight, lb/ft		7.96		6.23		8.45		7.11		5.59	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	70.1	105	55.1	82.8	74.6	112	62.6	94.0	49.4	74.2
	1	69.2	104	54.5	81.9	73.0	110	61.4	92.3	48.5	72.9
	2	66.7	100	52.6	79.1	68.7	103	58.0	87.1	46.0	69.2
	3	62.7	94.3	49.7	74.6	62.0	93.1	52.7	79.2	42.1	63.3
	4	57.6	86.6	45.8	68.9	53.7	80.7	46.1	69.3	37.2	55.9
	5	51.6	77.5	41.3	62.1	44.6	67.1	38.8	58.4	31.7	47.7
	6	45.1	67.7	36.4	54.7	35.6	53.5	31.5	47.3	26.1	39.2
	7	38.4	57.8	31.3	47.1	27.2	40.9	24.6	36.9	20.7	31.2
	8	32.0	48.1	26.4	39.6	20.8	31.3	18.8	28.3	16.0	24.0
	9	25.9	38.9	21.7	32.6	16.4	24.7	14.9	22.3	12.6	19.0
	10	21.0	31.5	17.6	26.4	13.3	20.0	12.0	18.1	10.2	15.4
	11	17.3	26.1	14.5	21.8	11.0	16.6	9.95	15.0	8.46	12.7
	12	14.6	21.9	12.2	18.3			8.36	12.6	7.11	10.7
	13	12.4	18.7	10.4	15.6						
	14	10.7	16.1	8.96	13.5						
	15	9.33	14.0	7.80	11.7						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		70.1	105	55.1	82.8	74.6	112	62.6	94.1	49.4	74.3
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		57.0	85.6	44.9	67.3	60.7	91.0	50.9	76.4	40.2	60.3
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		20.2	30.4	16.5	24.8	23.2	34.8	20.2	30.4	16.5	24.8
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.7	23.6	13.1	19.7	11.9	17.9	11.2	16.9	9.73	14.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		5.66	8.51	4.59	6.90	5.49	8.25	4.79	7.20	3.92	5.89
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		4.97	7.46	4.04	6.08	4.09	6.15	3.59	5.40	2.94	4.43
Properties											
Area, in.^{2}		2.34		1.84		2.49		2.09		1.65	
r_y, in.		0.927		0.956		0.716		0.743		0.771	
r_x/r_y		1.15		1.15		1.39		1.39		1.37	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS3–HSS2½

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS3×1½×				HSS3×1×		HSS2½×2×			
		¼		3/16		3/16		¼		3/16	
t_{des}, in.		0.250		0.188		0.188		0.250		0.188	
Nom. Weight, lb/ft		6.26		4.96		4.32		6.26		4.96	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	55.1	82.8	43.7	65.7	38.0	57.1	55.1	82.8	43.7	65.7
	1	53.2	80.0	42.4	63.7	35.3	53.0	54.0	81.1	42.9	64.5
	2	48.0	72.1	38.5	57.9	28.2	42.4	50.8	76.4	40.6	61.0
	3	40.4	60.7	32.9	49.5	19.4	29.1	46.0	69.1	37.0	55.6
	4	31.7	47.6	26.4	39.7	11.7	17.5	39.9	60.0	32.5	48.8
	5	23.2	34.9	19.9	29.9	7.46	11.2	33.3	50.0	27.4	41.2
	6	16.3	24.4	14.1	21.3	5.18	7.78	26.7	40.1	22.4	33.6
	7	11.9	18.0	10.4	15.6			20.5	30.8	17.6	26.4
	8	9.14	13.7	7.96	12.0			15.7	23.6	13.5	20.2
	9	7.22	10.9	6.29	9.45			12.4	18.6	10.6	16.0
	10							10.0	15.1	8.62	13.0
	11							8.30	12.5	7.12	10.7
	12							6.97	10.5	5.98	9.00
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		55.1	82.8	43.7	65.7	38.0	57.2	55.1	82.8	43.7	65.7
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		44.9	67.3	35.6	53.4	31.0	46.4	44.9	67.3	35.6	53.4
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		20.2	30.4	16.5	24.8	16.5	24.8	15.7	23.6	13.1	19.7
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.74	10.1	6.32	9.50	2.94	4.43	11.2	16.9	9.73	14.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		3.94	5.93	3.27	4.91	2.59	3.90	3.57	5.36	2.94	4.43
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		2.37	3.56	1.98	2.98	1.13	1.70	3.04	4.58	2.52	3.79
Properties											
Area, in.^{2}		1.84		1.46		1.27		1.84		1.46	
r_y, in.		0.552		0.578		0.375		0.723		0.752	
r_x/r_y		1.76		1.75		2.50		1.20		1.19	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS2½–HSS2

Table 6-C (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS2½×1½×				HSS2½×1×		HSS2×1½×		HSS2×1×	
		¼		3/16		3/16		3/16		3/16	
t_{des}, in.		0.250		0.188		0.188		0.188		0.188	
Nom. Weight, lb/ft		5.41		4.32		3.68		3.68		3.04	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	47.6	71.5	38.0	57.1	32.3	48.6	32.3	48.6	26.8	40.3
	1	45.9	69.0	36.8	55.3	29.9	45.0	31.2	46.9	24.7	37.2
	2	41.2	61.9	33.3	50.1	23.7	35.6	28.1	42.2	19.3	29.1
	3	34.3	51.6	28.3	42.5	16.1	24.1	23.6	35.4	12.9	19.3
	4	26.6	40.0	22.4	33.7	9.54	14.3	18.5	27.7	7.53	11.3
	5	19.2	28.8	16.7	25.1	6.11	9.18	13.5	20.2	4.82	7.25
	6	13.3	20.1	11.8	17.7	4.24	6.37	9.40	14.1		
	7	9.80	14.7	8.64	13.0			6.91	10.4		
	8	7.51	11.3	6.61	9.94			5.29	7.95		
	9			5.22	7.85			4.18	6.28		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		47.6	71.6	38.0	57.2	32.3	48.6	32.3	48.6	26.8	40.3
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		38.8	58.1	31.0	46.4	26.3	39.5	26.3	39.5	21.8	32.8
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		15.7	23.6	13.1	19.7	13.1	19.7	9.73	14.6	9.73	14.6
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.74	10.1	6.32	9.50	2.94	4.43	6.32	9.50	2.94	4.43
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		2.87	4.31	2.41	3.62	1.87	2.81	1.67	2.52	1.25	1.88
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		1.98	2.97	1.67	2.51	0.938	1.41	1.36	2.05	0.749	1.13
Properties											
Area, in.^{2}		1.59		1.27		1.08		1.08		0.896	
r_y, in.		0.538		0.565		0.368		0.548		0.359	
r_x/r_y		1.52		1.51		2.14		1.26		1.77	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
3. Heavy line indicates L_c/r equal to or greater than 200.

HSS34–HSS30

Table 6-D
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS34×10×								HSS30×10×	
		1[a]		⅞[a], [c]		¾[a], [c]		⅝[a], [c]		1[a]	
t_{des}, in.		0.930		0.814		0.698		0.581		0.930	
Nom. Weight, lb/ft		277.07		244.88		212.00		178.41		249.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	2280	3430	1880	2820	1490	2240	1130	1690	2060	3090
	6	2230	3360	1850	2780	1470	2210	1110	1670	2010	3020
	7	2220	3330	1840	2760	1460	2190	1100	1660	2000	3000
	8	2200	3300	1830	2750	1450	2180	1100	1650	1980	2970
	9	2170	3270	1810	2730	1440	2170	1090	1640	1960	2940
	10	2150	3230	1800	2700	1430	2150	1080	1620	1930	2910
	11	2120	3190	1780	2680	1420	2130	1070	1610	1910	2870
	12	2090	3150	1760	2650	1400	2110	1060	1600	1880	2830
	13	2060	3100	1740	2620	1390	2090	1050	1580	1850	2790
	14	2030	3050	1720	2590	1370	2060	1040	1560	1820	2740
	15	1990	3000	1700	2560	1360	2040	1030	1540	1790	2690
	16	1960	2940	1680	2520	1340	2010	1010	1530	1760	2640
	17	1920	2880	1660	2490	1320	1980	1000	1510	1720	2590
	18	1880	2820	1630	2450	1300	1960	988	1480	1690	2540
	19	1840	2760	1600	2410	1280	1920	973	1460	1650	2480
	20	1790	2700	1580	2370	1260	1890	958	1440	1610	2420
	22	1710	2570	1520	2280	1220	1830	926	1390	1530	2300
	24	1620	2430	1440	2160	1170	1760	892	1340	1450	2170
	26	1520	2290	1360	2040	1120	1680	857	1290	1360	2040
	28	1430	2140	1270	1910	1070	1610	820	1230	1270	1910
	30	1330	2000	1190	1790	1020	1530	782	1180	1190	1780
	32	1230	1860	1110	1660	964	1450	743	1120	1100	1650
	34	1140	1710	1020	1540	899	1350	704	1060	1010	1520
	36	1050	1580	943	1420	830	1250	664	999	931	1400
	38	960	1440	865	1300	763	1150	625	939	851	1280
	40	873	1310	789	1190	698	1050	585	880	772	1160
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2280	3430	2010	3030	1740	2620	1460	2200	2060	3090
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1770	2660	1560	2350	1350	2030	1140	1710	1600	2400
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		1040	1570	924	1390	800	1200	674	1010	909	1370
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		241	362	221	332	198	298	172	259	241	362
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1870	2810	1670	2510	1450	2180	1230	1850	1510	2270
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		670	1010	560	842	451	678	346	519	650	977
Properties											
Area, in.^{2}		76.2		67.3		58.2		48.9		68.7	
r_y, in.		4.19		4.24		4.29		4.35		4.15	
r_x/r_y		2.67		2.67		2.66		2.64		2.41	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS30–HSS24

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS30×10×								HSS24×20×	
		7/8[a], [c]		3/4[a], [c]		5/8[a], [c]		1/2[a], [b], [c]		3/4[a]	
t_{des}, in.		0.814		0.698		0.581		0.465		0.698	
Nom. Weight, lb/ft		221.06		191.58		161.40		130.52		212.00	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1810	2730	1450	2180	1100	1660	787	1180	1740	2620
	6	1780	2680	1430	2140	1090	1640	775	1170	1730	2600
	7	1770	2660	1420	2130	1080	1630	771	1160	1730	2600
	8	1750	2630	1410	2120	1080	1620	767	1150	1720	2590
	9	1730	2610	1400	2100	1070	1600	761	1140	1720	2580
	10	1710	2580	1390	2090	1060	1590	756	1140	1710	2580
	11	1690	2550	1370	2070	1050	1580	749	1130	1710	2570
	12	1670	2510	1360	2050	1040	1560	742	1120	1700	2560
	13	1650	2470	1350	2020	1030	1550	735	1100	1690	2550
	14	1620	2430	1330	2000	1020	1530	727	1090	1690	2540
	15	1590	2390	1310	1970	1010	1510	718	1080	1680	2520
	16	1560	2350	1300	1950	992	1490	709	1070	1670	2510
	17	1530	2300	1280	1920	978	1470	700	1050	1660	2500
	18	1500	2250	1260	1890	964	1450	690	1040	1650	2480
	19	1470	2210	1240	1860	949	1430	680	1020	1640	2470
	20	1430	2150	1220	1830	934	1400	669	1010	1630	2450
	22	1360	2050	1170	1760	901	1350	646	972	1610	2420
	24	1290	1940	1120	1690	867	1300	623	936	1590	2380
	26	1220	1830	1060	1600	831	1250	598	899	1560	2340
	28	1140	1710	997	1500	794	1190	572	860	1530	2300
	30	1060	1600	932	1400	755	1140	546	820	1500	2260
	32	988	1480	867	1300	716	1080	519	780	1470	2210
	34	913	1370	803	1210	676	1020	492	739	1440	2170
	36	840	1260	740	1110	636	956	464	697	1410	2120
	38	769	1160	679	1020	585	879	437	656	1380	2070
	40	700	1050	620	931	536	805	409	615	1340	2020
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1820	2740	1570	2370	1330	1990	1070	1610	1740	2620
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1410	2120	1220	1830	1030	1540	832	1250	1350	2030
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		807	1210	700	1050	591	888	460	692	549	825
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		221	332	198	298	172	259	144	216	449	675
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1350	2030	1180	1770	998	1500	806	1210	1220	1830
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		532	800	434	653	335	503	240	360	984	1480
Properties											
Area, in.^{2}		60.8		52.6		44.3		35.8		58.2	
r_y, in.		4.20		4.25		4.31		4.36		8.02	
r_x/r_y		2.40		2.40		2.37		2.36		1.15	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24×20×								HSS24×18×	
		5/8[a], [b], [c]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.698	
Nom. Weight, lb/ft		178.41		144.13		109.15		91.39		201.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1400	2110	985	1480	592	890	426	640	1660	2490
	6	1400	2100	981	1470	590	886	425	638	1650	2480
	7	1390	2090	980	1470	589	885	424	637	1640	2470
	8	1390	2090	978	1470	588	884	424	637	1640	2460
	9	1390	2080	977	1470	587	883	423	636	1630	2450
	10	1380	2080	975	1470	586	881	422	634	1630	2440
	11	1380	2070	973	1460	585	879	421	633	1620	2430
	12	1380	2070	970	1460	584	877	420	632	1610	2420
	13	1370	2060	968	1450	582	875	419	630	1600	2410
	14	1370	2050	965	1450	581	873	418	629	1600	2400
	15	1360	2040	962	1450	579	871	417	627	1590	2380
	16	1350	2040	959	1440	578	868	416	625	1580	2370
	17	1350	2030	956	1440	576	865	415	624	1570	2350
	18	1340	2020	952	1430	574	862	414	622	1560	2340
	19	1340	2010	949	1430	572	859	412	619	1540	2320
	20	1330	2000	945	1420	570	856	411	617	1530	2300
	22	1310	1980	937	1410	565	849	407	612	1510	2270
	24	1300	1950	928	1390	560	842	404	607	1480	2220
	26	1280	1920	918	1380	555	834	400	602	1450	2180
	28	1260	1900	908	1360	549	825	396	596	1420	2130
	30	1240	1870	897	1350	543	816	392	589	1390	2090
	32	1220	1840	885	1330	537	806	388	582	1350	2040
	34	1200	1800	873	1310	530	796	383	575	1320	1980
	36	1180	1770	860	1290	523	786	378	568	1280	1930
	38	1160	1740	847	1270	515	774	373	560	1250	1870
	40	1130	1700	833	1250	507	763	367	552	1210	1820
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1460	2200	1180	1780	895	1350	751	1130	1660	2490
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1140	1710	918	1380	695	1040	584	875	1290	1930
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		465	700	378	567	260	390	167	252	549	825
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		382	574	311	467	238	358	180	271	399	599
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		929	1400	674	1010	457	688	359	539	1140	1710
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		755	1130	555	835	370	556	287	431	857	1290
Properties											
Area, in.^{2}		48.9		39.5		29.9		25.1		55.4	
r_y, in.		8.08		8.13		8.19		8.21		7.29	
r_x/r_y		1.15		1.15		1.15		1.15		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24×18×								HSS24×16×	
		5/8[a], [b], [c]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.698	
Nom. Weight, lb/ft		169.91		137.32		104.04		87.14		191.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	1330	2000	967	1450	585	879	421	632	1570	2370
	6	1330	1990	962	1450	582	875	419	630	1560	2350
	7	1320	1990	961	1440	581	874	418	629	1560	2340
	8	1320	1980	959	1440	580	872	418	628	1550	2330
	9	1320	1980	957	1440	579	871	417	627	1540	2320
	10	1310	1970	955	1430	578	869	416	625	1540	2310
	11	1310	1970	952	1430	576	866	415	624	1530	2300
	12	1300	1960	949	1430	575	864	414	622	1520	2280
	13	1300	1950	946	1420	573	862	413	621	1510	2270
	14	1290	1940	943	1420	571	859	412	619	1500	2260
	15	1290	1930	939	1410	570	856	410	617	1490	2240
	16	1280	1920	936	1410	567	853	409	614	1480	2220
	17	1270	1910	932	1400	565	850	407	612	1470	2200
	18	1270	1900	928	1390	563	846	406	610	1450	2190
	19	1260	1890	923	1390	561	843	404	607	1440	2170
	20	1250	1880	919	1380	558	839	402	605	1430	2140
	22	1230	1850	909	1370	553	830	398	599	1400	2100
	24	1220	1830	898	1350	547	822	394	593	1370	2050
	26	1200	1800	885	1330	540	812	390	586	1330	2000
	28	1180	1770	870	1310	533	802	385	579	1300	1950
	30	1150	1730	854	1280	526	791	380	571	1260	1900
	32	1130	1700	838	1260	518	779	375	563	1220	1840
	34	1110	1660	821	1230	510	767	369	555	1180	1780
	36	1080	1630	803	1210	502	755	363	546	1140	1720
	38	1050	1580	785	1180	493	741	357	537	1100	1660
	40	1020	1530	766	1150	484	728	351	528	1060	1590
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1400	2100	1130	1690	853	1280	716	1080	1570	2370
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1080	1630	874	1310	663	994	556	834	1220	1830
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		465	700	378	567	260	390	167	252	549	825
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		340	511	277	417	213	320	179	269	349	524
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		940	1410	650	977	446	671	349	525	1060	1590
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		659	990	484	728	321	482	246	370	735	1110
Properties											
Area, in.^{2}		46.6		37.6		28.5		23.9		52.6	
r_y, in.		7.34		7.39		7.45		7.47		6.53	
r_x/r_y		1.25		1.25		1.24		1.24		1.37	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24×16×								HSS24×14×	
		5/8[a], [c]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.698	
Nom. Weight, lb/ft		161.40		130.52		98.94		82.88		181.37	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1260	1900	930	1400	576	866	415	624	1490	2240
	6	1260	1890	923	1390	573	862	413	620	1470	2220
	7	1250	1880	921	1380	572	860	412	619	1470	2210
	8	1250	1880	918	1380	571	858	411	618	1460	2200
	9	1240	1870	915	1380	569	856	410	617	1450	2180
	10	1240	1860	912	1370	568	853	409	615	1440	2170
	11	1230	1860	908	1370	566	851	408	613	1440	2160
	12	1230	1850	904	1360	564	848	407	611	1420	2140
	13	1220	1840	900	1350	562	845	405	609	1410	2120
	14	1220	1830	896	1350	560	842	404	607	1400	2110
	15	1210	1820	891	1340	558	838	402	604	1390	2090
	16	1200	1810	885	1330	555	834	400	602	1380	2070
	17	1190	1800	880	1320	552	830	398	599	1360	2050
	18	1190	1780	874	1310	549	826	396	596	1350	2020
	19	1180	1770	868	1300	546	821	394	593	1330	2000
	20	1170	1760	861	1290	543	817	392	590	1310	1970
	22	1150	1730	848	1270	537	807	388	583	1280	1920
	24	1130	1700	833	1250	529	796	383	575	1240	1870
	26	1110	1660	817	1230	522	784	377	567	1200	1810
	28	1080	1630	800	1200	513	771	372	558	1160	1750
	30	1060	1590	783	1180	504	758	365	549	1120	1690
	32	1030	1550	764	1150	495	744	359	540	1080	1620
	34	1000	1510	745	1120	485	729	352	530	1030	1550
	36	969	1460	726	1090	475	714	345	519	990	1490
	38	935	1400	705	1060	465	698	338	508	944	1420
	40	900	1350	684	1030	454	682	331	497	899	1350
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1330	1990	1070	1610	811	1220	680	1020	1490	2240
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1030	1540	832	1250	630	945	528	792	1160	1740
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		465	700	378	567	260	390	167	252	549	825
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		299	449	244	367	188	283	158	237	298	449
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		896	1350	650	977	432	649	340	511	976	1470
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		566	850	415	624	273	410	211	317	620	931
Properties											
Area, in.^{2}		44.3		35.8		27.1		22.7		49.8	
r_y, in.		6.59		6.64		6.69		6.72		5.77	
r_x/r_y		1.36		1.36		1.36		1.36		1.52	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24×14×									
		5/8[a], [c]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		152.89		123.71		93.83		78.63		63.25	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	1190	1790	873	1310	565	849	410	617	274	412
	6	1180	1780	865	1300	561	843	408	613	272	409
	7	1180	1770	863	1300	559	841	407	611	272	408
	8	1170	1760	859	1290	558	838	406	610	271	407
	9	1170	1760	856	1290	556	836	404	608	270	406
	10	1160	1750	852	1280	554	832	403	606	269	405
	11	1160	1740	848	1270	552	829	402	603	268	403
	12	1150	1730	843	1270	549	825	400	601	267	402
	13	1140	1720	838	1260	547	822	398	598	266	400
	14	1140	1710	833	1250	544	817	396	595	265	398
	15	1130	1690	827	1240	541	813	394	592	264	396
	16	1120	1680	821	1230	538	808	392	589	262	394
	17	1110	1670	814	1220	534	803	389	585	261	392
	18	1100	1650	807	1210	531	797	387	582	259	389
	19	1090	1640	800	1200	527	792	384	578	257	387
	20	1080	1620	793	1190	523	786	382	573	256	384
	22	1060	1590	777	1170	514	773	376	565	252	379
	24	1030	1550	760	1140	505	759	369	555	248	373
	26	1010	1510	742	1110	495	744	363	545	244	366
	28	981	1470	723	1090	482	725	355	534	239	359
	30	948	1430	703	1060	469	706	348	523	234	352
	32	912	1370	682	1020	456	685	340	511	229	344
	34	876	1320	660	993	442	664	332	498	224	336
	36	839	1260	638	960	427	643	323	485	218	328
	38	801	1200	616	926	413	620	314	472	213	319
	40	763	1150	593	891	398	598	305	458	207	311
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1250	1890	1010	1530	769	1160	647	972	521	783
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		974	1460	788	1180	598	896	502	753	405	607
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		465	700	378	567	260	390	167	252	85.4	128
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		257	386	211	316	163	245	137	206	111	167
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		828	1250	671	1010	416	625	330	496	247	372
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		477	717	349	525	229	344	175	263	126	189
Properties											
Area, in.^{2}		41.9		33.9		25.7		21.6		17.4	
r_y, in.		5.82		5.87		5.92		5.95		5.98	
r_x/r_y		1.52		1.51		1.51		1.51		1.51	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24×12×									
		1		⅞		¾[a]		⅝[a], [c]		½[a], [c]	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465	
Nom. Weight, lb/ft		222.63		197.24		171.16		144.39		116.91	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1840	2760	1630	2440	1410	2120	1120	1690	819	1230
	6	1810	2710	1600	2410	1390	2090	1110	1670	810	1220
	7	1800	2700	1590	2390	1380	2080	1110	1660	806	1210
	8	1780	2680	1580	2380	1370	2060	1100	1650	803	1210
	9	1770	2660	1570	2360	1360	2050	1090	1640	798	1200
	10	1760	2640	1560	2340	1350	2030	1090	1630	793	1190
	11	1740	2610	1540	2320	1340	2010	1080	1620	788	1180
	12	1720	2590	1530	2300	1330	1990	1070	1610	783	1180
	13	1700	2560	1510	2270	1310	1970	1060	1600	776	1170
	14	1680	2530	1490	2240	1300	1950	1050	1580	770	1160
	15	1660	2500	1470	2220	1280	1930	1040	1570	763	1150
	16	1640	2460	1460	2190	1260	1900	1030	1550	755	1140
	17	1620	2430	1430	2160	1250	1870	1020	1540	748	1120
	18	1590	2390	1410	2120	1230	1850	1010	1520	739	1110
	19	1560	2350	1390	2090	1210	1820	998	1500	731	1100
	20	1540	2310	1370	2050	1190	1790	985	1480	722	1080
	22	1480	2230	1320	1980	1150	1730	958	1440	703	1060
	24	1420	2140	1270	1900	1100	1660	930	1400	683	1030
	26	1360	2050	1210	1820	1060	1590	895	1350	661	994
	28	1300	1950	1160	1740	1010	1520	856	1290	639	960
	30	1230	1850	1100	1650	962	1450	815	1230	616	926
	32	1170	1750	1040	1570	913	1370	774	1160	592	890
	34	1100	1650	985	1480	863	1300	733	1100	568	853
	36	1030	1560	927	1390	813	1220	691	1040	543	816
	38	969	1460	870	1310	764	1150	650	977	517	778
	40	905	1360	813	1220	715	1070	609	916	492	740
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1840	2760	1630	2440	1410	2120	1190	1780	961	1440
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1430	2140	1260	1890	1100	1640	921	1380	746	1120
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		708	1060	632	949	549	825	465	700	378	567
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		308	463	280	420	249	374	215	323	177	266
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1150	1720	1020	1540	896	1350	758	1140	619	930
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		704	1060	629	945	509	765	390	587	287	431
Properties											
Area, in.^{2}		61.3		54.3		47.1		39.6		32.1	
r_y, in.		4.88		4.93		4.98		5.03		5.08	
r_x/r_y		1.73		1.72		1.72		1.71		1.71	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS24

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24×12×						HSS24×8×			
		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		1/2[a], [c]		3/8[a], [b], [c]	
t_{des}, in.		0.349		0.291		0.233		0.465		0.349	
Nom. Weight, lb/ft		88.73		74.38		59.85		103.30		78.52	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	539	810	401	602	268	402	705	1060	455	684
	6	533	801	397	597	265	399	689	1040	445	669
	7	531	798	396	595	265	398	683	1030	441	663
	8	528	794	394	593	264	396	676	1020	437	657
	9	526	790	393	590	263	395	669	1000	433	650
	10	523	786	391	588	262	393	660	993	427	642
	11	519	780	389	585	260	391	651	979	422	634
	12	516	775	387	581	259	389	642	964	416	625
	13	512	769	384	578	257	387	631	948	409	615
	14	507	763	382	574	256	384	620	932	402	605
	15	503	756	379	570	254	382	608	914	395	594
	16	498	749	376	565	252	379	596	896	387	582
	17	493	741	373	561	250	376	583	876	380	570
	18	488	733	370	556	248	373	570	856	371	558
	19	482	725	366	551	246	370	556	835	363	545
	20	477	716	363	545	244	366	542	814	354	532
	22	464	698	355	534	239	359	512	770	336	505
	24	451	678	347	522	234	351	482	724	317	476
	26	438	658	338	508	228	343	450	677	297	447
	28	423	636	327	491	223	334	418	629	278	418
	30	409	614	315	474	216	325	380	572	258	388
	32	393	591	304	456	210	316	341	512	238	358
	34	378	568	292	438	204	306	302	454	219	329
	36	362	544	279	420	197	296	270	405	201	302
	38	346	520	267	401	190	285	242	364	185	278
	40	330	495	255	383	183	274	218	328	171	257
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		728	1090	611	918	491	738	847	1270	644	968
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		565	847	474	711	381	572	658	987	500	750
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		260	390	167	252	85.4	128	378	567	260	390
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		138	207	116	174	94.6	142	110	166	87.1	131
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		417	626	315	473	239	359	511	769	384	577
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		187	282	142	214	102	153	171	257	111	167
Properties											
Area, in.^{2}		24.3		20.4		16.4		28.3		21.5	
r_y, in.		5.14		5.16		5.19		3.44		3.50	
r_x/r_y		1.70		1.70		1.70		2.38		2.36	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HS24–HSS20

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24×8×				HSS22×20×					
		5/16[a], [b], [c]		1/4[a], [b], [c]		3/4[a]		5/8[a], [b], [c]		1/2[a], [b], [c]	
t_{des}, in.		0.291		0.233		0.698		0.581		0.465	
Nom. Weight, lb/ft		65.87		53.05		201.79		169.91		137.32	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	347	522	249	375	1660	2490	1380	2070	972	1460
	6	339	510	244	366	1650	2480	1370	2060	969	1460
	7	337	506	242	363	1650	2470	1370	2060	967	1450
	8	333	501	239	360	1640	2470	1370	2060	966	1450
	9	330	496	237	356	1640	2460	1360	2050	964	1450
	10	326	490	234	352	1630	2450	1360	2040	962	1450
	11	322	484	231	347	1630	2440	1360	2040	960	1440
	12	317	477	228	342	1620	2430	1350	2030	958	1440
	13	312	469	224	337	1610	2420	1350	2030	955	1440
	14	307	461	220	331	1610	2410	1340	2020	952	1430
	15	301	453	216	325	1600	2400	1340	2010	949	1430
	16	296	444	212	319	1590	2390	1330	2000	946	1420
	17	290	435	208	313	1580	2380	1330	1990	943	1420
	18	283	426	204	306	1570	2360	1320	1980	939	1410
	19	277	416	199	299	1560	2350	1310	1970	936	1410
	20	270	406	194	292	1550	2330	1300	1960	932	1400
	22	256	385	184	277	1530	2300	1290	1940	923	1390
	24	242	364	174	262	1510	2260	1270	1910	914	1370
	26	228	342	164	246	1480	2230	1250	1880	904	1360
	28	213	320	153	230	1450	2190	1230	1840	894	1340
	30	198	298	143	214	1430	2140	1200	1810	883	1330
	32	183	275	132	199	1400	2100	1180	1770	871	1310
	34	168	253	122	183	1370	2050	1150	1730	858	1290
	36	155	233	112	168	1340	2010	1130	1690	845	1270
	38	143	215	103	155	1300	1960	1100	1650	832	1250
	40	132	199	96.0	144	1270	1910	1070	1610	817	1230
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		542	815	437	657	1660	2490	1400	2100	1130	1690
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		421	631	339	509	1290	1930	1080	1630	874	1310
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		167	252	85.4	128	499	750	424	637	344	517
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		74.5	112	61.1	91.8	449	675	382	574	311	467
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		311	467	231	347	1080	1620	826	1240	599	901
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		83.6	126	58.5	88.0	979	1470	731	1100	543	817
Properties											
Area, in.^{2}		18.1		14.6		55.4		46.6		37.6	
r_y, in.		3.52		3.55		7.93		7.99		8.04	
r_x/r_y		2.36		2.35		1.08		1.08		1.08	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS22×20×				HSS22×18×					
		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]		5/8[a], [b], [c]		1/2[a], [b], [c]	
t_{des}, in.		0.349		0.291		0.698		0.581		0.465	
Nom. Weight, lb/ft		104.04		87.14		191.58		161.40		130.52	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	588	883	422	635	1570	2370	1310	1970	957	1440
	6	586	880	421	633	1560	2350	1300	1960	953	1430
	7	585	879	421	632	1560	2340	1300	1950	951	1430
	8	584	878	420	631	1550	2340	1300	1950	949	1430
	9	583	876	419	630	1550	2330	1290	1940	947	1420
	10	582	874	419	629	1540	2320	1290	1940	945	1420
	11	581	873	418	628	1540	2310	1280	1930	942	1420
	12	579	871	417	626	1530	2300	1280	1920	939	1410
	13	578	869	416	625	1520	2290	1270	1920	936	1410
	14	576	866	415	623	1510	2270	1270	1910	933	1400
	15	575	864	414	622	1500	2260	1260	1900	929	1400
	16	573	861	412	620	1500	2250	1260	1890	926	1390
	17	571	858	411	618	1490	2230	1250	1880	922	1390
	18	569	855	410	616	1470	2220	1240	1870	917	1380
	19	567	852	408	614	1460	2200	1230	1850	913	1370
	20	565	849	407	611	1450	2180	1220	1840	908	1360
	22	560	842	404	607	1430	2150	1200	1810	898	1350
	24	555	834	400	601	1400	2110	1180	1780	887	1330
	26	550	826	396	596	1370	2060	1160	1740	873	1310
	28	544	817	392	590	1340	2020	1130	1700	858	1290
	30	538	808	388	583	1310	1970	1110	1670	842	1270
	32	531	798	383	576	1280	1920	1080	1620	825	1240
	34	524	788	379	569	1250	1870	1050	1580	808	1210
	36	517	777	374	561	1210	1820	1020	1540	790	1190
	38	509	765	368	554	1180	1770	994	1490	771	1160
	40	501	754	363	545	1140	1710	963	1450	752	1130
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		853	1280	716	1080	1570	2370	1330	1990	1070	1610
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		663	994	556	834	1220	1830	1030	1540	832	1250
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		260	391	180	271	499	750	424	637	344	517
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		238	358	180	271	399	599	340	511	277	417
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		406	610	316	475	1000	1510	831	1250	578	868
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		364	547	283	425	849	1280	637	957	471	707
Properties											
Area, in.^{2}		28.5		23.9		52.6		44.3		35.8	
r_y, in.		8.10		8.13		7.21		7.26		7.31	
r_x/r_y		1.08		1.07		1.17		1.17		1.17	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS22×18×				HSS22×16×					
		3/8[a], [b], [c]		5/16[a], [b], [c]		3/4[a]		5/8[a], [c]		1/2[a], [b], [c]	
t_{des}, in.		0.349		0.291		0.698		0.581		0.465	
Nom. Weight, lb/ft		98.94		82.88		181.37		152.89		123.71	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	580	872	417	627	1490	2240	1240	1860	917	1380
	6	578	869	415	624	1480	2220	1230	1850	911	1370
	7	577	867	415	624	1470	2210	1230	1840	908	1370
	8	576	866	414	622	1470	2210	1220	1840	906	1360
	9	575	864	413	621	1460	2200	1220	1830	903	1360
	10	573	862	412	620	1450	2190	1210	1820	899	1350
	11	572	860	411	618	1450	2170	1210	1820	896	1350
	12	570	857	410	617	1440	2160	1200	1810	892	1340
	13	569	855	409	615	1430	2150	1200	1800	887	1330
	14	567	852	408	613	1420	2130	1190	1790	882	1330
	15	565	849	407	611	1410	2120	1180	1780	877	1320
	16	563	846	405	609	1400	2100	1180	1770	872	1310
	17	561	843	404	607	1390	2080	1170	1760	866	1300
	18	558	839	402	604	1370	2070	1160	1740	860	1290
	19	556	835	400	602	1360	2050	1150	1720	854	1280
	20	553	831	398	599	1350	2030	1140	1710	848	1270
	22	548	823	395	593	1320	1980	1110	1670	834	1250
	24	542	814	390	587	1290	1940	1090	1630	819	1230
	26	535	804	386	580	1260	1890	1060	1590	803	1210
	28	528	794	381	573	1220	1840	1030	1550	786	1180
	30	521	782	376	565	1190	1790	1000	1510	768	1150
	32	513	771	371	557	1150	1730	973	1460	749	1130
	34	505	758	365	549	1110	1680	942	1420	730	1100
	36	496	745	359	540	1080	1620	910	1370	710	1070
	38	487	732	353	530	1040	1560	877	1320	689	1040
	40	478	718	347	521	997	1500	844	1270	668	1000
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		811	1220	680	1020	1490	2240	1250	1890	1010	1530
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		630	945	528	792	1160	1740	974	1460	788	1180
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		260	391	180	271	499	750	424	637	344	517
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		213	320	179	269	349	524	299	449	244	367
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		395	594	308	463	928	1400	788	1190	576	865
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		315	473	243	365	726	1090	547	822	406	610
Properties											
Area, in.^{2}		27.1		22.7		49.8		41.9		33.9	
r_y, in.		7.37		7.40		6.47		6.52		6.57	
r_x/r_y		1.16		1.16		1.28		1.28		1.28	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS22×16×						HSS22×14×			
		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		3/4[a]		5/8[a], [c]	
t_{des}, in.		0.349		0.291		0.233		0.698		0.581	
Nom. Weight, lb/ft		93.83		78.63		63.25		171.16		144.39	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	572	860	414	623	276	415	1410	2120	1170	1760
	6	569	855	412	619	275	413	1390	2100	1160	1740
	7	568	853	411	618	274	412	1390	2090	1160	1740
	8	567	851	410	617	274	411	1380	2080	1150	1730
	9	565	849	409	615	273	410	1370	2060	1150	1720
	10	563	847	408	614	272	409	1370	2050	1140	1710
	11	562	844	407	612	271	408	1360	2040	1130	1700
	12	560	841	406	610	271	407	1350	2020	1130	1690
	13	558	838	404	608	270	405	1340	2010	1120	1680
	14	555	835	403	605	269	404	1320	1990	1110	1670
	15	553	831	401	603	267	402	1310	1970	1100	1660
	16	550	827	399	600	266	400	1300	1950	1090	1640
	17	548	823	397	597	265	398	1280	1930	1080	1630
	18	545	819	395	594	264	397	1270	1910	1070	1610
	19	542	814	393	591	262	395	1260	1890	1060	1590
	20	538	809	391	588	261	392	1240	1860	1040	1570
	22	532	799	386	581	258	388	1210	1810	1020	1530
	24	524	788	381	573	255	383	1170	1760	988	1480
	26	516	776	376	565	251	378	1130	1700	957	1440
	28	508	763	370	556	247	372	1090	1650	924	1390
	30	499	750	363	546	244	366	1050	1580	891	1340
	32	489	736	357	536	239	360	1010	1520	857	1290
	34	479	721	350	526	235	353	971	1460	822	1230
	36	469	705	343	515	230	346	928	1390	786	1180
	38	458	689	335	504	226	339	885	1330	750	1130
	40	447	672	328	493	221	332	841	1260	714	1070
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		769	1160	647	972	521	783	1410	2120	1190	1780
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		598	896	502	753	405	607	1100	1640	921	1380
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		260	391	180	271	93.5	140	499	750	424	637
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		188	283	158	237	115	174	298	449	257	386
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		382	574	301	453	223	335	856	1290	726	1090
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		269	405	207	311	150	226	608	914	463	696
Properties											
Area, in.^{2}		25.7		21.6		17.4		47.1		39.6	
r_y, in.		6.63		6.65		6.68		5.71		5.76	
r_x/r_y		1.27		1.27		1.27		1.42		1.42	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS22×14×								HSS22×10×	
		½[a], [b], [c]		⅜[a], [b], [c]		5⁄16[a], [b], [c]		¼[a], [b], [c]		⅝[a], [c]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.581	
Nom. Weight, lb/ft		116.91		88.73		74.38		59.85		127.37	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	863	1300	560	842	407	612	271	407	1030	1550
	6	856	1290	556	836	404	607	269	404	1010	1530
	7	853	1280	555	834	403	606	268	403	1010	1520
	8	850	1280	553	832	402	604	268	402	1000	1510
	9	846	1270	551	829	401	602	267	401	993	1490
	10	842	1270	549	826	399	600	266	400	984	1480
	11	838	1260	547	822	398	598	265	398	975	1460
	12	833	1250	545	819	396	595	264	397	961	1440
	13	828	1240	542	815	394	593	263	395	947	1420
	14	822	1240	539	810	392	590	261	393	932	1400
	15	816	1230	536	806	390	586	260	391	916	1380
	16	810	1220	533	801	388	583	259	389	899	1350
	17	803	1210	529	796	385	579	257	387	881	1320
	18	796	1200	526	790	383	576	256	384	863	1300
	19	789	1190	522	784	380	572	254	382	844	1270
	20	782	1170	518	778	378	567	252	379	824	1240
	22	765	1150	509	765	372	558	248	373	784	1180
	24	748	1120	500	752	365	549	244	367	742	1110
	26	729	1100	489	735	358	539	240	361	699	1050
	28	710	1070	477	716	351	528	235	354	655	984
	30	690	1040	463	696	343	516	231	346	611	918
	32	669	1000	450	676	335	504	225	339	567	852
	34	647	972	435	654	327	491	220	331	524	787
	36	624	938	421	633	318	478	215	322	482	724
	38	601	904	406	610	309	465	209	314	441	662
	40	578	869	391	588	300	451	203	305	401	602
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		961	1440	728	1090	611	918	491	738	1050	1580
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		746	1120	565	847	474	711	381	572	814	1220
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		344	517	260	391	180	271	93.5	140	424	637
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		211	316	163	245	137	206	111	167	172	259
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		589	886	367	552	290	436	216	325	601	904
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		339	509	225	338	173	259	124	187	301	453
Properties											
Area, in.^{2}		32.1		24.3		20.4		16.4		35.0	
r_y, in.		5.81		5.87		5.89		5.92		4.19	
r_x/r_y		1.41		1.41		1.41		1.41		1.85	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS22–HSS20

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS22×10×								HSS20×16×	
		½[a], [c]		⅜[a], [b], [c]		5/16[a], [b], [c]		¼[a], [b], [c]		¾	
t_{des}, in.		0.465		0.349		0.291		0.233		0.698	
Nom. Weight, lb/ft		103.30		78.52		65.87		53.05		171.16	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	750	1130	493	741	379	570	262	394	1410	2120
	6	738	1110	485	729	374	562	259	389	1400	2100
	7	733	1100	482	725	371	558	258	387	1390	2090
	8	728	1090	479	720	369	555	256	385	1390	2080
	9	723	1090	476	715	366	551	255	383	1380	2080
	10	717	1080	472	709	363	546	253	381	1370	2070
	11	710	1070	467	703	360	541	251	378	1370	2050
	12	703	1060	463	696	357	536	249	375	1360	2040
	13	695	1040	458	688	353	530	247	372	1350	2030
	14	686	1030	452	680	349	524	245	368	1340	2020
	15	677	1020	447	672	344	517	242	364	1330	2000
	16	668	1000	441	663	340	511	240	361	1320	1980
	17	658	989	434	653	335	503	237	356	1310	1970
	18	648	974	428	643	330	496	234	352	1300	1950
	19	637	957	421	633	325	488	231	348	1280	1930
	20	626	941	414	622	319	480	228	343	1270	1910
	22	602	905	399	600	308	463	221	333	1240	1870
	24	578	868	383	576	296	445	214	322	1220	1830
	26	552	830	367	552	283	426	206	309	1180	1780
	28	525	789	350	526	271	407	196	295	1150	1730
	30	498	748	333	500	257	387	187	281	1120	1680
	32	465	699	315	474	244	367	177	266	1080	1630
	34	431	647	298	447	231	347	167	252	1050	1570
	36	397	596	280	421	217	326	158	237	1010	1520
	38	364	547	262	394	204	306	148	223	972	1460
	40	332	499	245	368	190	286	139	208	933	1400
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		847	1270	644	968	542	815	437	657	1410	2120
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		658	987	500	750	421	631	339	509	1100	1640
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		344	517	260	391	180	271	93.5	140	449	675
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		144	216	112	169	95.5	143	77.9	117	349	524
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		492	739	375	564	278	418	200	300	808	1220
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		222	333	145	219	110	166	78.6	118	694	1040
Properties											
Area, in.^{2}		28.3		21.5		18.1		14.6		47.1	
r_y, in.		4.24		4.29		4.32		4.34		6.39	
r_x/r_y		1.85		1.84		1.84		1.83		1.19	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×16×									
		5/8[a]		1/2[a], [b], [c]		3/8[a], [b], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		144.39		116.91		88.73		74.38		59.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1190	1780	905	1360	566	851	410	617	272	409
	6	1170	1770	899	1350	563	846	408	613	271	407
	7	1170	1760	896	1350	562	844	407	612	270	407
	8	1170	1750	894	1340	561	842	406	611	270	406
	9	1160	1750	891	1340	559	840	405	609	269	405
	10	1160	1740	887	1330	557	838	404	607	269	404
	11	1150	1730	883	1330	556	835	403	606	268	402
	12	1140	1720	879	1320	554	832	402	603	267	401
	13	1140	1710	875	1310	551	829	400	601	266	400
	14	1130	1700	870	1310	549	825	398	599	265	398
	15	1120	1680	865	1300	547	822	397	596	264	397
	16	1110	1670	859	1290	544	818	395	594	263	395
	17	1100	1660	853	1280	541	813	393	591	261	393
	18	1090	1640	847	1270	538	809	391	588	260	391
	19	1080	1630	841	1260	535	804	389	584	259	389
	20	1070	1610	834	1250	532	799	386	581	257	387
	22	1050	1580	820	1230	525	789	382	574	254	382
	24	1020	1540	804	1210	517	777	376	566	251	377
	26	999	1500	788	1180	509	765	371	557	247	372
	28	972	1460	771	1160	500	752	365	548	244	366
	30	943	1420	753	1130	491	738	359	539	240	360
	32	914	1370	733	1100	482	724	352	529	235	354
	34	884	1330	714	1070	472	709	345	518	231	347
	36	853	1280	693	1040	461	693	338	507	226	340
	38	822	1240	671	1010	450	677	330	496	221	333
	40	790	1190	645	970	439	660	322	484	217	325
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1190	1780	961	1440	728	1090	611	918	491	738
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		921	1380	746	1120	565	847	474	711	381	572
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		382	574	311	467	238	358	180	271	103	155
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		299	449	244	367	188	283	158	237	115	174
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		686	1030	503	756	336	505	263	395	194	291
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		540	811	391	588	262	394	203	305	148	222
Properties											
Area, in.^{2}		39.6		32.1		24.3		20.4		16.4	
r_y, in.		6.44		6.50		6.55		6.58		6.60	
r_x/r_y		1.19		1.18		1.18		1.18		1.18	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×12×									
		1		⅞		¾		⅝[a]		½[a], [c]	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465	
Nom. Weight, lb/ft		195.40		173.43		150.75		127.37		103.30	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1610	2420	1430	2150	1240	1870	1050	1580	792	1190
	6	1580	2380	1410	2110	1220	1840	1030	1550	782	1180
	7	1570	2370	1400	2100	1220	1830	1030	1540	779	1170
	8	1560	2350	1390	2090	1210	1820	1020	1530	775	1160
	9	1550	2330	1380	2070	1200	1800	1010	1520	770	1160
	10	1540	2310	1370	2050	1190	1790	1000	1510	765	1150
	11	1520	2290	1350	2030	1180	1770	994	1490	760	1140
	12	1510	2270	1340	2010	1170	1750	985	1480	754	1130
	13	1490	2240	1320	1990	1150	1730	974	1460	748	1120
	14	1470	2210	1310	1960	1140	1710	963	1450	741	1110
	15	1450	2180	1290	1940	1120	1690	951	1430	734	1100
	16	1430	2150	1270	1910	1110	1670	938	1410	726	1090
	17	1410	2120	1250	1880	1090	1640	925	1390	718	1080
	18	1390	2090	1230	1850	1080	1620	911	1370	710	1070
	19	1360	2050	1210	1820	1060	1590	896	1350	701	1050
	20	1340	2010	1190	1790	1040	1560	881	1320	692	1040
	22	1290	1940	1150	1730	1000	1510	850	1280	672	1010
	24	1240	1860	1100	1660	963	1450	816	1230	651	979
	26	1180	1770	1050	1580	922	1390	782	1180	630	946
	28	1120	1690	1000	1510	879	1320	746	1120	607	912
	30	1060	1600	951	1430	835	1250	710	1070	579	870
	32	1000	1510	900	1350	790	1190	672	1010	550	826
	34	946	1420	848	1270	745	1120	635	955	520	781
	36	886	1330	796	1200	701	1050	598	898	490	736
	38	828	1240	744	1120	656	986	561	843	460	692
	40	771	1160	694	1040	612	921	524	788	431	647
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1610	2420	1430	2150	1240	1870	1050	1580	847	1270
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1250	1880	1110	1660	965	1450	814	1220	658	987
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		575	864	515	774	449	675	382	574	311	467
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		308	463	280	420	249	374	215	323	177	266
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		858	1290	768	1160	674	1010	574	863	469	705
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		601	904	539	810	474	713	371	558	271	407
Properties											
Area, in.^{2}		53.8		47.7		41.5		35.0		28.3	
r_y, in.		4.78		4.83		4.88		4.93		4.99	
r_x/r_y		1.49		1.49		1.49		1.49		1.48	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×12×				HSS20×8×					
		3/8[a], [b], [c]		5/16[a], [b], [c]		1		7/8		3/4	
t_{des}, in.		0.349		0.291		0.930		0.814		0.698	
Nom. Weight, lb/ft		78.52		65.87		168.18		149.61		130.33	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	529	795	396	595	1390	2090	1230	1850	1070	1620
	6	523	786	392	590	1340	2010	1190	1790	1040	1560
	7	520	782	391	588	1320	1980	1170	1770	1020	1540
	8	518	778	390	585	1300	1950	1160	1740	1010	1520
	9	515	774	388	583	1280	1920	1140	1710	993	1490
	10	512	769	386	580	1250	1880	1120	1680	975	1470
	11	508	764	384	577	1230	1840	1090	1640	956	1440
	12	505	758	381	573	1200	1800	1070	1600	934	1400
	13	500	752	379	570	1170	1750	1040	1560	912	1370
	14	496	746	376	566	1130	1700	1010	1520	888	1340
	15	491	739	373	561	1100	1650	984	1480	864	1300
	16	486	731	370	557	1070	1600	954	1430	838	1260
	17	481	723	367	552	1030	1550	923	1390	811	1220
	18	476	715	364	547	994	1490	891	1340	784	1180
	19	470	706	360	542	956	1440	859	1290	757	1140
	20	464	697	357	536	918	1380	826	1240	728	1090
	22	451	679	349	524	842	1270	759	1140	671	1010
	24	438	658	340	512	766	1150	692	1040	614	923
	26	424	637	330	496	690	1040	626	941	557	837
	28	409	615	319	479	617	928	562	845	501	754
	30	394	592	307	462	547	823	500	752	448	673
	32	378	569	295	444	481	723	441	663	396	595
	34	362	545	283	425	426	641	391	587	351	527
	36	346	520	270	406	380	572	348	524	313	470
	38	330	495	258	387	341	513	313	470	281	422
	40	313	470	245	368	308	463	282	424	254	381
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		644	968	542	815	1390	2090	1230	1850	1070	1620
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		500	750	421	631	1080	1620	958	1440	835	1250
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		238	358	180	271	575	864	515	774	449	675
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		138	207	116	174	174	262	163	244	148	223
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		320	481	242	364	681	1020	614	923	539	810
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		180	271	138	208	352	529	317	476	279	420
Properties											
Area, in.^{2}		21.5		18.1		46.4		41.2		35.9	
r_y, in.		5.04		5.07		3.19		3.24		3.29	
r_x/r_y		1.48		1.48		2.09		2.08		2.07	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×8×								HSS20×6×	
		5/8[a]		1/2[a], [c]		3/8[a], [c]		5/16[a], [b], [c]		5/8[a]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.581	
Nom. Weight, lb/ft		110.36		89.68		68.31		57.36		101.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	907	1360	681	1020	445	669	339	510	838	1260
	6	877	1320	664	998	434	653	332	498	789	1190
	7	866	1300	658	989	431	647	329	494	772	1160
	8	854	1280	651	979	426	641	325	489	753	1130
	9	840	1260	643	967	422	634	322	484	731	1100
	10	825	1240	635	954	416	626	318	478	708	1060
	11	809	1220	625	940	411	617	314	471	684	1030
	12	792	1190	615	925	404	608	309	464	658	989
	13	773	1160	605	909	398	598	304	457	631	948
	14	754	1130	593	892	390	587	298	449	603	906
	15	734	1100	581	874	383	576	293	440	574	862
	16	712	1070	569	855	375	564	287	431	545	819
	17	691	1040	555	835	367	552	281	422	515	774
	18	668	1000	542	814	358	539	274	413	486	730
	19	645	970	528	793	350	526	268	403	456	686
	20	622	935	511	767	341	512	261	393	427	642
	22	575	864	473	711	322	484	247	372	371	558
	24	527	792	435	653	303	455	233	350	317	477
	26	479	720	396	596	283	425	218	328	270	406
	28	433	651	359	540	263	395	203	305	233	350
	30	388	583	323	485	243	365	188	283	203	305
	32	345	518	288	433	223	335	173	260	178	268
	34	305	459	255	384	200	300	158	238	158	237
	36	272	409	228	342	178	268	145	218	141	212
	38	244	367	204	307	160	240	134	201	126	190
	40	221	331	184	277	144	217	123	185	114	172
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		907	1360	737	1110	560	842	470	707	838	1260
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		704	1060	572	858	435	652	365	548	651	977
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		382	574	311	467	238	358	180	271	382	574
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		131	196	110	166	87.1	131	74.5	112	88.9	134
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		462	694	379	570	292	439	241	363	404	608
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		221	332	162	243	107	161	81.0	122	153	230
Properties											
Area, in.^{2}		30.3		24.6		18.7		15.7		28.0	
r_y, in.		3.34		3.39		3.44		3.47		2.50	
r_x/r_y		2.06		2.05		2.04		2.04		2.64	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS20

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×6×								HSS20×4×	
		½[a], [c]		⅜[a], [c]		5⁄16[a], [b], [c]		¼[a], [b], [c]		½[a], [c]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.465	
Nom. Weight, lb/ft		82.88		63.21		53.11		42.84		76.07	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	627	942	403	606	306	461	218	328	570	857
	6	600	902	387	582	295	443	210	316	517	778
	7	591	888	381	573	290	436	207	311	499	751
	8	580	872	375	564	286	429	204	306	479	721
	9	569	854	368	553	280	421	200	301	458	688
	10	556	835	360	541	275	413	196	294	431	648
	11	541	814	352	529	268	403	191	288	398	599
	12	526	791	343	515	262	393	187	281	366	550
	13	511	767	333	501	254	382	182	273	333	501
	14	494	742	323	485	247	371	177	265	301	453
	15	474	713	313	470	239	360	171	257	270	406
	16	451	678	302	453	231	347	166	249	241	361
	17	428	643	291	437	223	335	160	240	213	320
	18	404	607	279	420	214	322	154	231	190	286
	19	380	572	268	402	206	309	148	222	171	256
	20	357	537	256	384	197	296	142	213	154	231
	22	312	469	232	349	180	270	129	195	127	191
	24	269	404	208	313	162	244	117	176	107	161
	26	229	344	181	271	145	217	105	158	91.1	137
	28	197	297	156	234	129	195	94.3	142	78.5	118
	30	172	258	136	204	117	175	85.2	128		
	32	151	227	119	179	103	155	77.5	116		
	34	134	201	106	159	91.2	137	70.8	106		
	36	119	179	94.2	142	81.3	122	65.0	97.7		
	38	107	161	84.5	127	73.0	110	59.9	90.0		
	40	96.7	145	76.3	115	65.9	99.0	54.5	81.9		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		683	1030	518	779	437	657	353	531	626	941
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		530	795	402	603	339	509	274	412	486	729
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		311	467	238	358	180	271	103	155	311	467
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		77.0	116	62.1	93.3	53.6	80.6	44.4	66.7	43.4	65.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		334	503	257	386	213	320	164	247	287	431
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		112	169	74.7	112	56.5	85.0	39.7	59.6	66.6	100
Properties											
Area, in.^{2}		22.8		17.3		14.6		11.8		20.9	
r_y, in.		2.55		2.60		2.63		2.66		1.68	
r_x/r_y		2.62		2.60		2.58		2.57		3.77	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS20–HSS18

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×4×						HSS18×10×			
		3/8[a], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		5/8[a]		1/2[a], [c]	
t_{des}, in.		0.349		0.291		0.233		0.581		0.465	
Nom. Weight, lb/ft		58.10		48.86		39.43		110.36		89.68	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	364	547	271	407	188	283	907	1360	720	1080
	6	334	501	248	373	174	261	887	1330	707	1060
	7	323	486	241	362	168	253	880	1320	703	1060
	8	311	468	233	350	163	245	872	1310	698	1050
	9	299	449	223	336	157	235	862	1300	692	1040
	10	285	428	214	321	150	225	852	1280	685	1030
	11	270	406	203	305	143	215	841	1260	678	1020
	12	255	384	192	289	136	204	829	1250	671	1010
	13	240	360	181	272	128	193	816	1230	663	996
	14	224	337	170	255	120	181	802	1210	654	983
	15	208	312	158	238	113	169	788	1180	642	965
	16	192	288	147	221	105	158	773	1160	630	947
	17	173	260	135	203	97.2	146	757	1140	618	929
	18	154	232	124	187	89.8	135	741	1110	605	909
	19	138	208	115	173	83.2	125	724	1090	591	889
	20	125	188	107	160	77.4	116	706	1060	577	868
	22	103	155	88.5	133	67.6	102	670	1010	549	825
	24	86.8	130	74.4	112	59.6	89.6	632	951	519	780
	26	73.9	111	63.4	95.2	52.8	79.4	594	893	488	734
	28	63.8	95.8	54.6	82.1	45.6	68.5	555	834	457	687
	30							516	776	426	640
	32							478	718	395	594
	34							440	661	365	548
	36							403	606	335	503
	38							367	552	306	460
	40							332	499	278	417
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		479	720	401	603	323	486	907	1360	737	1110
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		372	558	312	467	251	377	704	1060	572	858
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		238	358	180	271	103	155	340	511	277	417
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		37.0	55.6	32.7	49.2	27.6	41.5	172	259	144	216
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		223	335	184	277	141	212	439	660	359	540
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		44.5	66.9	33.7	50.6	23.5	35.4	286	430	207	310
Properties											
Area, in.^{2}		16.0		13.4		10.8		30.3		24.6	
r_y, in.		1.73		1.75		1.78		4.10		4.16	
r_x/r_y		3.71		3.69		3.65		1.58		1.57	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS18

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS18×10×						HSS18×8×			
		3/8[a], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		5/8[a]		1/2[a], [c]	
t_{des}, in.		0.349		0.291		0.233		0.581		0.465	
Nom. Weight, lb/ft		68.31		57.36		46.24		101.85		82.88	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	480	721	370	556	257	387	838	1260	666	1000
	6	472	709	364	547	254	382	810	1220	649	975
	7	469	705	362	544	253	380	800	1200	642	965
	8	466	700	359	540	251	378	788	1180	635	955
	9	462	695	357	536	250	376	776	1170	627	943
	10	458	688	353	531	248	373	762	1140	619	930
	11	454	682	350	526	246	370	746	1120	609	916
	12	449	674	346	521	244	367	730	1100	597	897
	13	444	667	342	515	242	364	713	1070	583	876
	14	438	658	338	508	240	360	694	1040	569	855
	15	432	650	334	502	237	356	675	1010	553	832
	16	426	640	329	494	234	352	655	985	538	808
	17	419	630	324	487	232	348	635	954	521	784
	18	413	620	319	479	229	344	614	923	505	758
	19	406	610	313	471	226	339	593	891	487	733
	20	398	599	308	463	222	334	571	858	470	707
	22	383	576	296	445	215	324	527	791	435	653
	24	367	551	284	427	208	313	482	724	399	600
	26	350	526	271	408	199	299	438	658	363	546
	28	333	500	258	388	190	285	395	593	329	494
	30	315	474	245	368	180	270	353	531	295	443
	32	297	447	231	347	170	256	313	470	262	394
	34	279	420	217	327	160	241	277	416	232	349
	36	259	390	204	306	150	226	247	371	207	312
	38	237	357	190	286	141	211	222	333	186	280
	40	216	325	177	266	131	197	200	301	168	252
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		560	842	470	707	380	572	838	1260	683	1030
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		435	652	365	548	295	443	651	977	530	795
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		213	320	179	269	115	173	340	511	277	417
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		112	169	95.5	143	77.9	117	131	196	110	166
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		277	416	207	311	149	224	389	585	319	480
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		138	208	106	159	76.1	114	215	323	156	234
Properties											
Area, in.^{2}		18.7		15.7		12.7		28.0		22.8	
r_y, in.		4.21		4.23		4.26		3.31		3.36	
r_x/r_y		1.57		1.57		1.57		1.89		1.88	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS18

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS18×8×						HSS18×6×			
		3/8[a], [c]		5/16[a], [b], [c]		1/4[a], [b], [c]		3/4		5/8[a]	
t_{des}, in.		0.349		0.291		0.233		0.698		0.581	
Nom. Weight, lb/ft		63.21		53.11		42.84		109.91		93.34	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	438	658	337	507	244	367	907	1360	769	1160
	6	427	642	329	494	238	358	851	1280	723	1090
	7	423	636	326	490	236	355	831	1250	708	1060
	8	419	630	323	485	234	351	809	1220	690	1040
	9	414	622	319	480	231	347	785	1180	670	1010
	10	409	614	315	474	228	343	759	1140	648	975
	11	403	605	311	467	225	338	731	1100	625	940
	12	396	596	306	460	221	333	702	1050	601	904
	13	390	586	301	452	218	327	671	1010	576	866
	14	382	575	295	444	214	321	640	961	550	827
	15	375	563	290	435	210	315	607	913	523	787
	16	367	551	284	426	205	309	575	864	496	746
	17	359	539	277	417	201	302	542	814	469	705
	18	350	526	271	407	196	295	509	765	442	664
	19	341	513	264	397	191	288	477	716	415	623
	20	332	499	257	387	187	280	445	668	388	583
	22	313	471	243	365	176	265	383	575	336	505
	24	294	441	228	343	166	249	324	487	286	431
	26	274	411	213	321	155	233	276	415	244	367
	28	253	381	198	298	144	217	238	358	210	316
	30	229	345	183	275	134	201	208	312	183	276
	32	205	308	168	253	123	185	182	274	161	242
	34	182	273	153	230	112	169	162	243	143	215
	36	162	244	139	209	103	155	144	217	127	191
	38	145	219	125	188	94.7	142	129	194	114	172
	40	131	197	113	169	87.5	131	117	175	103	155
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		518	779	437	657	353	531	907	1360	769	1160
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		402	603	339	509	274	412	704	1060	598	896
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		213	320	179	269	115	173	399	599	340	511
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		87.1	131	74.5	112	61.1	91.8	98.1	147	88.9	134
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		246	370	208	312	148	223	394	593	337	506
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		104	157	79.5	119	56.8	85.4	176	264	149	224
Properties											
Area, in.^{2}		17.3		14.6		11.8		30.3		25.7	
r_y, in.		3.41		3.44		3.46		2.43		2.48	
r_x/r_y		1.88		1.87		1.87		2.44		2.42	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS18–HSS16

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS18×6×								HSS16×12×	
		½[a], [c]		⅜[a], [c]		5⁄16[a], [b], [c]		¼[a], [b], [c]		1	
t_{des}, in.		0.465		0.349		0.291		0.233		0.930	
Nom. Weight, lb/ft		76.07		58.10		48.86		39.43		168.18	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	609	915	399	600	301	453	214	322	1390	2090
	6	582	875	383	575	289	435	206	309	1360	2050
	7	572	860	377	566	285	428	203	305	1360	2040
	8	562	844	370	556	280	421	199	300	1350	2020
	9	548	823	363	545	275	413	196	294	1340	2010
	10	531	798	355	533	269	404	191	288	1320	1990
	11	513	771	346	520	263	395	187	281	1310	1970
	12	494	742	337	507	256	385	182	274	1290	1950
	13	474	712	327	492	249	374	177	267	1280	1920
	14	453	681	317	476	241	363	172	259	1260	1900
	15	432	650	306	460	233	351	167	250	1240	1870
	16	411	617	295	444	225	339	161	242	1230	1840
	17	389	585	284	427	217	326	155	233	1210	1810
	18	367	552	272	409	209	313	149	224	1190	1780
	19	346	519	260	391	200	300	143	215	1160	1750
	20	324	487	249	374	191	287	137	206	1140	1720
	22	282	424	223	335	174	261	125	188	1100	1650
	24	242	364	193	289	156	234	113	169	1050	1580
	26	207	310	164	247	139	208	101	151	998	1500
	28	178	268	142	213	122	183	90.1	135	947	1420
	30	155	233	124	186	106	159	81.3	122	895	1340
	32	136	205	109	163	93.0	140	73.7	111	842	1270
	34	121	182	96.2	145	82.4	124	67.2	101	789	1190
	36	108	162	85.8	129	73.5	110	60.2	90.4	737	1110
	38	96.7	145	77.0	116	66.0	99.2	54.0	81.2	686	1030
	40	87.3	131	69.5	104	59.6	89.5	48.7	73.2	635	955
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		626	941	479	720	401	603	323	486	1390	2090
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		486	729	372	558	312	467	251	377	1080	1620
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		277	417	213	320	179	269	115	173	441	663
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		77.0	116	62.1	93.3	53.6	80.6	44.4	66.7	308	463
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		279	420	216	324	182	274	142	213	609	915
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		108	163	72.1	108	55.1	82.9	39.0	58.6	499	750
Properties											
Area, in.^{2}		20.9		16.0		13.4		10.8		46.4	
r_y, in.		2.53		2.58		2.61		2.63		4.64	
r_x/r_y		2.40		2.38		2.37		2.37		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×12×									
		⅞		¾		⅝		½[a]		⅜[a], [b], [c]	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349	
Nom. Weight, lb/ft		149.61		130.33		110.36		89.68		68.31	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	1230	1850	1070	1620	907	1360	737	1110	513	771
	6	1210	1820	1060	1590	892	1340	725	1090	507	762
	7	1210	1810	1050	1580	887	1330	721	1080	504	758
	8	1200	1800	1040	1570	881	1320	716	1080	502	754
	9	1190	1780	1030	1560	874	1310	710	1070	499	750
	10	1180	1770	1030	1540	867	1300	704	1060	495	745
	11	1160	1750	1020	1530	858	1290	698	1050	492	739
	12	1150	1730	1000	1510	849	1280	691	1040	488	733
	13	1140	1710	993	1490	840	1260	683	1030	483	727
	14	1120	1690	981	1470	829	1250	675	1010	479	720
	15	1110	1670	968	1450	819	1230	666	1000	474	712
	16	1090	1640	954	1430	807	1210	657	988	469	704
	17	1070	1620	939	1410	795	1190	647	973	463	696
	18	1060	1590	924	1390	782	1180	637	958	457	688
	19	1040	1560	908	1370	769	1160	627	942	451	679
	20	1020	1530	892	1340	756	1140	616	926	445	669
	22	979	1470	858	1290	727	1090	594	892	432	649
	24	937	1410	822	1230	697	1050	570	856	418	628
	26	894	1340	784	1180	666	1000	545	819	403	606
	28	849	1280	746	1120	634	953	519	780	388	583
	30	803	1210	706	1060	601	904	493	741	372	559
	32	757	1140	667	1000	568	854	467	701	356	535
	34	711	1070	627	942	535	804	440	661	338	508
	36	665	1000	587	882	502	754	413	621	318	478
	38	620	932	548	823	469	705	387	582	298	448
	40	575	865	509	766	437	656	361	542	278	418
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1230	1850	1070	1620	907	1360	737	1110	560	842
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		958	1440	835	1250	704	1060	572	858	435	652
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		398	598	349	524	299	449	244	367	188	283
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		280	420	249	374	215	323	177	266	138	207
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		546	821	482	724	412	619	337	506	233	350
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		447	671	394	593	337	506	254	381	169	254
Properties											
Area, in.^{2}		41.2		35.9		30.3		24.6		18.7	
r_y, in.		4.70		4.75		4.80		4.86		4.91	
r_x/r_y		1.25		1.25		1.25		1.25		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×12×		HSS16×10×							
		5/16[a], [b], [c]		5/8		1/2[a]		3/8[a], [c]		5/16[a], [b], [c]	
t_{des}, in.		0.291		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		57.36		101.85		82.88		63.21		53.11	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	385	578	838	1260	683	1030	471	708	367	552
	6	381	573	819	1230	667	1000	463	696	361	542
	7	380	571	812	1220	662	995	460	692	359	539
	8	378	568	805	1210	656	986	457	687	356	535
	9	376	565	796	1200	649	975	453	681	353	531
	10	374	562	786	1180	641	964	449	675	350	526
	11	372	559	776	1170	633	951	444	668	347	521
	12	370	556	764	1150	624	938	439	660	343	515
	13	367	552	752	1130	614	923	434	652	339	509
	14	364	548	739	1110	604	907	428	644	334	502
	15	361	543	726	1090	593	891	422	635	330	496
	16	358	538	711	1070	582	874	416	625	325	488
	17	355	533	696	1050	570	856	409	615	320	481
	18	351	528	681	1020	557	838	402	605	314	473
	19	348	523	665	999	544	818	395	594	309	464
	20	344	517	648	975	531	799	388	583	303	456
	22	336	505	614	924	504	758	372	559	291	438
	24	327	491	579	871	476	715	356	534	279	419
	26	316	475	543	816	447	672	338	509	266	399
	28	304	457	507	762	418	628	321	482	252	379
	30	292	439	470	707	388	584	299	449	239	358
	32	280	420	434	653	359	540	277	416	225	338
	34	267	401	399	600	331	497	255	384	211	317
	36	254	382	365	548	303	456	235	353	197	296
	38	241	363	332	499	276	415	214	322	183	275
	40	228	343	300	450	250	376	194	292	166	250
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		470	707	838	1260	683	1030	518	779	437	657
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		365	548	651	977	530	795	402	603	339	509
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		158	237	299	449	244	367	188	283	158	237
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		116	174	172	259	144	216	112	169	95.5	143
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		178	267	367	551	302	454	232	349	174	262
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		131	197	264	398	200	301	133	201	103	155
Properties											
Area, in.^{2}		15.7		28.0		22.8		17.3		14.6	
r_y, in.		4.94		4.05		4.10		4.15		4.18	
r_x/r_y		1.24		1.44		1.44		1.44		1.43	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×10×		HSS16×8×							
		¼[a], [b], [c]		⅞		¾		⅝		½[a]	
t_{des}, in.		0.233		0.814		0.698		0.581		0.465	
Nom. Weight, lb/ft		42.84		125.79		109.91		93.34		76.07	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	256	384	1040	1560	907	1360	769	1160	626	940
	6	252	379	1000	1500	875	1310	743	1120	605	909
	7	251	377	987	1480	863	1300	733	1100	597	897
	8	250	375	972	1460	850	1280	722	1090	589	885
	9	248	373	954	1430	836	1260	710	1070	579	870
	10	246	370	936	1410	820	1230	697	1050	569	855
	11	244	367	915	1380	802	1210	683	1030	557	838
	12	242	364	893	1340	784	1180	668	1000	545	820
	13	240	361	870	1310	764	1150	652	979	532	800
	14	238	357	846	1270	743	1120	634	954	519	780
	15	235	353	821	1230	722	1080	617	927	505	759
	16	232	349	794	1190	700	1050	598	899	490	736
	17	229	345	767	1150	676	1020	579	870	475	714
	18	226	340	740	1110	653	981	559	841	459	690
	19	223	335	712	1070	629	945	539	811	443	666
	20	220	330	683	1030	604	908	519	780	427	642
	22	213	320	626	940	555	834	478	718	394	592
	24	205	309	568	854	505	760	436	656	361	543
	26	196	294	512	769	457	686	395	594	328	493
	28	186	280	457	687	409	615	356	534	296	445
	30	176	265	404	608	364	547	317	477	265	398
	32	166	250	355	534	320	481	280	421	235	353
	34	156	235	315	473	284	426	248	373	208	313
	36	146	220	281	422	253	380	221	333	186	279
	38	136	205	252	379	227	341	199	299	167	250
	40	127	190	227	342	205	308	179	269	150	226
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		353	531	1040	1560	907	1360	769	1160	626	941
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		274	412	807	1210	704	1060	598	896	486	729
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		115	174	398	598	349	524	299	449	244	367
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		77.9	117	163	244	148	223	131	196	110	166
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		126	189	424	638	374	563	322	484	264	398
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		74.6	112	259	390	229	345	198	297	150	226
Properties											
Area, in.^{2}		11.8		34.7		30.3		25.7		20.9	
r_y, in.		4.21		3.17		3.22		3.27		3.32	
r_x/r_y		1.43		1.74		1.73		1.72		1.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×8×						HSS16×6×			
		3/8[a], [c]		5/16[a], [c]		1/4[a], [b], [c]		5/8		1/2[a]	
t_{des}, in.		0.349		0.291		0.233		0.581		0.465	
Nom. Weight, lb/ft		58.10		48.86		39.43		84.84		69.27	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	432	650	331	498	240	360	698	1050	569	855
	6	421	633	323	485	234	351	655	985	536	805
	7	417	627	320	481	232	348	641	963	524	788
	8	413	621	317	476	229	344	624	938	511	768
	9	408	613	313	470	226	340	606	911	497	747
	10	402	605	309	464	223	336	586	881	481	723
	11	396	596	304	457	220	331	565	849	465	698
	12	390	586	299	450	217	326	543	816	447	672
	13	383	575	294	442	213	320	520	781	429	645
	14	375	564	289	434	209	314	496	746	410	616
	15	367	552	283	425	205	308	472	709	391	587
	16	359	540	277	416	201	301	447	672	371	557
	17	351	527	270	406	196	295	422	634	351	527
	18	342	514	264	396	191	288	397	597	331	498
	19	333	500	257	386	186	280	372	559	311	468
	20	323	486	250	376	181	273	348	523	292	438
	22	304	457	236	354	171	257	301	452	253	381
	24	281	422	221	332	161	241	256	384	217	326
	26	256	385	205	309	150	225	218	327	185	278
	28	232	348	190	286	139	209	188	282	159	240
	30	208	313	175	263	128	193	164	246	139	209
	32	185	278	158	237	118	177	144	216	122	183
	34	164	247	140	210	107	161	127	191	108	162
	36	146	220	125	188	98.0	147	114	171	96.4	145
	38	131	197	112	168	90.0	135	102	153	86.5	130
	40	119	178	101	152	82.4	124	92.0	138	78.1	117
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		479	720	401	603	323	486	698	1050	569	855
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		372	558	312	467	251	377	542	813	442	663
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		188	283	158	237	115	174	299	449	244	367
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		87.1	131	74.5	112	61.1	91.8	88.9	134	77.0	116
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		205	308	173	260	124	187	277	416	229	344
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		100	151	77.4	116	55.6	83.6	136	205	104	157
Properties											
Area, in.^{2}		16.0		13.4		10.8		23.3		19.0	
r_y, in.		3.37		3.40		3.42		2.46		2.51	
r_x/r_y		1.71		1.71		1.70		2.19		2.18	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS16

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×6×								HSS16×4×	
		3/8[a], [c]		5/16[a], [c]		1/4[a], [b], [c]		3/16[a], [b], [c]		5/8	
t_{des}, in.		0.349		0.291		0.233		0.174		0.581	
Nom. Weight, lb/ft		53.00		44.60		36.03		27.29		76.33	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	391	587	295	444	213	320	138	207	629	945
	6	374	562	283	425	204	307	132	198	542	815
	7	368	553	279	419	201	302	130	195	514	773
	8	361	543	274	412	198	297	128	192	483	726
	9	354	532	268	403	194	291	125	188	451	677
	10	346	520	263	395	190	285	123	184	417	626
	11	337	507	256	385	185	278	120	180	382	575
	12	328	492	249	375	180	271	117	175	348	523
	13	318	478	242	364	175	263	113	171	314	472
	14	307	462	234	352	170	255	110	165	281	422
	15	297	446	226	340	164	247	106	160	249	375
	16	285	429	218	328	158	238	103	155	219	329
	17	274	412	210	315	153	229	99.1	149	194	292
	18	260	390	201	302	147	220	95.2	143	173	260
	19	245	368	193	289	140	211	91.3	137	155	234
	20	230	346	184	276	134	202	87.4	131	140	211
	22	201	302	166	249	122	183	79.5	120	116	174
	24	173	260	147	221	109	165	71.7	108	97.4	146
	26	148	222	125	188	97.3	146	64.0	96.3	83.0	125
	28	127	191	108	163	86.9	131	57.4	86.2		
	30	111	167	94.2	142	78.1	117	51.7	77.8		
	32	97.5	147	82.8	124	68.7	103	47.0	70.6		
	34	86.4	130	73.3	110	60.9	91.5	42.9	64.5		
	36	77.1	116	65.4	98.3	54.3	81.6	39.3	59.1		
	38	69.2	104	58.7	88.2	48.7	73.3	36.2	54.4		
	40	62.4	93.8	53.0	79.6	44.0	66.1	33.5	50.3		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		437	657	365	549	296	446	223	336	629	945
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		339	509	284	425	230	345	173	260	488	732
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		188	283	158	237	115	174	53.6	80.5	299	449
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		62.1	93.3	53.6	80.6	44.4	66.7	34.3	51.5	47.2	70.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		177	267	150	226	120	180	80.1	120	232	348
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		70.0	105	53.7	80.6	38.3	57.6	24.3	36.5	81.1	122
Properties											
Area, in.^{2}		14.6		12.2		9.90		7.46		21.0	
r_y, in.		2.56		2.58		2.61		2.64		1.60	
r_x/r_y		2.16		2.16		2.15		2.14		3.16	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS16

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×4×									
		½[a]		⅜[a], [c]		5⁄16[a], [c]		¼[a], [b], [c]		3⁄16[a], [b], [c]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		62.46		47.90		40.35		32.63		24.73	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	515	774	349	524	262	394	185	277	117	175
	6	448	673	317	477	240	360	169	254	107	161
	7	426	640	307	461	232	349	164	247	104	156
	8	402	604	295	443	223	336	158	238	100	151
	9	376	566	282	423	214	322	152	228	96.3	145
	10	350	526	268	402	204	307	145	218	92.1	138
	11	323	485	253	380	193	291	138	207	87.6	132
	12	295	443	235	354	182	274	131	196	83.0	125
	13	268	403	215	323	171	257	123	185	78.3	118
	14	241	363	195	293	159	240	115	173	73.5	110
	15	216	324	176	264	148	222	107	161	68.7	103
	16	191	287	157	236	135	203	99.4	149	63.8	95.9
	17	169	254	139	210	120	180	91.5	137	59.0	88.7
	18	151	227	124	187	107	161	84.1	126	54.4	81.8
	19	135	204	112	168	96.1	144	77.7	117	50.4	75.8
	20	122	184	101	151	86.7	130	71.9	108	46.8	70.4
	22	101	152	83.2	125	71.6	108	59.9	90.0	40.8	61.4
	24	84.9	128	69.9	105	60.2	90.5	50.3	75.6	36.0	54.1
	26	72.3	109	59.6	89.6	51.3	77.1	42.9	64.4	32.0	48.1
	28			51.4	77.2	44.2	66.5	37.0	55.5	28.5	42.9
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		515	774	395	594	332	500	268	403	202	304
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		400	600	307	460	258	387	208	312	157	236
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		244	367	188	283	158	237	115	174	53.6	80.5
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		43.4	65.3	37.0	55.6	32.7	49.2	27.6	41.5	21.8	32.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		193	290	150	226	127	192	102	153	71.8	108
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		62.0	93.1	41.9	62.9	32.2	48.3	22.9	34.5	14.3	21.5
Properties											
Area, in.^{2}		17.2		13.2		11.1		8.96		6.76	
r_y, in.		1.65		1.71		1.73		1.76		1.78	
r_x/r_y		3.12		3.06		3.05		3.02		3.01	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS14

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×12×									
		⅝		½[a]		⅜[a], [b], [c]		5/16[a], [b], [c]		¼[a], [b], [c]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		101.85		82.88		63.21		53.11		42.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	838	1260	683	1030	502	754	380	572	259	389
	6	824	1240	671	1010	495	744	376	566	256	385
	7	819	1230	667	1000	492	740	375	564	255	384
	8	813	1220	663	996	490	736	373	561	254	382
	9	807	1210	658	988	487	731	371	558	253	380
	10	800	1200	652	980	483	726	369	555	252	378
	11	792	1190	646	970	479	720	367	552	250	376
	12	783	1180	639	960	475	714	365	548	249	374
	13	774	1160	631	949	471	708	362	544	247	371
	14	764	1150	624	937	466	700	359	540	245	369
	15	754	1130	615	925	461	693	356	535	243	366
	16	743	1120	607	912	456	685	353	530	241	362
	17	731	1100	598	898	450	676	349	525	239	359
	18	719	1080	588	884	444	667	346	519	237	356
	19	707	1060	578	869	438	658	342	514	234	352
	20	694	1040	568	853	431	648	338	508	232	348
	22	667	1000	546	821	416	626	329	495	226	340
	24	639	960	523	787	399	600	320	481	220	331
	26	609	915	500	751	382	574	308	464	214	322
	28	579	870	476	715	364	546	296	445	208	312
	30	548	823	451	678	345	519	284	427	201	302
	32	517	777	426	640	326	490	271	408	194	291
	34	485	730	401	602	307	462	258	388	187	280
	36	454	683	376	565	289	434	245	368	179	269
	38	424	637	351	527	270	406	230	345	171	258
	40	394	592	327	491	252	378	214	322	164	246
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		838	1260	683	1030	518	779	437	657	353	531
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		651	977	530	795	402	603	339	509	274	412
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		257	386	211	316	163	245	137	206	111	167
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		215	323	177	266	138	207	116	174	94.6	142
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		337	506	277	416	194	291	148	223	110	165
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		304	458	249	374	162	243	126	190	92.4	139
Properties											
Area, in.^{2}		28.0		22.8		17.3		14.6		11.8	
r_y, in.		4.72		4.78		4.83		4.86		4.88	
r_x/r_y		1.13		1.13		1.12		1.12		1.13	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×10×									
		⅞		¾		⅝		½[a]		⅜[a], [c]	
t_{des}, in.		0.814		0.698		0.581		0.465		0.349	
Nom. Weight, lb/ft		125.79		109.91		93.34		76.07		58.10	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1040	1560	907	1360	769	1160	626	940	463	695
	6	1010	1520	885	1330	751	1130	611	919	454	683
	7	1000	1510	877	1320	745	1120	606	911	451	678
	8	993	1490	868	1310	737	1110	600	902	448	673
	9	982	1480	858	1290	729	1100	594	893	444	667
	10	969	1460	847	1270	720	1080	587	882	439	661
	11	955	1430	835	1260	710	1070	579	870	435	653
	12	939	1410	822	1240	699	1050	570	857	430	646
	13	923	1390	808	1220	688	1030	561	843	424	637
	14	906	1360	794	1190	675	1020	551	829	418	629
	15	888	1330	778	1170	663	996	541	813	412	619
	16	869	1310	762	1150	649	976	530	797	405	609
	17	849	1280	745	1120	635	954	519	781	399	599
	18	828	1240	727	1090	620	932	508	763	391	587
	19	807	1210	709	1070	605	910	496	745	382	574
	20	785	1180	691	1040	590	886	483	727	372	560
	22	741	1110	652	980	558	838	458	688	353	531
	24	694	1040	613	921	525	789	432	649	333	501
	26	648	973	572	860	491	738	405	608	313	470
	28	600	902	532	799	457	687	377	567	292	440
	30	554	832	491	738	423	636	350	526	272	409
	32	508	763	451	678	390	586	323	486	251	378
	34	463	696	413	620	357	536	297	446	231	348
	36	420	631	375	564	325	489	271	408	212	318
	38	378	568	338	508	294	442	247	371	193	290
	40	341	512	305	459	266	399	223	334	175	262
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1040	1560	907	1360	769	1160	626	941	479	720
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		807	1210	704	1060	598	896	486	729	372	558
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		339	510	298	449	257	386	211	316	163	245
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		221	332	198	298	172	259	144	216	112	169
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		394	593	349	525	299	450	247	371	190	286
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		312	469	277	416	237	357	195	294	128	192
Properties											
Area, in.^{2}		34.7		30.3		25.7		20.9		16.0	
r_y, in.		3.88		3.93		3.98		4.04		4.09	
r_x/r_y		1.30		1.30		1.30		1.29		1.29	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×10×				HSS14×8×					
		5/16[a], [b], [c]		1/4[a], [b], [c]		5/8		1/2[a]		3/8[a], [c]	
t_{des}, in.		0.291		0.233		0.581		0.465		0.349	
Nom. Weight, lb/ft		48.86		39.43		84.84		69.27		53.00	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	360	541	251	377	698	1050	569	855	421	632
	6	353	531	247	371	673	1010	549	825	409	615
	7	351	528	246	370	664	998	542	815	405	609
	8	348	524	244	367	654	983	534	803	401	602
	9	345	519	243	365	643	966	525	789	395	594
	10	342	514	241	362	630	947	516	775	390	586
	11	339	509	239	359	617	927	505	759	384	576
	12	335	503	237	356	603	906	494	742	377	566
	13	331	497	235	352	588	883	482	724	370	556
	14	326	490	232	349	572	859	469	705	362	544
	15	321	483	229	345	555	834	456	685	353	530
	16	316	476	227	341	538	808	442	664	342	514
	17	311	468	224	336	520	782	428	643	332	499
	18	306	460	221	331	502	755	413	621	321	482
	19	300	451	217	327	484	727	399	599	310	465
	20	294	442	214	321	465	698	384	577	298	448
	22	282	424	207	311	427	641	353	531	275	414
	24	269	405	199	299	389	584	323	485	252	379
	26	256	385	189	284	351	528	292	439	229	344
	28	242	364	179	270	315	473	263	395	207	311
	30	229	343	169	254	280	420	234	352	185	278
	32	213	319	159	239	246	370	207	311	164	247
	34	196	294	149	224	218	328	183	276	145	218
	36	180	270	139	209	195	292	164	246	130	195
	38	164	246	129	194	175	262	147	221	116	175
	40	148	223	119	179	158	237	133	199	105	158
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		401	603	323	486	698	1050	569	855	437	657
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		312	467	251	377	542	813	442	663	339	509
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		137	206	111	167	257	386	211	316	163	245
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		95.5	143	77.9	117	131	196	110	166	87.1	131
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		144	217	104	157	259	390	215	323	167	251
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		99.3	149	72.5	109	176	264	146	219	96.1	144
Properties											
Area, in.^{2}		13.4		10.8		23.3		19.0		14.6	
r_y, in.		4.12		4.14		3.22		3.27		3.32	
r_x/r_y		1.29		1.29		1.55		1.55		1.54	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×8×						HSS14×6×			
		5/16[a], [c]		1/4[a], [b], [c]		3/16[a], [b], [c]		5/8		1/2[a]	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465	
Nom. Weight, lb/ft		44.60		36.03		27.29		76.33		62.46	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	324	487	237	357	145	218	629	945	515	774
	6	315	474	231	348	142	214	590	886	484	728
	7	312	469	229	344	141	212	576	866	474	712
	8	309	464	227	341	140	211	561	843	462	694
	9	305	458	224	336	139	209	544	818	448	674
	10	301	452	221	332	137	206	526	791	434	652
	11	296	445	217	327	136	204	507	762	419	629
	12	291	438	214	322	134	201	486	731	402	605
	13	286	430	210	316	132	198	465	699	386	580
	14	280	421	206	310	130	195	443	666	368	553
	15	274	412	202	303	128	192	421	633	350	527
	16	268	403	197	297	126	189	398	599	332	499
	17	261	393	193	290	123	185	376	564	314	472
	18	255	383	188	282	121	182	353	530	296	444
	19	248	373	183	275	118	178	330	496	278	417
	20	241	362	178	267	116	174	308	463	260	390
	22	226	340	167	251	110	165	265	399	225	338
	24	211	317	156	235	104	156	225	338	192	288
	26	194	291	146	219	96.6	145	191	288	163	246
	28	175	263	135	202	89.5	134	165	248	141	212
	30	157	236	124	186	82.4	124	144	216	123	184
	32	140	210	113	169	75.4	113	126	190	108	162
	34	124	186	102	153	68.6	103	112	168	95.5	144
	36	110	166	91.1	137	62.7	94.2	99.9	150	85.2	128
	38	99.0	149	81.8	123	57.6	86.5	89.6	135	76.5	115
	40	89.3	134	73.8	111	53.1	79.8	80.9	122	69.0	104
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		365	549	296	446	223	336	629	945	515	774
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		284	425	230	345	173	260	488	732	400	600
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		137	206	111	167	61.5	92.5	257	386	211	316
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		74.5	112	61.1	91.8	46.8	70.3	88.9	134	77.0	116
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		141	212	102	153	67.0	101	221	333	184	276
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		74.8	112	54.1	81.4	35.1	52.7	121	182	101	151
Properties											
Area, in.^{2}		12.2		9.90		7.46		21.0		17.2	
r_y, in.		3.35		3.38		3.40		2.43		2.48	
r_x/r_y		1.54		1.54		1.54		1.96		1.95	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS14

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×6×								HSS14×4×	
		3/8[a], [c]		5/16[a], [c]		1/4[a], [c]		3/16[a], [b], [c]		5/8	
t_{des}, in.		0.349		0.291		0.233		0.174		0.581	
Nom. Weight, lb/ft		47.90		40.35		32.63		24.73		67.82	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	379	569	291	437	209	314	136	205	560	841
	6	362	544	278	418	200	301	130	196	482	724
	7	356	535	274	412	197	297	128	193	457	686
	8	349	525	269	404	194	291	126	190	429	645
	9	341	513	263	396	190	285	124	186	400	601
	10	333	501	257	386	186	279	121	182	369	555
	11	324	487	250	376	181	272	118	177	338	508
	12	312	469	243	366	176	265	115	173	307	462
	13	299	450	236	355	171	257	112	168	277	416
	14	286	430	228	343	165	249	108	162	248	372
	15	273	410	220	331	160	240	104	157	219	330
	16	259	390	212	318	154	231	101	151	193	290
	17	246	369	203	305	148	222	96.9	146	171	257
	18	232	349	194	292	142	213	93.1	140	152	229
	19	218	328	185	278	136	204	89.1	134	137	205
	20	205	308	174	261	129	195	85.1	128	123	185
	22	178	268	152	228	117	176	77.2	116	102	153
	24	153	230	131	197	104	157	69.3	104	85.7	129
	26	130	196	111	168	92.1	138	61.6	92.6	73.0	110
	28	112	169	96.1	144	79.4	119	55.0	82.7		
	30	98.0	147	83.7	126	69.2	104	49.5	74.5		
	32	86.1	129	73.6	111	60.8	91.4	44.8	67.4		
	34	76.3	115	65.2	98.0	53.9	80.9	40.8	61.4		
	36	68.1	102	58.1	87.4	48.0	72.2	37.1	55.7		
	38	61.1	91.8	52.2	78.4	43.1	64.8	33.3	50.0		
	40	55.1	82.8	47.1	70.8	38.9	58.5	30.0	45.2		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		395	594	332	500	268	403	202	304	560	842
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		307	460	258	387	208	312	157	236	435	652
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		163	245	137	206	111	167	61.5	92.5	257	386
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		62.1	93.3	53.6	80.6	44.4	66.7	34.3	51.5	47.2	70.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		143	215	121	182	98.8	149	65.4	98.3	182	274
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		66.7	100	51.8	77.8	37.3	56.0	23.9	35.9	71.1	107
Properties											
Area, in.^{2}		13.2		11.1		8.96		6.76		18.7	
r_y, in.		2.53		2.55		2.58		2.61		1.59	
r_x/r_y		1.94		1.94		1.93		1.92		2.81	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS14

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×4×									
		½[a]		⅜[a], [c]		5⁄16[a], [c]		¼[a], [c]		3⁄16[a], [b], [c]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		55.66		42.79		36.10		29.23		22.18	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	458	688	337	506	256	384	181	273	115	173
	6	398	598	305	458	233	350	166	249	106	159
	7	378	568	294	442	225	338	160	241	102	154
	8	357	536	279	419	216	325	155	232	98.6	148
	9	334	501	262	394	207	311	148	223	94.7	142
	10	310	465	244	367	197	296	141	212	90.4	136
	11	285	429	226	340	186	279	134	201	86.0	129
	12	261	392	208	312	175	263	126	190	81.3	122
	13	236	355	189	285	163	245	119	178	76.6	115
	14	213	320	172	258	148	222	111	166	71.7	108
	15	190	285	154	232	133	200	103	154	66.9	101
	16	168	252	137	207	119	179	94.8	142	62.1	93.3
	17	149	223	122	183	106	159	86.8	130	57.2	86.0
	18	133	199	109	163	94.5	142	78.3	118	52.6	79.1
	19	119	179	97.4	146	84.9	128	70.3	106	48.7	73.1
	20	107	161	87.9	132	76.6	115	63.4	95.4	45.1	67.8
	22	88.7	133	72.7	109	63.3	95.1	52.4	78.8	39.2	58.9
	24	74.6	112	61.1	91.8	53.2	79.9	44.1	66.2	34.4	51.7
	26	63.5	95.5	52.0	78.2	45.3	68.1	37.5	56.4	29.3	44.1
	28			44.9	67.4	39.1	58.7	32.4	48.6	25.3	38.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		458	689	353	531	297	446	240	361	181	273
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		356	534	274	412	231	346	187	280	141	211
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		211	316	163	245	137	206	111	167	61.5	92.5
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		43.4	65.3	37.0	55.6	32.7	49.2	27.6	41.5	21.8	32.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		152	229	119	179	101	152	82.8	125	59.6	89.6
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		60.0	90.1	39.9	59.9	31.0	46.6	22.4	33.6	14.2	21.3
Properties											
Area, in.^{2}		15.3		11.8		9.92		8.03		6.06	
r_y, in.		1.64		1.69		1.72		1.74		1.77	
r_x/r_y		2.77		2.74		2.72		2.71		2.68	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12×10×									
		⅝		½		⅜[a]		5/16[a], [b], [c]		¼[a], [b], [c]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		84.84		69.27		53.00		44.60		36.03	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	698	1050	569	855	437	657	350	526	247	372
	6	680	1020	555	835	427	642	343	516	244	366
	7	674	1010	550	827	423	636	341	513	242	364
	8	667	1000	545	819	419	630	338	508	241	362
	9	660	991	539	810	415	623	335	504	239	359
	10	651	978	532	799	409	615	332	499	237	357
	11	642	964	524	788	404	607	328	493	235	353
	12	631	949	516	776	398	598	324	487	233	350
	13	621	933	508	763	391	588	320	481	231	346
	14	609	915	499	750	384	578	315	474	228	343
	15	597	897	489	735	377	567	310	466	225	338
	16	584	878	479	720	370	556	305	459	222	334
	17	571	858	469	704	362	544	300	451	219	329
	18	557	838	458	688	354	531	294	442	216	325
	19	543	817	446	671	345	519	288	434	213	320
	20	529	795	435	654	336	506	282	424	209	314
	22	499	750	411	618	318	479	267	402	202	303
	24	468	704	386	581	300	451	252	379	193	290
	26	437	657	361	543	281	422	236	355	183	275
	28	405	609	336	505	262	393	220	331	173	260
	30	374	562	311	467	242	364	204	307	163	245
	32	343	516	286	430	224	336	189	284	153	229
	34	313	471	262	393	205	308	173	260	142	214
	36	284	428	238	358	187	281	158	238	130	195
	38	256	385	215	324	170	255	144	216	118	178
	40	231	347	194	292	153	230	130	195	107	161
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		698	1050	569	855	437	657	365	549	296	446
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		542	813	442	663	339	509	284	425	230	345
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		215	323	177	266	138	207	116	174	94.6	142
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		172	259	144	216	112	169	95.5	143	77.9	117
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		238	357	197	296	152	229	116	175	84.4	127
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		210	315	174	261	123	185	94.7	142	69.9	105
Properties											
Area, in.^{2}		23.3		19.0		14.6		12.2		9.90	
r_y, in.		3.90		3.96		4.01		4.04		4.07	
r_x/r_y		1.15		1.15		1.15		1.15		1.15	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS12

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12×10×		HSS12×8×							
		3/16[a], [b], [c]		5/8		1/2		3/8[a]		5/16[a], [c]	
t_{des}, in.		0.174		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		27.29		76.33		62.46		47.90		40.35	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	147	221	629	945	515	774	395	594	317	477
	6	145	218	605	910	496	746	381	573	308	463
	7	145	217	597	897	490	736	377	566	305	459
	8	144	216	588	883	482	725	371	558	301	453
	9	143	215	577	868	474	713	365	548	297	447
	10	142	213	566	850	465	699	358	538	293	440
	11	141	211	553	832	455	684	351	527	288	433
	12	139	210	540	812	445	668	343	515	283	425
	13	138	208	526	791	433	651	335	503	277	417
	14	137	205	511	769	422	634	326	490	272	408
	15	135	203	496	745	409	615	317	476	265	399
	16	134	201	480	721	396	596	307	462	259	389
	17	132	198	464	697	383	576	297	447	251	377
	18	130	195	447	672	370	556	287	432	242	364
	19	128	193	430	646	356	535	277	416	234	352
	20	126	190	412	620	342	514	267	401	225	338
	22	122	184	377	567	314	472	245	369	208	312
	24	118	177	343	515	286	430	224	337	190	285
	26	113	170	308	463	258	388	203	305	172	259
	28	109	163	275	413	231	347	183	274	155	233
	30	104	156	243	366	205	309	163	245	138	208
	32	98.5	148	214	321	181	272	144	216	122	184
	34	93.3	140	189	285	160	241	127	192	108	163
	36	88.1	132	169	254	143	215	114	171	96.8	145
	38	82.8	124	152	228	128	193	102	153	86.8	131
	40	76.8	115	137	206	116	174	92.1	138	78.4	118
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		223	336	629	945	515	774	395	594	332	500
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		173	260	488	732	400	600	307	460	258	387
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		64.5	97.0	215	323	177	266	138	207	116	174
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		59.3	89.1	131	196	110	166	87.1	131	74.5	112
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		57.1	85.8	205	308	170	255	132	199	112	168
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		46.2	69.4	154	232	128	193	91.9	138	70.8	106
Properties											
Area, in.^{2}		7.46		21.0		17.2		13.2		11.1	
r_y, in.		4.09		3.16		3.21		3.27		3.29	
r_x/r_y		1.15		1.37		1.37		1.37		1.37	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS12

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12×8×				HSS12×6×					
		¼[a], [b], [c]		3/16[a], [b], [c]		⅝		½		3/8[a]	
t_{des}, in.		0.233		0.174		0.581		0.465		0.349	
Nom. Weight, lb/ft		32.63		24.73		67.82		55.66		42.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	233	350	143	215	560	841	458	688	353	531
	6	227	340	140	211	524	787	430	646	332	500
	7	224	337	139	209	512	769	420	631	325	489
	8	222	333	138	208	498	748	409	615	317	476
	9	219	329	137	205	482	725	397	597	308	463
	10	216	324	135	203	466	700	384	577	298	448
	11	212	319	134	201	448	673	370	556	288	432
	12	209	313	132	198	429	645	355	534	277	416
	13	205	308	130	195	410	616	340	511	265	399
	14	200	301	128	192	390	586	324	487	253	381
	15	196	295	126	189	370	556	308	462	241	362
	16	191	288	123	185	349	525	291	438	229	344
	17	187	281	121	182	329	494	275	413	216	325
	18	182	273	118	178	308	463	258	388	204	306
	19	177	265	116	174	288	433	242	364	191	288
	20	171	258	113	170	268	403	226	339	179	269
	22	161	241	107	161	229	345	195	293	155	233
	24	150	225	101	151	194	291	165	248	133	199
	26	138	208	93.4	140	165	248	141	211	113	170
	28	127	191	86.2	129	142	214	121	182	97.4	146
	30	114	171	79.0	119	124	186	106	159	84.9	128
	32	101	151	71.9	108	109	164	92.9	140	74.6	112
	34	89.2	134	65.2	98.0	96.4	145	82.2	124	66.1	99.3
	36	79.5	120	59.4	89.3	86.0	129	73.4	110	58.9	88.6
	38	71.4	107	54.4	81.8	77.2	116	65.8	99.0	52.9	79.5
	40	64.4	96.8	49.5	74.4			59.4	89.3	47.7	71.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		268	403	202	304	560	842	458	689	353	531
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		208	312	157	236	435	652	356	534	274	412
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		94.6	142	64.5	97.0	215	323	177	266	138	207
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		61.1	91.8	46.8	70.3	88.9	134	77.0	116	62.1	93.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		81.7	123	53.6	80.6	172	258	143	215	112	168
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		52.0	78.1	34.1	51.2	105	158	87.8	132	63.5	95.5
Properties											
Area, in.^{2}		8.96		6.76		18.7		15.3		11.8	
r_y, in.		3.32		3.35		2.39		2.44		2.49	
r_x/r_y		1.36		1.36		1.73		1.73		1.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12×6×						HSS12×4×			
		5/16[a], [c]		1/4[a], [c]		3/16[a], [b], [c]		5/8		1/2	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465	
Nom. Weight, lb/ft		36.10		29.23		22.18		59.32		48.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	282	423	205	308	134	202	491	738	404	607
	6	269	404	196	294	128	193	421	633	350	526
	7	264	397	193	290	126	190	398	599	332	499
	8	259	390	189	284	124	186	374	561	313	470
	9	253	381	185	278	121	183	347	522	292	439
	10	247	372	181	272	119	178	320	481	271	407
	11	240	361	176	264	116	174	293	440	249	374
	12	233	351	171	257	112	169	265	399	227	341
	13	224	337	166	249	109	164	239	359	205	308
	14	215	323	160	240	105	159	213	319	184	277
	15	205	307	154	232	102	153	188	282	164	246
	16	194	292	148	223	98.0	147	165	248	144	217
	17	184	276	142	214	94.1	141	146	219	128	192
	18	174	261	136	204	90.1	135	130	196	114	172
	19	163	245	130	195	86.1	129	117	176	102	154
	20	153	230	123	185	82.1	123	105	159	92.5	139
	22	133	200	109	164	74.0	111	87.2	131	76.4	115
	24	114	172	93.9	141	66.1	99.3	73.3	110	64.2	96.5
	26	97.3	146	80.0	120	58.4	87.8	62.4	93.8	54.7	82.2
	28	83.9	126	69.0	104	52.0	78.1				
	30	73.1	110	60.1	90.3	46.4	69.8				
	32	64.2	96.5	52.8	79.4	40.8	61.3				
	34	56.9	85.5	46.8	70.3	36.1	54.3				
	36	50.7	76.3	41.7	62.7	32.2	48.5				
	38	45.5	68.4	37.4	56.3	28.9	43.5				
	40	41.1	61.8	33.8	50.8	26.1	39.2				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		297	446	240	361	181	273	491	738	404	608
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		231	346	187	280	141	211	381	572	314	471
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		116	174	94.6	142	64.5	97.0	215	323	177	266
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		53.6	80.6	44.4	66.7	34.3	51.5	47.2	70.9	43.4	65.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		95.1	143	77.6	117	51.9	78.1	138	208	117	175
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		49.2	73.9	35.9	54.0	23.3	35.0	61.1	91.9	52.1	78.4
Properties											
Area, in.^{2}		9.92		8.03		6.06		16.4		13.5	
r_y, in.		2.52		2.54		2.57		1.57		1.62	
r_x/r_y		1.71		1.71		1.70		2.46		2.44	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12×4×								HSS12×3×	
		3/8[a]		5/16[a], [c]		1/4[a], [c]		3/16[a], [b], [c]		5/16[a], [c]	
t_{des}, in.		0.349		0.291		0.233		0.174		0.291	
Nom. Weight, lb/ft		37.69		31.84		25.82		19.63		29.72	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	311	468	247	371	177	266	114	171	229	345
	6	272	409	224	336	161	242	104	156	193	289
	7	259	389	216	324	156	234	100	151	178	267
	8	245	368	207	311	150	225	96.7	145	161	242
	9	229	345	195	293	143	215	92.6	139	144	217
	10	213	321	182	274	136	204	88.3	133	127	191
	11	197	296	169	254	129	193	83.7	126	111	167
	12	181	272	155	233	121	182	79.0	119	95.5	144
	13	165	247	142	213	113	170	74.2	112	81.4	122
	14	149	223	128	193	105	158	69.3	104	70.2	105
	15	133	200	116	174	95.4	143	64.4	96.8	61.1	91.9
	16	118	178	103	155	85.5	128	59.5	89.4	53.7	80.8
	17	105	157	91.4	137	75.9	114	54.6	82.0	47.6	71.5
	18	93.4	140	81.6	123	67.7	102	50.1	75.3	42.5	63.8
	19	83.9	126	73.2	110	60.7	91.3	46.1	69.4	38.1	57.3
	20	75.7	114	66.1	99.3	54.8	82.4	42.7	64.1	34.4	51.7
	22	62.6	94.0	54.6	82.1	45.3	68.1	35.5	53.3		
	24	52.6	79.0	45.9	69.0	38.1	57.2	29.8	44.8		
	26	44.8	67.3	39.1	58.8	32.4	48.7	25.4	38.2		
	28			33.7	50.7	28.0	42.0	21.9	32.9		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		311	468	262	394	213	320	161	242	245	368
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		242	363	204	306	165	248	125	187	190	285
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		138	207	116	174	94.6	142	64.5	97.0	116	174
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		37.0	55.6	32.7	49.2	27.6	41.5	21.8	32.7	22.3	33.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		91.6	138	78.1	117	63.9	96.0	47.9	71.9	69.6	105
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		38.0	57.1	29.5	44.3	21.4	32.2	13.8	20.8	20.4	30.6
Properties											
Area, in.^{2}		10.4		8.76		7.10		5.37		8.17	
r_y, in.		1.67		1.70		1.72		1.75		1.27	
r_x/r_y		2.41		2.39		2.38		2.36		3.07	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS12

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12×3×				HSS12×2×					
		¼[a], [c]		3/16[a], [b], [c]		5/16[a], [c]		¼[a], [c]		3/16[a], [b], [c]	
t_{des}, in.		0.233		0.174		0.291		0.233		0.174	
Nom. Weight, lb/ft		24.12		18.35		27.59		22.42		17.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	163	245	103	155	212	319	149	224	92.6	139
	6	138	208	88.4	133	129	194	103	155	66.1	99.3
	7	130	196	83.6	126	106	159	89.5	135	58.4	87.8
	8	122	183	78.4	118	83.2	125	71.9	108	50.6	76.0
	9	113	169	72.9	110	65.8	98.8	56.8	85.3	43.0	64.6
	10	103	155	67.2	101	53.3	80.1	46.0	69.1	36.9	55.4
	11	92.3	139	61.4	92.3	44.0	66.2	38.0	57.1	30.6	46.0
	12	79.8	120	55.5	83.5	37.0	55.6	31.9	48.0	25.7	38.7
	13	68.1	102	49.7	74.7	31.5	47.4	27.2	40.9	21.9	33.0
	14	58.8	88.3	44.6	67.0			23.5	35.3	18.9	28.4
	15	51.2	76.9	40.2	60.4						
	16	45.0	67.6	35.7	53.6						
	17	39.8	59.9	31.6	47.5						
	18	35.5	53.4	28.2	42.4						
	19	31.9	47.9	25.3	38.0						
	20	28.8	43.3	22.8	34.3						
	22			18.9	28.4						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		199	298	150	226	227	342	185	278	140	210
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		154	231	117	175	176	265	143	215	109	163
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		94.6	142	64.5	97.0	116	174	94.6	142	64.5	97.0
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		19.3	28.9	15.5	23.3	11.8	17.8	10.9	16.4	9.25	13.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		57.1	85.9	42.6	64.1	61.1	91.9	50.1	75.4	37.6	56.5
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		15.0	22.5	9.59	14.4	11.9	17.9	8.86	13.3	5.73	8.61
Properties											
Area, in.^{2}		6.63		5.02		7.59		6.17		4.67	
r_y, in.		1.29		1.32		0.820		0.845		0.872	
r_x/r_y		3.05		3.02		4.52		4.44		4.36	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×8×									
		⅝		½		⅜		5/16[a]		¼[a], [b], [c]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		67.82		55.66		42.79		36.10		29.23	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	560	841	458	688	353	531	297	446	227	341
	6	538	809	441	663	340	512	286	430	220	331
	7	530	797	435	653	336	505	283	425	218	327
	8	522	784	428	643	331	497	278	418	215	323
	9	512	770	420	631	325	488	274	411	212	319
	10	501	754	412	619	319	479	268	403	209	314
	11	490	736	403	605	312	469	263	395	205	309
	12	478	718	393	590	304	457	257	386	201	303
	13	465	698	382	575	297	446	250	376	197	297
	14	451	678	372	558	288	434	243	366	193	290
	15	437	657	360	541	280	421	236	355	188	283
	16	422	635	349	524	271	407	229	344	184	276
	17	407	612	336	506	262	394	221	333	179	269
	18	392	589	324	487	253	380	214	321	174	261
	19	376	565	312	468	243	365	206	309	168	252
	20	360	541	299	449	234	351	198	297	161	243
	22	328	493	273	411	214	322	182	273	148	223
	24	297	446	248	372	195	293	165	249	135	204
	26	266	399	223	334	176	264	149	225	123	184
	28	236	354	198	298	157	236	134	201	110	165
	30	207	311	175	263	139	209	119	179	98.0	147
	32	182	274	154	231	122	184	105	158	86.5	130
	34	161	242	136	205	108	163	92.9	140	76.6	115
	36	144	216	121	183	96.7	145	82.8	125	68.3	103
	38	129	194	109	164	86.8	130	74.3	112	61.3	92.1
	40	116	175	98.4	148	78.3	118	67.1	101	55.3	83.2
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		560	842	458	689	353	531	297	446	240	361
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		435	652	356	534	274	412	231	346	187	280
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		172	259	144	216	112	169	95.5	143	77.9	117
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		131	196	110	166	87.1	131	74.5	112	61.1	91.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		155	233	129	195	101	152	85.8	129	63.2	95.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		133	200	111	167	86.8	131	67.5	101	49.2	73.9
Properties											
Area, in.^{2}		18.7		15.3		11.8		9.92		8.03	
r_y, in.		3.09		3.14		3.19		3.22		3.25	
r_x/r_y		1.19		1.19		1.19		1.19		1.18	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS10

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×8×		HSS10×6×							
		3/16[a], [b], [c]		5/8		1/2		3/8		5/16[a]	
t_{des}, in.		0.174		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		22.18		59.32		48.85		37.69		31.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	141	212	491	738	404	607	311	468	262	394
	6	138	207	458	689	378	568	292	439	246	370
	7	137	205	447	672	369	555	286	429	241	362
	8	135	203	434	653	359	540	278	418	235	353
	9	134	201	420	632	348	523	270	406	228	343
	10	132	199	405	609	336	505	261	392	221	332
	11	131	196	389	585	323	486	251	378	213	320
	12	129	193	372	560	310	466	241	363	205	307
	13	127	190	355	533	296	445	231	347	196	294
	14	124	187	337	506	282	423	220	331	187	281
	15	122	184	319	479	267	401	209	314	178	267
	16	120	180	300	451	252	379	198	298	169	253
	17	117	176	282	423	237	357	187	281	159	239
	18	115	172	263	396	222	334	176	264	150	225
	19	112	168	245	369	208	312	164	247	141	211
	20	109	164	228	342	193	291	153	231	132	198
	22	103	155	194	291	166	249	132	199	114	171
	24	96.3	145	163	245	140	210	112	169	96.8	146
	26	88.8	134	139	208	119	179	95.6	144	82.5	124
	28	81.4	122	120	180	103	154	82.4	124	71.2	107
	30	74.1	111	104	157	89.4	134	71.8	108	62.0	93.2
	32	66.5	99.9	91.5	138	78.6	118	63.1	94.9	54.5	81.9
	34	58.9	88.5	81.1	122	69.6	105	55.9	84.0	48.3	72.5
	36	52.5	78.9	72.3	109	62.1	93.3	49.9	75.0	43.0	64.7
	38	47.1	70.8	64.9	97.6	55.7	83.8	44.8	67.3	38.6	58.1
	40	42.5	63.9					40.4	60.7	34.9	52.4
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		181	273	491	738	404	608	311	468	262	394
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		141	211	381	572	314	471	242	363	204	306
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		59.3	89.1	172	259	144	216	112	169	95.5	143
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		46.8	70.3	88.9	134	77.0	116	62.1	93.3	53.6	80.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		41.7	62.7	128	192	107	161	84.3	127	71.9	108
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		32.7	49.2	89.3	134	75.1	113	59.1	88.9	46.5	69.8
Properties											
Area, in.^{2}		6.06		16.4		13.5		10.4		8.76	
r_y, in.		3.28		2.34		2.39		2.44		2.47	
r_x/r_y		1.18		1.50		1.49		1.49		1.48	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×6×				HSS10×5×					
		¼[a], [c]		3/16[a], [b], [c]		⅜		5/16[a]		¼[a], [c]	
t_{des}, in.		0.233		0.174		0.349		0.291		0.233	
Nom. Weight, lb/ft		25.82		19.63		35.13		29.72		24.12	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	199	299	132	198	290	435	245	368	185	278
	6	189	285	126	189	265	398	224	337	173	260
	7	186	280	124	186	256	385	217	326	169	253
	8	182	274	121	182	247	371	209	314	164	246
	9	178	268	119	178	236	355	200	301	159	239
	10	174	261	116	174	225	339	191	288	153	230
	11	169	254	113	169	214	321	182	273	147	221
	12	163	246	109	164	202	303	172	258	141	212
	13	158	237	106	159	190	285	161	243	133	199
	14	152	229	102	153	177	266	151	227	124	187
	15	145	218	98.3	148	165	248	141	212	116	174
	16	138	207	94.4	142	152	229	130	196	108	162
	17	130	196	90.4	136	140	211	120	181	99.6	150
	18	123	184	86.3	130	129	193	110	166	91.6	138
	19	115	173	82.2	124	117	176	101	151	83.8	126
	20	108	162	78.1	117	106	159	91.4	137	76.3	115
	22	93.4	140	69.8	105	87.6	132	75.5	113	63.1	94.8
	24	79.8	120	61.7	92.8	73.6	111	63.4	95.3	53.0	79.6
	26	68.0	102	52.7	79.1	62.7	94.3	54.1	81.2	45.1	67.9
	28	58.6	88.1	45.4	68.2	54.1	81.3	46.6	70.1	38.9	58.5
	30	51.1	76.7	39.6	59.4	47.1	70.8	40.6	61.0	33.9	51.0
	32	44.9	67.4	34.8	52.2	41.4	62.3	35.7	53.6	29.8	44.8
	34	39.7	59.7	30.8	46.3	36.7	55.2	31.6	47.5	26.4	39.7
	36	35.5	53.3	27.5	41.3						
	38	31.8	47.8	24.7	37.0						
	40	28.7	43.2	22.2	33.4						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		213	320	161	242	290	435	245	368	199	298
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		165	248	125	187	225	337	190	285	154	231
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		77.9	117	59.3	89.1	112	169	95.5	143	77.9	117
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		44.4	66.7	34.3	51.5	49.5	74.4	43.2	64.9	36.0	54.1
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		58.9	88.5	39.7	59.7	75.8	114	64.9	97.5	53.1	79.9
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		33.9	51.0	22.4	33.7	46.7	70.1	36.8	55.3	26.9	40.5
Properties											
Area, in.^{2}		7.10		5.37		9.67		8.17		6.63	
r_y, in.		2.49		2.52		2.05		2.07		2.10	
r_x/r_y		1.48		1.48		1.72		1.72		1.71	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×4×									
		⅝		½		⅜		5⁄16[a]		¼[a], [c]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		50.81		42.05		32.58		27.59		22.42	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	419	630	347	522	269	404	227	342	171	257
	6	357	537	299	449	233	351	198	298	155	232
	7	337	507	283	426	222	333	189	284	149	224
	8	315	474	266	400	209	314	178	268	143	215
	9	293	440	248	373	196	294	167	252	136	205
	10	269	404	229	344	182	273	156	234	128	193
	11	245	368	210	315	167	251	144	216	119	179
	12	221	332	191	287	153	230	132	198	109	164
	13	198	298	172	258	139	208	120	180	99.8	150
	14	176	264	154	231	125	187	108	163	90.5	136
	15	154	232	136	205	111	167	97.2	146	81.4	122
	16	135	203	120	180	98.4	148	86.3	130	72.7	109
	17	120	180	106	159	87.1	131	76.5	115	64.4	96.8
	18	107	161	94.5	142	77.7	117	68.2	102	57.4	86.3
	19	96.0	144	84.8	127	69.8	105	61.2	92.0	51.6	77.5
	20	86.6	130	76.5	115	63.0	94.6	55.2	83.0	46.5	69.9
	22	71.6	108	63.2	95.1	52.0	78.2	45.7	68.6	38.5	57.8
	24	60.2	90.4	53.1	79.9	43.7	65.7	38.4	57.7	32.3	48.6
	26			45.3	68.1	37.3	56.0	32.7	49.1	27.5	41.4
	28									23.7	35.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		419	630	347	522	269	404	227	342	185	278
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		326	488	270	405	209	313	176	265	143	215
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		172	259	144	216	112	169	95.5	143	77.9	117
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		47.2	70.9	43.4	65.3	37.0	55.6	32.7	49.2	27.6	41.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		101	151	85.1	128	67.4	101	57.6	86.6	47.4	71.3
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		51.4	77.3	43.9	66.0	34.9	52.5	27.7	41.7	20.3	30.5
Properties											
Area, in.^{2}		14.0		11.6		8.97		7.59		6.17	
r_y, in.		1.54		1.59		1.64		1.67		1.70	
r_x/r_y		2.12		2.10		2.08		2.06		2.05	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×4×				HSS10×3½×					
		3/16[a], [c]		1/8[a], [b], [c]		3/8		5/16[a]		1/4[a], [c]	
t_{des}, in.		0.174		0.116		0.349		0.291		0.233	
Nom. Weight, lb/ft		17.08		11.56		31.31		26.53		21.57	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	111	167	60.9	91.5	258	388	219	328	164	246
	6	101	152	55.4	83.3	215	323	183	275	144	216
	7	97.4	146	53.6	80.5	201	302	172	258	137	206
	8	93.5	141	51.5	77.4	186	280	159	239	130	195
	9	89.4	134	49.3	74.1	171	257	146	220	121	182
	10	84.9	128	46.9	70.5	155	233	133	200	110	166
	11	80.3	121	44.4	66.8	140	210	120	181	100	150
	12	75.5	113	41.9	62.9	124	187	107	161	89.7	135
	13	70.5	106	39.3	59.0	109	164	94.9	143	79.7	120
	14	65.5	98.5	36.6	55.1	95.2	143	82.9	125	70.1	105
	15	60.5	91.0	34.0	51.1	82.9	125	72.2	108	61.1	91.8
	16	55.6	83.5	31.4	47.2	72.9	110	63.4	95.4	53.7	80.7
	17	49.9	75.0	28.8	43.3	64.6	97.0	56.2	84.5	47.5	71.5
	18	44.5	66.9	26.4	39.7	57.6	86.5	50.1	75.3	42.4	63.7
	19	39.9	60.0	24.4	36.6	51.7	77.7	45.0	67.6	38.1	57.2
	20	36.1	54.2	22.5	33.9	46.6	70.1	40.6	61.0	34.4	51.6
	22	29.8	44.8	19.5	29.3	38.5	57.9	33.6	50.4	28.4	42.7
	24	25.0	37.6	17.1	25.6	32.4	48.7	28.2	42.4	23.9	35.9
	26	21.3	32.1	14.9	22.5						
	28	18.4	27.6	12.9	19.4						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		140	210	94.6	142	258	388	219	329	178	267
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		109	163	73.5	110	200	301	170	255	138	207
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		59.3	89.1	25.4	38.2	112	169	95.5	143	77.9	117
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		21.8	32.7	15.2	22.9	30.7	46.2	27.5	41.3	23.4	35.2
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		36.4	54.8	21.6	32.4	63.1	94.9	54.1	81.4	44.7	67.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		13.4	20.1	7.15	10.8	29.4	44.3	23.4	35.1	17.1	25.7
Properties											
Area, in.^{2}		4.67		3.16		8.62		7.30		5.93	
r_y, in.		1.72		1.75		1.44		1.46		1.49	
r_x/r_y		2.05		2.03		2.32		2.32		2.29	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×3½×		HSS10×3×							
		3/16[a], [c]		3/8		5/16[a]		1/4[a], [c]		3/16[a], [c]	
t_{des}, in.		0.174		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		16.44		30.03		25.46		20.72		15.80	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	106	159	248	372	210	315	157	236	100	151
	6	93.6	141	192	288	165	248	132	198	85.4	128
	7	89.6	135	175	263	151	227	124	186	80.5	121
	8	85.1	128	157	237	136	205	113	170	75.2	113
	9	80.3	121	140	210	122	183	101	152	69.6	105
	10	75.2	113	122	183	107	161	89.8	135	63.8	95.8
	11	69.9	105	105	158	92.9	140	78.4	118	57.8	86.9
	12	64.6	97.0	89.2	134	79.4	119	67.6	102	51.9	78.0
	13	59.2	88.9	76.0	114	67.7	102	57.7	86.7	45.1	67.8
	14	53.8	80.8	65.6	98.5	58.3	87.7	49.7	74.8	38.9	58.4
	15	47.6	71.5	57.1	85.8	50.8	76.4	43.3	65.1	33.9	50.9
	16	41.8	62.9	50.2	75.4	44.7	67.1	38.1	57.2	29.8	44.7
	17	37.1	55.7	44.5	66.8	39.6	59.5	33.7	50.7	26.4	39.6
	18	33.1	49.7	39.7	59.6	35.3	53.0	30.1	45.2	23.5	35.4
	19	29.7	44.6	35.6	53.5	31.7	47.6	27.0	40.6	21.1	31.7
	20	26.8	40.2	32.1	48.3	28.6	43.0	24.4	36.6	19.1	28.6
	22	22.1	33.3								
	24	18.6	27.9								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		135	203	248	372	210	315	171	257	129	194
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		105	157	192	288	163	244	133	199	100	151
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		59.3	89.1	112	169	95.5	143	77.9	117	59.3	89.1
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		18.6	28.0	24.5	36.7	22.3	33.5	19.3	28.9	15.5	23.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		34.2	51.4	59.1	88.9	50.6	76.1	41.7	62.6	31.9	48.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		11.2	16.9	24.3	36.5	19.2	28.8	14.1	21.2	9.25	13.9
Properties											
Area, in.^{2}		4.50		8.27		7.01		5.70		4.32	
r_y, in.		1.51		1.22		1.25		1.28		1.30	
r_x/r_y		2.28		2.67		2.64		2.61		2.60	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS10

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×3×		HSS10×2×							
		⅛[a], [b], [c]		⅜		5⁄16[a]		¼[a], [c]		3⁄16[a], [c]	
t_{des}, in.		0.116		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		10.71		27.48		23.34		19.02		14.53	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	54.0	81.1	227	341	193	289	143	215	90.3	136
	6	46.2	69.4	123	185	108	163	91.4	137	63.3	95.1
	7	43.7	65.6	98.7	148	88.0	132	75.3	113	55.5	83.4
	8	40.9	61.5	76.6	115	69.1	104	60.0	90.2	47.6	71.5
	9	38.0	57.2	60.5	90.9	54.6	82.1	47.4	71.3	38.3	57.5
	10	35.1	52.7	49.0	73.7	44.3	66.5	38.4	57.7	31.0	46.6
	11	32.0	48.1	40.5	60.9	36.6	55.0	31.7	47.7	25.6	38.5
	12	29.0	43.6	34.0	51.1	30.7	46.2	26.7	40.1	21.5	32.4
	13	26.0	39.1	29.0	43.6	26.2	39.4	22.7	34.2	18.4	27.6
	14	23.3	35.1							15.8	23.8
	15	21.1	31.7								
	16	19.2	28.8								
	17	17.5	26.4								
	18	16.1	24.2								
	19	14.8	22.3								
	20	13.5	20.3								
	22	11.2	16.8								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		87.7	132	227	341	193	289	157	236	119	179
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		68.1	102	176	264	149	224	122	183	92.5	139
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		25.4	38.2	112	169	95.5	143	77.9	117	59.3	89.1
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.0	16.6	11.9	18.0	11.8	17.8	10.9	16.4	9.25	13.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		20.4	30.7	50.6	76.1	43.7	65.6	35.9	54.0	27.7	41.6
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		4.91	7.39	14.4	21.6	11.3	17.0	8.34	12.5	5.54	8.32
Properties											
Area, in.^{2}		2.93		7.58		6.43		5.24		3.98	
r_y, in.		1.33		0.787		0.812		0.838		0.864	
r_x/r_y		2.57		3.91		3.84		3.78		3.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS10–HSS9

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×2×		HSS9×7×							
		⅛[a], [b], [c]		⅝		½		⅜		5⁄16[a]	
t_{des}, in.		0.116		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		9.86		59.32		48.85		37.69		31.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	47.1	70.8	491	738	404	607	311	468	262	394
	6	33.9	50.9	466	700	384	577	296	446	250	376
	7	30.1	45.2	457	687	377	567	291	438	246	369
	8	26.2	39.4	447	672	369	555	285	429	241	362
	9	22.4	33.7	436	655	360	542	279	419	235	354
	10	19.3	29.0	424	637	351	527	272	408	230	345
	11	16.9	25.4	411	618	341	512	264	397	223	335
	12	14.9	22.4	398	598	330	496	256	385	216	325
	13	13.2	19.9	383	576	318	478	247	372	209	315
	14	11.4	17.1	368	554	306	461	238	358	202	304
	15			353	531	294	442	229	344	194	292
	16			337	507	282	423	220	330	186	280
	17			321	483	269	404	210	316	178	268
	18			305	459	256	384	200	301	170	256
	19			289	435	243	365	190	286	162	244
	20			273	411	230	345	181	271	154	231
	22			242	363	204	307	161	242	138	207
	24			211	317	179	269	142	214	122	183
	26			182	273	155	234	124	186	106	160
	28			157	236	134	201	107	161	92.1	138
	30			137	205	117	175	93.2	140	80.2	121
	32			120	180	103	154	81.9	123	70.5	106
	34			106	160	90.8	137	72.6	109	62.5	93.9
	36			94.9	143	81.0	122	64.7	97.3	55.7	83.7
	38			85.1	128	72.7	109	58.1	87.3	50.0	75.1
	40			76.8	115	65.6	98.7	52.4	78.8	45.1	67.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		80.8	122	491	738	404	608	311	468	262	394
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		62.8	94.2	381	572	314	471	242	363	204	306
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		25.4	38.2	152	228	127	191	99.7	150	85.0	128
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.88	10.3	110	165	93.6	141	74.6	112	64.1	96.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		17.6	26.4	121	181	101	152	79.3	119	67.6	102
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		2.93	4.41	101	152	84.8	128	66.6	100	55.9	84.0
Properties											
Area, in.^{2}		2.70		16.4		13.5		10.4		8.76	
r_y, in.		0.890		2.68		2.73		2.78		2.81	
r_x/r_y		3.65		1.22		1.22		1.22		1.21	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS9

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS9×7×				HSS9×5×					
		¼[a], [b], [c]		3/16[a], [b], [c]		⅝		½		⅜	
t_{des}, in.		0.233		0.174		0.581		0.465		0.349	
Nom. Weight, lb/ft		25.82		19.63		50.81		42.05		32.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	209	313	137	205	419	630	347	522	269	404
	6	201	302	132	199	378	568	315	473	245	368
	7	198	297	131	197	364	548	304	457	237	356
	8	195	293	129	194	349	525	292	439	228	343
	9	191	287	128	192	333	500	279	419	218	328
	10	187	280	125	189	315	473	265	398	208	313
	11	182	273	123	185	297	446	250	376	197	296
	12	176	265	121	182	278	418	235	353	186	279
	13	170	256	118	177	259	389	220	330	174	262
	14	165	247	115	172	239	360	204	307	163	245
	15	158	238	111	167	220	331	189	284	151	227
	16	152	229	108	162	202	303	173	261	140	210
	17	146	219	104	156	184	276	159	238	128	193
	18	139	209	100	151	166	250	144	217	117	176
	19	133	199	96.5	145	149	224	130	196	107	160
	20	126	190	92.7	139	135	202	117	177	96.5	145
	22	113	170	84.8	128	111	167	97.1	146	79.7	120
	24	100	151	77.0	116	93.5	141	81.6	123	67.0	101
	26	88.0	132	67.8	102	79.7	120	69.5	104	57.1	85.8
	28	76.2	115	58.9	88.5	68.7	103	59.9	90.1	49.2	74.0
	30	66.4	99.8	51.3	77.1	59.9	90.0	52.2	78.5	42.9	64.4
	32	58.4	87.7	45.1	67.8	52.6	79.1	45.9	69.0	37.7	56.6
	34	51.7	77.7	39.9	60.0						
	36	46.1	69.3	35.6	53.5						
	38	41.4	62.2	32.0	48.1						
	40	37.4	56.2	28.9	43.4						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		213	320	161	242	419	630	347	522	269	404
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		165	248	125	187	326	488	270	405	209	313
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		69.5	104	53.0	79.7	152	228	127	191	99.7	150
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		52.7	79.3	40.5	60.9	68.1	102	60.1	90.4	49.5	74.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		55.4	83.2	34.6	52.1	96.1	144	81.1	122	64.1	96.4
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		39.8	59.9	26.7	40.1	63.1	94.9	53.6	80.6	42.7	64.1
Properties											
Area, in.^{2}		7.10		5.37		14.0		11.6		8.97	
r_y, in.		2.84		2.87		1.92		1.97		2.03	
r_x/r_y		1.21		1.21		1.60		1.59		1.58	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS9

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS9×5×						HSS9×3×			
		5/16[a]		1/4[a], [c]		3/16[a], [c]		1/2		3/8	
t_{des}, in.		0.291		0.233		0.174		0.465		0.349	
Nom. Weight, lb/ft		27.59		22.42		17.08		35.24		27.48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	227	342	181	272	120	180	292	438	227	341
	6	208	312	168	253	112	168	221	332	175	263
	7	201	302	164	246	109	164	200	301	160	240
	8	194	291	158	238	106	160	178	268	143	215
	9	186	279	152	228	103	155	156	235	127	191
	10	177	266	145	218	99.3	149	135	203	111	166
	11	168	252	138	207	95.5	144	115	173	95.1	143
	12	158	238	130	196	91.5	137	96.6	145	80.4	121
	13	149	224	122	184	87.2	131	82.3	124	68.5	103
	14	139	209	115	172	82.9	125	71.0	107	59.1	88.8
	15	129	194	107	161	78.5	118	61.9	93.0	51.5	77.4
	16	120	180	99.1	149	74.0	111	54.4	81.7	45.2	68.0
	17	110	166	91.4	137	69.5	104	48.2	72.4	40.1	60.2
	18	101	152	84.0	126	64.5	97.0	43.0	64.6	35.8	53.7
	19	92.0	138	76.7	115	59.1	88.8	38.6	57.9	32.1	48.2
	20	83.2	125	69.7	105	53.7	80.8			29.0	43.5
	22	68.8	103	57.6	86.5	44.4	66.8				
	24	57.8	86.9	48.4	72.7	37.3	56.1				
	26	49.3	74.0	41.2	62.0	31.8	47.8				
	28	42.5	63.8	35.5	53.4	27.4	41.2				
	30	37.0	55.6	31.0	46.5	23.9	35.9				
	32	32.5	48.9	27.2	40.9	21.0	31.6				
	34	28.8	43.3	24.1	36.2	18.6	27.9				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		227	342	185	278	140	210	292	438	227	341
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		176	265	143	215	109	163	226	340	176	264
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		85.0	128	69.5	104	53.0	79.7	127	191	99.7	150
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		43.2	64.9	36.0	54.1	28.0	42.1	26.7	40.2	24.5	36.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		54.9	82.5	45.2	67.9	34.4	51.8	61.4	92.3	49.2	73.9
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		35.8	53.8	25.9	38.9	17.2	25.9	26.9	40.5	22.0	33.0
Properties											
Area, in.^{2}		7.59		6.17		4.67		9.74		7.58	
r_y, in.		2.05		2.08		2.10		1.17		1.21	
r_x/r_y		1.58		1.57		1.58		2.46		2.45	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS9–HSS8

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS9×3×						HSS8×6×			
		5/16[a]		1/4[a], [c]		3/16[a], [c]		5/8		1/2	
t_{des}, in.		0.291		0.233		0.174		0.581		0.465	
Nom. Weight, lb/ft		23.34		19.02		14.53		50.81		42.05	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	193	289	153	230	99.1	149	419	630	347	522
	6	150	226	124	186	83.7	126	389	585	324	487
	7	138	207	114	171	78.8	118	379	570	316	474
	8	124	187	103	155	73.4	110	368	553	306	461
	9	111	166	92.5	139	67.7	102	355	534	296	446
	10	97.1	146	81.7	123	61.8	92.8	342	514	286	429
	11	84.1	126	71.2	107	55.4	83.3	327	492	274	412
	12	71.7	108	61.3	92.1	47.9	72.0	312	469	262	394
	13	61.1	91.8	52.2	78.5	40.9	61.5	297	446	250	375
	14	52.7	79.1	45.0	67.6	35.3	53.0	281	422	237	356
	15	45.9	68.9	39.2	58.9	30.7	46.2	265	398	224	336
	16	40.3	60.6	34.5	51.8	27.0	40.6	248	373	210	316
	17	35.7	53.7	30.5	45.9	23.9	36.0	232	349	197	297
	18	31.9	47.9	27.2	40.9	21.3	32.1	216	325	184	277
	19	28.6	43.0	24.4	36.7	19.2	28.8	200	301	171	258
	20	25.8	38.8	22.1	33.1	17.3	26.0	185	278	159	239
	22							156	234	135	202
	24							131	196	113	170
	26							111	167	96.4	145
	28							96.0	144	83.1	125
	30							83.7	126	72.4	109
	32							73.5	111	63.6	95.7
	34							65.1	97.9	56.4	84.7
	36							58.1	87.3	50.3	75.6
	38									45.1	67.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		193	289	157	236	119	179	419	630	347	522
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		149	224	122	183	92.5	139	326	488	270	405
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		85.0	128	69.5	104	53.0	79.7	131	196	110	166
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		22.3	33.5	19.3	28.9	15.5	23.3	88.9	134	77.0	116
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		42.2	63.4	34.9	52.5	26.9	40.5	90.1	135	76.1	114
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		18.7	28.1	13.6	20.4	9.02	13.6	73.6	111	62.1	93.4
Properties											
Area, in.^{2}		6.43		5.24		3.98		14.0		11.6	
r_y, in.		1.24		1.27		1.29		2.27		2.32	
r_x/r_y		2.42		2.39		2.38		1.26		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8×6×								HSS8×4×	
		3/8		5/16		1/4[a], [c]		3/16[a], [b], [c]		5/8	
t_{des}, in.		0.349		0.291		0.233		0.174		0.581	
Nom. Weight, lb/ft		32.58		27.59		22.42		17.08		42.30	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	269	404	227	342	185	278	128	192	350	526
	6	251	378	213	320	173	260	122	183	297	446
	7	245	369	208	312	169	254	119	179	279	420
	8	238	358	202	304	165	248	117	176	261	392
	9	231	347	196	295	160	240	114	171	241	362
	10	223	335	189	284	155	232	111	167	221	332
	11	214	322	182	274	149	224	108	162	200	301
	12	205	309	175	263	143	215	104	157	180	271
	13	196	295	167	251	137	205	101	151	161	241
	14	187	280	159	239	130	196	96.9	146	142	213
	15	177	266	151	226	124	186	92.9	140	124	186
	16	167	251	142	214	117	176	88.9	134	109	163
	17	157	236	134	201	110	166	84.6	127	96.4	145
	18	147	221	126	189	104	156	79.6	120	85.9	129
	19	137	206	117	177	97.0	146	74.6	112	77.1	116
	20	128	192	109	164	90.5	136	69.7	105	69.6	105
	22	109	164	93.8	141	77.9	117	60.2	90.5	57.5	86.5
	24	92.1	138	79.2	119	66.0	99.2	51.2	77.0	48.3	72.7
	26	78.5	118	67.5	101	56.3	84.6	43.6	65.6		
	28	67.6	102	58.2	87.5	48.5	72.9	37.6	56.6		
	30	58.9	88.6	50.7	76.2	42.3	63.5	32.8	49.3		
	32	51.8	77.8	44.6	67.0	37.1	55.8	28.8	43.3		
	34	45.9	69.0	39.5	59.3	32.9	49.4	25.5	38.4		
	36	40.9	61.5	35.2	52.9	29.3	44.1	22.8	34.2		
	38	36.7	55.2	31.6	47.5	26.3	39.6	20.4	30.7		
	40			28.5	42.9	23.8	35.7	18.4	27.7		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		269	404	227	342	185	278	140	210	350	527
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		209	313	176	265	143	215	109	163	272	408
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		87.1	131	74.5	112	61.1	91.8	46.8	70.3	131	196
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		62.1	93.3	53.6	80.6	44.4	66.7	34.3	51.5	47.2	70.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		60.1	90.4	51.4	77.3	42.2	63.4	28.9	43.5	68.4	103
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		49.4	74.3	42.2	63.4	31.8	47.8	21.1	31.7	41.4	62.3
Properties											
Area, in.^{2}		8.97		7.59		6.17		4.67		11.7	
r_y, in.		2.38		2.40		2.43		2.46		1.51	
r_x/r_y		1.25		1.25		1.25		1.24		1.75	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8×4×									
		½		⅜		5⁄16		¼[a]		3⁄16[a], [c]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		35.24		27.48		23.34		19.02		14.53	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	292	438	227	341	193	289	157	236	107	161
	6	250	375	196	295	167	251	137	205	96.8	145
	7	236	355	186	280	159	238	130	196	93.2	140
	8	221	332	175	263	149	225	123	185	89.3	134
	9	205	309	163	245	140	210	115	173	85.0	128
	10	189	284	151	227	130	195	107	161	80.4	121
	11	173	260	139	209	119	179	98.8	149	75.6	114
	12	156	235	126	190	109	164	90.5	136	70.1	105
	13	140	211	114	172	98.5	148	82.3	124	63.9	96.1
	14	125	188	102	154	88.5	133	74.2	112	57.9	87.0
	15	110	165	91.0	137	78.9	119	66.4	99.8	52.0	78.1
	16	96.6	145	80.1	120	69.7	105	58.9	88.5	46.3	69.7
	17	85.6	129	71.0	107	61.7	92.7	52.2	78.4	41.1	61.7
	18	76.4	115	63.3	95.1	55.0	82.7	46.5	69.9	36.6	55.0
	19	68.5	103	56.8	85.4	49.4	74.2	41.8	62.8	32.9	49.4
	20	61.9	93.0	51.3	77.1	44.6	67.0	37.7	56.6	29.7	44.6
	22	51.1	76.8	42.4	63.7	36.8	55.4	31.1	46.8	24.5	36.8
	24	43.0	64.6	35.6	53.5	31.0	46.5	26.2	39.3	20.6	31.0
	26	36.6	55.0	30.3	45.6	26.4	39.6	22.3	33.5	17.6	26.4
	28									15.1	22.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		292	438	227	341	193	289	157	236	119	179
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		226	340	176	264	149	224	122	183	92.5	139
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		110	166	87.1	131	74.5	112	61.1	91.8	46.8	70.3
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		43.4	65.3	37.0	55.6	32.7	49.2	27.6	41.5	21.8	32.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		58.6	88.1	46.9	70.5	40.2	60.4	33.2	49.9	25.4	38.3
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		35.7	53.6	28.7	43.1	24.7	37.2	18.9	28.4	12.5	18.8
Properties											
Area, in.^{2}		9.74		7.58		6.43		5.24		3.98	
r_y, in.		1.56		1.61		1.63		1.66		1.69	
r_x/r_y		1.74		1.73		1.73		1.72		1.70	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8×4×		HSS8×3×							
		⅛[a], [b], [c]		½		⅜		5⁄16		¼[a]	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		9.86		31.84		24.93		21.21		17.32	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	59.9	90.0	264	396	206	310	175	263	143	215
	6	54.1	81.4	198	298	158	238	136	205	112	168
	7	52.2	78.5	179	268	144	216	125	187	103	154
	8	50.1	75.3	158	238	129	194	112	169	92.8	139
	9	47.8	71.8	138	208	114	171	99.7	150	82.7	124
	10	45.3	68.1	119	179	99.2	149	87.3	131	72.8	109
	11	42.8	64.3	101	151	85.0	128	75.5	113	63.2	95.0
	12	40.1	60.3	84.5	127	71.8	108	64.2	96.4	54.0	81.2
	13	37.4	56.2	72.0	108	61.2	92.0	54.7	82.2	46.0	69.2
	14	34.7	52.2	62.0	93.3	52.8	79.3	47.1	70.8	39.7	59.7
	15	32.0	48.1	54.1	81.2	46.0	69.1	41.1	61.7	34.6	52.0
	16	29.4	44.1	47.5	71.4	40.4	60.7	36.1	54.2	30.4	45.7
	17	26.7	40.2	42.1	63.2	35.8	53.8	32.0	48.0	26.9	40.5
	18	24.4	36.7	37.5	56.4	31.9	48.0	28.5	42.9	24.0	36.1
	19	22.4	33.7	33.7	50.6	28.6	43.1	25.6	38.5	21.6	32.4
	20	20.6	31.0			25.9	38.9	23.1	34.7	19.4	29.2
	22	17.0	25.6								
	24	14.3	21.5								
	26	12.2	18.3								
	28	10.5	15.8								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		80.8	122	264	396	206	310	175	263	143	215
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		62.8	94.2	205	307	160	240	136	204	111	166
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		28.6	43.0	110	166	87.1	131	74.5	112	61.1	91.8
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.2	22.9	26.7	40.2	24.5	36.7	22.3	33.5	19.3	28.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		15.4	23.1	49.9	75.0	40.2	60.4	34.7	52.1	28.7	43.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		6.91	10.4	24.1	36.2	19.7	29.6	17.1	25.7	13.1	19.7
Properties											
Area, in.^{2}		2.70		8.81		6.88		5.85		4.77	
r_y, in.		1.71		1.15		1.20		1.23		1.25	
r_x/r_y		1.71		2.24		2.21		2.19		2.18	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS8

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8×3×				HSS8×2×					
		3/16[a], [c]		1/8[a], [b], [c]		1/2		3/8		5/16	
t_{des}, in.		0.174		0.116		0.465		0.349		0.291	
Nom. Weight, lb/ft		13.25		9.01		28.43		22.37		19.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	96.8	146	52.7	79.2	236	355	185	278	157	237
	6	81.3	122	44.7	67.2	116	174	98.8	148	87.4	131
	7	76.2	115	42.1	63.3	89.5	134	78.7	118	70.6	106
	8	70.8	106	39.3	59.1	68.5	103	60.9	91.5	55.2	82.9
	9	64.6	97.1	36.4	54.7	54.1	81.3	48.1	72.3	43.6	65.5
	10	57.2	85.9	33.4	50.2	43.8	65.9	38.9	58.5	35.3	53.1
	11	49.9	75.1	30.3	45.6	36.2	54.4	32.2	48.4	29.2	43.9
	12	43.1	64.7	27.3	41.0	30.4	45.7	27.0	40.6	24.5	36.9
	13	36.7	55.2	24.3	36.5					20.9	31.4
	14	31.7	47.6	21.7	32.6						
	15	27.6	41.5	19.5	29.3						
	16	24.2	36.4	17.2	25.9						
	17	21.5	32.3	15.2	22.9						
	18	19.2	28.8	13.6	20.4						
	19	17.2	25.8	12.2	18.3						
	20	15.5	23.3	11.0	16.6						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		109	163	73.7	111	236	355	185	278	157	237
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		84.4	127	57.2	85.8	183	275	144	216	122	183
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		46.8	70.3	28.6	43.0	110	166	87.1	131	74.5	112
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.5	23.3	11.0	16.6	10.1	15.2	11.9	18.0	11.8	17.8
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		22.1	33.3	14.9	22.4	41.2	61.9	33.4	50.3	28.9	43.5
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		8.70	13.1	4.76	7.16	13.6	20.5	11.5	17.3	10.1	15.2
Properties											
Area, in.^{2}		3.63		2.46		7.88		6.18		5.26	
r_y, in.		1.28		1.31		0.730		0.777		0.802	
r_x/r_y		2.16		2.14		3.29		3.20		3.15	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS8–HSS7

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8×2×						HSS7×5×			
		¼[a]		3/16[a], [c]		⅛[a], [b], [c]		½		⅜	
t_{des}, in.		0.233		0.174		0.116		0.465		0.349	
Nom. Weight, lb/ft		15.62		11.97		8.16		35.24		27.48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	129	193	86.3	130	45.8	68.8	292	438	227	341
	6	74.0	111	58.3	87.7	32.4	48.6	263	395	206	309
	7	60.6	91.0	48.3	72.6	28.5	42.9	253	380	199	299
	8	48.0	72.1	38.9	58.5	24.6	37.0	242	364	191	287
	9	37.9	57.0	30.8	46.2	20.9	31.3	231	347	182	274
	10	30.7	46.1	24.9	37.4	17.8	26.8	219	328	173	260
	11	25.4	38.1	20.6	30.9	14.9	22.3	206	309	163	246
	12	21.3	32.0	17.3	26.0	12.5	18.8	192	289	154	231
	13	18.2	27.3	14.7	22.2	10.6	16.0	179	269	143	216
	14			12.7	19.1	9.18	13.8	166	249	133	200
	15							152	229	123	185
	16							139	209	113	170
	17							127	190	104	156
	18							114	172	94.2	142
	19							103	154	85.1	128
	20							92.7	139	76.8	115
	22							76.6	115	63.4	95.4
	24							64.4	96.8	53.3	80.1
	26							54.9	82.5	45.4	68.3
	28							47.3	71.1	39.2	58.9
	30							41.2	61.9	34.1	51.3
	32									30.0	45.1
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		129	194	98.2	148	66.8	100	292	438	227	341
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		100	150	76.3	114	51.8	77.8	226	340	176	264
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		61.1	91.8	46.8	70.3	28.6	43.0	93.6	141	74.6	112
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		10.9	16.4	9.25	13.9	6.88	10.3	60.1	90.4	49.5	74.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		24.2	36.3	18.7	28.2	12.6	19.0	54.6	82.1	43.7	65.6
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		7.77	11.7	5.21	7.83	2.84	4.26	43.2	64.9	34.4	51.8
Properties											
Area, in.^{2}		4.30		3.28		2.23		9.74		7.58	
r_y, in.		0.827		0.853		0.879		1.91		1.97	
r_x/r_y		3.11		3.06		3.01		1.31		1.30	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS7

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS7×5×								HSS7×4×	
		5/16		1/4[a]		3/16[a], [c]		1/8[a], [b], [c]		1/2	
t_{des}, in.		0.291		0.233		0.174		0.116		0.465	
Nom. Weight, lb/ft		23.34		19.02		14.53		9.86		31.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	193	289	157	236	115	173	62.6	94.0	264	396
	6	175	263	143	215	107	161	59.1	88.8	224	337
	7	169	254	138	208	104	156	57.9	87.0	212	318
	8	162	244	133	200	101	152	56.5	85.0	198	297
	9	155	233	127	191	97.3	146	55.0	82.7	183	275
	10	148	222	121	182	92.8	139	53.4	80.2	168	253
	11	140	210	115	173	88.0	132	51.6	77.5	153	230
	12	131	197	108	163	83.1	125	49.7	74.6	138	207
	13	123	185	101	152	78.0	117	47.3	71.0	123	185
	14	114	172	94.6	142	72.9	110	44.8	67.3	109	164
	15	106	159	87.8	132	67.8	102	42.3	63.6	95.7	144
	16	97.5	146	81.0	122	62.7	94.3	39.8	59.8	84.1	126
	17	89.3	134	74.4	112	57.8	86.8	37.2	56.0	74.5	112
	18	81.3	122	68.0	102	52.9	79.5	34.7	52.2	66.4	99.9
	19	73.6	111	61.8	92.9	48.2	72.5	32.3	48.5	59.6	89.6
	20	66.4	99.9	55.8	83.9	43.6	65.6	29.8	44.7	53.8	80.9
	22	54.9	82.5	46.1	69.3	36.1	54.2	25.0	37.5	44.5	66.8
	24	46.1	69.4	38.7	58.2	30.3	45.6	21.0	31.5	37.4	56.2
	26	39.3	59.1	33.0	49.6	25.8	38.8	17.9	26.8		
	28	33.9	51.0	28.5	42.8	22.3	33.5	15.4	23.2		
	30	29.5	44.4	24.8	37.3	19.4	29.2	13.4	20.2		
	32	26.0	39.0	21.8	32.8	17.0	25.6	11.8	17.7		
	34					15.1	22.7	10.4	15.7		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		193	289	157	236	119	179	80.8	122	264	396
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		149	224	122	183	92.5	139	62.8	94.2	205	307
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		64.1	96.3	52.7	79.3	40.5	60.9	27.7	41.7	93.6	141
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		43.2	64.9	36.0	54.1	28.0	42.1	19.4	29.1	43.4	65.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		37.4	56.3	30.9	46.5	23.8	35.7	13.0	19.5	46.9	70.5
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		29.7	44.6	24.5	36.8	15.9	23.9	9.04	13.6	31.4	47.3
Properties											
Area, in.^{2}		6.43		5.24		3.98		2.70		8.81	
r_y, in.		1.99		2.02		2.05		2.07		1.53	
r_x/r_y		1.30		1.30		1.29		1.29		1.57	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS7

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS7×4×									
		3/8		5/16		1/4[a]		3/16[a], [c]		1/8[a], [b], [c]	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116	
Nom. Weight, lb/ft		24.93		21.21		17.32		13.25		9.01	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	206	310	175	263	143	215	104	157	58.9	88.5
	6	177	266	151	227	124	186	93.6	141	53.1	79.8
	7	168	252	144	216	118	177	89.9	135	51.1	76.8
	8	157	236	135	203	111	167	85.1	128	48.9	73.6
	9	146	220	126	189	104	156	79.8	120	46.6	70.0
	10	135	203	117	175	96.6	145	74.2	111	44.1	66.3
	11	124	186	107	161	88.9	134	68.4	103	41.5	62.4
	12	112	169	97.6	147	81.3	122	62.7	94.2	38.8	58.4
	13	101	152	88.2	133	73.7	111	57.0	85.6	36.1	54.3
	14	90.1	135	79.0	119	66.3	99.7	51.4	77.2	33.4	50.2
	15	79.7	120	70.2	106	59.2	89.0	46.0	69.1	30.7	46.1
	16	70.0	105	61.8	92.9	52.3	78.6	40.8	61.3	28.0	42.1
	17	62.0	93.2	54.8	82.3	46.3	69.6	36.1	54.3	25.4	38.1
	18	55.3	83.2	48.9	73.4	41.3	62.1	32.2	48.4	22.6	34.0
	19	49.7	74.6	43.8	65.9	37.1	55.8	28.9	43.5	20.3	30.5
	20	44.8	67.4	39.6	59.5	33.5	50.3	26.1	39.2	18.3	27.6
	22	37.0	55.7	32.7	49.2	27.7	41.6	21.6	32.4	15.2	22.8
	24	31.1	46.8	27.5	41.3	23.2	34.9	18.1	27.2	12.7	19.1
	26	26.5	39.9	23.4	35.2	19.8	29.8	15.4	23.2	10.8	16.3
	28									9.35	14.1
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		206	310	175	263	143	215	109	163	73.7	111
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		160	240	136	204	111	166	84.4	127	57.2	85.8
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		74.6	112	64.1	96.3	52.7	79.3	40.5	60.9	27.7	41.7
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		37.0	55.6	32.7	49.2	27.6	41.5	21.8	32.7	15.2	22.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		37.7	56.6	32.7	49.1	26.9	40.5	20.8	31.2	12.6	19.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		25.4	38.3	22.0	33.1	18.3	27.5	11.9	17.9	6.72	10.1
Properties											
Area, in.^{2}		6.88		5.85		4.77		3.63		2.46	
r_y, in.		1.58		1.61		1.64		1.66		1.69	
r_x/r_y		1.56		1.55		1.54		1.54		1.53	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS7

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS7×3×									
		½		⅜		5⁄16		¼[a]		3⁄16[a], [c]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		28.43		22.37		19.08		15.62		11.97	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	236	355	185	278	157	237	129	193	94.0	141
	6	176	265	142	213	122	183	101	151	77.3	116
	7	159	238	129	193	111	166	92.0	138	71.0	107
	8	140	211	115	173	99.4	149	83.1	125	64.2	96.6
	9	122	184	101	152	88.0	132	73.9	111	57.4	86.3
	10	105	158	88.0	132	76.7	115	64.9	97.6	50.6	76.0
	11	88.3	133	75.3	113	66.0	99.2	56.2	84.5	44.0	66.2
	12	74.2	112	63.4	95.3	55.8	83.9	47.9	72.0	37.7	56.7
	13	63.3	95.1	54.1	81.2	47.6	71.5	40.8	61.4	32.2	48.3
	14	54.5	82.0	46.6	70.0	41.0	61.6	35.2	52.9	27.7	41.7
	15	47.5	71.4	40.6	61.0	35.7	53.7	30.7	46.1	24.2	36.3
	16	41.8	62.8	35.7	53.6	31.4	47.2	27.0	40.5	21.2	31.9
	17	37.0	55.6	31.6	47.5	27.8	41.8	23.9	35.9	18.8	28.3
	18	33.0	49.6	28.2	42.4	24.8	37.3	21.3	32.0	16.8	25.2
	19			25.3	38.0	22.3	33.5	19.1	28.7	15.1	22.6
	20					20.1	30.2	17.3	25.9	13.6	20.4
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		236	355	185	278	157	237	129	194	98.2	148
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		183	275	144	216	122	183	100	150	76.3	114
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		93.6	141	74.6	112	64.1	96.3	52.7	79.3	40.5	60.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		26.7	40.2	24.5	36.7	22.3	33.5	19.3	28.9	15.5	23.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		39.4	59.3	31.9	48.0	27.7	41.6	23.0	34.6	17.8	26.8
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		21.1	31.7	17.3	26.1	15.1	22.7	12.6	19.0	8.30	12.5
Properties											
Area, in.^{2}		7.88		6.18		5.26		4.30		3.28	
r_y, in.		1.14		1.19		1.21		1.24		1.26	
r_x/r_y		1.99		1.97		1.97		1.95		1.94	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS7–HSS6

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS7×3×		HSS7×2×						HSS6×5×	
		⅛[a], [c]		¼[a]		3/16[a], [c]		⅛[a], [c]		½	
t_{des}, in.		0.116		0.233		0.174		0.116		0.465	
Nom. Weight, lb/ft		8.16		13.91		10.70		7.31		31.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	52.0	78.2	115	173	83.5	126	45.1	67.8	264	396
	6	43.8	65.8	65.3	98.2	51.6	77.5	31.4	47.2	237	356
	7	41.1	61.8	53.3	80.1	42.6	64.0	27.5	41.4	228	342
	8	38.3	57.5	42.0	63.1	34.1	51.3	23.6	35.5	218	327
	9	35.3	53.0	33.2	49.9	27.0	40.5	19.6	29.4	207	311
	10	32.2	48.4	26.9	40.4	21.8	32.8	15.8	23.8	195	293
	11	29.1	43.7	22.2	33.4	18.0	27.1	13.1	19.7	183	275
	12	26.0	39.0	18.7	28.1	15.2	22.8	11.0	16.5	171	257
	13	22.9	34.4	15.9	23.9	12.9	19.4	9.37	14.1	159	238
	14	19.8	29.7			11.1	16.7	8.08	12.1	146	220
	15	17.2	25.9							134	201
	16	15.1	22.7							122	183
	17	13.4	20.1							110	166
	18	12.0	18.0							99.3	149
	19	10.7	16.1							89.1	134
	20	9.68	14.6							80.4	121
	22									66.4	99.9
	24									55.8	83.9
	26									47.6	71.5
	28									41.0	61.6
	30									35.7	53.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		66.8	100	115	173	87.7	132	59.9	90.0	264	396
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		51.8	77.8	89.3	134	68.1	102	46.5	69.8	205	307
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		27.7	41.7	52.7	79.3	40.5	60.9	27.7	41.7	77.0	116
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.0	16.6	10.9	16.4	9.25	13.9	6.88	10.3	60.1	90.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		12.3	18.5	19.1	28.7	14.8	22.3	10.3	15.5	42.9	64.5
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		4.63	6.96	7.53	11.3	4.98	7.48	2.78	4.18	37.9	57.0
Properties											
Area, in.^{2}		2.23		3.84		2.93		2.00		8.81	
r_y, in.		1.29		0.819		0.845		0.871		1.87	
r_x/r_y		1.93		2.77		2.73		2.70		1.16	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS6

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6×5×									
		⅜		5⁄16		¼		3⁄16[a]		1⁄8[a], [b], [c]	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116	
Nom. Weight, lb/ft		24.93		21.21		17.32		13.25		9.01	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	206	310	175	263	143	215	109	163	61.2	92.0
	1	205	309	175	263	142	214	108	163	61.1	91.9
	2	204	306	173	260	141	212	108	162	60.8	91.4
	3	201	302	171	257	139	210	106	160	60.3	90.7
	4	197	296	168	252	137	206	104	157	59.6	89.6
	5	192	288	163	246	134	201	102	153	58.7	88.3
	6	186	279	159	238	130	195	98.9	149	57.7	86.7
	7	179	269	153	230	125	188	95.7	144	56.4	84.8
	8	172	258	147	220	120	181	92.0	138	55.0	82.7
	9	163	246	140	210	115	173	88.0	132	53.5	80.3
	10	155	233	133	200	109	164	83.7	126	51.8	77.8
	11	146	219	125	188	103	155	79.3	119	49.9	75.0
	12	137	205	118	177	97.0	146	74.7	112	47.8	71.9
	13	127	191	110	165	90.7	136	70.0	105	45.4	68.2
	14	118	177	102	153	84.4	127	65.2	98.0	42.9	64.4
	15	108	163	93.9	141	78.0	117	60.5	90.9	40.3	60.6
	16	99.2	149	86.2	130	71.8	108	55.8	83.8	37.8	56.8
	17	90.2	136	78.7	118	65.7	98.8	51.2	76.9	35.2	52.9
	18	81.6	123	71.4	107	59.8	89.9	46.7	70.2	32.2	48.4
	19	73.3	110	64.3	96.7	54.1	81.3	42.4	63.8	29.3	44.0
	20	66.2	99.5	58.0	87.2	48.8	73.3	38.3	57.5	26.5	39.8
	21	60.0	90.2	52.7	79.1	44.3	66.5	34.7	52.2	24.0	36.1
	22	54.7	82.2	48.0	72.1	40.3	60.6	31.6	47.5	21.9	32.9
	23	50.0	75.2	43.9	66.0	36.9	55.5	28.9	43.5	20.0	30.1
	24	46.0	69.1	40.3	60.6	33.9	50.9	26.6	39.9	18.4	27.6
	25	42.4	63.7	37.2	55.8	31.2	46.9	24.5	36.8	16.9	25.4
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		206	310	175	263	143	215	109	163	73.7	111
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		160	240	136	204	111	166	84.4	127	57.2	85.8
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		62.1	93.3	53.6	80.6	44.4	66.7	34.3	51.5	23.5	35.4
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		49.5	74.4	43.2	64.9	36.0	54.1	28.0	42.1	19.4	29.1
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		34.4	51.8	29.7	44.6	24.6	37.0	19.0	28.6	10.5	15.7
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		30.4	45.8	26.2	39.4	21.8	32.7	15.3	23.0	8.67	13.0
Properties											
Area, in.^{2}		6.88		5.85		4.77		3.63		2.46	
r_y, in.		1.92		1.95		1.98		2.01		2.03	
r_x/r_y		1.16		1.15		1.15		1.15		1.15	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS6

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6×4×									
		½		⅜		5⁄16		¼		3⁄16[a]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		28.43		22.37		19.08		15.62		11.97	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	236	355	185	278	157	237	129	193	98.2	148
	1	235	353	184	277	157	236	128	193	97.8	147
	2	232	348	182	273	155	233	127	190	96.7	145
	3	226	340	178	267	152	228	124	187	94.8	142
	4	219	329	173	259	147	221	121	181	92.2	139
	5	210	315	166	249	142	213	116	175	88.9	134
	6	199	300	158	238	135	203	111	167	85.1	128
	7	188	282	149	224	128	193	106	159	80.9	122
	8	175	263	140	210	120	181	99.3	149	76.2	115
	9	161	243	130	195	112	168	92.6	139	71.2	107
	10	148	222	119	179	103	155	85.8	129	66.1	99.3
	11	134	201	109	164	94.5	142	78.8	118	60.8	91.4
	12	120	181	98.4	148	85.8	129	71.7	108	55.5	83.4
	13	107	161	88.2	133	77.2	116	64.8	97.4	50.3	75.5
	14	94.3	142	78.4	118	68.9	104	58.1	87.3	45.2	67.9
	15	82.3	124	68.9	104	60.9	91.6	51.6	77.6	40.3	60.5
	16	72.3	109	60.5	91.0	53.5	80.5	45.4	68.3	35.5	53.4
	17	64.0	96.2	53.6	80.6	47.4	71.3	40.3	60.5	31.5	47.3
	18	57.1	85.9	47.8	71.9	42.3	63.6	35.9	54.0	28.1	42.2
	19	51.3	77.1	42.9	64.5	38.0	57.1	32.2	48.4	25.2	37.9
	20	46.3	69.5	38.7	58.2	34.3	51.5	29.1	43.7	22.7	34.2
	21	42.0	63.1	35.1	52.8	31.1	46.7	26.4	39.7	20.6	31.0
	22	38.2	57.5	32.0	48.1	28.3	42.6	24.0	36.1	18.8	28.2
	23	35.0	52.6	29.3	44.0	25.9	38.9	22.0	33.1	17.2	25.8
	24	32.1	48.3	26.9	40.4	23.8	35.8	20.2	30.4	15.8	23.7
	25	29.6	44.5	24.8	37.3	21.9	33.0	18.6	28.0	14.6	21.9
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		236	355	185	278	157	237	129	194	98.2	148
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		183	275	144	216	122	183	100	150	76.3	114
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		77.0	116	62.1	93.3	53.6	80.6	44.4	66.7	34.3	51.5
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		43.4	65.3	37.0	55.6	32.7	49.2	27.6	41.5	21.8	32.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		36.4	54.8	29.7	44.6	25.7	38.6	21.3	32.0	16.5	24.8
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		27.4	41.3	22.3	33.5	19.3	29.1	16.1	24.2	11.4	17.2
Properties											
Area, in.^{2}		7.88		6.18		5.26		4.30		3.28	
r_y, in.		1.50		1.55		1.58		1.61		1.63	
r_x/r_y		1.39		1.38		1.37		1.37		1.37	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Note: Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.

HSS6

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6×4×		HSS6×3×							
		⅛[a], [b], [c]		½		⅜		5⁄16		¼	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		8.16		25.03		19.82		16.96		13.91	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	57.9	87.0	208	313	164	247	140	211	115	173
	1	57.7	86.7	206	310	163	245	139	209	114	172
	2	57.2	85.9	201	302	159	239	136	204	112	168
	3	56.3	84.6	193	290	153	230	131	197	108	162
	4	55.1	82.8	182	273	145	218	124	187	103	154
	5	53.6	80.6	169	254	135	203	116	175	96.3	145
	6	51.8	77.9	154	231	124	187	107	161	89.1	134
	7	49.8	74.9	138	207	113	169	97.3	146	81.3	122
	8	47.6	71.5	122	183	100	151	87.1	131	73.1	110
	9	45.2	67.9	105	158	88.0	132	76.7	115	64.8	97.4
	10	42.6	64.0	89.9	135	76.0	114	66.6	100	56.7	85.2
	11	39.9	60.0	75.2	113	64.7	97.2	57.0	85.7	48.8	73.4
	12	37.2	55.9	63.2	95.0	54.4	81.7	48.0	72.2	41.4	62.3
	13	34.4	51.7	53.8	80.9	46.3	69.6	40.9	61.5	35.3	53.1
	14	31.6	47.5	46.4	69.8	39.9	60.0	35.3	53.0	30.4	45.7
	15	28.3	42.5	40.4	60.8	34.8	52.3	30.7	46.2	26.5	39.9
	16	25.1	37.7	35.5	53.4	30.6	46.0	27.0	40.6	23.3	35.0
	17	22.2	33.4	31.5	47.3	27.1	40.7	23.9	36.0	20.6	31.0
	18	19.8	29.8	28.1	42.2	24.2	36.3	21.4	32.1	18.4	27.7
	19	17.8	26.7			21.7	32.6	19.2	28.8	16.5	24.8
	20	16.0	24.1							14.9	22.4
	21	14.5	21.9								
	22	13.3	19.9								
	23	12.1	18.2								
	24	11.1	16.7								
	25	10.3	15.4								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		66.8	100	208	313	164	247	140	211	115	173
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		51.8	77.8	162	242	127	191	109	163	89.3	134
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		23.5	35.4	77.0	116	62.1	93.3	53.6	80.6	44.4	66.7
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.2	22.9	26.7	40.2	24.5	36.7	22.3	33.5	19.3	28.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		10.1	15.2	30.2	45.4	24.7	37.1	21.5	32.3	17.9	27.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		6.46	9.71	18.2	27.3	15.0	22.6	13.1	19.8	11.0	16.5
Properties											
Area, in.^{2}		2.23		6.95		5.48		4.68		3.84	
r_y, in.		1.66		1.12		1.17		1.19		1.22	
r_x/r_y		1.36		1.76		1.74		1.74		1.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS6

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6×3×				HSS6×2×					
		3/16[a]		1/8[a], [c]		3/8		5/16		1/4	
t_{des}, in.		0.174		0.116		0.349		0.291		0.233	
Nom. Weight, lb/ft		10.70		7.31		17.27		14.83		12.21	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	87.7	132	51.0	76.6	143	215	123	184	101	152
	1	87.1	131	50.7	76.2	141	211	121	181	99.3	149
	2	85.4	128	49.9	75.1	133	200	115	172	94.6	142
	3	82.6	124	48.7	73.2	121	183	105	158	87.3	131
	4	78.8	118	47.0	70.7	107	161	93.4	140	78.0	117
	5	74.1	111	44.9	67.5	90.7	136	80.1	120	67.6	102
	6	68.8	103	42.5	63.9	74.2	112	66.4	99.7	56.6	85.1
	7	63.1	94.8	39.8	59.8	58.6	88.0	53.1	79.9	46.0	69.1
	8	57.0	85.7	36.9	55.4	45.0	67.7	41.2	61.9	36.1	54.2
	9	50.8	76.4	33.8	50.8	35.6	53.5	32.6	48.9	28.5	42.8
	10	44.7	67.2	30.6	46.0	28.8	43.3	26.4	39.6	23.1	34.7
	11	38.8	58.3	27.2	40.9	23.8	35.8	21.8	32.8	19.1	28.7
	12	33.2	49.9	23.4	35.2	20.0	30.1	18.3	27.5	16.0	24.1
	13	28.3	42.5	19.9	29.9			15.6	23.5	13.7	20.5
	14	24.4	36.6	17.2	25.8						
	15	21.2	31.9	15.0	22.5						
	16	18.7	28.1	13.2	19.8						
	17	16.5	24.9	11.7	17.5						
	18	14.7	22.2	10.4	15.6						
	19	13.2	19.9	9.33	14.0						
	20	11.9	18.0	8.42	12.7						
	21			7.64	11.5						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		87.7	132	59.9	90.0	143	215	123	185	101	152
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		68.1	102	46.5	69.8	111	167	95.3	143	78.4	118
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		34.3	51.5	23.5	35.4	62.1	93.3	53.6	80.6	44.4	66.7
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.5	23.3	11.0	16.6	11.9	18.0	11.8	17.8	10.9	16.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		13.9	21.0	9.66	14.5	19.8	29.7	17.3	26.1	14.6	21.9
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		7.90	11.9	4.46	6.70	8.63	13.0	7.66	11.5	6.51	9.79
Properties											
Area, in.^{2}		2.93		2.00		4.78		4.10		3.37	
r_y, in.		1.25		1.27		0.760		0.785		0.810	
r_x/r_y		1.71		1.71		2.49		2.46		2.43	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS6–HSS5

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6×2×				HSS5×4×					
		3/16[a]		1/8[a], [c]		1/2		3/8		5/16	
t_{des}, in.		0.174		0.116		0.465		0.349		0.291	
Nom. Weight, lb/ft		9.42		6.46		25.03		19.82		16.96	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	77.2	116	44.1	66.3	208	313	164	247	140	211
	1	76.1	114	43.6	65.6	207	311	163	245	139	210
	2	72.7	109	42.3	63.5	204	307	161	242	138	207
	3	67.5	101	40.1	60.3	199	299	157	237	135	202
	4	60.7	91.2	37.3	56.0	192	289	153	229	131	196
	5	53.0	79.7	33.9	50.9	184	276	146	220	125	188
	6	44.9	67.5	30.1	45.3	174	262	139	209	119	179
	7	36.9	55.5	26.2	39.3	163	246	131	197	113	169
	8	29.4	44.2	21.4	32.1	152	228	123	184	105	159
	9	23.2	34.9	16.9	25.4	139	210	113	170	97.8	147
	10	18.8	28.3	13.7	20.6	127	191	104	156	89.9	135
	11	15.6	23.4	11.3	17.0	114	172	94.5	142	81.9	123
	12	13.1	19.6	9.51	14.3	102	154	85.1	128	73.9	111
	13	11.1	16.7	8.10	12.2	90.3	136	76.0	114	66.2	99.5
	14			6.99	10.5	78.9	119	67.2	101	58.7	88.2
	15					68.7	103	58.7	88.3	51.5	77.4
	16					60.4	90.8	51.6	77.6	45.3	68.0
	17					53.5	80.4	45.7	68.7	40.1	60.3
	18					47.7	71.7	40.8	61.3	35.8	53.7
	19					42.8	64.4	36.6	55.0	32.1	48.2
	20					38.7	58.1	33.0	49.7	29.0	43.5
	21					35.1	52.7	30.0	45.0	26.3	39.5
	22					31.9	48.0	27.3	41.0	23.9	36.0
	23					29.2	43.9	25.0	37.5	21.9	32.9
	24					26.8	40.4	22.9	34.5	20.1	30.2
	25							21.1	31.8	18.5	27.9
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		77.2	116	53.0	79.7	208	313	164	247	140	211
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		60.0	90.0	41.2	61.7	162	242	127	191	109	163
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		34.3	51.5	23.5	35.4	60.1	90.4	49.5	74.4	43.2	64.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		9.25	13.9	6.88	10.3	43.4	65.3	37.0	55.6	32.7	49.2
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		11.4	17.2	7.96	12.0	27.2	40.9	22.4	33.6	19.4	29.2
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		4.71	7.08	2.67	4.01	23.3	35.1	19.1	28.8	16.6	25.0
Properties											
Area, in.^{2}		2.58		1.77		6.95		5.48		4.68	
r_y, in.		0.836		0.861		1.46		1.52		1.54	
r_x/r_y		2.40		2.38		1.20		1.19		1.19	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5×4×						HSS5×3×			
		¼		3⁄16		1⁄8[a], [b], [c]		½		3⁄8	
t_{des}, in.		0.233		0.174		0.116		0.465		0.349	
Nom. Weight, lb/ft		13.91		10.70		7.31		21.63		17.27	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	115	173	87.7	132	56.4	84.7	180	271	143	215
	1	114	172	87.4	131	56.2	84.4	179	269	142	213
	2	113	170	86.3	130	55.6	83.6	174	261	139	208
	3	111	166	84.5	127	54.7	82.2	166	250	133	200
	4	107	161	82.1	123	53.5	80.4	156	235	126	189
	5	103	155	79.2	119	51.9	78.0	144	217	117	176
	6	98.6	148	75.7	114	50.0	75.2	131	197	107	161
	7	93.3	140	71.7	108	47.9	72.0	117	175	96.2	145
	8	87.5	131	67.4	101	45.6	68.5	102	154	85.2	128
	9	81.3	122	62.9	94.5	43.1	64.8	87.9	132	74.2	112
	10	75.0	113	58.1	87.4	40.1	60.3	74.3	112	63.7	95.7
	11	68.6	103	53.3	80.2	36.9	55.4	61.7	92.7	53.6	80.5
	12	62.2	93.4	48.5	72.9	33.6	50.5	51.8	77.9	45.0	67.7
	13	55.9	84.0	43.8	65.8	30.4	45.7	44.2	66.4	38.4	57.7
	14	49.8	74.8	39.2	58.9	27.3	41.0	38.1	57.2	33.1	49.7
	15	43.9	66.0	34.8	52.3	24.3	36.5	33.2	49.9	28.8	43.3
	16	38.6	58.0	30.6	46.0	21.4	32.2	29.2	43.8	25.3	38.1
	17	34.2	51.4	27.1	40.7	19.0	28.5	25.8	38.8	22.4	33.7
	18	30.5	45.8	24.2	36.3	16.9	25.4	23.0	34.6	20.0	30.1
	19	27.4	41.1	21.7	32.6	15.2	22.8				
	20	24.7	37.1	19.6	29.4	13.7	20.6				
	21	22.4	33.7	17.8	26.7	12.4	18.7				
	22	20.4	30.7	16.2	24.3	11.3	17.0				
	23	18.7	28.1	14.8	22.2	10.4	15.6				
	24	17.2	25.8	13.6	20.4	9.51	14.3				
	25	15.8	23.8	12.5	18.8	8.77	13.2				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		115	173	87.7	132	59.9	90.0	180	271	143	215
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		89.3	134	68.1	102	46.5	69.8	140	210	111	167
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		36.0	54.1	28.0	42.1	19.4	29.1	60.1	90.4	49.5	74.4
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		27.6	41.5	21.8	32.7	15.2	22.9	26.7	40.2	24.5	36.7
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		16.2	24.3	12.6	18.9	7.84	11.8	22.0	33.1	18.3	27.5
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		13.9	20.9	10.8	16.3	6.10	9.18	15.2	22.9	12.7	19.1
Properties											
Area, in.^{2}		3.84		2.93		2.00		6.02		4.78	
r_y, in.		1.57		1.60		1.62		1.09		1.14	
r_x/r_y		1.19		1.19		1.19		1.51		1.51	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[b]Shape exceeds the compact limit for flexure about the X-X axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5×3×								HSS5×2½×	
		5/16		1/4		3/16		1/8[a], [c]		1/4	
t_{des}, in.		0.291		0.233		0.174		0.116		0.233	
Nom. Weight, lb/ft		14.83		12.21		9.42		6.46		11.36	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	123	184	101	152	77.2	116	49.5	74.4	94.0	141
	1	122	183	100	151	76.7	115	49.2	74.0	93.0	140
	2	119	179	97.9	147	75.1	113	48.4	72.8	90.1	135
	3	115	172	94.4	142	72.5	109	47.1	70.8	85.5	129
	4	109	163	89.6	135	69.0	104	45.4	68.2	79.4	119
	5	101	152	83.8	126	64.7	97.3	43.2	65.0	72.2	109
	6	93.1	140	77.2	116	59.9	90.0	40.7	61.2	64.3	96.6
	7	84.2	127	70.1	105	54.6	82.1	38.0	57.0	56.1	84.3
	8	75.0	113	62.7	94.2	49.1	73.8	34.4	51.7	47.9	71.9
	9	65.8	99.0	55.2	83.0	43.6	65.5	30.7	46.1	40.0	60.1
	10	56.9	85.5	48.0	72.1	38.1	57.2	27.0	40.6	32.7	49.2
	11	48.4	72.7	41.0	61.7	32.8	49.3	23.4	35.2	27.0	40.6
	12	40.7	61.1	34.6	52.0	27.8	41.8	20.0	30.1	22.7	34.1
	13	34.7	52.1	29.5	44.3	23.7	35.6	17.1	25.7	19.4	29.1
	14	29.9	44.9	25.4	38.2	20.5	30.7	14.7	22.1	16.7	25.1
	15	26.0	39.1	22.1	33.3	17.8	26.8	12.8	19.3	14.5	21.9
	16	22.9	34.4	19.5	29.2	15.7	23.5	11.3	16.9	12.8	19.2
	17	20.3	30.5	17.2	25.9	13.9	20.8	9.99	15.0		
	18	18.1	27.2	15.4	23.1	12.4	18.6	8.91	13.4		
	19	16.2	24.4	13.8	20.7	11.1	16.7	8.00	12.0		
	20					10.0	15.1	7.22	10.8		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		123	185	101	152	77.2	116	53.0	79.7	94.0	141
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		95.3	143	78.4	118	60.0	90.0	41.2	61.7	73.0	110
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		43.2	64.9	36.0	54.1	28.0	42.1	19.4	29.1	36.0	54.1
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		22.3	33.5	19.3	28.9	15.5	23.3	11.0	16.6	15.1	22.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		16.0	24.1	13.4	20.2	10.5	15.8	7.31	11.0	12.1	18.1
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		11.2	16.8	9.41	14.1	7.39	11.1	4.22	6.34	7.36	11.1
Properties											
Area, in.^{2}		4.10		3.37		2.58		1.77		3.14	
r_y, in.		1.17		1.19		1.22		1.25		0.999	
r_x/r_y		1.50		1.50		1.49		1.48		1.73	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5×2½×				HSS5×2×					
		3/16		1/8[a], [c]		3/8		5/16		1/4	
t_{des}, in.		0.174		0.116		0.349		0.291		0.233	
Nom. Weight, lb/ft		8.78		6.03		14.72		12.70		10.51	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	72.2	108	45.9	69.0	122	184	105	158	87.1	131
	1	71.4	107	45.5	68.4	120	181	104	156	85.7	129
	2	69.3	104	44.5	66.9	114	171	98.2	148	81.5	123
	3	65.9	99.0	42.9	64.5	103	155	89.9	135	75.1	113
	4	61.4	92.2	40.7	61.2	90.6	136	79.4	119	66.8	100
	5	56.0	84.2	38.0	57.2	76.5	115	67.8	102	57.6	86.5
	6	50.1	75.3	35.0	52.6	62.2	93.5	55.8	83.9	48.0	72.1
	7	43.9	66.0	30.9	46.5	48.7	73.2	44.3	66.7	38.7	58.1
	8	37.8	56.7	26.8	40.3	37.3	56.1	34.2	51.4	30.1	45.3
	9	31.8	47.8	22.8	34.3	29.5	44.3	27.0	40.6	23.8	35.8
	10	26.2	39.3	19.0	28.5	23.9	35.9	21.9	32.9	19.3	29.0
	11	21.6	32.5	15.7	23.6	19.7	29.7	18.1	27.2	15.9	24.0
	12	18.2	27.3	13.2	19.8	16.6	24.9	15.2	22.9	13.4	20.1
	13	15.5	23.3	11.2	16.9					11.4	17.2
	14	13.4	20.1	9.69	14.6						
	15	11.6	17.5	8.44	12.7						
	16	10.2	15.4	7.42	11.1						
	17	9.06	13.6	6.57	9.88						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		72.2	108	49.4	74.3	122	184	105	158	87.1	131
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		56.0	84.0	38.4	57.5	95.1	143	81.8	123	67.7	101
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		28.0	42.1	19.4	29.1	49.5	74.4	43.2	64.9	36.0	54.1
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		12.4	18.6	8.96	13.5	11.9	18.0	11.8	17.8	10.9	16.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		9.46	14.2	6.61	9.94	14.2	21.4	12.6	18.9	10.7	16.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		5.81	8.74	3.34	5.02	7.19	10.8	6.41	9.64	5.49	8.25
Properties											
Area, in.^{2}		2.41		1.65		4.09		3.52		2.91	
r_y, in.		1.02		1.05		0.748		0.772		0.797	
r_x/r_y		1.74		1.71		2.13		2.11		2.10	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5–HSS4

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5×2×				HSS4×3×					
		3/16		1/8[a], [c]		3/8		5/16		1/4	
t_{des}, in.		0.174		0.116		0.349		0.291		0.233	
Nom. Weight, lb/ft		8.15		5.61		14.72		12.70		10.51	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	67.1	101	42.6	64.0	122	184	105	158	87.1	131
	1	66.0	99.2	42.1	63.3	121	182	105	157	86.4	130
	2	63.0	94.7	40.7	61.2	118	178	102	153	84.4	127
	3	58.3	87.6	38.5	57.9	113	170	97.9	147	81.2	122
	4	52.3	78.6	35.6	53.4	107	161	92.4	139	76.9	116
	5	45.5	68.3	32.0	48.1	98.9	149	85.8	129	71.6	108
	6	38.3	57.6	27.2	40.9	90.0	135	78.3	118	65.7	98.8
	7	31.3	47.1	22.5	33.8	80.6	121	70.4	106	59.4	89.2
	8	24.7	37.2	18.1	27.2	70.9	107	62.2	93.4	52.8	79.4
	9	19.6	29.4	14.3	21.4	61.3	92.1	54.0	81.2	46.2	69.5
	10	15.8	23.8	11.6	17.4	52.1	78.3	46.2	69.4	39.8	59.9
	11	13.1	19.7	9.55	14.4	43.5	65.3	38.8	58.3	33.8	50.8
	12	11.0	16.5	8.03	12.1	36.5	54.9	32.6	49.0	28.4	42.7
	13	9.37	14.1	6.84	10.3	31.1	46.8	27.8	41.7	24.2	36.3
	14			5.90	8.86	26.8	40.3	23.9	36.0	20.9	31.3
	15					23.4	35.1	20.9	31.3	18.2	27.3
	16					20.5	30.9	18.3	27.5	16.0	24.0
	17					18.2	27.4	16.2	24.4	14.1	21.3
	18					16.2	24.4	14.5	21.8	12.6	19.0
	19									11.3	17.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		67.1	101	46.1	69.3	122	184	105	158	87.1	131
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		52.1	78.1	35.8	53.7	95.1	143	81.8	123	67.7	101
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		28.0	42.1	19.4	29.1	37.0	55.6	32.7	49.2	27.6	41.5
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		9.25	13.9	6.88	10.3	24.5	36.7	22.3	33.5	19.3	28.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		8.41	12.6	5.91	8.89	12.8	19.2	11.3	16.9	9.51	14.3
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		4.37	6.56	2.51	3.78	10.4	15.7	9.21	13.8	7.78	11.7
Properties											
Area, in.^{2}		2.24		1.54		4.09		3.52		2.91	
r_y, in.		0.823		0.848		1.11		1.13		1.16	
r_x/r_y		2.07		2.05		1.25		1.26		1.25	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.
[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS4

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS4×3×				HSS4×2½×					
		3/16		1/8[a]		1/4		3/16		1/8[a]	
t_{des}, in.		0.174		0.116		0.233		0.174		0.116	
Nom. Weight, lb/ft		8.15		5.61		9.66		7.51		5.18	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	67.1	101	46.1	69.3	79.9	120	61.7	92.7	42.5	63.9
	1	66.6	100	45.8	68.8	79.1	119	61.0	91.7	42.1	63.3
	2	65.1	97.8	44.8	67.3	76.5	115	59.1	88.9	40.9	61.4
	3	62.7	94.3	43.2	65.0	72.3	109	56.1	84.3	38.9	58.4
	4	59.5	89.5	41.1	61.8	66.9	101	52.1	78.3	36.3	54.5
	5	55.7	83.7	38.5	57.9	60.5	91.0	47.4	71.2	33.2	49.9
	6	51.3	77.1	35.6	53.5	53.6	80.5	42.2	63.4	29.7	44.7
	7	46.6	70.0	32.4	48.7	46.4	69.7	36.8	55.3	26.1	39.3
	8	41.7	62.6	29.1	43.7	39.2	59.0	31.4	47.2	22.5	33.9
	9	36.7	55.2	25.8	38.7	32.5	48.8	26.2	39.4	19.0	28.6
	10	31.9	47.9	22.5	33.8	26.4	39.7	21.5	32.3	15.7	23.6
	11	27.3	41.0	19.3	29.0	21.8	32.8	17.7	26.7	13.0	19.5
	12	23.0	34.6	16.3	24.6	18.3	27.5	14.9	22.4	10.9	16.4
	13	19.6	29.4	13.9	20.9	15.6	23.5	12.7	19.1	9.30	14.0
	14	16.9	25.4	12.0	18.0	13.5	20.2	10.9	16.5	8.02	12.1
	15	14.7	22.1	10.5	15.7	11.7	17.6	9.54	14.3	6.99	10.5
	16	12.9	19.4	9.19	13.8	10.3	15.5	8.38	12.6	6.14	9.23
	17	11.5	17.2	8.14	12.2					5.44	8.18
	18	10.2	15.4	7.26	10.9						
	19	9.17	13.8	6.52	9.80						
	20			5.88	8.84						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		67.1	101	46.1	69.3	79.9	120	61.7	92.7	42.5	63.9
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		52.1	78.1	35.8	53.7	62.1	93.1	47.9	71.8	33.0	49.5
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		21.8	32.7	15.2	22.9	27.6	41.5	21.8	32.7	15.2	22.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.5	23.3	11.0	16.6	15.1	22.6	12.4	18.6	8.96	13.5
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		7.49	11.3	5.26	7.91	8.43	12.7	6.66	10.0	4.69	7.05
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		6.14	9.23	3.95	5.93	6.06	9.11	4.82	7.24	3.11	4.67
Properties											
Area, in.^{2}		2.24		1.54		2.67		2.06		1.42	
r_y, in.		1.19		1.21		0.973		0.999		1.03	
r_x/r_y		1.25		1.26		1.45		1.44		1.43	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS4

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS4×2×									
		⅜		5⁄16		¼		3⁄16		⅛[a]	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116	
Nom. Weight, lb/ft		12.17		10.58		8.81		6.87		4.75	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	101	153	88.0	132	73.1	110	56.6	85.0	38.9	58.5
	1	99.5	150	86.4	130	71.8	108	55.7	83.7	38.3	57.6
	2	93.8	141	81.7	123	68.2	102	53.0	79.7	36.6	55.0
	3	84.9	128	74.5	112	62.5	93.9	48.9	73.5	33.9	51.0
	4	73.9	111	65.5	98.4	55.3	83.2	43.6	65.5	30.5	45.8
	5	61.9	93.0	55.4	83.3	47.3	71.2	37.7	56.6	26.6	39.9
	6	49.7	74.8	45.2	67.9	39.1	58.8	31.5	47.3	22.5	33.7
	7	38.4	57.7	35.5	53.4	31.2	46.9	25.5	38.3	18.4	27.7
	8	29.4	44.2	27.3	41.0	24.1	36.3	19.9	29.9	14.6	22.0
	9	23.2	34.9	21.5	32.4	19.1	28.7	15.7	23.7	11.5	17.3
	10	18.8	28.3	17.4	26.2	15.5	23.2	12.8	19.2	9.35	14.1
	11	15.5	23.4	14.4	21.7	12.8	19.2	10.5	15.8	7.73	11.6
	12	13.1	19.6	12.1	18.2	10.7	16.1	8.86	13.3	6.49	9.76
	13							7.55	11.3	5.53	8.31
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		101	153	88.0	132	73.1	110	56.6	85.1	38.9	58.5
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		78.8	118	68.4	103	56.7	85.1	43.9	65.9	30.2	45.3
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		37.0	55.6	32.7	49.2	27.6	41.5	21.8	32.7	15.2	22.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		11.9	18.0	11.8	17.8	10.9	16.4	9.25	13.9	6.88	10.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		9.58	14.4	8.56	12.9	7.34	11.0	5.84	8.78	4.14	6.23
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		5.76	8.66	5.19	7.80	4.47	6.71	3.57	5.36	2.34	3.52
Properties											
Area, in.^{2}		3.39		2.94		2.44		1.89		1.30	
r_y, in.		0.729		0.754		0.779		0.804		0.830	
r_x/r_y		1.77		1.75		1.75		1.73		1.72	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS4–HSS3½

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS4×1½×						HSS3½×2½×			
		¼		3/16		⅛[a]		3/8		5/16	
t_{des}, in.		0.233		0.174		0.116		0.349		0.291	
Nom. Weight, lb/ft		7.96		6.23		4.33		12.17		10.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	66.2	99.4	51.2	76.9	35.6	53.5	101	153	88.0	132
	1	64.1	96.3	49.7	74.7	34.7	52.1	100	151	87.0	131
	2	58.3	87.6	45.6	68.5	32.0	48.1	96.4	145	83.8	126
	3	49.7	74.7	39.4	59.2	28.0	42.1	90.4	136	78.9	119
	4	39.8	59.9	32.2	48.3	23.2	34.9	82.6	124	72.4	109
	5	29.9	45.0	24.8	37.2	18.2	27.4	73.5	111	64.9	97.6
	6	21.3	32.0	18.0	27.0	13.6	20.4	63.8	95.9	56.8	85.4
	7	15.6	23.5	13.2	19.8	9.97	15.0	54.0	81.1	48.5	72.9
	8	12.0	18.0	10.1	15.2	7.63	11.5	44.5	66.9	40.4	60.7
	9	9.45	14.2	7.99	12.0	6.03	9.06	35.7	53.7	32.8	49.2
	10			6.47	9.72	4.88	7.34	28.9	43.5	26.5	39.9
	11							23.9	35.9	21.9	33.0
	12							20.1	30.2	18.4	27.7
	13							17.1	25.7	15.7	23.6
	14							14.8	22.2	13.5	20.4
	15							12.9	19.3	11.8	17.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		66.2	99.5	51.2	77.0	35.6	53.6	101	153	88.0	132
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		51.4	77.1	39.8	59.6	27.7	41.5	78.8	118	68.4	103
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		27.6	41.5	21.8	32.7	15.2	22.9	30.7	46.2	27.5	41.3
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.71	10.1	6.11	9.19	4.79	7.20	18.2	27.3	17.0	25.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		6.24	9.38	5.01	7.54	3.57	5.36	8.96	13.5	7.98	12.0
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		3.02	4.54	2.45	3.68	1.62	2.44	7.04	10.6	6.29	9.45
Properties											
Area, in.^{2}		2.21		1.71		1.19		3.39		2.94	
r_y, in.		0.576		0.602		0.627		0.904		0.930	
r_x/r_y		2.24		2.21		2.17		1.31		1.31	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:

1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3½

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3½×2½×						HSS3½×2×			
		¼		3/16		1/8[a]		¼		3/16	
t_{des}, in.		0.233		0.174		0.116		0.233		0.174	
Nom. Weight, lb/ft		8.81		6.87		4.75		7.96		6.23	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	73.1	110	56.6	85.0	38.9	58.5	66.2	99.4	51.2	76.9
	1	72.2	109	56.0	84.1	38.5	57.9	65.0	97.7	50.3	75.7
	2	69.8	105	54.2	81.4	37.3	56.1	61.6	92.6	47.9	72.0
	3	65.9	99.0	51.3	77.1	35.5	53.3	56.3	84.6	44.0	66.2
	4	60.8	91.3	47.5	71.4	33.0	49.6	49.7	74.6	39.1	58.8
	5	54.8	82.3	43.1	64.8	30.1	45.2	42.2	63.5	33.7	50.6
	6	48.3	72.5	38.2	57.5	26.8	40.3	34.7	52.1	28.0	42.1
	7	41.5	62.4	33.2	49.9	23.5	35.3	27.5	41.3	22.5	33.8
	8	34.9	52.5	28.2	42.3	20.1	30.2	21.1	31.8	17.5	26.3
	9	28.7	43.2	23.4	35.2	16.9	25.4	16.7	25.1	13.8	20.8
	10	23.3	35.0	19.1	28.7	13.8	20.8	13.5	20.3	11.2	16.8
	11	19.2	28.9	15.8	23.7	11.4	17.2	11.2	16.8	9.25	13.9
	12	16.2	24.3	13.2	19.9	9.61	14.4	9.40	14.1	7.78	11.7
	13	13.8	20.7	11.3	17.0	8.19	12.3			6.62	9.96
	14	11.9	17.8	9.73	14.6	7.06	10.6				
	15	10.3	15.5	8.47	12.7	6.15	9.25				
	16			7.45	11.2	5.41	8.13				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		73.1	110	56.6	85.1	38.9	58.5	66.2	99.5	51.2	77.0
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		56.7	85.1	43.9	65.9	30.2	45.3	51.4	77.1	39.8	59.6
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		23.4	35.2	18.6	28.0	13.1	19.7	23.4	35.2	18.6	28.0
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.1	22.6	12.4	18.6	8.96	13.5	10.9	16.4	9.25	13.9
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		6.84	10.3	5.44	8.18	3.84	5.78	5.89	8.85	4.72	7.09
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		5.39	8.10	4.29	6.45	3.03	4.55	3.94	5.93	3.17	4.76
Properties											
Area, in.^{2}		2.44		1.89		1.30		2.21		1.71	
r_y, in.		0.956		0.983		1.01		0.766		0.792	
r_x/r_y		1.31		1.30		1.30		1.57		1.55	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3½–HSS3

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3½×2×		HSS3½×1½×						HSS3×2½×	
		⅛[a]		¼		3⁄16		⅛[a]		5⁄16	
t_{des}, in.		0.116		0.233		0.174		0.116		0.291	
Nom. Weight, lb/ft		4.33		7.11		5.59		3.90		9.51	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y:	0	35.6	53.5	59.0	88.6	46.1	69.3	32.0	48.1	79.0	119
	1	35.1	52.7	57.1	85.8	44.8	67.3	31.2	46.8	78.0	117
	2	33.5	50.3	51.8	77.8	40.9	61.5	28.7	43.1	75.1	113
	3	30.9	46.5	44.0	66.2	35.2	53.0	25.0	37.6	70.5	106
	4	27.7	41.6	35.1	52.7	28.6	43.0	20.6	31.0	64.4	96.8
	5	24.0	36.1	26.2	39.3	21.9	32.9	16.1	24.2	57.4	86.3
	6	20.2	30.4	18.5	27.8	15.8	23.7	11.9	17.9	49.9	75.0
	7	16.5	24.8	13.6	20.4	11.6	17.4	8.73	13.1	42.3	63.5
	8	13.0	19.5	10.4	15.6	8.86	13.3	6.69	10.0	34.9	52.5
	9	10.3	15.4	8.22	12.4	7.00	10.5	5.28	7.94	28.0	42.2
	10	8.31	12.5					4.28	6.43	22.7	34.1
	11	6.87	10.3							18.8	28.2
	12	5.77	8.67							15.8	23.7
	13	4.92	7.39							13.4	20.2
	14									11.6	17.4
	15									10.1	15.2
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		35.6	53.6	59.0	88.7	46.1	69.3	32.0	48.2	79.0	119
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		27.7	41.5	45.8	68.7	35.8	53.7	24.9	37.3	61.4	92.1
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		13.1	19.7	23.4	35.2	18.6	28.0	13.1	19.7	22.3	33.5
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.88	10.3	6.71	10.1	6.11	9.19	4.79	7.20	17.0	25.6
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		3.34	5.03	4.94	7.43	3.99	6.00	2.87	4.31	6.26	9.41
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		2.27	3.41	2.64	3.98	2.16	3.25	1.56	2.35	5.49	8.25
Properties											
Area, in.^{2}		1.19		1.97		1.54		1.07		2.64	
r_y, in.		0.818		0.569		0.594		0.619		0.908	
r_x/r_y		1.55		2.00		1.97		1.95		1.16	

[a]Shape exceeds the compact limit for flexure about the Y-Y axis for F_y = 50 ksi.

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3×2½×						HSS3×2×			
		¼		3⁄16		⅛		5⁄16		¼	
t_{des}, in.		0.233		0.174		0.116		0.291		0.233	
Nom. Weight, lb/ft		7.96		6.23		4.33		8.45		7.11	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	66.2	99.4	51.2	76.9	35.6	53.5	70.4	106	59.0	88.6
	1	65.4	98.3	50.6	76.1	35.2	53.0	69.0	104	57.9	87.0
	2	63.1	94.8	48.9	73.5	34.1	51.3	64.9	97.6	54.7	82.3
	3	59.4	89.2	46.2	69.5	32.3	48.6	58.8	88.3	49.9	74.9
	4	54.6	82.0	42.7	64.2	30.0	45.1	51.1	76.8	43.8	65.8
	5	49.0	73.6	38.5	57.9	27.2	40.9	42.6	64.1	37.0	55.6
	6	42.9	64.5	34.0	51.1	24.2	36.4	34.2	51.4	30.1	45.3
	7	36.7	55.1	29.4	44.1	21.0	31.6	26.3	39.5	23.6	35.5
	8	30.6	46.0	24.8	37.2	17.9	26.9	20.1	30.3	18.1	27.2
	9	24.9	37.4	20.4	30.7	14.9	22.4	15.9	23.9	14.3	21.5
	10	20.2	30.3	16.6	24.9	12.2	18.3	12.9	19.4	11.6	17.4
	11	16.7	25.0	13.7	20.6	10.1	15.1	10.7	16.0	9.58	14.4
	12	14.0	21.0	11.5	17.3	8.45	12.7	8.95	13.5	8.05	12.1
	13	11.9	17.9	9.79	14.7	7.20	10.8				
	14	10.3	15.5	8.45	12.7	6.21	9.34				
	15	8.96	13.5	7.36	11.1	5.41	8.13				
	16			6.47	9.72	4.76	7.15				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		66.2	99.5	51.2	77.0	35.6	53.6	70.4	106	59.0	88.7
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		51.4	77.1	39.8	59.6	27.7	41.5	54.6	82.0	45.8	68.7
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		19.3	28.9	15.5	23.3	11.0	16.6	22.3	33.5	19.3	28.9
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		15.1	22.6	12.4	18.6	8.96	13.5	11.8	17.8	10.9	16.4
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		5.39	8.10	4.32	6.49	3.07	4.61	5.26	7.91	4.57	6.86
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		4.74	7.13	3.79	5.70	2.72	4.09	3.94	5.93	3.44	5.18
Properties											
Area, in.^{2}		2.21		1.71		1.19		2.35		1.97	
r_y, in.		0.935		0.963		0.990		0.725		0.751	
r_x/r_y		1.16		1.15		1.15		1.39		1.38	

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3×2×				HSS3×1½×					
		3/16		1/8		1/4		3/16		1/8	
t_{des}, in.		0.174		0.116		0.233		0.174		0.116	
Nom. Weight, lb/ft		5.59		3.90		6.26		4.96		3.48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	46.1	69.3	32.0	48.1	52.1	78.3	41.0	61.6	28.6	43.0
	1	45.3	68.1	31.5	47.4	50.4	75.7	39.8	59.8	27.8	41.8
	2	43.0	64.6	30.0	45.1	45.5	68.4	36.3	54.5	25.6	38.4
	3	39.4	59.3	27.7	41.6	38.5	57.8	31.1	46.7	22.2	33.3
	4	34.9	52.5	24.7	37.1	30.4	45.7	25.0	37.6	18.2	27.4
	5	29.8	44.9	21.3	32.0	22.4	33.7	19.0	28.5	14.1	21.2
	6	24.6	37.0	17.8	26.8	15.8	23.7	13.5	20.4	10.3	15.5
	7	19.7	29.6	14.4	21.7	11.6	17.4	9.95	15.0	7.58	11.4
	8	15.2	22.8	11.3	17.0	8.87	13.3	7.62	11.5	5.80	8.72
	9	12.0	18.1	8.91	13.4	7.01	10.5	6.02	9.05	4.58	6.89
	10	9.73	14.6	7.22	10.9					3.71	5.58
	11	8.04	12.1	5.97	8.97						
	12	6.76	10.2	5.01	7.54						
	13			4.27	6.42						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		46.1	69.3	32.0	48.2	52.1	78.3	41.0	61.7	28.6	43.0
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		35.8	53.7	24.9	37.3	40.5	60.7	31.9	47.8	22.2	33.3
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		15.5	23.3	11.0	16.6	19.3	28.9	15.5	23.3	11.0	16.6
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		9.25	13.9	6.88	10.3	6.71	10.1	6.11	9.19	4.79	7.20
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		3.69	5.55	2.64	3.98	3.77	5.66	3.09	4.65	2.23	3.36
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		2.79	4.20	2.00	3.01	2.27	3.42	1.88	2.82	1.37	2.06
Properties											
Area, in.^{2}		1.54		1.07		1.74		1.37		0.956	
r_y, in.		0.778		0.804		0.559		0.584		0.610	
r_x/r_y		1.38		1.37		1.76		1.75		1.72	

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3–HSS2½

Table 6-D (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3×1×				HSS2½×2×					
		3/16		1/8		1/4		3/16		1/8	
t_{des}, in.		0.174		0.116		0.233		0.174		0.116	
Nom. Weight, lb/ft		4.32		3.05		6.26		4.96		3.48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	35.6	53.5	25.1	37.8	52.1	78.3	41.0	61.6	28.6	43.0
	1	33.1	49.8	23.6	35.4	51.1	76.8	40.3	60.5	28.1	42.3
	2	26.6	40.0	19.5	29.2	48.1	72.4	38.1	57.3	26.7	40.2
	3	18.5	27.8	14.1	21.2	43.6	65.6	34.8	52.3	24.5	36.9
	4	11.2	16.8	8.99	13.5	38.0	57.1	30.6	46.0	21.8	32.7
	5	7.17	10.8	5.75	8.65	31.8	47.8	25.9	39.0	18.7	28.1
	6	4.98	7.49	3.99	6.00	25.6	38.5	21.2	31.9	15.5	23.3
	7					19.8	29.8	16.7	25.1	12.4	18.6
	8					15.2	22.8	12.8	19.3	9.61	14.4
	9					12.0	18.0	10.1	15.2	7.59	11.4
	10					9.71	14.6	8.22	12.3	6.15	9.24
	11					8.02	12.1	6.79	10.2	5.08	7.64
	12					6.74	10.1	5.71	8.58	4.27	6.42
	13									3.64	5.47
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		35.6	53.6	25.1	37.8	52.1	78.3	41.0	61.7	28.6	43.0
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		27.7	41.5	19.5	29.3	40.5	60.7	31.9	47.8	22.2	33.3
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		15.5	23.3	11.0	16.6	15.1	22.6	12.4	18.6	8.96	13.5
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		2.99	4.49	2.72	4.08	10.9	16.4	9.25	13.9	6.88	10.3
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		2.47	3.71	1.82	2.73	3.42	5.14	2.79	4.20	2.02	3.03
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		1.08	1.62	0.811	1.22	2.92	4.39	2.39	3.59	1.73	2.60
Properties											
Area, in.^{2}		1.19		0.840		1.74		1.37		0.956	
r_y, in.		0.380		0.405		0.731		0.758		0.785	
r_x/r_y		2.49		2.44		1.20		1.19		1.19	

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS2½

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS2½×1½×						HSS2½×1×			
		¼		3/16		⅛		3/16		⅛	
t_{des}, in.		0.233		0.174		0.116		0.174		0.116	
Nom. Weight, lb/ft		5.41		4.32		3.05		3.68		2.63	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	45.2	67.9	35.6	53.5	25.1	37.8	30.5	45.9	21.7	32.6
	1	43.6	65.6	34.5	51.9	24.4	36.7	28.3	42.6	20.3	30.5
	2	39.3	59.0	31.3	47.1	22.3	33.6	22.6	34.0	16.6	25.0
	3	32.9	49.4	26.7	40.1	19.3	29.0	15.5	23.3	12.0	18.0
	4	25.7	38.6	21.3	32.0	15.7	23.6	9.31	14.0	7.52	11.3
	5	18.7	28.1	15.9	24.0	12.0	18.1	5.96	8.95	4.81	7.23
	6	13.1	19.6	11.3	17.0	8.68	13.0	4.14	6.22	3.34	5.02
	7	9.59	14.4	8.29	12.5	6.38	9.59				
	8	7.34	11.0	6.35	9.54	4.88	7.34				
	9	5.80	8.72	5.02	7.54	3.86	5.80				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		45.2	68.0	35.6	53.6	25.1	37.8	30.5	45.9	21.7	32.6
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		35.1	52.7	27.7	41.5	19.5	29.3	23.7	35.6	16.8	25.2
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		15.1	22.6	12.4	18.6	8.96	13.5	12.4	18.6	8.96	13.5
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.71	10.1	6.11	9.19	4.79	7.20	2.99	4.49	2.72	4.08
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		2.77	4.16	2.28	3.43	1.67	2.52	1.78	2.67	1.33	2.00
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		1.91	2.87	1.59	2.39	1.17	1.76	0.898	1.35	0.684	1.03
Properties											
Area, in.^{2}		1.51		1.19		0.840		1.02		0.724	
r_y, in.		0.546		0.572		0.597		0.374		0.399	
r_x/r_y		1.51		1.50		1.49		2.13		2.09	

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS2

Table 6-D (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Rectangular HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS2×1½×				HSS2×1×			
		3/16		1/8		3/16		1/8	
t_{des}, in.		0.174		0.116		0.174		0.116	
Nom. Weight, lb/ft		3.68		2.63		3.04		2.20	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	30.5	45.9	21.7	32.6	25.3	38.0	18.2	27.4
	1	29.5	44.4	21.0	31.6	23.4	35.1	17.0	25.5
	2	26.6	40.0	19.1	28.8	18.4	27.7	13.8	20.7
	3	22.4	33.7	16.4	24.6	12.4	18.7	9.76	14.7
	4	17.6	26.5	13.2	19.8	7.34	11.0	6.03	9.07
	5	13.0	19.5	9.94	14.9	4.70	7.06	3.86	5.80
	6	9.08	13.6	7.09	10.7	3.26	4.91	2.68	4.03
	7	6.67	10.0	5.21	7.82				
	8	5.11	7.67	3.99	5.99				
	9	4.03	6.06	3.15	4.73				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		30.5	45.9	21.7	32.6	25.3	38.0	18.2	27.4
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		23.7	35.6	16.8	25.2	19.6	29.5	14.1	21.2
Available Strength in Major Axis Shear, kips		V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$	V_{nx}/Ω_v	$\phi_v V_{nx}$
		9.25	13.9	6.88	10.3	9.25	13.9	6.88	10.3
Available Strength in Minor Axis Shear, kips		V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$	V_{ny}/Ω_v	$\phi_v V_{ny}$
		6.11	9.19	4.79	7.20	2.99	4.49	2.72	4.08
Available Strength in Flexure about X-X Axis, kip-ft		M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$	M_{nx}/Ω_b	$\phi_b M_{nx}$
		1.59	2.40	1.19	1.78	1.20	1.80	0.913	1.37
Available Strength in Flexure about Y-Y Axis, kip-ft		M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$	M_{ny}/Ω_b	$\phi_b M_{ny}$
		1.30	1.95	0.971	1.46	0.719	1.08	0.556	0.836
Properties									
Area, in.^{2}		1.02		0.724		0.845		0.608	
r_y, in.		0.554		0.581		0.365		0.390	
r_x/r_y		1.26		1.25		1.76		1.74	

Notes:
1. Per AISC *Specification* Section F7.4, lateral-torsional buckling should be considered for bending about the X-X axis.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS22

Table 6-E
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS22×22×									
		1		⅞		¾		⅝[f]		½[c], [f]	
t_{des}, in.		1.00		0.875		0.750		0.625		0.500	
Nom. Weight, lb/ft		277.07		244.88		212.00		178.41		144.13	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	2440	3660	2160	3240	1870	2800	1570	2360	1120	1680
	1	2440	3660	2160	3240	1870	2800	1570	2360	1120	1680
	2	2440	3660	2150	3240	1860	2800	1570	2360	1120	1680
	3	2430	3660	2150	3240	1860	2800	1570	2360	1120	1680
	4	2430	3650	2150	3230	1860	2800	1570	2350	1120	1680
	5	2430	3650	2150	3230	1860	2790	1560	2350	1120	1680
	6	2420	3640	2140	3220	1860	2790	1560	2350	1120	1680
	7	2420	3640	2140	3220	1850	2780	1560	2340	1110	1670
	8	2410	3630	2140	3210	1850	2780	1550	2340	1110	1670
	9	2410	3620	2130	3200	1840	2770	1550	2330	1110	1670
	10	2400	3610	2120	3190	1840	2760	1550	2330	1110	1670
	11	2390	3600	2120	3180	1830	2760	1540	2320	1110	1660
	12	2390	3590	2110	3170	1830	2750	1540	2310	1100	1660
	13	2380	3570	2100	3160	1820	2740	1530	2300	1100	1660
	14	2370	3560	2100	3150	1810	2730	1530	2290	1100	1650
	15	2360	3540	2090	3140	1810	2720	1520	2290	1100	1650
	16	2350	3530	2080	3120	1800	2700	1510	2280	1090	1640
	17	2340	3510	2070	3110	1790	2690	1510	2260	1090	1640
	18	2320	3490	2060	3090	1780	2680	1500	2250	1090	1630
	19	2310	3480	2050	3080	1770	2660	1490	2240	1080	1630
	20	2300	3460	2040	3060	1760	2650	1480	2230	1080	1620
	22	2270	3410	2010	3020	1740	2620	1470	2200	1070	1610
	24	2240	3370	1980	2980	1720	2580	1450	2180	1060	1600
	26	2210	3320	1960	2940	1690	2550	1430	2150	1050	1580
	28	2170	3270	1930	2890	1670	2510	1410	2110	1040	1560
	30	2140	3210	1890	2850	1640	2470	1380	2080	1030	1550
	32	2100	3160	1860	2800	1610	2420	1360	2040	1020	1530
	34	2060	3100	1830	2740	1580	2380	1330	2010	1010	1510
	36	2020	3030	1790	2690	1550	2330	1310	1970	993	1490
	38	1970	2970	1750	2630	1520	2280	1280	1930	979	1470
	40	1930	2900	1710	2570	1490	2230	1250	1890	965	1450
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2440	3660	2160	3240	1870	2800	1570	2360	1270	1910
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1980	2980	1760	2630	1520	2280	1280	1920	1030	1550
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		683	1030	610	917	534	802	451	678	368	554
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1580	2380	1410	2120	1230	1850	929	1400	680	1020
Properties											
Area, in.^{2}		81.4		72.0		62.3		52.4		42.4	
$r_x = r_y$, in.		8.50		8.56		8.62		8.68		8.74	
$I_x = I_y$, in.^{4}		5890		5280		4630		3950		3240	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS20

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×20×									
		1		⅞		¾		⅝[f]		½[c], [f]	
t_{des}, in.		1.00		0.875		0.750		0.625		0.500	
Nom. Weight, lb/ft		249.85		221.06		191.58		161.40		130.52	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	2200	3300	1950	2930	1690	2530	1420	2130	1080	1630
	1	2200	3300	1950	2920	1690	2530	1420	2130	1080	1630
	2	2200	3300	1940	2920	1680	2530	1420	2130	1080	1630
	3	2190	3300	1940	2920	1680	2530	1420	2130	1080	1630
	4	2190	3290	1940	2920	1680	2530	1420	2130	1080	1630
	5	2190	3290	1940	2910	1680	2520	1410	2120	1080	1630
	6	2180	3280	1930	2910	1680	2520	1410	2120	1080	1620
	7	2180	3270	1930	2900	1670	2510	1410	2120	1080	1620
	8	2170	3270	1920	2890	1670	2510	1400	2110	1080	1620
	9	2170	3260	1920	2880	1660	2500	1400	2100	1070	1620
	10	2160	3240	1910	2870	1660	2490	1400	2100	1070	1610
	11	2150	3230	1910	2860	1650	2480	1390	2090	1070	1610
	12	2140	3220	1900	2850	1640	2470	1380	2080	1070	1600
	13	2130	3210	1890	2840	1640	2460	1380	2070	1060	1600
	14	2120	3190	1880	2830	1630	2450	1370	2060	1060	1590
	15	2110	3170	1870	2810	1620	2440	1370	2050	1060	1590
	16	2100	3160	1860	2800	1610	2420	1360	2040	1050	1580
	17	2090	3140	1850	2780	1600	2410	1350	2030	1050	1580
	18	2070	3120	1840	2760	1590	2400	1340	2020	1050	1570
	19	2060	3100	1830	2750	1580	2380	1330	2010	1040	1560
	20	2050	3080	1810	2730	1570	2360	1330	1990	1040	1560
	22	2020	3030	1790	2690	1550	2330	1310	1960	1030	1540
	24	1980	2980	1760	2640	1530	2290	1290	1930	1020	1530
	26	1950	2930	1730	2600	1500	2250	1270	1900	1000	1510
	28	1910	2870	1700	2550	1470	2210	1240	1870	991	1490
	30	1870	2810	1660	2500	1440	2170	1220	1830	978	1470
	32	1830	2750	1630	2440	1410	2120	1190	1790	964	1450
	34	1790	2690	1590	2390	1380	2080	1170	1750	947	1420
	36	1740	2620	1550	2330	1350	2030	1140	1710	925	1390
	38	1700	2550	1510	2270	1310	1970	1110	1670	903	1360
	40	1650	2480	1470	2210	1280	1920	1080	1630	880	1320
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2200	3300	1950	2930	1690	2530	1420	2130	1150	1730
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1790	2680	1580	2380	1370	2060	1160	1730	936	1400
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		611	918	547	822	480	721	406	611	332	500
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1290	1940	1150	1730	1010	1510	817	1230	580	872
Properties											
Area, in.^{2}		73.4		65.0		56.3		47.4		38.4	
$r_x = r_y$, in.		7.69		7.75		7.81		7.87		7.93	
$I_x = I_y$, in.^{4}		4340		3900		3430		2940		2410	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS20–
HSS18

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20×20×				HSS18×18×					
		3/8[c], [f]		5/16[c], [f]		1		7/8		3/4	
t_{des}, in.		0.375		0.313		1.00		0.875		0.750	
Nom. Weight, lb/ft		98.94		82.88		222.63		197.24		171.16	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	663	996	479	719	1960	2940	1740	2610	1510	2260
	1	663	996	478	719	1960	2940	1740	2610	1510	2260
	2	662	996	478	719	1960	2940	1740	2610	1500	2260
	3	662	995	478	719	1950	2940	1730	2600	1500	2260
	4	662	994	478	718	1950	2930	1730	2600	1500	2260
	5	661	994	477	717	1950	2930	1730	2600	1500	2250
	6	660	992	477	717	1940	2920	1720	2590	1490	2250
	7	659	991	476	716	1940	2910	1720	2580	1490	2240
	8	658	990	475	715	1930	2900	1710	2570	1490	2230
	9	657	988	475	713	1920	2890	1710	2560	1480	2220
	10	656	986	474	712	1910	2880	1700	2550	1470	2220
	11	655	984	473	711	1910	2860	1690	2540	1470	2210
	12	653	981	472	709	1900	2850	1680	2530	1460	2190
	13	651	979	471	707	1890	2830	1670	2520	1450	2180
	14	649	976	469	705	1870	2820	1660	2500	1440	2170
	15	647	973	468	703	1860	2800	1650	2480	1430	2160
	16	645	970	467	701	1850	2780	1640	2470	1430	2140
	17	643	967	465	699	1840	2760	1630	2450	1420	2130
	18	641	963	463	696	1820	2740	1620	2430	1400	2110
	19	638	960	462	694	1810	2720	1600	2410	1390	2090
	20	636	956	460	691	1790	2690	1590	2390	1380	2080
	22	630	947	456	685	1760	2640	1560	2350	1360	2040
	24	624	938	452	679	1720	2590	1530	2300	1330	2000
	26	618	928	447	673	1680	2530	1500	2250	1300	1960
	28	611	918	443	665	1640	2470	1460	2200	1270	1910
	30	603	907	438	658	1600	2410	1430	2140	1240	1860
	32	596	895	432	650	1560	2340	1390	2090	1210	1820
	34	587	883	426	641	1510	2270	1350	2030	1170	1760
	36	579	870	421	632	1470	2200	1310	1960	1140	1710
	38	570	856	414	623	1420	2130	1270	1900	1100	1660
	40	560	842	408	613	1370	2060	1220	1840	1070	1600
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		871	1310	731	1100	1960	2940	1740	2610	1510	2260
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		709	1060	595	892	1590	2390	1410	2120	1230	1840
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		255	383	209	314	539	810	484	728	426	640
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		392	589	307	461	1030	1540	918	1380	803	1210
Properties											
Area, in.^{2}		29.1		24.4		65.4		58.0		50.3	
$r_x = r_y$, in.		7.99		8.02		6.87		6.93		6.99	
$I_x = I_y$, in.^{4}		1850		1570		3090		2780		2460	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS18

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS18×18×									
		5/8		1/2[f]		3/8[c], [f]		5/16[c], [f]		1/4[c], [f]	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		144.39		116.91		88.73		74.38		59.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1270	1910	1030	1550	645	970	469	705	312	469
	1	1270	1910	1030	1550	645	970	469	705	312	469
	2	1270	1910	1030	1550	645	969	469	704	312	468
	3	1270	1900	1030	1550	644	968	468	704	311	468
	4	1270	1900	1030	1540	644	968	468	703	311	468
	5	1260	1900	1020	1540	643	966	467	703	311	467
	6	1260	1890	1020	1540	642	965	467	702	310	467
	7	1260	1890	1020	1530	641	963	466	701	310	466
	8	1250	1880	1020	1530	640	961	465	699	309	465
	9	1250	1880	1010	1520	638	959	464	698	309	464
	10	1240	1870	1010	1520	637	957	463	696	308	463
	11	1240	1860	1000	1510	635	954	462	694	307	462
	12	1230	1850	1000	1500	633	951	461	692	306	461
	13	1220	1840	994	1490	631	948	459	690	306	459
	14	1220	1830	989	1490	629	945	458	688	305	458
	15	1210	1820	983	1480	626	941	456	685	304	456
	16	1200	1810	976	1470	624	937	454	683	302	454
	17	1190	1790	970	1460	621	933	452	680	301	453
	18	1190	1780	963	1450	618	929	450	677	300	451
	19	1180	1770	955	1440	615	924	448	674	299	449
	20	1170	1750	948	1420	612	920	446	670	297	447
	22	1150	1720	931	1400	605	909	441	663	294	442
	24	1120	1690	914	1370	598	898	436	656	291	437
	26	1100	1650	895	1340	590	886	431	647	288	432
	28	1080	1620	875	1310	581	874	425	638	284	427
	30	1050	1580	854	1280	572	860	419	629	280	421
	32	1020	1540	832	1250	563	846	412	619	276	414
	34	994	1490	810	1220	553	831	405	609	271	408
	36	965	1450	786	1180	542	815	398	598	267	401
	38	935	1410	762	1150	531	799	390	587	262	394
	40	905	1360	738	1110	520	782	383	575	257	386
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1270	1910	1030	1550	781	1170	656	986	527	792
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1030	1550	839	1260	636	954	534	801	429	644
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		362	543	296	446	228	342	192	289	133	201
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		684	1030	490	736	331	497	257	386	189	284
Properties											
Area, in.^{2}		42.4		34.4		26.1		21.9		17.6	
$r_x = r_y$, in.		7.05		7.11		7.17		7.20		7.23	
$I_x = I_y$, in.^{4}		2110		1740		1340		1130		919	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS16

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×16×									
		1		⅞		¾		⅝		½[f]	
t_{des}, in.		1.00		0.875		0.750		0.625		0.500	
Nom. Weight, lb/ft		195.40		173.43		150.75		127.37		103.30	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1720	2580	1530	2300	1330	1990	1120	1680	910	1370
	1	1720	2580	1530	2290	1330	1990	1120	1680	910	1370
	2	1720	2580	1530	2290	1320	1990	1120	1680	909	1370
	3	1710	2580	1520	2290	1320	1990	1120	1680	908	1360
	4	1710	2570	1520	2280	1320	1980	1110	1680	906	1360
	5	1710	2560	1520	2280	1320	1980	1110	1670	904	1360
	6	1700	2560	1510	2270	1310	1970	1110	1670	902	1350
	7	1690	2550	1510	2260	1310	1970	1100	1660	898	1350
	8	1690	2540	1500	2250	1300	1960	1100	1650	895	1340
	9	1680	2520	1490	2240	1300	1950	1100	1650	891	1340
	10	1670	2510	1480	2230	1290	1940	1090	1640	886	1330
	11	1660	2490	1480	2220	1280	1930	1080	1630	881	1320
	12	1650	2480	1470	2200	1270	1920	1080	1620	876	1320
	13	1640	2460	1460	2190	1270	1900	1070	1610	870	1310
	14	1620	2440	1440	2170	1260	1890	1060	1600	864	1300
	15	1610	2420	1430	2150	1250	1870	1050	1580	857	1290
	16	1600	2400	1420	2140	1240	1860	1040	1570	850	1280
	17	1580	2380	1410	2120	1220	1840	1040	1560	843	1270
	18	1570	2350	1390	2090	1210	1820	1030	1540	835	1250
	19	1550	2330	1380	2070	1200	1800	1020	1530	827	1240
	20	1530	2300	1360	2050	1190	1780	1000	1510	818	1230
	22	1500	2250	1330	2000	1160	1740	982	1480	800	1200
	24	1460	2190	1300	1950	1130	1700	958	1440	781	1170
	26	1410	2130	1260	1900	1100	1650	932	1400	760	1140
	28	1370	2060	1220	1840	1070	1600	905	1360	739	1110
	30	1330	1990	1180	1780	1030	1550	877	1320	716	1080
	32	1280	1920	1140	1720	999	1500	848	1270	693	1040
	34	1230	1850	1100	1660	963	1450	818	1230	669	1010
	36	1180	1780	1060	1590	927	1390	788	1180	645	969
	38	1130	1710	1020	1530	890	1340	757	1140	620	932
	40	1080	1630	972	1460	852	1280	725	1090	595	894
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1720	2580	1530	2300	1330	1990	1120	1680	910	1370
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1400	2100	1240	1860	1080	1620	912	1370	741	1110
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		467	702	421	633	372	559	317	476	260	392
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		793	1190	711	1070	624	938	534	803	418	628
Properties											
Area, in.^{2}		57.4		51.0		44.3		37.4		30.4	
$r_x = r_y$, in.		6.05		6.11		6.17		6.23		6.29	
$I_x = I_y$, in.^{4}		2100		1900		1690		1450		1200	

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS16–
HSS14

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16×16×						HSS14×14×			
		3/8[c], [f]		5/16[c], [f]		1/4[c], [f]		1		7/8	
t_{des}, in.		0.375		0.313		0.250		1.00		0.875	
Nom. Weight, lb/ft		78.52		65.87		53.05		168.18		149.61	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	623	936	457	687	306	459	1480	2220	1320	1980
	1	623	936	457	686	306	459	1480	2220	1320	1980
	2	623	936	456	686	305	459	1480	2220	1320	1980
	3	622	935	456	686	305	459	1470	2220	1310	1970
	4	621	934	456	685	305	458	1470	2210	1310	1970
	5	620	932	455	684	304	458	1460	2200	1310	1960
	6	619	930	454	683	304	457	1460	2190	1300	1950
	7	618	928	453	681	303	456	1450	2180	1290	1940
	8	616	926	452	679	303	455	1440	2170	1290	1930
	9	614	923	451	677	302	454	1430	2160	1280	1920
	10	612	920	449	675	301	452	1420	2140	1270	1910
	11	610	917	448	673	300	451	1410	2120	1260	1890
	12	607	913	446	671	299	449	1400	2100	1250	1880
	13	605	909	444	668	298	447	1390	2080	1240	1860
	14	602	905	442	665	296	446	1370	2060	1220	1840
	15	599	900	440	662	295	444	1360	2040	1210	1820
	16	596	895	438	658	294	441	1340	2020	1200	1800
	17	592	890	436	655	292	439	1320	1990	1180	1780
	18	589	885	433	651	291	437	1310	1960	1170	1750
	19	585	879	430	647	289	434	1290	1940	1150	1730
	20	581	873	428	643	287	432	1270	1910	1130	1700
	22	572	860	422	634	283	426	1230	1850	1100	1650
	24	563	846	415	624	279	420	1190	1780	1060	1600
	26	553	831	408	614	275	413	1140	1720	1020	1540
	28	542	815	401	603	270	406	1100	1650	982	1480
	30	531	798	393	591	266	399	1050	1570	940	1410
	32	519	781	385	579	260	391	999	1500	897	1350
	34	507	762	377	566	255	383	949	1430	854	1280
	36	493	741	368	553	249	375	900	1350	810	1220
	38	474	713	359	539	244	366	850	1280	767	1150
	40	455	685	349	525	238	357	801	1200	723	1090
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		692	1040	581	873	467	702	1480	2220	1320	1980
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		563	845	473	709	380	570	1200	1810	1070	1610
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		201	302	170	255	133	201	395	594	358	539
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		272	409	213	321	156	235	589	885	531	799
Properties											
Area, in.^{2}		23.1		19.4		15.6		49.4		44.0	
$r_x = r_y$, in.		6.35		6.38		6.41		5.24		5.30	
$I_x = I_y$, in.^{4}		931		790		641		1350		1230	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS14

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×14×									
		¾		⅝		½		⅜[c], [f]		5/16[c], [f]	
t_{des}, in.		0.750		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		130.33		110.36		89.68		68.31		57.36	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1150	1720	970	1460	790	1190	595	895	441	663
	1	1150	1720	970	1460	790	1190	595	894	441	662
	2	1150	1720	969	1460	789	1190	595	894	440	662
	3	1140	1720	967	1450	788	1180	594	893	440	661
	4	1140	1710	965	1450	786	1180	593	891	439	660
	5	1140	1710	961	1440	784	1180	592	889	438	659
	6	1130	1700	958	1440	781	1170	590	887	437	657
	7	1130	1690	953	1430	777	1170	588	884	436	655
	8	1120	1680	948	1420	773	1160	586	881	435	653
	9	1110	1670	942	1420	768	1150	584	877	433	651
	10	1110	1660	936	1410	763	1150	581	873	431	648
	11	1100	1650	929	1400	758	1140	577	868	429	645
	12	1090	1630	921	1380	752	1130	573	861	427	642
	13	1080	1620	913	1370	745	1120	568	854	424	638
	14	1070	1600	904	1360	738	1110	563	846	422	634
	15	1060	1590	895	1350	730	1100	557	837	419	630
	16	1040	1570	885	1330	723	1090	551	828	416	626
	17	1030	1550	875	1310	714	1070	545	819	413	621
	18	1020	1530	864	1300	706	1060	538	809	410	616
	19	1000	1510	852	1280	696	1050	532	799	406	611
	20	990	1490	840	1260	687	1030	525	789	403	606
	22	960	1440	816	1230	667	1000	510	766	395	594
	24	928	1400	789	1190	646	971	494	742	387	582
	26	895	1350	761	1140	624	937	477	717	378	568
	28	860	1290	732	1100	600	902	460	691	369	554
	30	825	1240	703	1060	577	867	442	664	359	540
	32	788	1180	672	1010	552	830	424	637	349	524
	34	751	1130	641	963	527	792	405	608	338	508
	36	713	1070	610	916	502	754	386	580	326	490
	38	675	1020	578	869	476	716	367	551	310	466
	40	638	959	547	822	451	678	348	522	294	442
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1150	1720	970	1460	790	1190	602	905	506	761
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		934	1400	790	1180	644	965	490	735	412	618
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		318	478	272	408	225	338	174	261	147	221
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		469	705	402	604	329	495	218	327	171	257
Properties											
Area, in.^{2}		38.3		32.4		26.4		20.1		16.9	
$r_x = r_y$, in.		5.36		5.42		5.48		5.54		5.57	
$I_x = I_y$, in.^{4}		1100		952		791		615		523	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS14–
HSS12

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14×14×		HSS12×12×							
		¼[c], [f]		1		⅞		¾		⅝	
t_{des}, in.		0.250		1.00		0.875		0.750		0.625	
Nom. Weight, lb/ft		46.24		140.96		125.79		109.91		93.34	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	298	447	1240	1860	1110	1670	967	1450	820	1230
	1	298	447	1240	1860	1110	1660	967	1450	820	1230
	2	297	447	1240	1860	1110	1660	965	1450	819	1230
	3	297	446	1230	1850	1100	1660	963	1450	817	1230
	4	297	446	1230	1850	1100	1650	959	1440	814	1220
	5	296	445	1220	1840	1090	1640	955	1440	810	1220
	6	295	444	1220	1830	1090	1630	949	1430	806	1210
	7	295	443	1210	1810	1080	1620	943	1420	801	1200
	8	294	441	1200	1800	1070	1610	936	1410	795	1190
	9	293	440	1190	1780	1060	1600	928	1390	788	1180
	10	291	438	1170	1770	1050	1580	919	1380	781	1170
	11	290	436	1160	1750	1040	1560	909	1370	772	1160
	12	289	434	1150	1720	1030	1540	898	1350	764	1150
	13	287	432	1130	1700	1010	1520	887	1330	754	1130
	14	286	429	1120	1680	1000	1500	875	1320	744	1120
	15	284	427	1100	1650	984	1480	862	1300	733	1100
	16	282	424	1080	1620	969	1460	849	1280	722	1090
	17	280	421	1060	1590	952	1430	834	1250	710	1070
	18	278	418	1040	1560	935	1400	820	1230	698	1050
	19	276	415	1020	1530	917	1380	804	1210	685	1030
	20	274	411	999	1500	898	1350	788	1180	672	1010
	22	269	404	955	1440	859	1290	755	1140	645	969
	24	264	396	909	1370	819	1230	721	1080	616	926
	26	258	388	861	1290	777	1170	685	1030	586	881
	28	252	379	812	1220	734	1100	648	974	555	835
	30	246	370	763	1150	691	1040	611	918	524	788
	32	240	360	714	1070	647	973	573	861	493	741
	34	233	350	665	999	604	908	536	805	462	694
	36	226	339	616	927	561	844	499	750	430	647
	38	219	329	569	856	519	781	462	695	400	601
	40	211	317	523	787	479	719	427	642	370	556
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		407	612	1240	1860	1110	1670	967	1450	820	1230
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		332	497	1010	1510	902	1350	787	1180	668	1000
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		119	180	323	486	295	443	263	395	227	341
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		126	190	417	626	377	566	334	503	289	435
Properties											
Area, in.^{2}		13.6		41.4		37.0		32.3		27.4	
$r_x = r_y$, in.		5.60		4.42		4.48		4.54		4.60	
$I_x = I_y$, in.^{4}		426		809		742		666		580	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS12

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12×12×									
		½		⅜[f]		5⁄16[c], [f]		¼[c], [f]		3⁄16[c], [f]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		76.07		58.10		48.86		39.43		29.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	671	1010	512	770	419	630	287	431	173	259
	1	670	1010	512	769	419	630	287	431	173	259
	2	669	1010	511	768	418	629	286	430	172	259
	3	668	1000	510	766	418	628	286	430	172	259
	4	665	1000	508	764	417	626	285	429	172	258
	5	663	996	506	760	416	625	285	428	171	258
	6	659	991	503	757	414	622	284	426	171	257
	7	655	984	500	752	412	620	283	425	170	256
	8	650	977	497	747	410	617	281	423	170	255
	9	645	969	493	741	408	613	280	421	169	254
	10	639	960	488	734	406	610	278	418	168	252
	11	632	951	484	727	403	605	277	416	167	251
	12	625	940	478	719	400	601	275	413	166	249
	13	618	929	473	710	397	596	273	410	165	248
	14	610	917	467	701	393	591	270	406	164	246
	15	601	904	460	692	388	583	268	403	162	244
	16	592	890	454	682	383	575	266	399	161	242
	17	583	876	447	671	377	566	263	395	159	240
	18	573	861	439	660	371	557	260	391	158	237
	19	563	846	432	649	364	548	257	387	156	235
	20	552	830	424	637	358	538	254	382	155	232
	22	530	797	407	612	344	517	248	373	151	227
	24	507	762	390	586	330	495	241	362	147	221
	26	483	726	372	559	314	473	234	351	143	215
	28	459	689	353	531	299	449	226	340	139	208
	30	434	652	335	503	283	426	218	328	134	202
	32	408	614	316	474	267	402	210	315	130	195
	34	383	575	296	446	251	378	201	302	125	187
	36	358	538	277	417	235	354	191	287	120	180
	38	333	500	259	389	220	330	179	268	115	172
	40	309	464	240	361	204	307	166	250	110	165
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		671	1010	512	770	431	648	347	522	263	396
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		546	819	417	625	351	527	283	424	214	321
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		189	284	147	221	125	188	101	153	75.0	113
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		238	358	177	265	132	199	98.1	147	66.1	99.3
Properties											
Area, in.^{2}		22.4		17.1		14.4		11.6		8.79	
$r_x = r_y$, in.		4.66		4.72		4.75		4.78		4.81	
$I_x = I_y$, in.^{4}		486		380		324		265		203	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS10

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×10×									
		¾		⅝		½		⅜		5/16[f]	
t_{des}, in.		0.750		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		89.50		76.33		62.46		47.90		40.35	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	787	1180	671	1010	551	828	422	635	356	536
	1	787	1180	670	1010	551	827	422	634	356	535
	2	785	1180	669	1010	549	826	421	633	355	534
	3	782	1180	666	1000	547	823	420	631	354	532
	4	778	1170	663	996	545	819	418	628	352	530
	5	773	1160	658	990	541	813	415	624	350	526
	6	766	1150	653	982	537	807	412	619	348	523
	7	759	1140	647	972	532	800	408	613	345	518
	8	750	1130	640	962	526	791	404	607	341	513
	9	740	1110	632	950	520	781	399	600	337	507
	10	730	1100	623	936	513	771	394	592	333	500
	11	718	1080	613	922	505	759	388	584	328	493
	12	706	1060	603	907	497	747	382	574	323	485
	13	692	1040	592	890	488	734	376	564	318	477
	14	678	1020	580	872	479	720	369	554	312	469
	15	664	997	568	854	469	705	361	543	306	459
	16	648	974	555	835	459	690	354	531	299	450
	17	632	950	542	815	448	674	346	519	293	440
	18	615	925	528	794	437	657	337	507	286	429
	19	598	899	514	773	426	640	329	494	279	419
	20	581	873	499	751	414	622	320	481	271	408
	22	545	819	469	706	390	586	302	454	256	385
	24	508	764	439	659	365	549	283	426	241	362
	26	471	708	408	613	340	511	264	397	225	338
	28	434	652	376	566	315	473	245	369	209	314
	30	397	597	346	519	290	435	226	340	193	290
	32	361	543	315	474	265	399	208	312	177	266
	34	327	491	286	430	241	363	190	285	162	244
	36	293	441	258	387	218	328	172	259	147	221
	38	263	395	231	348	196	295	155	233	133	200
	40	237	357	209	314	177	266	140	210	120	180
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		787	1180	671	1010	551	828	422	635	356	536
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		641	962	546	819	449	673	344	516	290	435
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		209	314	183	274	153	230	120	180	102	153
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		223	335	194	291	161	242	126	189	102	154
Properties											
Area, in.^{2}		26.3		22.4		18.4		14.1		11.9	
$r_x = r_y$, in.		3.72		3.78		3.84		3.90		3.93	
$I_x = I_y$, in.^{4}		364		321		271		214		184	

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS10–HSS9

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10×10×				HSS9×9×					
		¼[c], [f]		3/16[c], [f]		⅝		½		⅜	
t_{des}, in.		0.250		0.188		0.625		0.500		0.375	
Nom. Weight, lb/ft		32.63		24.73		67.82		55.66		42.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	271	407	166	250	596	895	491	738	377	567
	1	271	407	166	250	595	895	491	737	377	567
	2	270	406	166	249	594	892	489	735	376	565
	3	270	405	166	249	591	888	487	732	374	563
	4	269	404	165	248	587	882	484	728	372	559
	5	268	402	164	247	582	875	480	722	369	555
	6	266	400	164	246	576	866	475	715	366	550
	7	265	398	163	245	569	856	470	706	362	544
	8	263	395	162	243	561	844	464	697	357	537
	9	261	392	161	242	553	831	457	686	352	529
	10	259	389	159	240	543	816	449	675	346	520
	11	256	385	158	238	533	800	441	662	340	511
	12	253	381	157	235	521	784	432	649	333	501
	13	251	377	155	233	509	766	422	634	326	490
	14	247	372	153	230	497	747	412	619	319	479
	15	244	367	151	227	484	727	401	603	311	467
	16	241	362	149	224	470	706	390	587	303	455
	17	236	355	147	221	456	685	379	570	294	442
	18	231	347	145	218	441	663	367	552	286	429
	19	225	339	143	215	426	641	355	534	277	416
	20	220	330	140	211	411	618	343	516	267	402
	22	207	312	136	204	380	572	318	479	249	374
	24	195	293	130	196	349	525	293	441	230	346
	26	182	274	125	187	318	479	268	403	211	317
	28	170	255	119	179	288	433	243	366	192	289
	30	157	236	113	170	259	389	219	330	174	262
	32	144	217	107	161	230	346	196	295	156	235
	34	132	199	101	151	204	307	174	262	139	209
	36	120	181	92.6	139	182	274	155	234	124	187
	38	109	163	83.9	126	163	246	139	210	112	168
	40	98.1	147	75.7	114	147	222	126	189	101	151
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		287	432	218	328	596	896	491	738	377	567
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		234	351	178	267	485	728	400	600	307	461
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		83.1	125	63.8	95.8	160	241	135	203	106	160
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		72.7	109	49.2	73.9	153	231	128	193	101	151
Properties											
Area, in.^{2}		9.59		7.29		19.9		16.4		12.6	
$r_x = r_y$, in.		3.96		3.99		3.37		3.43		3.50	
$I_x = I_y$, in.^{4}		151		116		227		193		154	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS9–
HSS8

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS9×9×						HSS8×8×			
		5/16		1/4[f]		3/16[c], [f]		5/8		1/2	
t_{des}, in.		0.313		0.250		0.188		0.625		0.500	
Nom. Weight, lb/ft		36.10		29.23		22.18		59.32		48.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	317	477	257	387	162	243	521	783	431	648
	1	317	477	257	386	162	243	520	782	431	647
	2	316	475	256	385	162	243	518	779	429	645
	3	315	473	255	384	161	242	515	775	427	641
	4	313	471	254	381	161	241	511	768	423	636
	5	311	467	252	379	160	240	506	760	419	630
	6	308	463	250	375	159	239	499	750	414	622
	7	304	458	247	371	158	237	491	739	408	613
	8	301	452	244	367	156	235	483	725	401	602
	9	296	445	240	361	155	233	473	711	393	591
	10	292	438	237	356	154	231	462	695	384	578
	11	286	430	233	350	152	228	451	678	375	564
	12	281	422	228	343	150	225	439	659	366	549
	13	275	413	223	336	148	222	426	640	355	534
	14	269	404	219	328	146	219	412	620	344	518
	15	262	394	213	321	144	216	398	599	333	501
	16	255	384	208	312	141	212	384	577	321	483
	17	248	373	202	304	139	208	369	555	310	465
	18	241	362	196	295	136	204	354	532	297	447
	19	234	351	191	286	133	200	339	509	285	428
	20	226	340	184	277	130	196	323	486	273	410
	22	210	316	172	259	124	187	292	439	247	372
	24	195	292	159	240	118	178	262	394	223	335
	26	179	269	147	220	112	168	232	349	199	298
	28	163	245	134	202	103	155	204	307	175	264
	30	148	222	122	183	93.5	141	178	268	153	230
	32	133	200	110	165	84.4	127	156	235	135	203
	34	119	178	98.3	148	75.7	114	139	208	119	179
	36	106	159	87.7	132	67.5	101	124	186	106	160
	38	94.9	143	78.7	118	60.6	91.1	111	167	95.6	144
	40	85.7	129	71.0	107	54.7	82.2	100	150	86.2	130
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		317	477	257	387	196	294	521	783	431	648
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		258	388	209	314	159	239	424	636	351	527
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		90.6	136	74.1	111	57.0	85.7	138	207	117	176
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		85.6	129	61.2	91.9	41.5	62.4	118	177	99.1	149
Properties											
Area, in.^{2}		10.6		8.59		6.54		17.4		14.4	
$r_x = r_y$, in.		3.52		3.56		3.58		2.97		3.03	
$I_x = I_y$, in.^{4}		132		109		84.0		153		131	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS8–
HSS7

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS8×8×								HSS7×7×	
		3/8		5/16		1/4[f]		3/16[c], [f]		5/8	
t_{des}, in.		0.375		0.313		0.250		0.188		0.625	
Nom. Weight, lb/ft		37.69		31.84		25.82		19.63		50.81	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	332	499	281	422	227	342	156	235	446	670
	1	332	499	280	421	227	341	156	234	445	669
	2	331	497	279	420	226	340	156	234	443	666
	3	329	495	278	418	225	338	155	233	440	661
	4	327	491	276	414	223	336	154	232	435	653
	5	323	486	273	410	221	333	153	231	429	644
	6	319	480	270	406	219	329	152	229	421	633
	7	315	473	266	400	216	324	151	227	412	620
	8	310	465	262	393	212	319	149	224	403	605
	9	304	457	257	386	209	313	148	222	392	589
	10	298	447	252	378	204	307	146	219	380	571
	11	291	437	246	370	200	300	143	216	367	552
	12	284	426	240	361	195	293	141	212	354	532
	13	276	415	234	351	190	285	139	208	340	511
	14	268	402	227	341	185	277	136	204	326	489
	15	259	390	220	331	179	269	133	200	311	467
	16	251	377	213	320	173	260	130	196	296	444
	17	242	363	205	308	167	251	127	191	280	421
	18	232	349	198	297	161	242	124	186	265	398
	19	223	335	190	285	155	233	119	179	250	375
	20	214	321	182	274	149	223	114	172	235	353
	22	195	293	166	250	136	204	105	157	205	308
	24	176	265	150	226	123	185	95.0	143	177	266
	26	158	237	135	203	111	167	85.6	129	151	227
	28	140	210	120	181	98.9	149	76.5	115	130	195
	30	123	185	106	159	87.3	131	67.8	102	113	170
	32	108	162	93.0	140	76.8	115	59.6	89.5	99.5	150
	34	95.7	144	82.4	124	68.0	102	52.8	79.3	88.2	133
	36	85.4	128	73.5	110	60.7	91.2	47.1	70.8	78.6	118
	38	76.6	115	65.9	99.1	54.4	81.8	42.3	63.5	70.6	106
	40	69.1	104	59.5	89.4	49.1	73.8	38.1	57.3	63.7	95.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		332	500	281	422	227	342	173	260	446	671
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		271	406	228	343	185	278	141	211	363	545
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		92.7	139	79.4	119	65.1	97.9	50.3	75.5	115	173
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		78.1	117	66.9	101	52.3	78.6	34.2	51.4	86.8	131
Properties											
Area, in.^{2}		11.1		9.37		7.59		5.78		14.9	
$r_x = r_y$, in.		3.09		3.12		3.15		3.18		2.56	
$I_x = I_y$, in.^{4}		106		91.0		75.2		58.4		97.6	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS7

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS7×7×									
		½		⅜		5⁄16		¼		3⁄16[c], [f]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		42.05		32.58		27.59		22.42		17.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	371	558	287	431	243	365	197	297	149	224
	1	371	557	286	430	243	365	197	296	149	224
	2	369	555	285	429	242	363	196	295	149	223
	3	366	550	283	425	240	361	195	293	148	222
	4	362	544	280	421	238	357	193	290	147	221
	5	357	537	277	416	235	353	191	286	146	219
	6	351	528	272	409	231	347	188	282	143	215
	7	344	518	267	401	227	341	184	277	141	212
	8	337	506	261	392	222	333	180	271	138	207
	9	328	493	255	383	216	325	176	265	135	203
	10	318	479	248	372	211	317	171	258	131	197
	11	308	463	240	361	204	307	167	250	128	192
	12	298	447	232	349	198	297	161	242	124	186
	13	286	431	224	337	191	287	156	234	119	180
	14	275	413	215	323	184	276	150	225	115	173
	15	263	395	206	310	176	265	144	216	111	166
	16	251	377	197	296	168	253	138	207	106	159
	17	238	358	188	282	161	241	132	198	101	152
	18	226	339	178	268	153	230	125	188	96.5	145
	19	213	321	169	254	145	218	119	179	91.8	138
	20	201	302	160	240	137	206	113	169	87.0	131
	22	177	266	141	212	121	183	100	150	77.5	117
	24	153	231	123	185	106	160	88.0	132	68.3	103
	26	131	198	106	160	92.1	138	76.4	115	59.6	89.5
	28	113	170	91.6	138	79.4	119	65.9	99.0	51.4	77.2
	30	98.7	148	79.8	120	69.2	104	57.4	86.2	44.8	67.3
	32	86.8	130	70.1	105	60.8	91.4	50.4	75.8	39.3	59.1
	34	76.9	116	62.1	93.4	53.8	80.9	44.7	67.1	34.8	52.4
	36	68.6	103	55.4	83.3	48.0	72.2	39.8	59.9	31.1	46.7
	38	61.5	92.5	49.7	74.8	43.1	64.8	35.8	53.8	27.9	41.9
	40	55.5	83.5	44.9	67.5	38.9	58.5	32.3	48.5	25.2	37.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		371	558	287	431	243	365	197	297	151	226
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		302	453	234	350	198	297	161	241	123	184
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		98.8	149	79.2	119	68.1	102	56.1	84.4	43.5	65.4
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		73.9	111	58.6	88.1	50.1	75.4	41.2	61.9	27.4	41.1
Properties											
Area, in.^{2}		12.4		9.58		8.12		6.59		5.03	
$r_x = r_y$, in.		2.62		2.68		2.71		2.74		2.77	
$I_x = I_y$, in.^{4}		84.7		68.7		59.6		49.4		38.6	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS6

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6×6×									
		⅝		½		⅜		5/16		¼	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		42.30		35.24		27.48		23.34		19.02	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	371	558	311	468	242	364	206	309	167	252
	1	370	557	311	467	241	363	205	309	167	251
	2	368	553	309	464	240	361	204	307	166	250
	3	364	547	305	459	238	357	202	304	164	247
	4	358	538	301	452	234	352	199	299	162	244
	5	351	527	295	443	230	345	196	294	159	240
	6	342	514	288	433	225	338	191	288	156	235
	7	332	499	280	421	219	329	187	280	152	229
	8	321	482	271	408	212	319	181	272	148	222
	9	309	464	261	393	205	308	175	263	143	215
	10	296	444	251	377	197	296	169	253	138	207
	11	282	424	240	361	189	284	162	243	132	199
	12	267	402	228	343	180	271	154	232	127	190
	13	253	380	216	325	171	257	147	221	121	181
	14	238	357	204	307	162	244	139	209	114	172
	15	222	334	192	288	153	230	131	198	108	163
	16	207	311	179	270	143	216	124	186	102	153
	17	192	289	167	251	134	201	116	174	95.6	144
	18	177	267	155	233	125	188	108	162	89.3	134
	19	163	245	143	215	116	174	100	151	83.1	125
	20	149	224	131	198	107	161	92.8	139	77.0	116
	22	124	186	110	165	89.8	135	78.4	118	65.5	98.4
	24	104	156	92.0	138	75.4	113	65.9	99.0	55.0	82.7
	26	88.5	133	78.4	118	64.3	96.6	56.1	84.3	46.9	70.4
	28	76.3	115	67.6	102	55.4	83.3	48.4	72.7	40.4	60.7
	30	66.5	99.9	58.9	88.5	48.3	72.6	42.1	63.4	35.2	52.9
	32	58.4	87.8	51.8	77.8	42.4	63.8	37.0	55.7	30.9	46.5
	34	51.8	77.8	45.9	68.9	37.6	56.5	32.8	49.3	27.4	41.2
	36			40.9	61.5	33.5	50.4	29.3	44.0	24.4	36.7
	38							26.3	39.5	21.9	33.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		371	558	311	468	242	364	206	309	167	252
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		302	453	254	380	197	295	167	251	136	204
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		92.7	139	80.8	122	65.7	98.8	56.9	85.5	47.2	70.9
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		60.6	91.1	52.1	78.4	41.9	63.0	36.2	54.4	29.7	44.6
Properties											
Area, in.^{2}		12.4		10.4		8.08		6.87		5.59	
$r_x = r_y$, in.		2.15		2.21		2.27		2.30		2.33	
$I_x = I_y$, in.^{4}		57.4		50.5		41.6		36.3		30.3	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS6–
HSS5½

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6×6×		HSS5½×5½×							
		3/16[f]		3/8		5/16		1/4		3/16	
t_{des}, in.		0.188		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		14.53		24.93		21.21		17.32		13.25	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	128	193	219	330	187	281	152	229	117	176
	1	128	192	219	329	186	280	152	229	117	175
	2	127	191	217	327	185	278	151	227	116	174
	3	126	189	215	323	183	275	149	224	114	172
	4	124	187	211	317	180	270	147	221	113	169
	5	122	184	206	310	176	265	144	216	110	166
	6	120	180	201	302	171	258	140	211	108	162
	7	117	176	195	292	166	250	136	204	105	157
	8	114	171	188	282	160	241	131	197	101	152
	9	110	165	180	270	154	231	126	190	97.3	146
	10	106	159	172	258	147	221	121	182	93.2	140
	11	102	153	163	245	140	210	115	173	88.9	134
	12	97.6	147	154	232	132	199	109	164	84.4	127
	13	93.1	140	145	218	125	188	103	155	79.7	120
	14	88.5	133	136	204	117	176	96.7	145	75.0	113
	15	83.7	126	126	190	109	164	90.4	136	70.3	106
	16	79.0	119	117	176	101	152	84.1	126	65.5	98.5
	17	74.2	112	108	162	93.7	141	77.9	117	60.8	91.4
	18	69.5	104	99.0	149	86.2	130	71.8	108	56.2	84.5
	19	64.8	97.3	90.4	136	78.9	119	65.9	99.1	51.7	77.7
	20	60.2	90.4	82.0	123	71.8	108	60.2	90.5	47.3	71.2
	22	51.3	77.1	67.7	102	59.3	89.2	49.8	74.9	39.2	59.0
	24	43.2	64.9	56.9	85.5	49.9	75.0	41.8	62.9	33.0	49.6
	26	36.8	55.3	48.5	72.9	42.5	63.9	35.7	53.6	28.1	42.2
	28	31.7	47.7	41.8	62.9	36.6	55.1	30.7	46.2	24.2	36.4
	30	27.6	41.6	36.4	54.7	31.9	48.0	26.8	40.3	21.1	31.7
	32	24.3	36.5	32.0	48.1	28.1	42.2	23.5	35.4	18.5	27.9
	34	21.5	32.4	28.4	42.6	24.8	37.3	20.9	31.3	16.4	24.7
	36	19.2	28.9							14.7	22.0
	38	17.2	25.9								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		128	193	219	330	187	281	152	229	117	176
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		104	156	179	268	152	228	124	186	95.1	143
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		36.7	55.2	59.0	88.7	51.3	77.1	42.7	64.1	33.4	50.2
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		22.2	33.3	34.4	51.8	29.9	45.0	24.7	37.2	19.2	28.9
Properties											
Area, in.^{2}		4.28		7.33		6.24		5.09		3.90	
$r_x = r_y$, in.		2.36		2.07		2.10		2.13		2.16	
$I_x = I_y$, in.^{4}		23.8		31.3		27.4		23.0		18.1	

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS5×5×									
		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		28.43		22.37		19.08		15.62		11.97	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	250	376	197	296	168	253	137	207	106	159
	1	249	375	196	295	168	252	137	206	105	158
	2	247	371	195	293	166	250	136	204	105	157
	3	243	365	192	288	164	246	134	201	103	155
	4	238	357	188	282	161	241	131	197	101	152
	5	231	347	183	274	156	235	128	192	98.6	148
	6	223	335	177	265	151	227	124	186	95.7	144
	7	213	321	170	255	146	219	119	180	92.3	139
	8	203	306	162	244	139	209	114	172	88.5	133
	9	192	289	154	231	133	199	109	164	84.5	127
	10	181	272	145	218	125	188	103	155	80.1	120
	11	169	254	136	205	118	177	97.3	146	75.6	114
	12	157	236	127	191	110	165	91.1	137	70.9	107
	13	145	217	118	177	102	154	84.8	127	66.2	99.5
	14	132	199	108	163	94.4	142	78.5	118	61.4	92.3
	15	120	181	99.3	149	86.7	130	72.3	109	56.7	85.2
	16	109	164	90.4	136	79.1	119	66.1	99.4	52.0	78.2
	17	97.9	147	81.8	123	71.8	108	60.2	90.5	47.5	71.4
	18	87.3	131	73.3	110	64.7	97.2	54.5	81.9	43.1	64.8
	19	78.3	118	65.8	98.9	58.0	87.2	48.9	73.5	38.8	58.3
	20	70.7	106	59.4	89.3	52.4	78.7	44.2	66.4	35.0	52.6
	22	58.4	87.8	49.1	73.8	43.3	65.1	36.5	54.8	28.9	43.5
	24	49.1	73.8	41.3	62.0	36.4	54.7	30.7	46.1	24.3	36.6
	26	41.8	62.9	35.1	52.8	31.0	46.6	26.1	39.3	20.7	31.2
	28	36.1	54.2	30.3	45.6	26.7	40.2	22.5	33.9	17.9	26.9
	30	31.4	47.2	26.4	39.7	23.3	35.0	19.6	29.5	15.6	23.4
	32							17.2	25.9	13.7	20.6
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		250	376	197	296	168	253	137	207	106	159
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		204	306	160	241	137	205	112	168	86.0	129
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		62.9	94.5	52.3	78.6	45.7	68.6	38.2	57.4	30.0	45.1
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		34.2	51.4	27.9	42.0	24.2	36.4	20.1	30.3	15.7	23.7
Properties											
Area, in.^{2}		8.36		6.58		5.62		4.59		3.53	
$r_x = r_y$, in.		1.80		1.86		1.89		1.92		1.95	
$I_x = I_y$, in.^{4}		27.1		22.8		20.1		16.9		13.4	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS4½

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS4½×4½×									
		½		⅜		5⁄16		¼		3⁄16	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		25.03		19.82		16.96		13.91		10.70	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	220	331	175	262	149	225	122	184	94.3	142
	1	219	330	174	261	149	224	122	183	94.0	141
	2	217	326	172	258	147	221	121	181	93.0	140
	3	212	319	169	253	145	217	119	178	91.4	137
	4	206	310	164	247	141	212	116	174	89.3	134
	5	199	299	159	238	136	205	112	168	86.5	130
	6	190	286	152	229	131	197	108	162	83.3	125
	7	180	271	145	218	125	187	103	155	79.7	120
	8	169	255	137	205	118	177	97.5	147	75.7	114
	9	158	237	128	193	111	167	91.8	138	71.4	107
	10	146	220	119	179	103	155	85.8	129	66.9	101
	11	134	201	110	165	95.6	144	79.6	120	62.2	93.5
	12	122	183	101	151	87.9	132	73.4	110	57.5	86.4
	13	110	165	91.5	138	80.1	120	67.1	101	52.8	79.3
	14	98.4	148	82.5	124	72.5	109	61.0	91.6	48.1	72.3
	15	87.3	131	73.9	111	65.2	98.0	55.0	82.6	43.5	65.4
	16	76.8	115	65.5	98.5	58.1	87.3	49.2	74.0	39.1	58.8
	17	68.1	102	58.0	87.2	51.5	77.4	43.7	65.7	34.8	52.4
	18	60.7	91.2	51.8	77.8	45.9	69.0	39.0	58.6	31.1	46.7
	19	54.5	81.9	46.5	69.8	41.2	61.9	35.0	52.6	27.9	41.9
	20	49.2	73.9	41.9	63.0	37.2	55.9	31.6	47.5	25.2	37.8
	22	40.6	61.1	34.6	52.1	30.7	46.2	26.1	39.2	20.8	31.3
	24	34.1	51.3	29.1	43.8	25.8	38.8	21.9	33.0	17.5	26.3
	26	29.1	43.7	24.8	37.3	22.0	33.1	18.7	28.1	14.9	22.4
	28					19.0	28.5	16.1	24.2	12.8	19.3
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		220	331	175	262	149	225	122	184	94.3	142
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		179	269	142	213	122	182	99.7	150	76.8	115
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		53.9	81.0	45.5	68.4	40.0	60.2	33.7	50.6	26.6	40.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		26.7	40.1	22.0	33.0	19.2	28.8	16.0	24.1	12.6	18.9
Properties											
Area, in.^{2}		7.36		5.83		4.99		4.09		3.15	
$r_x = r_y$, in.		1.60		1.66		1.69		1.72		1.75	
$I_x = I_y$, in.^{4}		18.7		16.0		14.2		12.1		9.62	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS4

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS4×4×									
		½		⅜		5⁄16		¼		3⁄16	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		21.63		17.27		14.83		12.21		9.42	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	190	286	152	229	131	196	107	162	83.2	125
	1	189	285	151	227	130	195	107	161	82.9	125
	2	186	280	149	224	128	192	106	159	81.8	123
	3	181	273	145	219	125	188	103	155	80.0	120
	4	175	262	140	211	121	182	99.8	150	77.5	117
	5	166	250	134	202	116	174	95.8	144	74.5	112
	6	156	235	127	191	110	165	91.0	137	70.9	107
	7	146	219	119	179	103	155	85.7	129	67.0	101
	8	134	202	110	166	96.0	144	80.0	120	62.6	94.2
	9	122	184	101	152	88.4	133	73.9	111	58.1	87.3
	10	110	166	92.2	139	80.7	121	67.7	102	53.4	80.3
	11	98.5	148	83.0	125	73.0	110	61.5	92.4	48.6	73.1
	12	86.9	131	73.9	111	65.3	98.2	55.3	83.1	43.9	66.0
	13	75.8	114	65.2	98.1	57.9	87.1	49.3	74.0	39.3	59.1
	14	65.4	98.4	56.9	85.5	50.9	76.4	43.5	65.3	34.9	52.4
	15	57.0	85.7	49.5	74.5	44.3	66.6	38.0	57.1	30.6	46.0
	16	50.1	75.3	43.5	65.5	38.9	58.5	33.4	50.2	26.9	40.4
	17	44.4	66.7	38.6	58.0	34.5	51.8	29.6	44.4	23.8	35.8
	18	39.6	59.5	34.4	51.7	30.8	46.2	26.4	39.6	21.2	31.9
	19	35.5	53.4	30.9	46.4	27.6	41.5	23.7	35.6	19.1	28.7
	20	32.1	48.2	27.9	41.9	24.9	37.5	21.4	32.1	17.2	25.9
	22	26.5	39.8	23.0	34.6	20.6	31.0	17.7	26.5	14.2	21.4
	24			19.4	29.1	17.3	26.0	14.8	22.3	11.9	18.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		190	286	152	229	131	196	107	162	83.2	125
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		155	233	124	186	106	159	87.5	131	67.8	102
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		44.9	67.5	38.8	58.3	34.4	51.7	29.2	43.9	23.2	34.9
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		20.0	30.1	16.8	25.2	14.7	22.2	12.4	18.6	9.78	14.7
Properties											
Area, in.^{2}		6.36		5.08		4.36		3.59		2.78	
$r_x = r_y$, in.		1.39		1.45		1.48		1.51		1.54	
$I_x = I_y$, in.^{4}		12.3		10.7		9.59		8.22		6.61	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3½–
HSS3

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS3½×3½×								HSS3×3×	
		3/8		5/16		1/4		3/16		3/8	
t_{des}, in.		0.375		0.313		0.250		0.188		0.375	
Nom. Weight, lb/ft		14.72		12.70		10.51		8.15		12.17	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	130	195	112	168	92.5	139	71.9	108	107	161
	1	129	194	111	167	91.9	138	71.4	107	106	160
	2	126	190	109	164	90.3	136	70.2	105	103	155
	3	122	183	106	159	87.5	132	68.2	102	98.2	148
	4	116	175	101	152	83.9	126	65.4	98.3	91.7	138
	5	110	165	95.4	143	79.4	119	62.1	93.3	84.0	126
	6	102	153	88.8	134	74.2	111	58.2	87.4	75.5	113
	7	93.2	140	81.7	123	68.5	103	53.9	81.0	66.5	100
	8	84.2	127	74.2	112	62.5	93.9	49.4	74.2	57.5	86.4
	9	75.1	113	66.5	100	56.3	84.6	44.7	67.2	48.7	73.2
	10	66.1	99.3	58.9	88.5	50.1	75.3	40.0	60.1	40.4	60.7
	11	57.4	86.2	51.5	77.3	44.0	66.2	35.3	53.1	33.4	50.2
	12	49.0	73.7	44.4	66.7	38.2	57.5	30.9	46.4	28.1	42.2
	13	41.8	62.8	37.8	56.9	32.8	49.2	26.6	40.0	23.9	35.9
	14	36.0	54.2	32.6	49.0	28.2	42.4	23.0	34.5	20.6	31.0
	15	31.4	47.2	28.4	42.7	24.6	37.0	20.0	30.0	18.0	27.0
	16	27.6	41.5	25.0	37.6	21.6	32.5	17.6	26.4	15.8	23.7
	17	24.4	36.7	22.1	33.3	19.2	28.8	15.6	23.4	14.0	21.0
	18	21.8	32.8	19.7	29.7	17.1	25.7	13.9	20.9		
	19	19.6	29.4	17.7	26.6	15.3	23.0	12.5	18.7		
	20	17.7	26.5	16.0	24.0	13.8	20.8	11.2	16.9		
	22							9.29	14.0		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		130	195	112	168	92.5	139	71.9	108	107	161
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		106	158	91.2	137	75.3	113	58.5	87.8	87.3	131
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		32.1	48.2	28.8	43.3	24.7	37.1	19.9	29.8	25.3	38.1
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		12.3	18.4	10.9	16.4	9.21	13.8	7.34	11.0	8.43	12.7
Properties											
Area, in.^{2}		4.33		3.74		3.09		2.40		3.58	
$r_x = r_y$, in.		1.25		1.28		1.31		1.34		1.04	
$I_x = I_y$, in.^{4}		6.74		6.11		5.29		4.30		3.89	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3–
HSS2½

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS3×3×						HSS2½×2½×			
		5/16		1/4		3/16		5/16		1/4	
t_{des}, in.		0.313		0.250		0.188		0.313		0.250	
Nom. Weight, lb/ft		10.58		8.81		6.87		8.45		7.11	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	93.1	140	77.5	117	60.5	90.9	74.6	112	62.6	94.0
	1	92.3	139	76.9	116	60.0	90.2	73.5	110	61.8	92.8
	2	89.8	135	74.9	113	58.5	88.0	70.5	106	59.4	89.3
	3	85.7	129	71.7	108	56.2	84.4	65.8	98.8	55.7	83.7
	4	80.4	121	67.5	101	53.0	79.7	59.6	89.6	50.8	76.4
	5	74.0	111	62.4	93.8	49.2	74.0	52.6	79.1	45.2	68.0
	6	66.9	101	56.7	85.2	44.9	67.6	45.1	67.8	39.2	58.9
	7	59.3	89.2	50.6	76.1	40.4	60.7	37.6	56.6	33.1	49.7
	8	51.7	77.7	44.4	66.8	35.7	53.6	30.5	45.9	27.2	40.9
	9	44.2	66.4	38.3	57.6	31.0	46.6	24.2	36.4	21.8	32.8
	10	37.1	55.8	32.5	48.8	26.5	39.9	19.6	29.5	17.7	26.6
	11	30.7	46.2	27.0	40.6	22.3	33.4	16.2	24.4	14.6	21.9
	12	25.8	38.8	22.7	34.1	18.7	28.1	13.6	20.5	12.3	18.4
	13	22.0	33.1	19.4	29.1	15.9	23.9	11.6	17.5	10.5	15.7
	14	19.0	28.5	16.7	25.1	13.7	20.6	10.0	15.1	9.02	13.6
	15	16.5	24.8	14.5	21.9	12.0	18.0			7.85	11.8
	16	14.5	21.8	12.8	19.2	10.5	15.8				
	17	12.9	19.3	11.3	17.0	9.32	14.0				
	18			10.1	15.2	8.31	12.5				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		93.1	140	77.5	117	60.5	90.9	74.6	112	62.6	94.1
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		75.8	114	63.1	94.7	49.2	73.9	60.7	91.0	50.9	76.4
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		23.2	34.8	20.2	30.4	16.5	24.8	17.5	26.4	15.7	23.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		7.58	11.4	6.51	9.79	5.24	7.88	4.89	7.35	4.27	6.41
Properties											
Area, in.^{2}		3.11		2.59		2.02		2.49		2.09	
$r_x = r_y$, in.		1.07		1.10		1.13		0.869		0.900	
$I_x = I_y$, in.^{4}		3.59		3.16		2.61		1.88		1.69	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS2½
HSS2

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS2½×2½×		HSS2¼×2¼×				HSS2×2×			
		3/16		1/4		3/16		1/4		3/16	
t_{des}, in.		0.188		0.250		0.188		0.250		0.188	
Nom. Weight, lb/ft		5.59		6.26		4.96		5.41		4.32	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	49.4	74.2	55.1	82.8	43.7	65.7	47.6	71.5	38.0	57.1
	1	48.8	73.4	54.2	81.4	43.0	64.7	46.6	70.0	37.3	56.0
	2	47.1	70.7	51.6	77.5	41.1	61.8	43.6	65.6	35.1	52.8
	3	44.3	66.5	47.5	71.4	38.1	57.2	39.1	58.8	31.8	47.7
	4	40.7	61.1	42.3	63.6	34.2	51.4	33.6	50.5	27.6	41.5
	5	36.4	54.8	36.4	54.8	29.8	44.8	27.6	41.6	23.1	34.7
	6	31.9	47.9	30.4	45.7	25.1	37.8	21.8	32.7	18.5	27.8
	7	27.2	40.9	24.5	36.8	20.6	31.0	16.4	24.7	14.3	21.4
	8	22.7	34.1	19.1	28.7	16.3	24.5	12.6	18.9	10.9	16.4
	9	18.4	27.6	15.1	22.7	12.9	19.4	9.93	14.9	8.63	13.0
	10	14.9	22.4	12.2	18.4	10.4	15.7	8.04	12.1	6.99	10.5
	11	12.3	18.5	10.1	15.2	8.63	13.0	6.64	9.99	5.77	8.68
	12	10.3	15.5	8.49	12.8	7.26	10.9			4.85	7.29
	13	8.81	13.2	7.24	10.9	6.18	9.29				
	14	7.60	11.4								
	15	6.62	9.95								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		49.4	74.3	55.1	82.8	43.7	65.7	47.6	71.6	38.0	57.2
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		40.2	60.3	44.9	67.3	35.6	53.4	38.8	58.1	31.0	46.4
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		13.1	19.7	13.5	20.3	11.4	17.2	11.2	16.9	9.73	14.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		3.49	5.25	3.32	4.99	2.74	4.13	2.50	3.75	2.10	3.15
Properties											
Area, in.^{2}		1.65		1.84		1.46		1.59		1.27	
$r_x = r_y$, in.		0.930		0.798		0.828		0.696		0.726	
$I_x = I_y$, in.^{4}		1.43		1.17		1.00		0.769		0.670	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS1½

Table 6-E (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS1½×1½×			
		¼		3/16	
t_{des}, in.		0.250		0.188	
Nom. Weight, lb/ft		3.71		3.04	
Design		ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y	0	32.6	49.0	26.8	40.3
	1	31.2	47.0	25.8	38.8
	2	27.4	41.2	23.0	34.5
	3	22.0	33.1	18.9	28.5
	4	16.2	24.4	14.5	21.7
	5	11.0	16.5	10.2	15.3
	6	7.62	11.5	7.08	10.6
	7	5.60	8.41	5.20	7.82
	8	4.29	6.44	3.98	5.98
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		32.6	49.1	26.8	40.3
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		26.6	39.9	21.8	32.8
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		6.74	10.1	6.32	9.50
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1.20	1.80	1.06	1.59
Properties					
Area, in.^{2}		1.09		0.896	
$r_x = r_y$, in.		0.491		0.522	
$I_x = I_y$, in.^{4}		0.263		0.244	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS22

Table 6-F
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS22×22×									
		1		⅞		¾[f]		⅝[c], [f]		½[c], [f]	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465	
Nom. Weight, lb/ft		277.07		244.88		212.00		178.41		144.13	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	2280	3430	2010	3030	1740	2620	1430	2150	987	1480
	1	2280	3430	2010	3030	1740	2620	1430	2150	987	1480
	2	2280	3430	2010	3030	1740	2620	1430	2150	987	1480
	3	2280	3420	2010	3020	1740	2620	1430	2150	986	1480
	4	2280	3420	2010	3020	1740	2610	1430	2150	986	1480
	5	2270	3420	2010	3020	1740	2610	1430	2150	985	1480
	6	2270	3410	2000	3010	1730	2610	1430	2150	984	1480
	7	2270	3400	2000	3010	1730	2600	1430	2140	983	1480
	8	2260	3400	2000	3000	1730	2600	1420	2140	982	1480
	9	2250	3390	1990	2990	1720	2590	1420	2140	980	1470
	10	2250	3380	1990	2990	1720	2580	1420	2130	979	1470
	11	2240	3370	1980	2980	1710	2570	1420	2130	977	1470
	12	2230	3360	1970	2970	1710	2570	1410	2120	975	1460
	13	2230	3350	1970	2960	1700	2560	1410	2120	973	1460
	14	2220	3330	1960	2940	1700	2550	1410	2110	970	1460
	15	2210	3320	1950	2930	1690	2540	1400	2110	968	1450
	16	2200	3300	1940	2920	1680	2530	1400	2100	965	1450
	17	2190	3290	1930	2910	1670	2510	1390	2090	962	1450
	18	2180	3270	1920	2890	1660	2500	1390	2090	959	1440
	19	2170	3250	1910	2880	1660	2490	1380	2080	956	1440
	20	2150	3240	1900	2860	1650	2480	1380	2070	953	1430
	22	2130	3200	1880	2830	1630	2450	1370	2050	946	1420
	24	2100	3160	1860	2790	1610	2420	1350	2030	938	1410
	26	2070	3110	1830	2750	1580	2380	1330	2000	930	1400
	28	2040	3060	1800	2710	1560	2350	1310	1970	921	1380
	30	2000	3010	1770	2660	1540	2310	1290	1940	911	1370
	32	1970	2960	1740	2620	1510	2270	1270	1910	901	1350
	34	1930	2900	1710	2570	1480	2230	1250	1870	890	1340
	36	1890	2840	1670	2520	1450	2180	1220	1840	879	1320
	38	1850	2780	1640	2460	1420	2140	1200	1800	867	1300
	40	1810	2720	1600	2410	1390	2090	1170	1760	855	1290
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2280	3430	2010	3030	1740	2620	1460	2200	1180	1780
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1770	2660	1560	2350	1350	2030	1140	1710	918	1380
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		642	964	573	862	499	750	424	637	344	517
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1490	2240	1320	1990	1110	1680	830	1250	616	926
Properties											
Area, in.^{2}		76.2		67.3		58.2		48.9		39.5	
$r_x = r_y$, in.		8.54		8.59		8.65		8.70		8.76	
$I_x = I_y$, in.^{4}		5550		4970		4350		3710		3030	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS20

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×20×									
		1		⅞		¾		⅝[f]		½[c], [f]	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465	
Nom. Weight, lb/ft		249.85		221.06		191.58		161.40		130.52	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	2060	3090	1820	2740	1570	2370	1330	1990	961	1440
	1	2060	3090	1820	2740	1570	2370	1330	1990	961	1440
	2	2060	3090	1820	2730	1570	2370	1330	1990	960	1440
	3	2050	3090	1820	2730	1570	2360	1320	1990	960	1440
	4	2050	3080	1820	2730	1570	2360	1320	1990	959	1440
	5	2050	3080	1810	2720	1570	2360	1320	1990	958	1440
	6	2040	3070	1810	2720	1570	2350	1320	1980	957	1440
	7	2040	3060	1800	2710	1560	2350	1320	1980	955	1440
	8	2030	3060	1800	2710	1560	2340	1310	1970	954	1430
	9	2030	3050	1790	2700	1550	2330	1310	1970	952	1430
	10	2020	3040	1790	2690	1550	2330	1300	1960	950	1430
	11	2010	3030	1780	2680	1540	2320	1300	1950	948	1420
	12	2010	3010	1780	2670	1540	2310	1290	1950	945	1420
	13	2000	3000	1770	2660	1530	2300	1290	1940	943	1420
	14	1990	2990	1760	2640	1520	2290	1280	1930	940	1410
	15	1980	2970	1750	2630	1520	2280	1280	1920	937	1410
	16	1970	2950	1740	2620	1510	2270	1270	1910	934	1400
	17	1950	2940	1730	2600	1500	2250	1260	1900	930	1400
	18	1940	2920	1720	2590	1490	2240	1260	1890	927	1390
	19	1930	2900	1710	2570	1480	2230	1250	1880	923	1390
	20	1920	2880	1700	2550	1470	2210	1240	1860	919	1380
	22	1890	2840	1670	2510	1450	2180	1220	1840	910	1370
	24	1860	2790	1650	2470	1430	2140	1200	1810	901	1350
	26	1830	2740	1620	2430	1400	2110	1180	1780	891	1340
	28	1790	2690	1590	2390	1380	2070	1160	1750	880	1320
	30	1750	2640	1560	2340	1350	2030	1140	1710	869	1310
	32	1720	2580	1520	2290	1320	1990	1110	1680	856	1290
	34	1680	2520	1490	2240	1290	1940	1090	1640	844	1270
	36	1640	2460	1450	2180	1260	1900	1060	1600	830	1250
	38	1590	2400	1420	2130	1230	1850	1040	1560	816	1230
	40	1550	2330	1380	2070	1200	1800	1010	1520	802	1210
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2060	3090	1820	2740	1570	2370	1330	1990	1070	1610
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1600	2400	1410	2120	1220	1830	1030	1540	832	1250
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		575	864	515	774	449	675	382	574	311	467
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1210	1820	1080	1620	943	1420	723	1090	527	792
Properties											
Area, in.^{2}		68.7		60.8		52.6		44.3		35.8	
$r_x = r_y$, in.		7.72		7.77		7.84		7.88		7.95	
$I_x = I_y$, in.^{4}		4100		3670		3230		2750		2260	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS20–HSS18

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20×20×				HSS18×18×					
		3/8[c], [f]		5/16[c], [f]		1		7/8		3/4	
t_{des}, in.		0.349		0.291		0.930		0.814		0.698	
Nom. Weight, lb/ft		98.94		82.88		222.63		197.24		171.16	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	582	874	418	629	1840	2760	1630	2440	1410	2120
	1	582	874	418	629	1830	2760	1630	2440	1410	2120
	2	581	874	418	629	1830	2760	1620	2440	1410	2120
	3	581	874	418	628	1830	2750	1620	2440	1410	2120
	4	581	873	418	628	1830	2750	1620	2440	1410	2110
	5	580	872	417	627	1830	2740	1620	2430	1400	2110
	6	580	871	417	627	1820	2740	1610	2420	1400	2100
	7	579	870	416	626	1820	2730	1610	2420	1400	2100
	8	578	869	416	625	1810	2720	1600	2410	1390	2090
	9	577	867	415	624	1800	2710	1600	2400	1390	2080
	10	576	865	414	623	1800	2700	1590	2390	1380	2070
	11	575	864	413	621	1790	2690	1580	2380	1370	2070
	12	573	862	413	620	1780	2670	1580	2370	1370	2060
	13	572	859	412	619	1770	2660	1570	2360	1360	2040
	14	570	857	410	617	1760	2640	1560	2340	1350	2030
	15	569	855	409	615	1750	2620	1550	2330	1340	2020
	16	567	852	408	613	1730	2610	1540	2310	1340	2010
	17	565	849	407	611	1720	2590	1530	2290	1330	1990
	18	563	846	405	609	1710	2570	1520	2280	1320	1980
	19	561	843	404	607	1690	2550	1500	2260	1310	1960
	20	559	839	402	605	1680	2520	1490	2240	1290	1950
	22	554	832	399	600	1650	2480	1460	2200	1270	1910
	24	549	824	396	594	1620	2430	1430	2160	1250	1870
	26	543	816	392	589	1580	2380	1400	2110	1220	1830
	28	537	807	388	582	1540	2320	1370	2060	1190	1790
	30	531	798	383	576	1500	2260	1340	2010	1160	1750
	32	524	787	378	569	1460	2200	1300	1960	1130	1700
	34	517	777	374	562	1420	2140	1260	1900	1100	1660
	36	509	766	368	554	1380	2070	1230	1840	1070	1610
	38	502	754	363	546	1330	2000	1190	1790	1040	1560
	40	494	742	358	537	1290	1940	1150	1730	1000	1510
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		811	1220	680	1020	1840	2760	1630	2440	1410	2120
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		630	945	528	792	1430	2140	1260	1890	1100	1640
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		238	358	180	271	508	763	456	686	399	599
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		357	536	276	414	966	1450	863	1300	753	1130
Properties											
Area, in.^{2}		27.1		22.7		61.3		54.3		47.1	
$r_x = r_y$, in.		8.00		8.03		6.90		6.96		7.02	
$I_x = I_y$, in.^{4}		1740		1460		2920		2630		2320	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS18

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS18×18×									
		5/8[f]		1/2[c], [f]		3/8[c], [f]		5/16[c], [f]		1/4[c], [f]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		144.39		116.91		88.73		74.38		59.85	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1190	1780	927	1390	567	853	411	617	273	410
	1	1190	1780	927	1390	567	853	411	617	273	410
	2	1180	1780	927	1390	567	852	411	617	272	409
	3	1180	1780	926	1390	567	852	410	617	272	409
	4	1180	1780	925	1390	566	851	410	616	272	409
	5	1180	1770	924	1390	566	850	410	615	272	408
	6	1180	1770	923	1390	565	849	409	615	271	408
	7	1170	1760	921	1380	564	847	408	614	271	407
	8	1170	1760	919	1380	563	846	408	613	271	407
	9	1170	1750	917	1380	561	844	407	611	270	406
	10	1160	1740	914	1370	560	842	406	610	269	405
	11	1160	1740	912	1370	559	840	405	608	269	404
	12	1150	1730	909	1370	557	837	404	607	268	403
	13	1140	1720	905	1360	555	834	402	605	267	402
	14	1140	1710	902	1360	553	831	401	603	266	400
	15	1130	1700	898	1350	551	828	400	601	265	399
	16	1120	1690	894	1340	549	825	398	598	264	398
	17	1120	1680	890	1340	547	821	396	596	263	396
	18	1110	1660	885	1330	544	818	395	593	262	394
	19	1100	1650	881	1320	541	814	393	590	261	393
	20	1090	1640	876	1320	539	810	391	588	260	391
	22	1070	1610	865	1300	533	801	387	582	257	387
	24	1050	1580	853	1280	527	791	383	575	255	383
	26	1030	1550	836	1260	520	781	378	568	252	378
	28	1010	1510	817	1230	512	770	373	560	249	374
	30	981	1470	798	1200	505	758	367	552	245	368
	32	956	1440	777	1170	496	746	362	544	242	363
	34	929	1400	756	1140	488	733	356	535	238	357
	36	902	1360	735	1100	479	720	350	525	234	351
	38	875	1310	713	1070	470	706	343	516	230	345
	40	846	1270	690	1040	460	691	336	506	225	339
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1190	1780	961	1440	728	1090	611	918	491	738
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		921	1380	746	1120	565	847	474	711	381	572
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		340	511	277	417	213	320	179	269	115	173
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		626	941	442	664	298	449	233	350	171	258
Properties											
Area, in.^{2}		39.6		32.1		24.3		20.4		16.4	
$r_x = r_y$, in.		7.07		7.13		7.18		7.21		7.24	
$I_x = I_y$, in.^{4}		1980		1630		1250		1060		860	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS16

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×16×									
		1		⅞		¾		⅝		½[f]	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465	
Nom. Weight, lb/ft		195.40		173.43		150.75		127.37		103.30	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1610	2420	1430	2150	1240	1870	1050	1580	847	1270
	1	1610	2420	1430	2150	1240	1870	1050	1570	847	1270
	2	1610	2420	1430	2140	1240	1870	1050	1570	846	1270
	3	1610	2410	1420	2140	1240	1860	1050	1570	845	1270
	4	1600	2410	1420	2140	1240	1860	1040	1570	844	1270
	5	1600	2400	1420	2130	1230	1850	1040	1560	842	1270
	6	1590	2400	1410	2130	1230	1850	1040	1560	839	1260
	7	1590	2390	1410	2120	1230	1840	1030	1550	836	1260
	8	1580	2380	1400	2110	1220	1830	1030	1550	833	1250
	9	1570	2370	1400	2100	1220	1830	1030	1540	829	1250
	10	1570	2350	1390	2090	1210	1820	1020	1530	825	1240
	11	1560	2340	1380	2080	1200	1810	1010	1520	821	1230
	12	1550	2320	1370	2060	1190	1800	1010	1520	816	1230
	13	1540	2310	1360	2050	1190	1780	1000	1500	810	1220
	14	1520	2290	1350	2030	1180	1770	994	1490	805	1210
	15	1510	2270	1340	2020	1170	1760	986	1480	798	1200
	16	1500	2250	1330	2000	1160	1740	978	1470	792	1190
	17	1480	2230	1320	1980	1150	1720	969	1460	785	1180
	18	1470	2210	1300	1960	1140	1710	960	1440	778	1170
	19	1450	2190	1290	1940	1130	1690	951	1430	770	1160
	20	1440	2160	1280	1920	1110	1670	941	1410	762	1150
	22	1400	2110	1250	1880	1090	1630	920	1380	746	1120
	24	1370	2060	1220	1830	1060	1590	897	1350	728	1090
	26	1330	2000	1180	1780	1030	1550	873	1310	709	1070
	28	1290	1940	1150	1720	1000	1510	848	1270	689	1040
	30	1250	1880	1110	1670	970	1460	822	1240	668	1000
	32	1200	1810	1070	1610	938	1410	795	1200	646	971
	34	1160	1740	1030	1550	904	1360	767	1150	624	938
	36	1110	1680	994	1490	870	1310	739	1110	601	904
	38	1070	1610	954	1430	836	1260	710	1070	578	869
	40	1020	1540	913	1370	800	1200	681	1020	555	834
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1610	2420	1430	2150	1240	1870	1050	1580	847	1270
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1250	1880	1110	1660	965	1450	814	1220	658	987
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		441	663	398	598	349	524	299	449	244	367
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		749	1130	669	1010	586	881	499	750	372	558
Properties											
Area, in.^{2}		53.8		47.7		41.5		35.0		28.3	
$r_x = r_y$, in.		6.09		6.14		6.19		6.25		6.31	
$I_x = I_y$, in.^{4}		1990		1800		1590		1370		1130	

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

Table 6-F (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Square HSS

HSS16–HSS14

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16×16×						HSS14×14×			
		3/8[c], [f]		5/16[c], [f]		1/4[c], [f]		1		7/8	
t_{des}, in.		0.349		0.291		0.233		0.930		0.814	
Nom. Weight, lb/ft		78.52		65.87		53.05		168.18		149.61	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	551	827	402	604	270	405	1390	2090	1230	1850
	1	550	827	402	604	270	405	1390	2090	1230	1850
	2	550	827	402	604	269	405	1390	2080	1230	1850
	3	550	826	401	603	269	405	1380	2080	1230	1850
	4	549	825	401	603	269	404	1380	2080	1230	1840
	5	548	824	400	602	269	404	1380	2070	1220	1840
	6	547	822	400	601	268	403	1370	2060	1220	1830
	7	546	821	399	599	268	402	1360	2050	1210	1820
	8	545	819	398	598	267	401	1360	2040	1200	1810
	9	543	816	397	596	266	400	1350	2020	1200	1800
	10	541	814	396	595	266	399	1340	2010	1190	1790
	11	539	811	394	593	265	398	1330	1990	1180	1770
	12	537	808	393	590	264	396	1320	1980	1170	1760
	13	535	804	391	588	263	395	1300	1960	1160	1740
	14	533	800	389	585	262	393	1290	1940	1150	1720
	15	530	796	388	583	261	392	1280	1920	1130	1710
	16	527	792	386	580	259	390	1260	1890	1120	1690
	17	524	788	384	577	258	388	1250	1870	1110	1670
	18	521	783	382	573	257	386	1230	1850	1090	1640
	19	518	778	379	570	255	383	1210	1820	1080	1620
	20	514	773	377	566	254	381	1190	1790	1060	1600
	22	507	762	372	559	250	376	1160	1740	1030	1550
	24	499	750	366	550	247	371	1120	1680	996	1500
	26	490	737	360	541	243	365	1080	1620	960	1440
	28	481	723	354	532	239	359	1030	1550	922	1390
	30	472	709	347	522	235	353	988	1480	884	1330
	32	462	694	340	511	230	346	942	1420	844	1270
	34	451	678	333	500	226	339	896	1350	804	1210
	36	440	661	325	489	221	332	850	1280	763	1150
	38	429	644	317	477	216	324	804	1210	722	1090
	40	417	626	309	465	210	316	757	1140	682	1020
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		644	968	542	815	437	657	1390	2090	1230	1850
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		500	750	421	631	339	509	1080	1620	958	1440
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		188	283	158	237	115	174	374	562	339	510
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		247	372	193	290	142	213	559	840	501	754
Properties											
Area, in.^{2}		21.5		18.1		14.6		46.4		41.2	
$r_x = r_y$, in.		6.37		6.39		6.42		5.27		5.33	
$I_x = I_y$, in.^{4}		873		739		600		1290		1170	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS14

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×14×									
		¾		⅝		½[f]		⅜[c], [f]		5⁄16[c], [f]	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		130.33		110.36		89.68		68.31		57.36	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	1070	1620	907	1360	737	1110	527	792	387	582
	1	1070	1610	907	1360	736	1110	527	792	387	582
	2	1070	1610	906	1360	735	1110	527	792	387	581
	3	1070	1610	904	1360	734	1100	526	791	386	581
	4	1070	1610	902	1360	732	1100	525	789	386	580
	5	1070	1600	899	1350	730	1100	524	788	385	579
	6	1060	1590	896	1350	727	1090	523	786	384	577
	7	1060	1590	892	1340	724	1090	521	783	383	576
	8	1050	1580	887	1330	720	1080	519	781	382	574
	9	1040	1570	881	1320	716	1080	517	778	380	572
	10	1040	1560	875	1320	711	1070	515	774	379	569
	11	1030	1550	869	1310	706	1060	513	770	377	567
	12	1020	1530	862	1300	700	1050	510	766	375	564
	13	1010	1520	854	1280	694	1040	507	762	373	561
	14	1000	1500	846	1270	688	1030	504	757	371	558
	15	990	1490	837	1260	681	1020	500	752	369	554
	16	979	1470	828	1240	674	1010	497	746	366	550
	17	968	1450	819	1230	666	1000	493	741	364	546
	18	955	1440	808	1220	658	989	489	734	361	542
	19	943	1420	798	1200	649	976	484	728	358	538
	20	929	1400	787	1180	640	963	480	721	355	533
	22	901	1350	764	1150	622	935	470	707	348	523
	24	872	1310	739	1110	602	905	460	691	341	513
	26	841	1260	713	1070	582	874	444	668	334	501
	28	808	1210	686	1030	560	842	428	644	326	489
	30	775	1160	659	990	538	808	412	619	317	477
	32	741	1110	630	947	515	774	395	593	308	464
	34	706	1060	601	904	492	739	377	567	299	450
	36	671	1010	572	860	468	704	360	540	290	436
	38	636	955	543	816	445	668	342	514	280	421
	40	601	903	513	772	421	633	324	487	270	406
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1070	1620	907	1360	737	1110	560	842	470	707
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		835	1250	704	1060	572	858	435	652	365	548
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		298	449	257	386	211	316	163	245	137	206
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		442	664	377	566	309	464	198	298	155	233
Properties											
Area, in.^{2}		35.9		30.3		24.6		18.7		15.7	
$r_x = r_y$, in.		5.38		5.44		5.49		5.55		5.58	
$I_x = I_y$, in.^{4}		1040		897		743		577		490	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS14–HSS12

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14×14×		HSS12×12×							
		¼[c], [f]		1		⅞		¾		⅝	
t_{des}, in.		0.233		0.930		0.814		0.698		0.581	
Nom. Weight, lb/ft		46.24		140.96		125.79		109.91		93.34	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	262	394	1170	1760	1040	1560	907	1360	769	1160
	1	262	394	1170	1750	1040	1560	907	1360	769	1160
	2	262	394	1170	1750	1040	1560	905	1360	768	1150
	3	262	393	1160	1750	1030	1550	903	1360	766	1150
	4	261	393	1160	1740	1030	1550	900	1350	763	1150
	5	261	392	1150	1730	1030	1540	896	1350	760	1140
	6	260	391	1150	1720	1020	1530	891	1340	756	1140
	7	260	390	1140	1710	1010	1520	885	1330	751	1130
	8	259	389	1130	1700	1010	1510	878	1320	746	1120
	9	258	388	1120	1680	996	1500	871	1310	739	1110
	10	257	386	1110	1660	987	1480	862	1300	732	1100
	11	256	384	1090	1650	976	1470	853	1280	725	1090
	12	255	383	1080	1630	964	1450	843	1270	717	1080
	13	253	381	1070	1600	952	1430	833	1250	708	1060
	14	252	379	1050	1580	939	1410	821	1230	699	1050
	15	250	376	1040	1560	925	1390	810	1220	689	1040
	16	249	374	1020	1530	910	1370	797	1200	678	1020
	17	247	371	1000	1510	895	1340	784	1180	667	1000
	18	245	369	983	1480	879	1320	770	1160	656	986
	19	243	366	964	1450	862	1300	756	1140	644	968
	20	241	363	944	1420	845	1270	741	1110	632	949
	22	237	357	903	1360	809	1220	710	1070	606	911
	24	233	350	860	1290	771	1160	678	1020	579	870
	26	228	343	815	1230	732	1100	644	968	551	829
	28	223	335	770	1160	692	1040	610	917	523	786
	30	217	327	724	1090	652	980	575	864	494	742
	32	212	318	677	1020	611	919	540	812	464	698
	34	206	310	632	949	571	858	505	759	435	654
	36	200	300	586	881	531	798	471	707	406	610
	38	194	291	542	814	492	739	437	656	377	567
	40	187	281	499	750	454	682	404	606	349	525
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		380	572	1170	1760	1040	1560	907	1360	769	1160
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		295	443	907	1360	807	1210	704	1060	598	896
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		111	167	308	463	280	420	249	374	215	323
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		114	172	394	593	357	536	317	476	272	409
Properties											
Area, in.^{2}		12.7		39.0		34.7		30.3		25.7	
$r_x = r_y$, in.		5.60		4.45		4.51		4.56		4.62	
$I_x = I_y$, in.^{4}		399		772		706		631		548	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

Table 6-F (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Square HSS

HSS12

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12×12×									
		½		⅜[f]		5⁄16[c], [f]		¼[c], [f]		3⁄16[c], [f]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		76.07		58.10		48.86		39.43		29.84	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	626	941	479	720	371	557	252	379	150	225
	1	625	940	479	720	371	557	252	379	150	225
	2	625	939	478	719	370	556	252	379	149	225
	3	623	936	477	717	370	556	252	379	149	224
	4	621	933	475	715	369	554	251	378	149	224
	5	618	929	473	712	368	553	251	377	149	223
	6	615	924	471	708	367	551	250	376	148	223
	7	611	919	468	704	365	549	249	374	148	222
	8	607	912	465	699	363	546	248	373	147	221
	9	602	905	461	693	361	543	247	371	146	220
	10	596	896	457	687	359	540	245	369	146	219
	11	590	887	453	680	357	536	244	366	145	218
	12	584	878	448	673	354	533	242	364	144	216
	13	577	867	442	665	352	528	240	361	143	215
	14	569	856	437	657	349	524	238	358	142	213
	15	562	844	431	648	345	519	236	355	141	212
	16	553	832	425	638	342	514	234	352	140	210
	17	545	819	418	628	338	509	232	349	138	208
	18	535	805	411	618	335	503	230	345	137	206
	19	526	791	404	608	331	497	227	342	136	204
	20	516	776	397	596	326	491	225	338	134	202
	22	496	745	381	573	318	478	219	329	131	197
	24	474	713	365	549	307	461	213	320	128	192
	26	452	680	349	524	293	440	207	311	124	187
	28	429	645	331	498	279	419	200	301	121	181
	30	406	610	314	471	264	397	193	291	117	176
	32	382	575	296	445	249	375	186	280	113	170
	34	359	540	278	418	234	352	179	269	109	164
	36	336	504	260	391	220	330	171	257	105	157
	38	313	470	243	365	205	308	163	245	100	151
	40	290	436	226	339	191	287	155	233	95.9	144
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		626	941	479	720	401	603	323	486	244	367
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		486	729	372	558	312	467	251	377	189	284
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		177	266	138	207	116	174	94.6	142	64.5	97.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		224	336	157	236	120	181	88.9	134	59.4	89.3
Properties											
Area, in.^{2}		20.9		16.0		13.4		10.8		8.15	
$r_x = r_y$, in.		4.68		4.73		4.76		4.79		4.82	
$I_x = I_y$, in.^{4}		457		357		304		248		189	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

Table 6-F (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Square HSS

HSS10

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×10×									
		¾		⅝		½		⅜		5/16[f]	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		89.50		76.33		62.46		47.90		40.35	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	740	1110	629	945	515	774	395	594	332	500
	1	739	1110	628	944	515	773	395	594	332	499
	2	737	1110	627	942	514	772	394	592	331	498
	3	735	1100	625	939	512	769	393	590	330	496
	4	731	1100	621	934	509	765	391	588	329	494
	5	726	1090	617	928	506	760	388	584	327	491
	6	720	1080	612	921	502	755	386	580	324	487
	7	713	1070	607	912	497	748	382	574	321	483
	8	705	1060	600	902	492	740	378	569	318	478
	9	696	1050	593	891	486	731	374	562	315	473
	10	686	1030	585	879	480	721	369	555	311	467
	11	675	1020	576	865	473	711	364	547	306	460
	12	664	998	566	851	465	699	358	538	301	453
	13	652	979	556	835	457	687	352	529	296	445
	14	639	960	545	819	448	674	346	519	291	437
	15	625	939	534	802	439	660	339	509	285	429
	16	611	918	522	784	430	646	332	498	279	420
	17	596	895	509	765	420	631	324	487	273	411
	18	580	872	496	746	410	616	317	476	267	401
	19	564	848	483	726	399	600	309	464	260	391
	20	548	824	470	706	388	583	300	452	253	381
	22	515	774	442	664	366	550	284	426	239	360
	24	480	722	413	621	343	515	266	400	225	338
	26	446	670	384	577	319	480	249	374	210	316
	28	411	618	355	534	296	445	231	347	195	293
	30	377	567	326	490	273	410	213	321	180	271
	32	344	516	298	448	250	375	196	294	166	249
	34	311	468	271	407	228	342	179	269	152	228
	36	280	420	244	367	206	310	163	244	138	207
	38	251	377	219	329	185	278	147	220	125	187
	40	227	341	198	297	167	251	132	199	112	169
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		740	1110	629	945	515	774	395	594	332	500
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		574	861	488	732	400	600	307	460	258	387
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		198	298	172	259	144	216	112	169	95.5	143
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		211	318	183	275	151	228	118	177	90.9	137
Properties											
Area, in.^{2}		24.7		21.0		17.2		13.2		11.1	
$r_x = r_y$, in.		3.75		3.80		3.86		3.92		3.94	
$I_x = I_y$, in.^{4}		347		304		256		202		172	

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS10–HSS9

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10×10×				HSS9×9×					
		¼[c], [f]		3/16[c], [f]		⅝		½		⅜	
t_{des}, in.		0.233		0.174		0.581		0.465		0.349	
Nom. Weight, lb/ft		32.63		24.73		67.82		55.66		42.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	241	362	145	217	560	841	458	688	353	531
	1	241	362	145	217	559	841	458	688	353	531
	2	240	361	144	217	558	838	456	686	352	529
	3	240	360	144	217	555	835	454	683	351	527
	4	239	359	144	216	552	829	452	679	348	524
	5	238	358	143	215	547	823	448	673	346	520
	6	237	356	143	214	542	814	444	667	343	515
	7	236	354	142	213	535	805	439	659	339	509
	8	234	352	141	212	528	794	433	651	334	503
	9	232	349	140	210	520	782	426	641	330	495
	10	230	346	139	209	511	768	419	630	324	488
	11	228	343	138	207	501	754	412	619	319	479
	12	226	339	136	205	491	738	403	606	312	470
	13	223	336	135	203	480	721	394	593	306	460
	14	221	331	134	201	468	704	385	579	299	449
	15	218	327	132	198	456	686	375	564	291	438
	16	215	323	130	196	443	666	365	549	284	427
	17	211	318	129	193	430	647	355	533	276	415
	18	208	313	127	190	417	626	344	517	268	403
	19	205	307	125	188	403	606	333	500	260	390
	20	201	302	123	185	389	585	322	483	251	377
	22	193	290	119	178	360	542	299	449	234	351
	24	183	274	114	171	331	498	275	414	216	325
	26	171	257	109	164	302	455	252	379	198	298
	28	159	239	104	157	274	412	229	344	181	272
	30	147	221	99.3	149	247	371	207	311	164	246
	32	135	203	94.1	141	220	331	185	278	147	221
	34	124	186	88.8	133	195	293	164	247	131	197
	36	113	170	83.4	125	174	262	147	220	117	176
	38	102	153	77.9	117	156	235	132	198	105	158
	40	92.1	138	70.6	106	141	212	119	179	94.8	143
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		268	403	202	304	560	842	458	689	353	531
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		208	312	157	236	435	652	356	534	274	412
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		77.9	117	59.3	89.1	152	228	127	191	99.7	150
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		65.8	98.9	44.2	66.4	145	218	121	182	94.3	142
Properties											
Area, in.^{2}		8.96		6.76		18.7		15.3		11.8	
$r_x = r_y$, in.		3.97		4.00		3.40		3.45		3.51	
$I_x = I_y$, in.^{4}		141		108		216		183		145	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS9–HSS8

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS9×9×								HSS8×8×	
		5/16[f]		1/4[c], [f]		3/16[c], [f]		1/8[c], [f]		5/8	
t_{des}, in.		0.291		0.233		0.174		0.116		0.581	
Nom. Weight, lb/ft		36.10		29.23		22.18		14.96		59.32	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	297	446	232	349	141	212	67.9	102	491	738
	1	297	446	232	349	141	212	67.8	102	490	737
	2	296	445	232	348	141	212	67.7	102	489	735
	3	295	443	231	347	141	211	67.6	102	486	730
	4	293	440	230	346	140	211	67.4	101	482	724
	5	291	437	229	344	140	210	67.1	101	477	717
	6	288	433	228	342	139	209	66.7	100	471	707
	7	285	428	226	340	138	207	66.3	99.7	463	697
	8	281	423	224	337	137	206	65.8	99.0	455	684
	9	277	417	222	333	136	204	65.3	98.2	446	671
	10	273	410	219	330	134	202	64.7	97.3	436	656
	11	268	403	217	326	133	199	64.1	96.3	426	640
	12	263	396	213	321	131	197	63.4	95.3	414	623
	13	258	387	209	314	129	195	62.7	94.2	402	605
	14	252	379	204	307	128	192	61.9	93.0	390	586
	15	246	370	199	300	126	189	61.0	91.7	377	566
	16	240	360	194	292	124	186	60.1	90.4	363	546
	17	233	350	189	284	122	183	59.2	89.0	349	525
	18	226	340	184	276	119	179	58.2	87.5	335	504
	19	219	330	178	268	117	176	57.2	85.9	321	482
	20	212	319	172	259	115	172	56.1	84.3	307	461
	22	198	297	161	242	109	165	53.9	81.0	278	417
	24	183	275	149	224	104	157	51.5	77.5	249	374
	26	168	253	137	206	98.6	148	49.1	73.8	221	333
	28	154	231	125	188	92.8	139	46.6	70.0	195	293
	30	139	210	114	171	86.9	131	44.0	66.1	170	256
	32	126	189	103	154	78.6	118	41.3	62.1	149	225
	34	112	169	91.9	138	70.5	106	38.7	58.1	132	199
	36	100	150	82.0	123	62.9	94.5	36.0	54.0	118	177
	38	89.9	135	73.6	111	56.5	84.9	33.5	50.4	106	159
	40	81.1	122	66.4	99.8	51.0	76.6	31.4	47.1	95.6	144
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		297	446	240	361	181	273	122	184	491	738
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		231	346	187	280	141	211	95.1	143	381	572
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		85.0	128	69.5	104	53.0	79.7	28.4	42.6	131	196
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		78.5	118	55.4	83.2	37.3	56.1	21.3	32.0	112	168
Properties											
Area, in.^{2}		9.92		8.03		6.06		4.09		16.4	
$r_x = r_y$, in.		3.54		3.56		3.59		3.62		2.99	
$I_x = I_y$, in.^{4}		124		102		78.2		53.5		146	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS8

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8×8×									
		½		⅜		5⁄16		¼[f]		3⁄16[c], [f]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		48.85		37.69		31.84		25.82		19.63	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	404	607	311	468	262	394	213	320	137	206
	1	404	607	311	467	262	394	212	319	137	206
	2	402	605	310	466	261	393	212	318	137	205
	3	400	601	308	463	260	390	211	316	136	205
	4	397	597	306	460	258	387	209	314	136	204
	5	393	590	303	455	255	384	207	311	135	203
	6	388	583	299	450	252	379	205	308	134	201
	7	382	575	295	444	249	374	202	303	133	199
	8	376	565	290	436	245	368	199	299	131	197
	9	369	554	285	428	240	361	195	293	130	195
	10	361	542	279	419	236	354	191	287	128	192
	11	352	529	273	410	230	346	187	281	126	190
	12	343	516	266	400	225	338	182	274	124	187
	13	333	501	259	389	219	329	178	267	122	183
	14	323	486	251	378	212	319	173	260	120	180
	15	313	470	243	366	206	310	167	252	117	176
	16	302	454	235	354	199	299	162	243	115	173
	17	291	437	227	341	192	289	156	235	112	169
	18	279	420	218	328	185	278	151	227	109	165
	19	268	403	210	315	178	267	145	218	107	160
	20	256	385	201	302	171	256	139	209	104	156
	22	233	350	183	275	156	234	127	191	97.1	146
	24	210	315	166	249	141	212	115	173	88.3	133
	26	187	281	148	223	127	191	104	156	79.5	120
	28	165	249	132	198	113	170	92.5	139	71.1	107
	30	145	217	116	174	99.5	150	81.7	123	63.0	94.7
	32	127	191	102	153	87.5	131	71.8	108	55.4	83.2
	34	113	169	90.2	136	77.5	116	63.6	95.6	49.0	73.7
	36	100	151	80.5	121	69.1	104	56.7	85.3	43.7	65.7
	38	90.2	136	72.2	109	62.0	93.2	50.9	76.5	39.3	59.0
	40	81.4	122	65.2	98.0	56.0	84.1	46.0	69.1	35.4	53.2
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		404	608	311	468	262	394	213	320	161	242
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		314	471	242	363	204	306	165	248	125	187
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		110	166	87.1	131	74.5	112	61.1	91.8	46.8	70.3
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		93.6	141	73.4	110	62.6	94.1	46.7	70.1	30.8	46.3
Properties											
Area, in.^{2}		13.5		10.4		8.76		7.10		5.37	
$r_x = r_y$, in.		3.04		3.10		3.13		3.15		3.18	
$I_x = I_y$, in.^{4}		125		100		85.6		70.7		54.4	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS8–HSS7

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8×8×		HSS7×7×							
		⅛[c], [f]		⅝		½		⅜		5⁄16	
t_{des}, in.		0.116		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		13.26		50.81		42.05		32.58		27.59	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	66.4	99.8	419	630	347	522	269	404	227	342
	1	66.4	99.8	418	629	347	521	268	403	227	341
	2	66.3	99.6	417	626	345	519	267	401	226	340
	3	66.1	99.3	413	621	343	515	265	398	224	337
	4	65.8	98.9	409	614	339	509	262	394	222	334
	5	65.4	98.3	403	606	334	503	259	389	219	330
	6	65.0	97.7	396	595	329	494	255	383	216	324
	7	64.5	96.9	388	583	322	484	250	376	212	319
	8	63.9	96.0	379	569	315	474	245	368	207	312
	9	63.2	95.0	369	554	307	461	239	359	203	304
	10	62.5	93.9	358	538	298	448	232	349	197	296
	11	61.7	92.7	346	520	289	434	225	338	191	288
	12	60.8	91.4	334	502	279	419	218	327	185	278
	13	59.9	90.0	321	482	269	404	210	316	179	269
	14	58.9	88.6	307	462	258	387	202	303	172	258
	15	57.9	87.0	294	441	247	371	194	291	165	248
	16	56.8	85.3	280	420	235	354	185	278	158	237
	17	55.6	83.6	265	399	224	336	176	265	151	226
	18	54.4	81.8	251	377	212	319	168	252	143	215
	19	53.2	79.9	237	356	200	301	159	239	136	204
	20	51.9	78.0	223	335	189	284	150	226	129	193
	22	49.2	74.0	195	293	166	250	133	200	114	172
	24	46.4	69.8	169	253	145	217	116	175	100	150
	26	43.5	65.4	144	216	124	186	100	151	86.7	130
	28	40.6	61.0	124	186	107	161	86.4	130	74.8	112
	30	37.6	56.5	108	162	93.1	140	75.3	113	65.1	97.9
	32	34.5	51.9	95.0	143	81.8	123	66.2	99.4	57.2	86.0
	34	31.9	47.9	84.1	126	72.4	109	58.6	88.1	50.7	76.2
	36	29.5	44.3	75.1	113	64.6	97.1	52.3	78.6	45.2	68.0
	38	27.0	40.5	67.4	101	58.0	87.2	46.9	70.5	40.6	61.0
	40	24.3	36.6	60.8	91.4	52.3	78.7	42.3	63.6	36.6	55.1
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		108	163	419	630	347	522	269	404	227	342
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		84.2	126	326	488	270	405	209	313	176	265
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		28.6	43.0	110	165	93.6	141	74.6	112	64.1	96.3
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		17.6	26.5	82.6	124	69.6	105	55.1	82.9	47.2	70.9
Properties											
Area, in.^{2}		3.62		14.0		11.6		8.97		7.59	
$r_x = r_y$, in.		3.21		2.58		2.63		2.69		2.72	
$I_x = I_y$, in.^{4}		37.4		93.4		80.5		65.0		56.1	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.

HSS7–HSS6

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS7×7×						HSS6×6×			
		¼[f]		3/16[c], [f]		⅛[c], [f]		⅝		½	
t_{des}, in.		0.233		0.174		0.116		0.581		0.465	
Nom. Weight, lb/ft		22.42		17.08		11.56		42.30		35.24	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	185	278	131	198	65.1	97.8	350	526	292	438
	1	184	277	131	197	65.0	97.7	350	525	291	437
	2	184	276	131	197	64.9	97.5	347	522	289	435
	3	182	274	130	196	64.6	97.1	343	516	286	430
	4	181	272	129	195	64.2	96.5	338	508	282	424
	5	178	268	128	193	63.8	95.8	331	498	277	416
	6	176	264	127	191	63.2	95.0	323	486	270	406
	7	173	259	126	189	62.5	93.9	314	472	263	395
	8	169	254	124	186	61.7	92.8	304	456	255	383
	9	165	248	122	183	60.9	91.5	292	439	246	369
	10	161	242	120	180	59.9	90.1	280	421	236	355
	11	156	235	117	176	58.9	88.5	267	402	226	339
	12	151	227	115	172	57.8	86.8	254	382	215	323
	13	146	219	111	167	56.6	85.0	240	361	204	306
	14	141	211	107	161	55.3	83.1	226	340	193	289
	15	135	203	103	154	54.0	81.1	212	318	181	272
	16	129	194	98.4	148	52.6	79.0	198	297	170	255
	17	124	186	94.0	141	51.1	76.8	184	276	158	238
	18	118	177	89.6	135	49.6	74.6	170	255	147	221
	19	112	168	85.2	128	48.1	72.2	156	235	136	204
	20	106	159	80.8	121	46.5	69.8	143	215	125	188
	22	94.2	142	72.0	108	43.2	64.9	119	179	104	157
	24	82.8	125	63.4	95.3	39.8	59.8	99.8	150	87.8	132
	26	72.1	108	55.3	83.1	36.4	54.7	85.1	128	74.8	112
	28	62.1	93.4	47.7	71.7	32.9	49.4	73.4	110	64.5	96.9
	30	54.1	81.3	41.6	62.5	28.7	43.2	63.9	96.0	56.2	84.4
	32	47.6	71.5	36.5	54.9	25.3	38.0	56.2	84.4	49.4	74.2
	34	42.1	63.3	32.4	48.6	22.4	33.6	49.7	74.8	43.7	65.7
	36	37.6	56.5	28.9	43.4	20.0	30.0	44.4	66.7	39.0	58.6
	38	33.7	50.7	25.9	38.9	17.9	26.9				
	40	30.4	45.8	23.4	35.1	16.2	24.3				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		185	278	140	210	94.6	142	350	527	292	438
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		143	215	109	163	73.5	110	272	408	226	340
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		52.7	79.3	40.5	60.9	27.7	41.7	88.9	134	77.0	116
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		38.7	58.1	24.7	37.1	14.2	21.3	57.9	87.0	49.4	74.3
Properties											
Area, in.^{2}		6.17		4.67		3.16		11.7		9.74	
$r_x = r_y$, in.		2.75		2.77		2.80		2.17		2.23	
$I_x = I_y$, in.^{4}		46.5		36.0		24.8		55.2		48.3	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS6

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6×6×									
		3/8		5/16		1/4		3/16[f]		1/8[c], [f]	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116	
Nom. Weight, lb/ft		27.48		23.34		19.02		14.53		9.86	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	227	341	193	289	157	236	119	179	63.0	94.7
	1	226	340	192	289	157	235	119	179	62.9	94.6
	2	225	338	191	287	156	234	118	178	62.7	94.3
	3	223	335	189	284	154	232	117	176	62.4	93.7
	4	220	330	187	280	152	229	116	174	61.8	93.0
	5	216	324	183	275	150	225	114	171	61.2	92.0
	6	211	317	179	270	146	220	111	167	60.4	90.8
	7	206	309	175	263	143	215	109	163	59.5	89.4
	8	199	300	170	255	139	208	106	159	58.5	87.9
	9	193	289	164	247	134	202	102	154	57.3	86.1
	10	185	279	158	238	129	195	98.8	148	56.0	84.2
	11	178	267	152	228	124	187	95.0	143	54.6	82.1
	12	170	255	145	218	119	179	91.0	137	53.1	79.9
	13	161	242	138	207	113	170	86.8	130	51.6	77.5
	14	153	229	131	197	108	162	82.5	124	49.9	75.0
	15	144	216	123	186	102	153	78.2	117	48.2	72.4
	16	135	203	116	175	95.9	144	73.7	111	46.4	69.7
	17	126	190	109	164	90.0	135	69.3	104	44.5	66.9
	18	118	177	102	153	84.1	126	64.9	97.6	42.6	64.0
	19	109	164	94.4	142	78.4	118	60.6	91.0	40.6	61.1
	20	101	152	87.4	131	72.7	109	56.3	84.6	38.7	58.1
	22	85.0	128	74.0	111	61.9	93.0	48.1	72.3	33.1	49.8
	24	71.4	107	62.2	93.5	52.0	78.1	40.5	60.9	27.9	42.0
	26	60.8	91.4	53.0	79.6	44.3	66.6	34.5	51.9	23.8	35.8
	28	52.5	78.8	45.7	68.7	38.2	57.4	29.8	44.7	20.5	30.9
	30	45.7	68.7	39.8	59.8	33.3	50.0	25.9	39.0	17.9	26.9
	32	40.2	60.4	35.0	52.6	29.2	44.0	22.8	34.2	15.7	23.6
	34	35.6	53.5	31.0	46.6	25.9	38.9	20.2	30.3	13.9	20.9
	36	31.7	47.7	27.6	41.5	23.1	34.7	18.0	27.1	12.4	18.7
	38			24.8	37.3	20.7	31.2	16.2	24.3	11.1	16.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		227	341	193	289	157	236	119	179	80.8	122
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		176	264	149	224	122	183	92.5	139	62.8	94.2
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		62.1	93.3	53.6	80.6	44.4	66.7	34.3	51.5	23.5	35.4
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		39.4	59.3	33.9	51.0	27.9	42.0	19.5	29.3	11.1	16.7
Properties											
Area, in.^{2}		7.58		6.43		5.24		3.98		2.70	
$r_x = r_y$, in.		2.28		2.31		2.34		2.37		2.39	
$I_x = I_y$, in.^{4}		39.5		34.3		28.6		22.3		15.5	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS5½

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5½×5½×									
		⅜		5⁄16		¼		3⁄16[f]		⅛[c], [f]	
t_{des}, in.		0.349		0.291		0.233		0.174		0.116	
Nom. Weight, lb/ft		24.93		21.21		17.32		13.25		9.01	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	206	310	175	263	143	215	109	163	61.4	92.2
	1	205	309	175	263	142	214	108	163	61.3	92.1
	2	204	307	174	261	141	213	108	162	61.0	91.7
	3	202	303	171	258	140	210	106	160	60.6	91.1
	4	198	298	169	253	138	207	105	158	60.0	90.2
	5	194	291	165	248	135	203	103	154	59.2	89.0
	6	189	284	161	242	131	197	100	151	58.3	87.6
	7	183	275	156	234	127	192	97.3	146	57.2	86.0
	8	176	265	151	226	123	185	94.1	141	56.0	84.2
	9	169	254	145	217	118	178	90.5	136	54.6	82.1
	10	161	243	138	208	113	170	86.7	130	53.2	79.9
	11	153	231	132	198	108	162	82.7	124	51.6	77.5
	12	145	218	125	187	102	154	78.5	118	49.8	74.9
	13	137	205	117	177	96.5	145	74.2	112	48.0	72.2
	14	128	192	110	166	90.6	136	69.8	105	46.1	69.3
	15	119	179	103	155	84.7	127	65.4	98.3	44.1	66.3
	16	110	166	95.6	144	78.8	118	61.0	91.7	42.0	63.1
	17	102	153	88.4	133	73.0	110	56.6	85.1	39.1	58.7
	18	93.6	141	81.4	122	67.3	101	52.3	78.6	36.2	54.4
	19	85.6	129	74.6	112	61.8	92.9	48.1	72.3	33.3	50.1
	20	77.7	117	68.0	102	56.4	84.8	44.1	66.2	30.6	46.0
	22	64.2	96.5	56.2	84.4	46.7	70.1	36.5	54.9	25.4	38.2
	24	53.9	81.1	47.2	70.9	39.2	58.9	30.7	46.1	21.4	32.1
	26	46.0	69.1	40.2	60.4	33.4	50.2	26.2	39.3	18.2	27.4
	28	39.6	59.6	34.7	52.1	28.8	43.3	22.5	33.9	15.7	23.6
	30	34.5	51.9	30.2	45.4	25.1	37.7	19.6	29.5	13.7	20.6
	32	30.3	45.6	26.5	39.9	22.1	33.2	17.3	25.9	12.0	18.1
	34	26.9	40.4	23.5	35.3	19.5	29.4	15.3	23.0	10.7	16.0
	36							13.6	20.5	9.50	14.3
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		206	310	175	263	143	215	109	163	73.7	111
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		160	240	136	204	111	166	84.4	127	57.2	85.8
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		55.8	83.9	48.4	72.8	40.2	60.4	31.1	46.8	21.5	32.3
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		32.7	49.1	28.2	42.4	23.3	35.0	17.3	26.0	9.58	14.4
Properties											
Area, in.^{2}		6.88		5.85		4.77		3.63		2.46	
$r_x = r_y$, in.		2.08		2.11		2.13		2.16		2.19	
$I_x = I_y$, in.^{4}		29.7		25.9		21.7		17.0		11.8	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS5

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5×5×									
		½		⅜		5/16		¼		3/16	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		28.43		22.37		19.08		15.62		11.97	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	236	355	185	278	157	237	129	193	98.2	148
	1	235	353	184	277	157	236	128	193	97.9	147
	2	233	350	183	275	156	234	127	191	97.1	146
	3	229	345	180	271	153	231	126	189	95.8	144
	4	224	337	176	265	150	226	123	185	94.0	141
	5	218	328	172	258	146	220	120	180	91.7	138
	6	210	316	166	250	142	213	116	175	89.0	134
	7	202	303	160	240	137	205	112	168	85.9	129
	8	192	289	153	229	131	196	107	161	82.4	124
	9	182	274	145	218	124	187	102	154	78.7	118
	10	172	258	137	206	118	177	97.0	146	74.7	112
	11	161	241	129	193	111	166	91.5	137	70.5	106
	12	149	224	120	180	103	156	85.7	129	66.2	99.5
	13	138	207	111	167	96.2	145	79.8	120	61.8	92.9
	14	127	190	103	154	88.9	134	74.0	111	57.4	86.3
	15	115	173	94.0	141	81.7	123	68.2	102	53.0	79.7
	16	105	157	85.6	129	74.6	112	62.4	93.8	48.7	73.2
	17	94.2	142	77.5	116	67.8	102	56.9	85.5	44.5	66.8
	18	84.1	126	69.6	105	61.2	91.9	51.5	77.4	40.4	60.7
	19	75.5	113	62.5	93.9	54.9	82.5	46.3	69.6	36.4	54.8
	20	68.1	102	56.4	84.8	49.6	74.5	41.8	62.8	32.9	49.4
	22	56.3	84.6	46.6	70.0	41.0	61.5	34.5	51.9	27.2	40.8
	24	47.3	71.1	39.2	58.9	34.4	51.7	29.0	43.6	22.8	34.3
	26	40.3	60.6	33.4	50.2	29.3	44.1	24.7	37.2	19.5	29.2
	28	34.8	52.2	28.8	43.2	25.3	38.0	21.3	32.1	16.8	25.2
	30	30.3	45.5	25.1	37.7	22.0	33.1	18.6	27.9	14.6	22.0
	32							16.3	24.5	12.8	19.3
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		236	355	185	278	157	237	129	194	98.2	148
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		183	275	144	216	122	183	100	150	76.3	114
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		60.1	90.4	49.5	74.4	43.2	64.9	36.0	54.1	28.0	42.1
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		32.7	49.1	26.4	39.8	22.9	34.4	19.0	28.5	14.7	22.1
Properties											
Area, in.^{2}		7.88		6.18		5.26		4.30		3.28	
$r_x = r_y$, in.		1.82		1.87		1.90		1.93		1.96	
$I_x = I_y$, in.^{4}		26.0		21.7		19.0		16.0		12.6	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS5–HSS4½

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5×5×		HSS4½×4½×							
		⅛[c], [f]		½		⅜		5⁄16		¼	
t_{des}, in.		0.116		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		8.16		25.03		19.82		16.96		13.91	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	59.7	89.8	208	313	164	247	140	211	115	173
	1	59.6	89.6	207	311	163	246	140	210	115	172
	2	59.3	89.1	205	308	162	243	138	208	113	170
	3	58.8	88.4	201	302	159	238	136	204	111	167
	4	58.1	87.3	195	293	154	232	132	199	109	163
	5	57.1	85.9	188	283	149	224	128	192	105	158
	6	56.0	84.2	180	270	143	215	123	185	101	152
	7	54.7	82.3	171	256	136	205	117	176	96.8	145
	8	53.3	80.1	160	241	129	194	111	167	91.8	138
	9	51.7	77.6	150	225	121	182	104	157	86.5	130
	10	49.9	75.0	139	208	112	169	97.3	146	80.9	122
	11	48.0	72.1	127	191	104	156	90.2	136	75.1	113
	12	45.5	68.4	116	174	95.3	143	82.9	125	69.3	104
	13	42.6	64.0	105	157	86.7	130	75.7	114	63.4	95.4
	14	39.6	59.6	93.9	141	78.3	118	68.6	103	57.7	86.7
	15	36.7	55.2	83.4	125	70.2	105	61.7	92.8	52.1	78.3
	16	33.8	50.8	73.5	110	62.3	93.7	55.1	82.9	46.7	70.2
	17	31.0	46.5	65.1	97.8	55.2	83.0	48.8	73.4	41.5	62.4
	18	28.2	42.4	58.0	87.2	49.2	74.0	43.6	65.5	37.0	55.6
	19	25.5	38.4	52.1	78.3	44.2	66.4	39.1	58.8	33.2	49.9
	20	23.0	34.6	47.0	70.7	39.9	59.9	35.3	53.0	30.0	45.1
	22	19.0	28.6	38.9	58.4	33.0	49.5	29.2	43.8	24.8	37.3
	24	16.0	24.1	32.6	49.1	27.7	41.6	24.5	36.8	20.8	31.3
	26	13.6	20.5	27.8	41.8	23.6	35.5	20.9	31.4	17.7	26.7
	28	11.8	17.7					18.0	27.1	15.3	23.0
	30	10.2	15.4								
	32	9.00	13.5								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		66.8	100	208	313	164	247	140	211	115	173
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		51.8	77.8	162	242	127	191	109	163	89.3	134
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		19.4	29.1	51.8	77.8	43.3	65.0	38.0	57.0	31.8	47.8
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		8.20	12.3	25.4	38.3	20.9	31.4	18.1	27.3	15.1	22.7
Properties											
Area, in.^{2}		2.23		6.95		5.48		4.68		3.84	
$r_x = r_y$, in.		1.99		1.61		1.67		1.70		1.73	
$I_x = I_y$, in.^{4}		8.80		18.1		15.3		13.5		11.4	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS4½–HSS4

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS4½×4½×				HSS4×4×					
		3/16		1/8[c], [f]		1/2		3/8		5/16	
t_{des}, in.		0.174		0.116		0.465		0.349		0.291	
Nom. Weight, lb/ft		10.70		7.31		21.63		17.27		14.83	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	87.7	132	57.7	86.7	180	271	143	215	123	184
	1	87.4	131	57.5	86.5	179	269	142	214	122	184
	2	86.5	130	57.2	85.9	176	265	140	211	120	181
	3	85.1	128	56.5	84.9	172	258	137	206	118	177
	4	83.0	125	55.6	83.6	166	249	132	199	114	171
	5	80.5	121	54.5	81.8	158	237	127	190	109	164
	6	77.5	117	53.1	79.8	149	224	120	180	103	156
	7	74.1	111	50.9	76.5	139	209	113	169	97.3	146
	8	70.4	106	48.4	72.8	128	193	105	157	90.6	136
	9	66.4	99.8	45.7	68.8	117	176	96.4	145	83.6	126
	10	62.2	93.5	43.0	64.6	106	160	87.9	132	76.4	115
	11	57.9	87.0	40.1	60.2	95.0	143	79.4	119	69.2	104
	12	53.5	80.4	37.1	55.8	84.1	126	71.0	107	62.0	93.2
	13	49.1	73.7	34.1	51.3	73.6	111	62.8	94.4	55.1	82.8
	14	44.7	67.2	31.2	46.9	63.7	95.8	55.0	82.7	48.5	72.8
	15	40.5	60.8	28.4	42.6	55.5	83.5	47.9	72.0	42.2	63.5
	16	36.4	54.7	25.6	38.4	48.8	73.3	42.1	63.3	37.1	55.8
	17	32.4	48.7	22.9	34.4	43.2	65.0	37.3	56.1	32.9	49.4
	18	28.9	43.4	20.4	30.7	38.6	58.0	33.3	50.0	29.3	44.1
	19	25.9	39.0	18.3	27.5	34.6	52.0	29.9	44.9	26.3	39.6
	20	23.4	35.2	16.5	24.9	31.2	46.9	27.0	40.5	23.8	35.7
	22	19.4	29.1	13.7	20.5	25.8	38.8	22.3	33.5	19.6	29.5
	24	16.3	24.4	11.5	17.3			18.7	28.1	16.5	24.8
	26	13.9	20.8	9.78	14.7						
	28	11.9	18.0	8.44	12.7						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		87.7	132	59.9	90.0	180	271	143	215	123	185
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		68.1	102	46.5	69.8	140	210	111	167	95.3	143
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		24.9	37.4	17.3	26.0	43.4	65.3	37.0	55.6	32.7	49.2
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		11.8	17.7	6.88	10.3	19.2	28.9	15.9	24.0	13.9	21.0
Properties											
Area, in.^{2}		2.93		2.00		6.02		4.78		4.10	
$r_x = r_y$, in.		1.75		1.78		1.41		1.47		1.49	
$I_x = I_y$, in.^{4}		9.02		6.35		11.9		10.3		9.14	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS4–HSS3½

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS4×4×						HSS3½×3½×			
		¼		3/16		⅛[f]		3/8		5/16	
t_{des}, in.		0.233		0.174		0.116		0.349		0.291	
Nom. Weight, lb/ft		12.21		9.42		6.46		14.72		12.70	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	101	152	77.2	116	53.0	79.6	122	184	105	158
	1	100	151	76.9	116	52.8	79.3	122	183	105	157
	2	99.1	149	75.9	114	52.1	78.3	119	179	103	154
	3	96.8	146	74.3	112	51.0	76.7	115	173	99.6	150
	4	93.8	141	72.0	108	49.5	74.5	110	166	95.2	143
	5	90.0	135	69.2	104	47.7	71.7	104	156	90.0	135
	6	85.6	129	66.0	99.2	45.5	68.4	96.4	145	83.9	126
	7	80.7	121	62.3	93.7	43.1	64.8	88.5	133	77.3	116
	8	75.4	113	58.4	87.7	40.5	60.8	80.1	120	70.3	106
	9	69.8	105	54.2	81.4	37.7	56.6	71.6	108	63.1	94.9
	10	64.0	96.1	49.8	74.9	34.8	52.2	63.1	94.8	56.0	84.1
	11	58.1	87.4	45.5	68.3	31.8	47.8	54.9	82.5	49.0	73.7
	12	52.3	78.7	41.1	61.8	28.9	43.4	47.1	70.7	42.4	63.7
	13	46.7	70.2	36.8	55.4	26.0	39.1	40.1	60.3	36.2	54.4
	14	41.3	62.1	32.7	49.2	23.2	34.8	34.6	52.0	31.2	46.9
	15	36.1	54.3	28.8	43.2	20.5	30.8	30.1	45.3	27.2	40.8
	16	31.7	47.7	25.3	38.0	18.0	27.1	26.5	39.8	23.9	35.9
	17	28.1	42.3	22.4	33.6	16.0	24.0	23.5	35.2	21.2	31.8
	18	25.1	37.7	20.0	30.0	14.2	21.4	20.9	31.4	18.9	28.4
	19	22.5	33.8	17.9	26.9	12.8	19.2	18.8	28.2	16.9	25.5
	20	20.3	30.5	16.2	24.3	11.5	17.3	16.9	25.5	15.3	23.0
	22	16.8	25.2	13.4	20.1	9.53	14.3				
	24	14.1	21.2	11.2	16.9	8.01	12.0				
	26					6.82	10.3				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		101	152	77.2	116	53.0	79.7	122	184	105	158
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		78.4	118	60.0	90.0	41.2	61.7	95.1	143	81.8	123
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		27.6	41.5	21.8	32.7	15.2	22.9	30.7	46.2	27.5	41.3
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		11.7	17.6	9.16	13.8	5.78	8.69	11.7	17.6	10.3	15.5
Properties											
Area, in.^{2}		3.37		2.58		1.77		4.09		3.52	
$r_x = r_y$, in.		1.52		1.55		1.58		1.26		1.29	
$I_x = I_y$, in.^{4}		7.80		6.21		4.40		6.49		5.84	

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS3½–HSS3

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3½×3½×						HSS3×3×			
		¼		3/16		1/8[f]		3/8		5/16	
t_{des}, in.		0.233		0.174		0.116		0.349		0.291	
Nom. Weight, lb/ft		10.51		8.15		5.61		12.17		10.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	87.1	131	67.1	101	46.1	69.3	101	153	88.0	132
	1	86.6	130	66.7	100	45.8	68.9	101	151	87.2	131
	2	85.0	128	65.5	98.5	45.1	67.8	97.8	147	84.9	128
	3	82.5	124	63.7	95.7	43.8	65.9	93.3	140	81.2	122
	4	79.1	119	61.1	91.9	42.1	63.4	87.4	131	76.2	115
	5	74.9	113	58.0	87.2	40.1	60.2	80.3	121	70.2	106
	6	70.1	105	54.5	81.9	37.7	56.6	72.4	109	63.6	95.6
	7	64.8	97.4	50.5	75.9	35.0	52.6	64.1	96.4	56.6	85.0
	8	59.2	89.0	46.3	69.6	32.2	48.4	55.7	83.7	49.4	74.2
	9	53.4	80.3	42.0	63.1	29.3	44.0	47.5	71.4	42.4	63.7
	10	47.6	71.6	37.6	56.6	26.3	39.5	39.8	59.8	35.7	53.6
	11	41.9	63.0	33.3	50.1	23.4	35.2	32.9	49.4	29.6	44.5
	12	36.5	54.9	29.2	43.9	20.6	30.9	27.6	41.5	24.9	37.4
	13	31.3	47.1	25.2	37.9	17.9	26.8	23.5	35.4	21.2	31.8
	14	27.0	40.6	21.7	32.7	15.4	23.1	20.3	30.5	18.3	27.4
	15	23.5	35.4	18.9	28.5	13.4	20.2	17.7	26.6	15.9	23.9
	16	20.7	31.1	16.6	25.0	11.8	17.7	15.5	23.3	14.0	21.0
	17	18.3	27.5	14.7	22.2	10.4	15.7	13.8	20.7	12.4	18.6
	18	16.3	24.6	13.2	19.8	9.31	14.0			11.0	16.6
	19	14.7	22.0	11.8	17.7	8.36	12.6				
	20	13.2	19.9	10.7	16.0	7.54	11.3				
	22	10.9	16.4	8.80	13.2	6.23	9.37				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		87.1	131	67.1	101	46.1	69.3	101	153	88.0	132
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		67.7	101	52.1	78.1	35.8	53.7	78.8	118	68.4	103
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		23.4	35.2	18.6	28.0	13.1	19.7	24.5	36.7	22.3	33.5
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		8.73	13.1	6.89	10.4	4.79	7.20	8.11	12.2	7.24	10.9
Properties											
Area, in.^{2}		2.91		2.24		1.54		3.39		2.94	
$r_x = r_y$, in.		1.32		1.35		1.37		1.06		1.08	
$I_x = I_y$, in.^{4}		5.04		4.05		2.90		3.78		3.45	

[f]Shape exceeds the compact limit for flexure for F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS3–HSS2½

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3×3×						HSS2½×2½×			
		¼		3/16		⅛		5/16		¼	
t_{des}, in.		0.233		0.174		0.116		0.291		0.233	
Nom. Weight, lb/ft		8.81		6.87		4.75		8.45		7.11	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	73.1	110	56.6	85.0	38.9	58.5	70.4	106	59.0	88.6
	1	72.4	109	56.1	84.4	38.6	58.1	69.4	104	58.2	87.5
	2	70.6	106	54.8	82.3	37.7	56.7	66.6	100	56.0	84.2
	3	67.6	102	52.6	79.1	36.3	54.6	62.3	93.6	52.6	79.0
	4	63.7	95.8	49.7	74.7	34.4	51.7	56.6	85.1	48.1	72.3
	5	59.0	88.7	46.2	69.5	32.1	48.3	50.1	75.3	42.9	64.4
	6	53.7	80.7	42.3	63.5	29.5	44.4	43.1	64.8	37.2	56.0
	7	48.1	72.2	38.0	57.2	26.7	40.1	36.1	54.3	31.5	47.4
	8	42.3	63.5	33.7	50.6	23.8	35.8	29.5	44.3	26.0	39.1
	9	36.6	55.0	29.4	44.1	20.9	31.4	23.5	35.2	20.9	31.5
	10	31.1	46.7	25.2	37.8	18.0	27.1	19.0	28.6	17.0	25.5
	11	25.9	39.0	21.2	31.8	15.3	23.1	15.7	23.6	14.0	21.1
	12	21.8	32.8	17.8	26.8	12.9	19.4	13.2	19.8	11.8	17.7
	13	18.6	27.9	15.2	22.8	11.0	16.5	11.2	16.9	10.0	15.1
	14	16.0	24.1	13.1	19.7	9.48	14.2	9.69	14.6	8.65	13.0
	15	13.9	21.0	11.4	17.1	8.26	12.4			7.53	11.3
	16	12.3	18.4	10.0	15.1	7.26	10.9				
	17	10.9	16.3	8.87	13.3	6.43	9.66				
	18	9.69	14.6	7.91	11.9	5.73	8.62				
	19					5.15	7.73				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		73.1	110	56.6	85.1	38.9	58.5	70.4	106	59.0	88.7
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		56.7	85.1	43.9	65.9	30.2	45.3	54.6	82.0	45.8	68.7
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		19.3	28.9	15.5	23.3	11.0	16.6	17.0	25.6	15.1	22.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		6.19	9.30	4.92	7.39	3.49	5.25	4.69	7.05	4.07	6.11
Properties											
Area, in.^{2}		2.44		1.89		1.30		2.35		1.97	
$r_x = r_y$, in.		1.11		1.14		1.17		0.880		0.908	
$I_x = I_y$, in.^{4}		3.02		2.46		1.78		1.82		1.63	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS2½–HSS2¼

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS2½×2½×				HSS2¼×2¼×					
		3/16		1/8		1/4		3/16		1/8	
t_{des}, in.		0.174		0.116		0.233		0.174		0.116	
Nom. Weight, lb/ft		5.59		3.90		6.26		4.96		3.48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	46.1	69.3	32.0	48.1	52.1	78.3	41.0	61.6	28.6	43.0
	1	45.6	68.5	31.7	47.6	51.3	77.0	40.4	60.7	28.2	42.4
	2	43.9	66.1	30.6	46.0	48.8	73.4	38.6	58.0	27.0	40.7
	3	41.4	62.2	28.9	43.5	45.0	67.7	35.8	53.8	25.2	37.9
	4	38.1	57.2	26.7	40.2	40.2	60.4	32.2	48.4	22.8	34.3
	5	34.2	51.3	24.1	36.3	34.7	52.2	28.1	42.3	20.1	30.2
	6	29.9	45.0	21.3	32.0	29.1	43.7	23.8	35.8	17.2	25.9
	7	25.6	38.5	18.4	27.7	23.5	35.4	19.6	29.4	14.3	21.5
	8	21.4	32.2	15.5	23.4	18.4	27.7	15.6	23.4	11.6	17.4
	9	17.4	26.2	12.8	19.3	14.6	21.9	12.3	18.5	9.18	13.8
	10	14.1	21.2	10.4	15.6	11.8	17.7	9.97	15.0	7.43	11.2
	11	11.7	17.5	8.60	12.9	9.75	14.7	8.24	12.4	6.14	9.23
	12	9.80	14.7	7.22	10.9	8.19	12.3	6.92	10.4	5.16	7.76
	13	8.35	12.6	6.15	9.25	6.98	10.5	5.90	8.87	4.40	6.61
	14	7.20	10.8	5.31	7.98					3.79	5.70
	15	6.27	9.43	4.62	6.95						
	16			4.06	6.11						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		46.1	69.3	32.0	48.2	52.1	78.3	41.0	61.7	28.6	43.0
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		35.8	53.7	24.9	37.3	40.5	60.7	31.9	47.8	22.2	33.3
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		12.4	18.6	8.96	13.5	13.0	19.5	10.8	16.3	7.92	11.9
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		3.29	4.95	2.36	3.55	3.19	4.80	2.59	3.90	1.88	2.83
Properties											
Area, in.^{2}		1.54		1.07		1.74		1.37		0.956	
$r_x = r_y$, in.		0.937		0.965		0.806		0.835		0.863	
$I_x = I_y$, in.^{4}		1.35		0.998		1.13		0.953		0.712	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS2–HSS1½

Table 6-F (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS2×2×						HSS1½×1½×			
		¼		3/16		⅛		¼		3/16	
t_{des}, in.		0.233		0.174		0.116		0.233		0.174	
Nom. Weight, lb/ft		5.41		4.32		3.05		3.71		3.04	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	45.2	67.9	35.6	53.5	25.1	37.8	31.1	46.8	25.3	38.0
	1	44.3	66.5	34.9	52.5	24.7	37.1	29.9	44.9	24.4	36.6
	2	41.5	62.4	32.9	49.5	23.4	35.1	26.3	39.5	21.8	32.7
	3	37.3	56.1	29.9	44.9	21.4	32.1	21.3	32.0	18.0	27.1
	4	32.2	48.4	26.0	39.1	18.8	28.3	15.9	23.9	13.8	20.8
	5	26.6	40.0	21.8	32.8	16.0	24.0	10.9	16.3	9.84	14.8
	6	21.0	31.6	17.6	26.4	13.1	19.6	7.54	11.3	6.83	10.3
	7	15.9	24.0	13.6	20.5	10.3	15.5	5.54	8.32	5.02	7.54
	8	12.2	18.3	10.4	15.7	7.93	11.9	4.24	6.37	3.84	5.77
	9	9.64	14.5	8.24	12.4	6.27	9.42				
	10	7.81	11.7	6.67	10.0	5.08	7.63				
	11	6.46	9.70	5.52	8.29	4.20	6.31				
	12			4.63	6.97	3.53	5.30				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		45.2	68.0	35.6	53.6	25.1	37.8	31.1	46.8	25.3	38.0
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		35.1	52.7	27.7	41.5	19.5	29.3	24.2	36.3	19.6	29.5
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		10.9	16.4	9.25	13.9	6.88	10.3	6.71	10.1	6.11	9.19
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		2.41	3.62	1.99	2.99	1.46	2.19	1.17	1.76	1.01	1.52
Properties											
Area, in.^{2}		1.51		1.19		0.840		1.04		0.845	
$r_x = r_y$, in.		0.704		0.733		0.761		0.500		0.528	
$I_x = I_y$, in.^{4}		0.747		0.641		0.486		0.260		0.236	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS1½

Table 6-F (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Square HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS1½×1½×	
		⅛	
t_{des}, in.		0.116	
Nom. Weight, lb/ft		2.20	
Design		ASD	LRFD
Available Compressive Strength, kips		P_n/Ω_c	$\phi_c P_n$
Effective length, L_c (ft), with respect to the least radius of gyration, r_y.	0	18.2	27.4
	1	17.6	26.4
	2	15.9	23.9
	3	13.4	20.2
	4	10.6	15.9
	5	7.79	11.7
	6	5.47	8.22
	7	4.02	6.04
	8	3.08	4.62
	9	2.43	3.65
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$
		18.2	27.4
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$
		14.1	21.2
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$
		4.79	7.20
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$
		0.771	1.16

Properties	
Area, in.^{2}	0.608
$r_x = r_y$, in.	0.557
$I_x = I_y$, in.^{4}	0.188

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS28.000

Table 6-G
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS28.000×									
		1.000		0.875		0.750		0.625[f]		0.500[f]	
t_{des}, in.		1.00		0.875		0.750		0.625		0.500	
Nom. Weight, lb/ft		288.63		253.72		218.48		182.90		146.99	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	2540	3820	2230	3360	1920	2890	1610	2420	1290	1940
	1	2540	3820	2230	3360	1920	2890	1610	2420	1290	1940
	2	2540	3810	2230	3360	1920	2890	1610	2420	1290	1940
	3	2540	3810	2230	3350	1920	2890	1610	2420	1290	1940
	4	2530	3810	2230	3350	1920	2880	1610	2420	1290	1940
	5	2530	3810	2230	3350	1920	2880	1610	2410	1290	1940
	6	2530	3800	2220	3340	1910	2880	1600	2410	1290	1940
	7	2520	3790	2220	3340	1910	2870	1600	2410	1290	1930
	8	2520	3790	2220	3330	1910	2870	1600	2400	1280	1930
	9	2520	3780	2210	3330	1900	2860	1600	2400	1280	1930
	10	2510	3770	2210	3320	1900	2860	1590	2390	1280	1920
	11	2500	3760	2200	3310	1900	2850	1590	2390	1280	1920
	12	2500	3750	2200	3300	1890	2840	1580	2380	1270	1910
	13	2490	3740	2190	3290	1890	2830	1580	2380	1270	1910
	14	2480	3730	2180	3280	1880	2830	1580	2370	1270	1900
	15	2470	3720	2180	3270	1870	2820	1570	2360	1260	1900
	16	2460	3700	2170	3260	1870	2810	1570	2350	1260	1890
	17	2460	3690	2160	3250	1860	2800	1560	2340	1250	1880
	18	2450	3680	2150	3240	1850	2780	1550	2330	1250	1880
	19	2440	3660	2140	3220	1850	2770	1550	2320	1240	1870
	20	2420	3640	2130	3210	1840	2760	1540	2310	1240	1860
	22	2400	3610	2110	3180	1820	2730	1530	2290	1230	1840
	24	2380	3570	2090	3140	1800	2710	1510	2270	1210	1820
	26	2350	3530	2070	3110	1780	2680	1490	2240	1200	1800
	28	2320	3490	2040	3070	1760	2640	1470	2220	1190	1780
	30	2290	3440	2020	3030	1740	2610	1460	2190	1170	1760
	32	2260	3390	1990	2990	1710	2570	1440	2160	1150	1730
	34	2220	3340	1960	2940	1690	2530	1410	2130	1140	1710
	36	2190	3290	1930	2900	1660	2490	1390	2090	1120	1680
	38	2150	3230	1890	2850	1630	2450	1370	2060	1100	1660
	40	2110	3170	1860	2800	1600	2410	1350	2020	1080	1630
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2540	3820	2230	3360	1920	2890	1610	2420	1290	1940
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2070	3100	1820	2730	1560	2350	1310	1970	1050	1580
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		762	1140	670	1010	577	867	483	726	388	583
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1820	2730	1610	2420	1390	2090	1140	1720	887	1330
Properties											
Area, in.^{2}		84.8		74.6		64.2		53.8		43.2	
I, in.^{4}		7740		6860		5960		5040		4080	
r, in.		9.55		9.60		9.64		9.68		9.72	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS28.000–HSS26.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS28.000×		HSS26.000×							
		0.375[c], [f]		0.750		0.625[f]		0.500[f]		0.375[c], [f]	
t_{des}, in.		0.375		0.750		0.625		0.500		0.375	
Nom. Weight, lb/ft		110.74		202.44		169.54		136.30		102.73	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	936	1410	1780	2680	1490	2240	1200	1800	890	1340
	1	936	1410	1780	2680	1490	2240	1200	1800	890	1340
	2	935	1410	1780	2680	1490	2240	1200	1800	890	1340
	3	935	1410	1780	2670	1490	2240	1200	1800	889	1340
	4	934	1400	1780	2670	1490	2240	1200	1800	889	1340
	5	933	1400	1780	2670	1490	2230	1200	1800	888	1330
	6	932	1400	1770	2660	1480	2230	1200	1800	886	1330
	7	931	1400	1770	2660	1480	2230	1190	1790	885	1330
	8	929	1400	1770	2650	1480	2220	1190	1790	883	1330
	9	927	1390	1760	2650	1480	2220	1190	1790	881	1320
	10	926	1390	1760	2640	1470	2210	1190	1780	879	1320
	11	923	1390	1750	2640	1470	2210	1180	1780	877	1320
	12	921	1380	1750	2630	1460	2200	1180	1770	874	1310
	13	919	1380	1740	2620	1460	2190	1170	1770	871	1310
	14	916	1380	1740	2610	1450	2180	1170	1760	868	1300
	15	913	1370	1730	2600	1450	2180	1170	1750	865	1300
	16	910	1370	1720	2590	1440	2170	1160	1750	862	1290
	17	906	1360	1710	2580	1440	2160	1160	1740	858	1290
	18	903	1360	1710	2570	1430	2150	1150	1730	854	1280
	19	899	1350	1700	2550	1420	2140	1150	1720	850	1280
	20	895	1350	1690	2540	1410	2130	1140	1710	846	1270
	22	887	1330	1670	2510	1400	2100	1130	1690	837	1260
	24	878	1320	1650	2480	1380	2080	1110	1670	827	1240
	26	869	1310	1630	2450	1360	2050	1100	1650	816	1230
	28	858	1290	1610	2410	1350	2020	1080	1630	805	1210
	30	847	1270	1580	2380	1330	1990	1070	1610	793	1190
	32	836	1260	1560	2340	1300	1960	1050	1580	781	1170
	34	824	1240	1530	2300	1280	1930	1030	1550	768	1150
	36	811	1220	1500	2260	1260	1890	1020	1530	754	1130
	38	798	1200	1470	2210	1230	1860	996	1500	740	1110
	40	784	1180	1440	2170	1210	1820	976	1470	725	1090
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		973	1460	1780	2680	1490	2240	1200	1800	904	1360
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		792	1190	1450	2180	1210	1820	977	1470	736	1100
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		292	439	534	803	447	672	360	541	271	408
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		644	968	1190	1790	997	1500	773	1160	560	842
Properties											
Area, in.^{2}		32.5		59.5		49.8		40.1		30.2	
I, in.^{4}		3110		4750		4010		3260		2480	
r, in.		9.77		8.93		8.97		9.02		9.06	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS26.000–
HSS24.000

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS26.000×		HSS24.000×							
		0.313[c], [f]		1.000		0.875		0.750		0.625	
t_{des}, in.		0.313		1.00		0.875		0.750		0.625	
Nom. Weight, lb/ft		85.81		245.87		216.31		186.41		156.18	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	703	1060	2160	3250	1900	2860	1640	2470	1370	2070
	1	703	1060	2160	3250	1900	2860	1640	2470	1370	2070
	2	703	1060	2160	3250	1900	2860	1640	2460	1370	2060
	3	702	1060	2160	3250	1900	2860	1640	2460	1370	2060
	4	701	1050	2160	3250	1900	2850	1640	2460	1370	2060
	5	701	1050	2160	3240	1900	2850	1630	2460	1370	2060
	6	700	1050	2150	3230	1890	2850	1630	2450	1370	2050
	7	698	1050	2150	3230	1890	2840	1630	2450	1360	2050
	8	697	1050	2140	3220	1890	2830	1620	2440	1360	2050
	9	696	1050	2140	3210	1880	2830	1620	2440	1360	2040
	10	694	1040	2130	3200	1870	2820	1620	2430	1350	2030
	11	692	1040	2120	3190	1870	2810	1610	2420	1350	2030
	12	690	1040	2120	3180	1860	2800	1600	2410	1340	2020
	13	688	1030	2110	3170	1850	2790	1600	2400	1340	2010
	14	685	1030	2100	3150	1850	2780	1590	2390	1330	2000
	15	683	1030	2090	3140	1840	2760	1580	2380	1330	2000
	16	680	1020	2080	3120	1830	2750	1580	2370	1320	1990
	17	677	1020	2070	3110	1820	2730	1570	2360	1310	1980
	18	674	1010	2060	3090	1810	2720	1560	2340	1310	1970
	19	671	1010	2040	3070	1800	2700	1550	2330	1300	1950
	20	668	1000	2030	3050	1790	2690	1540	2320	1290	1940
	22	661	993	2000	3010	1760	2650	1520	2290	1280	1920
	24	653	981	1980	2970	1740	2610	1500	2250	1260	1890
	26	645	969	1940	2920	1710	2570	1480	2220	1240	1860
	28	636	956	1910	2870	1680	2530	1450	2180	1220	1830
	30	627	942	1880	2820	1650	2480	1430	2140	1200	1800
	32	617	927	1840	2760	1620	2440	1400	2100	1170	1760
	34	606	911	1800	2710	1590	2390	1370	2060	1150	1730
	36	596	895	1760	2650	1550	2330	1340	2020	1130	1690
	38	584	878	1720	2590	1520	2280	1310	1970	1100	1650
	40	573	861	1680	2520	1480	2220	1280	1920	1070	1610
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		754	1130	2160	3250	1900	2860	1640	2470	1370	2070
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		614	921	1760	2640	1550	2330	1340	2000	1120	1680
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		225	338	649	976	571	859	492	740	412	620
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		458	688	1320	1980	1170	1760	1010	1520	853	1280
Properties											
Area, in.^{2}		25.2		72.3		63.6		54.8		45.9	
I, in.^{4}		2080		4790		4260		3710		3140	
r, in.		9.08		8.14		8.18		8.22		8.27	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS24.000–
HSS22.000

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS24.000×						HSS22.000×			
		0.500[f]		0.375[c], [f]		0.313[c], [f]		0.750		0.625	
t_{des}, in.		0.500		0.375		0.313		0.750		0.625	
Nom. Weight, lb/ft		125.61		94.71		79.13		170.37		142.81	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	1100	1660	842	1260	665	1000	1500	2250	1260	1890
	1	1100	1660	841	1260	665	1000	1500	2250	1260	1890
	2	1100	1660	841	1260	665	999	1500	2250	1260	1890
	3	1100	1660	840	1260	664	999	1500	2250	1260	1890
	4	1100	1660	839	1260	664	998	1500	2250	1250	1880
	5	1100	1650	838	1260	663	996	1490	2240	1250	1880
	6	1100	1650	837	1260	662	995	1490	2240	1250	1880
	7	1100	1650	835	1260	660	993	1490	2230	1250	1870
	8	1090	1640	833	1250	659	990	1480	2230	1240	1870
	9	1090	1640	831	1250	657	988	1480	2220	1240	1860
	10	1090	1640	829	1250	655	985	1470	2210	1230	1860
	11	1080	1630	826	1240	653	982	1470	2200	1230	1850
	12	1080	1620	823	1240	651	979	1460	2190	1220	1840
	13	1080	1620	820	1230	649	975	1450	2180	1220	1830
	14	1070	1610	817	1230	646	971	1450	2170	1210	1820
	15	1070	1600	813	1220	643	967	1440	2160	1210	1810
	16	1060	1600	810	1220	640	962	1430	2150	1200	1800
	17	1060	1590	806	1210	637	957	1420	2140	1190	1790
	18	1050	1580	801	1200	634	952	1410	2120	1180	1780
	19	1050	1570	797	1200	630	947	1400	2110	1180	1770
	20	1040	1560	792	1190	627	942	1390	2090	1170	1760
	22	1030	1540	782	1180	619	930	1370	2060	1150	1730
	24	1010	1520	771	1160	610	917	1350	2030	1130	1700
	26	997	1500	760	1140	601	904	1320	1990	1110	1670
	28	980	1470	748	1120	591	889	1300	1950	1090	1640
	30	963	1450	735	1100	581	874	1270	1910	1070	1600
	32	945	1420	721	1080	571	858	1240	1860	1040	1570
	34	926	1390	707	1060	559	841	1210	1820	1020	1530
	36	907	1360	692	1040	548	823	1180	1770	990	1490
	38	886	1330	677	1020	536	805	1150	1720	964	1450
	40	866	1300	661	993	523	787	1110	1670	936	1410
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1100	1660	832	1250	698	1050	1500	2250	1260	1890
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		899	1350	678	1020	568	852	1220	1830	1020	1540
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		331	498	250	375	209	315	450	676	377	567
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		663	997	481	723	393	591	846	1270	714	1070
Properties											
Area, in.^{2}		36.9		27.8		23.3		50.1		42.0	
I, in.^{4}		2550		1940		1630		2830		2400	
r, in.		8.31		8.35		8.38		7.52		7.56	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS22.000–
HSS20.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS22.000×						HSS20.000×			
		0.500[f]		0.375[f]		0.313[c], [f]		1.000		0.875	
t_{des}, in.		0.500		0.375		0.313		1.00		0.875	
Nom. Weight, lb/ft		114.92		86.69		72.45		203.11		178.89	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	1010	1520	763	1150	625	939	1790	2690	1570	2370
	1	1010	1520	763	1150	625	939	1790	2690	1570	2370
	2	1010	1520	763	1150	624	938	1790	2680	1570	2360
	3	1010	1520	762	1150	624	938	1780	2680	1570	2360
	4	1010	1520	761	1140	623	936	1780	2680	1570	2360
	5	1010	1510	760	1140	622	935	1780	2670	1570	2350
	6	1010	1510	759	1140	621	933	1770	2660	1560	2350
	7	1000	1510	757	1140	619	931	1770	2660	1560	2340
	8	1000	1500	755	1130	618	928	1760	2650	1550	2330
	9	997	1500	752	1130	616	926	1750	2640	1550	2320
	10	994	1490	750	1130	614	922	1750	2620	1540	2310
	11	990	1490	747	1120	611	919	1740	2610	1530	2300
	12	986	1480	744	1120	609	915	1730	2600	1520	2290
	13	981	1470	741	1110	606	911	1720	2580	1510	2280
	14	976	1470	737	1110	603	907	1710	2570	1510	2260
	15	971	1460	733	1100	600	902	1700	2550	1500	2250
	16	966	1450	729	1100	597	897	1680	2530	1480	2230
	17	960	1440	725	1090	593	892	1670	2510	1470	2210
	18	954	1430	720	1080	590	886	1660	2490	1460	2200
	19	948	1420	715	1080	586	880	1640	2470	1450	2180
	20	941	1410	710	1070	582	874	1630	2450	1440	2160
	22	927	1390	700	1050	573	861	1600	2400	1410	2120
	24	911	1370	688	1030	564	847	1560	2350	1380	2070
	26	895	1340	676	1020	554	832	1530	2300	1350	2030
	28	877	1320	663	997	543	816	1490	2240	1320	1980
	30	859	1290	649	976	532	799	1450	2180	1280	1920
	32	840	1260	635	954	520	782	1410	2120	1240	1870
	34	820	1230	620	932	508	764	1370	2050	1210	1810
	36	799	1200	605	909	495	745	1320	1990	1170	1760
	38	778	1170	589	885	483	725	1280	1920	1130	1700
	40	756	1140	573	860	469	705	1230	1850	1090	1640
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1010	1520	763	1150	638	959	1790	2690	1570	2370
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		824	1240	622	932	519	779	1460	2180	1280	1920
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		304	456	229	344	191	288	536	806	472	710
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		564	847	407	611	334	501	901	1350	798	1200
Properties											
Area, in.^{2}		33.8		25.5		21.3		59.7		52.6	
I, in.^{4}		1950		1490		1250		2700		2410	
r, in.		7.60		7.65		7.67		6.73		6.77	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS20.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20.000×									
		0.750		0.625		0.500		0.375[f]		0.313[c], [f]	
t_{des}, in.		0.750		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		154.34		129.45		104.23		78.67		65.77	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	1360	2040	1140	1710	916	1380	692	1040	584	878
	1	1360	2040	1140	1710	916	1380	691	1040	584	878
	2	1360	2040	1140	1710	915	1380	691	1040	584	877
	3	1360	2040	1140	1710	914	1370	690	1040	583	876
	4	1350	2040	1130	1700	913	1370	689	1040	582	875
	5	1350	2030	1130	1700	911	1370	688	1030	581	873
	6	1350	2030	1130	1700	909	1370	686	1030	580	871
	7	1340	2020	1130	1690	906	1360	684	1030	578	869
	8	1340	2010	1120	1690	903	1360	682	1030	576	866
	9	1330	2010	1120	1680	900	1350	679	1020	574	863
	10	1330	2000	1110	1670	896	1350	677	1020	572	859
	11	1320	1990	1110	1660	892	1340	674	1010	569	855
	12	1320	1980	1100	1660	887	1330	670	1010	566	851
	13	1310	1970	1100	1650	883	1330	667	1000	563	846
	14	1300	1950	1090	1640	877	1320	663	996	560	841
	15	1290	1940	1080	1630	872	1310	658	990	556	836
	16	1280	1930	1070	1610	866	1300	654	983	553	831
	17	1270	1910	1070	1600	859	1290	649	976	549	825
	18	1260	1900	1060	1590	853	1280	644	968	544	818
	19	1250	1880	1050	1580	846	1270	639	961	540	812
	20	1240	1870	1040	1560	839	1260	634	952	536	805
	22	1220	1830	1020	1530	823	1240	622	935	526	790
	24	1190	1790	1000	1500	807	1210	610	917	515	775
	26	1170	1750	978	1470	789	1190	597	897	504	758
	28	1140	1710	954	1430	770	1160	583	876	493	741
	30	1110	1670	930	1400	751	1130	568	854	480	722
	32	1080	1620	904	1360	731	1100	553	831	468	703
	34	1050	1570	878	1320	709	1070	537	807	454	683
	36	1010	1520	851	1280	688	1030	521	783	441	663
	38	979	1470	823	1240	666	1000	504	758	427	642
	40	945	1420	795	1190	643	967	487	733	413	620
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1360	2040	1140	1710	916	1380	692	1040	578	869
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1110	1660	926	1390	746	1120	563	845	470	706
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		408	613	341	513	275	413	207	312	173	261
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		694	1040	586	881	474	713	340	511	278	418
Properties											
Area, in.^{2}		45.4		38.0		30.6		23.1		19.3	
I, in.^{4}		2100		1790		1460		1110		937	
r, in.		6.81		6.85		6.90		6.94		6.96	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS20.000–
HSS18.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS20.000×		HSS18.000×							
		0.250[c], [f]		1.000		0.875		0.750		0.625	
t_{des}, in.		0.250		1.00		0.875		0.750		0.625	
Nom. Weight, lb/ft		52.78		181.73		160.19		138.30		116.09	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	437	657	1600	2400	1410	2120	1220	1830	1020	1530
	1	437	657	1600	2400	1410	2120	1220	1830	1020	1530
	2	437	657	1600	2400	1410	2120	1210	1820	1020	1530
	3	436	656	1590	2400	1410	2110	1210	1820	1020	1530
	4	436	655	1590	2390	1400	2110	1210	1820	1020	1530
	5	435	654	1590	2390	1400	2100	1210	1810	1010	1520
	6	434	652	1580	2380	1400	2100	1200	1810	1010	1520
	7	433	650	1580	2370	1390	2090	1200	1800	1010	1510
	8	431	648	1570	2360	1380	2080	1190	1790	1000	1510
	9	430	646	1560	2350	1380	2070	1190	1790	998	1500
	10	428	643	1550	2330	1370	2060	1180	1780	993	1490
	11	426	640	1540	2320	1360	2050	1170	1770	987	1480
	12	424	637	1530	2300	1350	2030	1170	1750	981	1470
	13	422	634	1520	2290	1340	2020	1160	1740	974	1460
	14	419	630	1510	2270	1330	2000	1150	1730	967	1450
	15	416	626	1500	2250	1320	1990	1140	1710	959	1440
	16	414	622	1480	2230	1310	1970	1130	1700	951	1430
	17	411	617	1470	2210	1300	1950	1120	1680	942	1420
	18	408	613	1460	2190	1290	1930	1110	1670	933	1400
	19	404	608	1440	2160	1270	1910	1100	1650	923	1390
	20	401	603	1420	2140	1260	1890	1090	1630	913	1370
	22	394	592	1390	2090	1230	1840	1060	1590	892	1340
	24	386	580	1350	2030	1200	1800	1030	1550	870	1310
	26	378	568	1310	1970	1160	1750	1000	1510	846	1270
	28	369	555	1270	1910	1130	1690	974	1460	821	1230
	30	360	541	1230	1850	1090	1640	942	1420	795	1190
	32	350	527	1190	1780	1050	1580	910	1370	768	1150
	34	341	512	1140	1720	1010	1520	876	1320	740	1110
	36	330	497	1100	1650	973	1460	842	1270	712	1070
	38	320	481	1050	1580	932	1400	808	1210	683	1030
	40	309	465	1000	1510	891	1340	773	1160	654	983
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		464	698	1600	2400	1410	2120	1220	1830	1020	1530
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		378	567	1300	1950	1150	1720	990	1480	831	1250
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		139	209	480	721	423	636	365	548	306	460
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		217	327	721	1080	641	964	556	836	472	709
Properties											
Area, in.^{2}		15.5		53.4		47.1		40.6		34.1	
I, in.^{4}		756		1940		1730		1510		1290	
r, in.		6.98		6.02		6.06		6.10		6.15	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS18.000–
HSS16.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS18.000×								HSS16.000×	
		0.500		0.375[f]		0.313[f]		0.250[c], [f]		1.000	
t_{des}, in.		0.500		0.375		0.313		0.250		1.00	
Nom. Weight, lb/ft		93.54		70.66		59.09		47.44		160.35	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	823	1240	623	936	521	783	405	608	1410	2120
	1	823	1240	623	936	521	783	405	608	1410	2120
	2	822	1240	622	935	520	782	404	608	1410	2120
	3	821	1230	621	934	520	781	404	607	1410	2110
	4	820	1230	620	932	519	780	403	606	1400	2110
	5	818	1230	619	930	517	778	402	604	1400	2100
	6	815	1230	617	927	516	775	401	603	1390	2090
	7	812	1220	615	924	514	773	400	601	1380	2080
	8	809	1220	612	920	512	770	398	598	1380	2070
	9	805	1210	609	916	510	766	396	595	1370	2060
	10	801	1200	606	911	507	762	394	592	1360	2040
	11	796	1200	603	906	504	758	392	589	1350	2030
	12	791	1190	599	900	501	753	390	586	1340	2010
	13	786	1180	595	894	498	748	387	582	1320	1990
	14	780	1170	591	888	494	743	384	577	1310	1970
	15	774	1160	586	881	490	737	381	573	1300	1950
	16	767	1150	581	873	486	731	378	568	1280	1930
	17	760	1140	576	865	482	724	375	563	1270	1900
	18	753	1130	570	857	477	718	371	558	1250	1880
	19	746	1120	565	849	473	710	368	553	1230	1850
	20	738	1110	559	840	468	703	364	547	1220	1830
	22	721	1080	546	821	457	687	356	535	1180	1770
	24	703	1060	533	801	446	670	347	522	1140	1710
	26	684	1030	518	779	434	653	338	508	1100	1650
	28	664	998	503	757	422	634	328	494	1050	1580
	30	643	966	488	733	409	614	318	479	1010	1520
	32	621	934	472	709	395	594	308	463	963	1450
	34	599	901	455	684	381	573	297	447	917	1380
	36	577	867	438	659	367	552	286	431	871	1310
	38	554	832	421	633	353	531	275	414	824	1240
	40	530	797	403	606	338	509	264	397	778	1170
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		823	1240	623	936	521	783	416	626	1410	2120
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		670	1010	507	761	424	636	339	508	1150	1720
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		247	371	187	281	156	235	125	188	423	636
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		382	574	280	421	228	343	178	267	561	844
Properties											
Area, in.^{2}		27.5		20.8		17.4		13.9		47.1	
I, in.^{4}		1050		807		679		549		1330	
r, in.		6.19		6.23		6.25		6.28		5.32	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS16.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16.000×									
		0.875		0.750		0.625		0.500		0.438	
t_{des}, in.		0.875		0.750		0.625		0.500		0.438	
Nom. Weight, lb/ft		141.48		122.27		102.73		82.85		72.87	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	1250	1870	1070	1620	904	1360	728	1090	641	963
	1	1250	1870	1070	1610	904	1360	727	1090	640	963
	2	1240	1870	1070	1610	903	1360	727	1090	640	962
	3	1240	1870	1070	1610	901	1350	725	1090	639	960
	4	1240	1860	1070	1610	899	1350	723	1090	637	958
	5	1230	1850	1070	1600	896	1350	721	1080	635	955
	6	1230	1850	1060	1590	893	1340	718	1080	633	951
	7	1220	1840	1060	1590	889	1340	715	1070	630	947
	8	1220	1830	1050	1580	884	1330	711	1070	627	942
	9	1210	1820	1040	1570	879	1320	707	1060	623	936
	10	1200	1800	1040	1560	873	1310	702	1060	619	930
	11	1190	1790	1030	1550	866	1300	697	1050	614	923
	12	1180	1780	1020	1530	859	1290	692	1040	609	916
	13	1170	1760	1010	1520	851	1280	686	1030	604	908
	14	1160	1740	1000	1510	843	1270	679	1020	598	899
	15	1150	1720	991	1490	835	1250	672	1010	592	890
	16	1130	1700	980	1470	825	1240	665	1000	586	881
	17	1120	1680	968	1460	816	1230	657	988	579	871
	18	1110	1660	956	1440	806	1210	649	976	572	860
	19	1090	1640	943	1420	795	1200	641	963	565	849
	20	1080	1620	930	1400	784	1180	632	950	557	838
	22	1040	1570	903	1360	761	1140	614	923	541	814
	24	1010	1520	873	1310	737	1110	595	894	524	788
	26	972	1460	842	1270	711	1070	574	863	506	761
	28	934	1400	810	1220	684	1030	553	831	488	733
	30	896	1350	777	1170	656	987	531	798	468	704
	32	856	1290	743	1120	628	944	508	764	449	674
	34	815	1230	708	1060	599	901	485	729	428	644
	36	775	1160	673	1010	570	857	462	694	408	613
	38	734	1100	638	959	541	813	439	659	388	583
	40	693	1040	603	907	512	769	415	624	367	552
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1250	1870	1070	1620	904	1360	728	1090	641	963
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1010	1520	875	1310	736	1100	592	888	522	782
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		374	562	322	485	271	408	218	328	192	289
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		499	750	437	656	369	555	299	450	264	398
Properties											
Area, in.^{2}		41.6		35.9		30.2		24.3		21.4	
I, in.^{4}		1190		1050		894		732		649	
r, in.		5.36		5.40		5.44		5.48		5.50	

Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS16.000–HSS14.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS16.000×						HSS14.000×			
		0.375[f]		0.313[f]		0.250[c], [f]		1.000		0.875	
t_{des}, in.		0.375		0.313		0.250		1.00		0.875	
Nom. Weight, lb/ft		62.64		52.41		42.09		138.97		122.77	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	551	828	461	693	375	564	1220	1840	1080	1620
	1	551	828	461	693	375	564	1220	1840	1080	1620
	2	550	827	460	692	375	563	1220	1830	1080	1620
	3	549	825	460	691	374	562	1220	1830	1080	1620
	4	548	823	459	689	373	561	1210	1820	1070	1610
	5	546	821	457	687	372	559	1210	1810	1070	1600
	6	544	818	455	685	371	557	1200	1800	1060	1600
	7	542	814	453	681	369	555	1190	1790	1060	1590
	8	539	810	451	678	367	552	1180	1780	1050	1570
	9	536	805	448	674	365	549	1170	1760	1040	1560
	10	532	800	446	670	363	545	1160	1750	1030	1550
	11	528	794	442	665	360	541	1150	1730	1020	1530
	12	524	788	439	660	357	537	1140	1710	1010	1510
	13	520	781	435	654	354	533	1120	1690	995	1500
	14	515	774	431	648	351	528	1110	1670	982	1480
	15	510	766	427	642	348	523	1090	1640	969	1460
	16	504	758	422	635	344	517	1080	1620	954	1430
	17	499	750	418	628	340	511	1060	1590	939	1410
	18	493	741	413	620	336	505	1040	1560	923	1390
	19	487	731	408	613	332	499	1020	1540	907	1360
	20	480	721	402	604	328	493	1000	1510	890	1340
	22	466	701	391	587	319	479	961	1440	854	1280
	24	452	679	379	569	309	464	918	1380	816	1230
	26	437	656	366	550	298	449	874	1310	778	1170
	28	421	632	353	530	288	432	828	1250	738	1110
	30	404	607	339	509	277	416	782	1180	697	1050
	32	387	582	325	488	265	399	736	1110	656	987
	34	370	556	311	467	254	381	689	1040	616	925
	36	353	530	296	445	242	363	643	966	575	864
	38	335	504	281	423	230	346	597	898	535	804
	40	318	477	267	401	218	328	553	831	496	745
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		551	828	461	693	371	558	1220	1840	1080	1620
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		449	673	375	563	302	453	995	1490	880	1320
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		165	248	138	208	111	167	366	551	324	487
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		225	339	183	275	143	214	422	634	377	566
Properties											
Area, in.^{2}		18.4		15.4		12.4		40.8		36.1	
I, in.^{4}		562		474		384		868		780	
r, in.		5.53		5.55		5.57		4.61		4.65	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS14.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14.000×									
		0.750		0.625		0.500		0.375		0.313[f]	
t_{des}, in.		0.750		0.625		0.500		0.375		0.313	
Nom. Weight, lb/ft		106.23		89.36		72.16		54.62		45.73	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	934	1400	787	1180	635	954	482	725	401	603
	1	934	1400	787	1180	634	954	482	724	401	603
	2	932	1400	786	1180	634	952	481	723	400	602
	3	930	1400	784	1180	632	950	480	722	400	601
	4	927	1390	782	1170	630	947	479	719	398	599
	5	923	1390	778	1170	627	943	477	716	397	596
	6	918	1380	774	1160	624	938	474	713	395	593
	7	912	1370	769	1160	621	933	471	709	392	590
	8	906	1360	764	1150	616	926	468	704	390	586
	9	899	1350	758	1140	611	919	465	698	387	581
	10	890	1340	751	1130	606	911	461	692	384	576
	11	882	1320	744	1120	600	902	456	686	380	571
	12	872	1310	736	1110	594	893	452	679	376	565
	13	862	1290	727	1090	587	883	446	671	372	559
	14	850	1280	718	1080	580	872	441	663	367	552
	15	839	1260	708	1060	572	860	435	654	363	545
	16	826	1240	698	1050	564	848	429	645	358	537
	17	813	1220	687	1030	556	835	423	636	352	530
	18	800	1200	676	1020	547	822	416	626	347	521
	19	786	1180	664	999	537	808	409	615	341	513
	20	771	1160	652	980	528	793	402	604	335	504
	22	741	1110	627	942	508	763	387	582	323	485
	24	709	1070	600	902	487	732	371	558	310	465
	26	676	1020	573	861	465	699	355	533	296	445
	28	642	965	544	818	442	665	338	508	282	424
	30	607	913	516	775	419	630	321	482	268	402
	32	572	860	486	731	396	595	303	456	253	381
	34	537	807	457	687	373	560	285	429	239	359
	36	502	755	428	643	349	525	268	403	224	337
	38	468	703	399	600	326	490	251	377	210	315
	40	434	653	371	557	304	456	233	351	195	294
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		934	1400	787	1180	635	954	482	725	401	603
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		761	1140	641	962	517	775	392	589	327	490
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		280	421	236	355	190	286	145	217	120	181
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		329	495	279	420	228	342	174	261	143	215
Properties											
Area, in.^{2}		31.2		26.3		21.2		16.1		13.4	
I, in.^{4}		687		589		484		373		315	
r, in.		4.69		4.73		4.78		4.82		4.84	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS14.000–
HSS13.375

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS14.000×				HSS13.375×					
		0.250[f]		0.188[c], [f]		0.625		0.500		0.375	
t_{des}, in.		0.250		0.188		0.625		0.500		0.375	
Nom. Weight, lb/ft		36.75		27.69		85.19		68.82		52.11	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	323	486	234	352	749	1130	605	909	458	689
	1	323	486	234	352	748	1120	604	909	458	688
	2	323	485	234	352	747	1120	604	907	457	687
	3	322	484	233	351	745	1120	602	905	456	685
	4	321	483	233	350	742	1120	600	902	454	683
	5	320	481	232	348	739	1110	597	898	452	680
	6	318	478	231	347	735	1100	594	893	450	676
	7	316	475	229	345	730	1100	590	887	447	672
	8	314	472	228	342	724	1090	586	880	444	667
	9	312	469	226	340	718	1080	580	872	440	661
	10	309	465	224	337	711	1070	575	864	436	655
	11	306	460	222	334	703	1060	569	855	431	648
	12	303	456	220	331	695	1040	562	845	426	641
	13	300	451	218	327	686	1030	555	834	421	633
	14	296	445	215	323	676	1020	548	823	416	625
	15	292	440	212	319	666	1000	540	811	410	616
	16	288	434	209	315	656	985	531	798	403	606
	17	284	427	206	310	645	969	522	785	397	596
	18	280	421	203	305	633	951	513	771	390	586
	19	275	414	200	300	621	933	504	757	383	575
	20	271	407	196	295	609	915	494	742	375	564
	22	261	392	189	284	583	876	473	711	360	541
	24	250	376	182	273	556	835	452	679	344	517
	26	239	360	174	261	528	793	429	646	327	492
	28	228	343	166	249	499	750	407	611	310	466
	30	216	325	157	237	470	706	383	576	293	440
	32	205	308	149	224	441	662	360	541	275	414
	34	193	290	141	211	411	618	337	506	258	387
	36	181	273	132	199	383	575	314	472	240	361
	38	170	255	124	186	354	533	291	438	223	336
	40	158	238	116	174	327	491	269	404	207	311
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		323	486	244	366	749	1130	605	909	458	689
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		263	395	198	298	609	914	492	739	373	559
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		97.0	146	73.1	110	225	338	181	273	137	207
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		111	167	80.4	121	254	383	207	311	158	238
Properties											
Area, in.^{2}		10.8		8.14		25.0		20.2		15.3	
I, in.^{4}		255		194		510		420		324	
r, in.		4.86		4.88		4.51		4.56		4.60	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS13.375–
HSS12.750

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS13.375×						HSS12.750×			
		0.313[f]		0.250[f]		0.188[c], [f]		0.750		0.625	
t_{des}, in.		0.313		0.250		0.188		0.750		0.625	
Nom. Weight, lb/ft		43.64		35.08		26.43		96.21		81.01	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	383	576	308	464	227	341	847	1270	713	1070
	1	383	576	308	463	227	341	847	1270	712	1070
	2	382	575	308	463	227	341	845	1270	711	1070
	3	382	573	307	461	226	340	843	1270	709	1070
	4	380	571	306	460	225	339	839	1260	706	1060
	5	379	569	305	458	224	337	835	1260	702	1060
	6	376	566	303	455	223	335	830	1250	698	1050
	7	374	562	301	453	222	333	823	1240	693	1040
	8	371	558	299	449	220	331	816	1230	687	1030
	9	368	553	296	445	218	328	808	1210	680	1020
	10	365	548	294	441	216	325	799	1200	673	1010
	11	361	543	291	437	214	322	790	1190	665	999
	12	357	537	287	432	212	318	779	1170	656	986
	13	353	530	284	427	209	314	768	1150	647	972
	14	348	523	280	421	206	310	756	1140	637	957
	15	343	515	276	415	204	306	743	1120	627	942
	16	338	508	272	409	201	301	730	1100	615	925
	17	332	499	268	402	197	297	716	1080	604	908
	18	327	491	263	396	194	292	701	1050	592	890
	19	321	482	258	388	191	286	687	1030	580	871
	20	315	473	254	381	187	281	671	1010	567	852
	22	302	454	243	366	180	270	639	960	540	812
	24	288	434	233	350	172	258	606	910	513	770
	26	275	413	222	333	164	246	571	859	484	727
	28	260	391	210	316	155	233	536	806	455	684
	30	246	369	199	298	147	221	501	754	426	640
	32	231	348	187	281	138	208	466	701	397	596
	34	217	326	175	263	130	195	432	649	368	553
	36	202	304	164	246	121	182	398	598	339	510
	38	188	283	152	229	113	169	365	549	312	469
	40	174	262	141	212	105	157	333	501	285	429
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		383	576	308	464	233	350	847	1270	713	1070
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		312	468	251	377	189	284	690	1030	580	870
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		115	173	92.5	139	69.8	105	254	382	214	321
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		131	197	102	153	73.9	111	269	405	230	345
Properties											
Area, in.^{2}		12.8		10.3		7.77		28.3		23.8	
I, in.^{4}		274		222		169		511		439	
r, in.		4.62		4.64		4.66		4.25		4.29	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS12.750–
HSS12.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12.750×								HSS12.000×	
		0.500		0.375		0.250[f]		0.188[c], [f]		0.625	
t_{des}, in.		0.500		0.375		0.250		0.188		0.625	
Nom. Weight, lb/ft		65.48		49.61		33.41		25.18		76.00	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	575	864	437	657	294	442	220	330	668	1000
	1	575	864	437	657	294	442	219	330	667	1000
	2	574	862	436	656	293	441	219	329	666	1000
	3	572	860	435	654	293	440	218	328	664	998
	4	570	856	433	651	291	438	218	327	661	993
	5	567	852	431	648	290	436	217	326	657	987
	6	563	847	429	644	288	433	215	324	652	980
	7	559	841	426	640	286	430	214	321	647	972
	8	555	833	422	634	284	427	212	319	641	963
	9	549	826	418	628	281	423	210	316	634	952
	10	543	817	414	622	279	419	208	313	626	941
	11	537	807	409	615	275	414	206	309	617	928
	12	530	797	404	607	272	409	203	306	608	914
	13	523	786	398	599	268	403	201	301	598	899
	14	515	774	393	590	265	398	198	297	588	884
	15	507	761	386	581	260	391	195	293	577	867
	16	498	748	380	571	256	385	191	288	566	850
	17	489	735	373	561	252	378	188	283	554	832
	18	479	720	366	550	247	371	185	278	541	813
	19	469	705	359	539	242	364	181	272	528	794
	20	459	690	351	528	237	356	177	266	515	774
	22	438	658	335	504	227	340	170	255	488	733
	24	416	625	319	479	216	324	161	243	460	691
	26	393	591	302	453	204	307	153	230	431	647
	28	370	556	284	427	193	290	144	217	402	604
	30	347	521	267	401	181	272	136	204	373	560
	32	323	486	249	375	169	254	127	191	344	517
	34	300	451	232	348	158	237	118	178	316	474
	36	278	417	215	323	146	220	110	165	288	433
	38	255	384	198	297	135	203	102	153	262	394
	40	234	352	182	273	124	187	93.4	140	236	355
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		575	864	437	657	294	442	222	333	668	1000
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		468	702	356	534	239	359	180	271	544	815
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		172	259	131	197	88.2	133	66.5	99.9	200	301
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		187	282	143	215	93.0	140	67.4	101	202	304
Properties											
Area, in.^{2}		19.2		14.6		9.82		7.40		22.3	
I, in.^{4}		362		279		192		146		362	
r, in.		4.33		4.38		4.42		4.44		4.03	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS12.000–
HSS11.750

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS12.000×						HSS11.750×			
		0.500		0.375		0.250[f]		0.625		0.500	
t_{des}, in.		0.500		0.375		0.250		0.625		0.500	
Nom. Weight, lb/ft		61.47		46.60		31.40		74.33		60.13	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	542	815	410	617	276	415	653	981	530	796
	1	542	814	410	616	276	415	652	980	530	796
	2	541	812	409	615	276	414	651	978	529	794
	3	539	810	408	613	275	413	649	975	527	792
	4	536	806	406	610	274	411	646	970	524	788
	5	533	802	404	607	272	409	642	965	521	783
	6	530	796	401	603	270	406	637	957	517	778
	7	525	790	398	598	268	403	631	949	513	771
	8	520	782	394	592	266	399	625	939	508	763
	9	515	774	390	586	263	395	618	929	502	755
	10	509	764	385	579	260	391	610	917	496	745
	11	502	754	380	572	257	386	601	904	489	735
	12	495	743	375	564	253	381	592	890	482	724
	13	487	732	369	555	249	375	582	875	474	712
	14	478	719	363	546	245	369	571	859	465	699
	15	470	706	357	536	241	362	560	842	456	686
	16	461	692	350	526	236	355	549	825	447	672
	17	451	678	343	515	232	348	537	806	437	657
	18	441	663	335	504	227	341	524	787	427	642
	19	431	647	328	492	222	333	511	768	417	627
	20	420	632	320	480	217	326	498	748	406	611
	22	398	599	303	456	206	309	470	706	384	577
	24	376	565	286	431	195	293	442	664	361	543
	26	353	530	269	405	183	275	413	620	338	508
	28	329	495	252	378	172	258	384	576	315	473
	30	306	460	234	352	160	240	354	533	291	438
	32	283	425	217	326	148	223	326	490	268	403
	34	260	391	200	300	137	206	298	448	246	369
	36	238	357	183	275	126	189	271	407	224	337
	38	216	325	167	251	115	173	245	368	203	305
	40	196	294	151	227	104	157	221	332	183	275
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		542	815	410	617	276	415	653	981	530	797
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		441	662	334	501	225	337	531	797	431	647
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		163	244	123	185	82.9	125	196	294	159	239
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		165	248	126	190	83.2	125	193	290	158	237
Properties											
Area, in.^{2}		18.1		13.7		9.23		21.8		17.7	
I, in.^{4}		299		232		159		339		280	
r, in.		4.07		4.11		4.16		3.94		3.98	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS11.750–HSS10.750

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS11.750×						HSS10.750×			
		0.375		0.337		0.250[f]		0.625		0.500	
t_{des}, in.		0.375		0.337		0.250		0.625		0.500	
Nom. Weight, lb/ft		45.60		41.12		30.73		67.65		54.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	401	603	362	545	270	406	596	895	482	725
	1	401	603	362	544	270	406	595	895	482	724
	2	400	601	361	543	270	405	594	893	480	722
	3	399	599	360	541	269	404	591	889	479	719
	4	397	597	359	539	268	402	588	884	476	715
	5	395	593	356	536	266	400	584	877	473	710
	6	392	589	354	532	264	397	579	870	468	704
	7	389	584	351	528	262	394	572	860	464	697
	8	385	578	348	522	260	390	565	850	458	688
	9	381	572	344	517	257	386	558	838	452	679
	10	376	565	340	510	254	381	549	825	445	669
	11	371	557	335	504	250	376	540	811	438	658
	12	365	549	330	496	247	371	530	796	430	646
	13	359	540	325	488	243	365	519	780	421	633
	14	353	531	319	480	239	359	508	763	412	619
	15	346	521	313	471	234	352	496	745	403	605
	16	340	510	307	462	230	345	483	727	393	590
	17	332	500	301	452	225	338	471	707	383	575
	18	325	488	294	442	220	331	457	687	372	559
	19	317	477	287	431	215	323	444	667	361	543
	20	309	465	280	421	210	315	430	646	350	526
	22	293	440	265	398	199	299	401	603	327	492
	24	276	414	250	376	187	282	372	559	304	457
	26	258	388	234	352	176	264	343	515	281	422
	28	241	362	218	328	164	247	314	472	258	387
	30	223	335	203	305	153	229	286	429	235	353
	32	206	309	187	281	141	212	258	388	213	320
	34	189	284	172	258	130	195	232	348	191	288
	36	172	259	157	236	119	178	207	310	171	257
	38	157	235	143	215	108	162	185	279	153	230
	40	141	212	129	194	97.6	147	167	251	138	208
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		401	603	362	545	270	406	596	896	482	725
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		327	490	295	442	220	330	485	728	392	589
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		120	181	109	163	81.1	122	179	269	145	217
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		121	182	110	165	79.8	120	160	241	131	197
Properties											
Area, in.^{2}		13.4		12.1		9.03		19.9		16.1	
I, in.^{4}		217		197		149		256		212	
r, in.		4.02		4.04		4.07		3.59		3.63	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS10.750–
HSS10.000

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10.750×								HSS10.000×	
		0.375		0.313		0.250[f]		0.188[f]		0.625	
t_{des}, in.		0.375		0.313		0.250		0.188		0.625	
Nom. Weight, lb/ft		41.59		34.87		28.06		21.17		62.64	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	365	549	305	459	247	371	186	280	551	828
	1	365	549	305	459	247	371	186	280	550	827
	2	364	547	304	458	246	370	186	279	549	825
	3	363	545	303	456	245	369	185	278	546	821
	4	361	542	302	453	244	367	184	277	543	815
	5	358	538	300	450	242	364	183	275	538	808
	6	355	534	297	446	240	361	181	272	532	800
	7	352	528	294	442	238	358	179	270	526	790
	8	347	522	291	437	235	354	177	267	518	779
	9	343	515	287	431	232	349	175	263	510	766
	10	338	508	283	425	229	344	173	259	501	753
	11	332	499	278	418	225	338	170	255	491	738
	12	326	491	273	411	221	333	167	251	480	722
	13	320	481	268	403	217	326	164	246	469	705
	14	313	471	262	394	213	320	161	241	457	687
	15	306	460	257	386	208	313	157	236	444	668
	16	299	449	251	377	203	305	153	231	431	648
	17	291	438	244	367	198	298	150	225	418	628
	18	284	426	238	357	193	290	146	219	404	608
	19	275	414	231	347	187	282	142	213	390	587
	20	267	402	224	337	182	273	138	207	376	565
	22	250	376	210	316	171	256	129	194	347	521
	24	233	350	196	294	159	239	120	181	318	478
	26	215	324	181	272	147	221	112	168	289	434
	28	198	297	167	250	136	204	103	155	261	392
	30	181	272	152	229	124	186	94.2	142	233	350
	32	164	247	138	208	113	170	85.8	129	207	311
	34	148	222	125	188	102	153	77.6	117	183	275
	36	132	199	112	168	91.5	137	69.7	105	163	246
	38	119	179	100	151	82.1	123	62.6	94.0	147	220
	40	107	161	90.6	136	74.1	111	56.5	84.9	132	199
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		365	549	305	459	247	371	186	280	551	828
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		297	446	249	373	201	302	152	227	449	673
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		110	165	91.6	138	74.1	111	55.9	84.0	165	248
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		101	152	85.1	128	67.9	102	48.7	73.2	137	206
Properties											
Area, in.^{2}		12.2		10.2		8.25		6.22		18.4	
I, in.^{4}		165		140		114		86.8		203	
r, in.		3.67		3.69		3.71		3.73		3.32	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS10.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS10.000×									
		0.500		0.375		0.313		0.250		0.188[f]	
t_{des}, in.		0.500		0.375		0.313		0.250		0.188	
Nom. Weight, lb/ft		50.78		38.58		32.36		26.06		19.67	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	446	670	338	509	285	428	229	345	173	260
	1	446	670	338	508	284	428	229	344	173	260
	2	444	668	337	507	284	426	229	343	172	259
	3	442	665	336	504	282	425	228	342	172	258
	4	440	661	333	501	281	422	226	340	171	256
	5	436	655	331	497	278	418	224	337	169	254
	6	431	648	327	492	276	414	222	334	168	252
	7	426	641	324	486	273	410	220	330	166	249
	8	420	632	319	480	269	404	217	326	164	246
	9	414	622	314	473	265	398	213	321	161	242
	10	406	611	309	464	260	391	210	316	159	238
	11	399	599	303	456	256	384	206	310	156	234
	12	390	586	297	446	250	376	202	303	153	229
	13	381	573	290	436	245	368	197	297	149	224
	14	372	558	283	426	239	359	193	290	146	219
	15	362	544	276	415	233	350	188	282	142	214
	16	351	528	268	403	226	340	183	275	138	208
	17	341	512	260	391	220	330	178	267	134	202
	18	330	496	252	379	213	320	172	259	130	196
	19	319	479	244	367	206	310	167	250	126	190
	20	307	462	236	354	199	299	161	242	122	183
	22	284	427	218	328	185	278	149	225	113	170
	24	261	392	201	302	170	256	138	207	105	157
	26	237	357	183	276	155	234	126	190	95.8	144
	28	215	323	166	250	141	212	115	172	87.2	131
	30	193	290	150	225	127	191	103	155	78.8	118
	32	171	258	134	201	114	171	92.7	139	70.7	106
	34	152	228	119	178	101	152	82.3	124	62.8	94.5
	36	135	204	106	159	90.1	135	73.4	110	56.1	84.2
	38	122	183	95.0	143	80.9	122	65.9	99.1	50.3	75.6
	40	110	165	85.7	129	73.0	110	59.5	89.4	45.4	68.2
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		446	671	338	509	285	428	229	345	173	260
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		363	545	275	413	232	348	187	280	141	211
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		134	201	101	153	85.4	128	68.8	103	51.9	78.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		113	170	86.8	131	73.1	110	59.4	89.3	42.6	64.0
Properties											
Area, in.^{2}		14.9		11.3		9.51		7.66		5.78	
I, in.^{4}		169		132		112		91.1		69.6	
r, in.		3.36		3.41		3.43		3.45		3.47	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS9.625

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS9.625×									
		0.625		0.500		0.375		0.313		0.250	
t_{des}, in.		0.625		0.500		0.375		0.313		0.250	
Nom. Weight, lb/ft		60.13		48.77		37.08		31.11		25.06	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	530	796	428	643	326	491	274	411	220	331
	1	529	796	428	643	326	490	273	411	220	331
	2	528	793	426	641	325	489	273	410	220	330
	3	525	789	424	638	323	486	271	408	218	328
	4	521	783	421	633	321	483	269	405	217	326
	5	516	776	417	627	318	479	267	401	215	323
	6	511	767	413	621	315	473	264	397	213	320
	7	504	757	407	612	311	467	261	392	210	316
	8	496	745	401	603	306	461	257	386	207	312
	9	487	732	395	593	301	453	253	380	204	307
	10	478	718	387	582	296	445	248	373	200	301
	11	468	703	379	570	290	435	243	366	196	295
	12	457	686	370	556	283	426	238	358	192	289
	13	445	669	361	543	276	415	232	349	188	282
	14	433	650	351	528	269	404	226	340	183	275
	15	420	631	341	513	261	393	220	330	178	267
	16	407	611	331	497	254	381	213	321	173	259
	17	393	591	320	481	246	369	207	311	167	251
	18	379	570	309	464	237	357	200	300	162	243
	19	365	548	297	447	229	344	193	290	156	235
	20	350	527	286	430	220	331	185	279	150	226
	22	321	483	263	395	203	305	171	257	139	209
	24	292	439	239	360	185	278	156	235	127	191
	26	263	396	216	325	168	252	142	213	116	174
	28	235	354	194	292	151	227	128	192	104	157
	30	209	314	173	259	135	202	114	171	93.3	140
	32	184	276	152	229	119	179	101	152	82.7	124
	34	163	244	135	202	105	158	89.3	134	73.3	110
	36	145	218	120	181	93.9	141	79.7	120	65.3	98.2
	38	130	196	108	162	84.3	127	71.5	107	58.6	88.1
	40	118	177	97.3	146	76.0	114	64.5	97.0	52.9	79.5
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		530	797	428	644	326	491	274	411	220	331
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		431	647	349	523	266	399	223	334	179	269
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		159	239	128	193	97.9	147	82.1	123	66.1	99.4
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		126	190	104	156	80.1	120	67.6	102	54.9	82.5
Properties											
Area, in.^{2}		17.7		14.3		10.9		9.14		7.36	
I, in.^{4}		180		150		117		99.2		81.0	
r, in.		3.19		3.23		3.27		3.29		3.32	

Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS9.625–
HSS8.625

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS9.625×		HSS8.625×							
		0.188[f]		0.625		0.500		0.375		0.322	
t_{des}, in.		0.188		0.625		0.500		0.375		0.322	
Nom. Weight, lb/ft		18.92		53.45		43.43		33.07		28.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	166	250	470	706	383	576	291	437	251	378
	1	166	250	469	706	383	575	291	437	251	378
	2	166	249	468	703	381	573	290	435	250	376
	3	165	248	465	698	379	569	288	433	249	374
	4	164	246	460	692	376	564	285	429	247	371
	5	163	244	455	684	371	558	282	424	244	367
	6	161	242	448	674	366	550	278	418	241	362
	7	159	239	441	663	360	541	274	412	237	356
	8	157	236	432	650	353	531	269	404	233	350
	9	154	232	423	636	346	520	263	396	228	342
	10	151	228	413	620	338	507	257	387	223	335
	11	149	223	401	603	329	494	251	377	217	326
	12	145	218	390	585	319	480	244	366	211	317
	13	142	213	377	567	309	465	236	355	205	308
	14	138	208	364	547	299	449	228	343	198	298
	15	135	202	350	527	288	433	220	331	191	287
	16	131	196	337	506	277	416	212	319	184	277
	17	127	190	322	484	266	399	204	306	177	266
	18	123	184	308	463	254	382	195	293	169	255
	19	118	178	293	441	242	364	186	280	162	244
	20	114	172	279	419	231	347	178	267	154	232
	22	105	158	250	376	207	312	160	241	139	210
	24	96.7	145	222	333	184	277	143	215	125	187
	26	88.0	132	194	292	162	244	126	190	110	166
	28	79.4	119	169	253	141	212	110	166	96.7	145
	30	71.2	107	147	221	123	185	96.1	144	84.2	127
	32	63.2	95.0	129	194	108	163	84.5	127	74.0	111
	34	56.0	84.2	114	172	95.9	144	74.8	112	65.6	98.5
	36	50.0	75.1	102	153	85.5	129	66.7	100	58.5	87.9
	38	44.8	67.4	91.5	138	76.7	115	59.9	90.0	52.5	78.9
	40	40.5	60.8	82.6	124	69.3	104	54.1	81.3	47.4	71.2
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		166	250	470	707	383	576	291	437	251	378
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		136	203	383	574	312	468	237	355	205	307
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		49.9	75.1	141	212	115	173	87.3	131	75.4	113
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		39.8	59.9	100	150	82.3	124	63.6	95.6	55.4	83.3
Properties											
Area, in.^{2}		5.56		15.7		12.8		9.72		8.40	
I, in.^{4}		61.9		126		106		82.9		72.5	
r, in.		3.34		2.84		2.88		2.92		2.94	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS8.625–
HSS7.500

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS8.625×				HSS7.500×					
		0.250		0.188[f]		0.500		0.375		0.313	
t_{des}, in.		0.250		0.188		0.500		0.375		0.313	
Nom. Weight, lb/ft		22.38		16.91		37.42		28.56		24.01	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	197	296	149	224	329	495	251	378	211	318
	1	197	296	149	223	329	494	251	377	211	317
	2	196	295	148	223	327	492	250	375	210	316
	3	195	293	147	221	324	487	247	372	208	313
	4	193	290	146	219	320	482	245	368	206	310
	5	191	287	144	217	316	474	241	362	203	305
	6	189	284	143	214	310	465	237	356	199	300
	7	186	279	140	211	303	455	232	348	195	293
	8	182	274	138	207	295	444	226	340	190	286
	9	179	269	135	203	287	431	220	330	185	278
	10	175	263	132	199	278	417	213	320	180	270
	11	170	256	129	194	268	402	206	309	173	261
	12	166	249	125	189	257	387	198	297	167	251
	13	161	242	122	183	247	371	190	285	160	241
	14	156	234	118	177	235	354	182	273	154	231
	15	150	226	114	171	224	337	173	260	146	220
	16	145	218	110	165	212	319	164	247	139	209
	17	139	209	106	159	201	302	156	234	132	198
	18	133	201	101	152	189	284	147	221	125	187
	19	128	192	97.0	146	178	267	138	208	117	176
	20	122	183	92.6	139	166	250	129	195	110	165
	22	110	166	83.8	126	144	216	113	169	95.9	144
	24	98.6	148	75.2	113	123	184	96.6	145	82.6	124
	26	87.4	131	66.8	100	104	157	82.3	124	70.3	106
	28	76.8	115	58.7	88.3	90.1	135	70.9	107	60.6	91.1
	30	66.9	100	51.2	76.9	78.5	118	61.8	92.9	52.8	79.4
	32	58.8	88.3	45.0	67.6	69.0	104	54.3	81.6	46.4	69.8
	34	52.1	78.2	39.9	59.9	61.1	91.8	48.1	72.3	41.1	61.8
	36	46.4	69.8	35.5	53.4	54.5	81.9	42.9	64.5	36.7	55.1
	38	41.7	62.6	31.9	48.0	48.9	73.5	38.5	57.9	32.9	49.5
	40	37.6	56.5	28.8	43.3	44.1	66.3	34.8	52.2	29.7	44.7
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		197	296	149	224	329	495	251	378	211	318
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		160	241	121	182	268	402	205	307	172	258
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		59.1	88.8	44.6	67.1	98.8	149	75.4	113	63.4	95.3
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		43.7	65.6	32.5	48.9	61.1	91.9	47.7	71.6	40.4	60.8
Properties											
Area, in.^{2}		6.58		4.97		11.0		8.39		7.06	
I, in.^{4}		57.7		44.3		67.7		53.4		45.7	
r, in.		2.96		2.98		2.48		2.52		2.54	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Confirm ASTM A1085/A1085M material availability before specifying.

HSS7.500–
HSS7.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS7.500×				HSS7.000×					
		0.250		0.188		0.500		0.375		0.313	
t_{des}, in.		0.250		0.188		0.500		0.375		0.313	
Nom. Weight, lb/ft		19.38		14.66		34.74		26.56		22.34	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	170	256	129	194	305	459	234	351	197	296
	1	170	256	129	194	305	458	233	350	196	295
	2	169	254	128	193	303	455	232	348	195	293
	3	168	252	127	191	300	451	230	345	193	291
	4	166	250	126	189	296	445	227	340	191	287
	5	164	246	124	186	291	437	223	335	188	282
	6	161	242	122	183	284	427	218	328	184	276
	7	157	237	119	180	277	416	213	320	179	270
	8	154	231	117	175	269	404	207	311	174	262
	9	150	225	114	171	260	391	200	301	169	254
	10	145	218	110	166	250	376	193	290	163	245
	11	140	211	107	160	240	361	185	279	157	236
	12	135	203	103	155	229	345	177	267	150	226
	13	130	195	99.0	149	218	328	169	254	143	215
	14	124	187	94.9	143	207	311	161	242	136	205
	15	119	178	90.6	136	195	293	152	229	129	194
	16	113	170	86.3	130	183	276	143	215	122	183
	17	107	161	82.0	123	172	258	135	202	114	172
	18	101	152	77.6	117	160	241	126	189	107	161
	19	95.4	143	73.2	110	149	224	117	176	100	150
	20	89.6	135	68.9	104	138	207	109	164	92.9	140
	22	78.3	118	60.4	90.7	116	175	92.8	139	79.4	119
	24	67.5	101	52.3	78.5	97.8	147	78.1	117	66.9	101
	26	57.6	86.5	44.6	67.1	83.3	125	66.5	100	57.0	85.6
	28	49.6	74.6	38.5	57.9	71.8	108	57.3	86.2	49.1	73.8
	30	43.2	65.0	33.5	50.4	62.6	94.1	50.0	75.1	42.8	64.3
	32	38.0	57.1	29.5	44.3	55.0	82.7	43.9	66.0	37.6	56.5
	34	33.7	50.6	26.1	39.2	48.7	73.2	38.9	58.5	33.3	50.1
	36	30.0	45.1	23.3	35.0	43.5	65.3	34.7	52.1	29.7	44.7
	38	27.0	40.5	20.9	31.4	39.0	58.6	31.1	46.8	26.7	40.1
	40	24.3	36.6	18.9	28.3						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		170	256	129	194	305	459	234	351	197	296
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		139	208	105	158	249	373	190	285	160	240
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		51.1	76.8	38.7	58.2	91.6	138	70.1	105	59.0	88.7
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		32.7	49.1	25.0	37.5	52.9	79.5	41.2	61.9	34.9	52.5
Properties											
Area, in.^{2}		5.69		4.31		10.2		7.80		6.57	
I, in.^{4}		37.5		28.8		54.2		43.0		36.8	
r, in.		2.56		2.59		2.30		2.35		2.37	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS7.000–
HSS6.875

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS7.000×				HSS6.875×					
		0.250		0.188		0.375		0.313		0.250	
t_{des}, in.		0.250		0.188		0.375		0.313		0.250	
Nom. Weight, lb/ft		18.04		13.65		26.06		21.92		17.71	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	159	239	120	180	229	345	193	290	156	234
	1	158	238	120	180	229	344	192	289	155	234
	2	158	237	119	179	228	342	191	288	154	232
	3	156	235	118	178	225	339	189	285	153	230
	4	154	232	117	175	222	334	187	281	151	227
	5	152	228	115	172	218	328	184	276	148	223
	6	148	223	112	169	213	321	180	270	145	218
	7	145	218	110	165	208	313	175	263	142	213
	8	141	212	107	161	202	303	170	256	138	207
	9	137	205	104	156	195	293	165	247	133	200
	10	132	198	100	151	188	282	159	238	128	193
	11	127	191	96.4	145	180	271	152	229	123	185
	12	122	183	92.5	139	172	259	145	219	118	177
	13	116	175	88.4	133	164	246	139	208	112	169
	14	111	166	84.2	126	155	233	131	198	107	161
	15	105	158	79.8	120	147	220	124	187	101	152
	16	99.0	149	75.5	113	138	207	117	176	95.2	143
	17	93.1	140	71.1	107	129	194	110	165	89.3	134
	18	87.3	131	66.7	100	120	181	102	154	83.5	126
	19	81.6	123	62.4	93.8	112	168	95.2	143	77.8	117
	20	75.9	114	58.1	87.4	103	155	88.2	133	72.1	108
	22	65.0	97.7	49.9	75.0	87.4	131	74.8	112	61.4	92.3
	24	54.9	82.5	42.2	63.4	73.4	110	62.8	94.4	51.6	77.6
	26	46.7	70.3	36.0	54.1	62.6	94.0	53.5	80.4	44.0	66.1
	28	40.3	60.6	31.0	46.6	53.9	81.1	46.1	69.4	37.9	57.0
	30	35.1	52.8	27.0	40.6	47.0	70.6	40.2	60.4	33.0	49.6
	32	30.9	46.4	23.7	35.7	41.3	62.1	35.3	53.1	29.0	43.6
	34	27.3	41.1	21.0	31.6	36.6	55.0	31.3	47.0	25.7	38.6
	36	24.4	36.6	18.8	28.2	32.6	49.1	27.9	42.0	22.9	34.5
	38	21.9	32.9	16.8	25.3	29.3	44.0	25.1	37.7	20.6	30.9
	40			15.2	22.8						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		159	239	120	180	229	345	193	290	156	234
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		129	194	97.7	147	187	280	157	235	127	190
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		47.6	71.6	36.0	54.1	68.8	103	57.8	86.9	46.7	70.2
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		28.4	42.8	21.7	32.6	39.7	59.6	33.7	50.6	27.4	41.3
Properties											
Area, in.^{2}		5.30		4.01		7.66		6.44		5.20	
I, in.^{4}		30.2		23.3		40.6		34.8		28.6	
r, in.		2.39		2.41		2.30		2.32		2.34	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS6.875–
HSS6.625

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6.875×		HSS6.625×							
		0.188		0.500		0.432		0.375		0.313	
t_{des}, in.		0.188		0.500		0.432		0.375		0.313	
Nom. Weight, lb/ft		13.40		32.74		28.60		25.06		21.09	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	118	177	288	433	251	378	220	331	186	279
	1	118	177	287	432	251	377	220	330	185	278
	2	117	176	285	429	249	375	218	328	184	277
	3	116	174	282	424	247	371	216	325	182	274
	4	114	172	278	418	243	365	213	320	179	270
	5	113	169	272	409	238	358	209	314	176	265
	6	110	166	266	399	232	349	204	306	172	259
	7	108	162	258	388	226	339	198	298	167	252
	8	105	157	250	375	219	328	192	289	162	244
	9	101	152	240	361	211	316	185	278	156	235
	10	97.8	147	230	346	202	303	178	267	150	226
	11	94.0	141	220	330	193	290	170	255	144	216
	12	90.1	135	209	314	183	276	162	243	137	206
	13	85.9	129	197	297	174	261	153	230	130	195
	14	81.7	123	186	279	164	246	144	217	123	184
	15	77.4	116	174	262	153	231	136	204	115	173
	16	73.0	110	162	244	143	215	127	191	108	162
	17	68.6	103	151	227	133	200	118	178	101	151
	18	64.3	96.6	140	210	123	186	110	165	93.5	141
	19	60.0	90.1	128	193	114	171	101	152	86.4	130
	20	55.7	83.8	118	177	105	157	93.0	140	79.6	120
	22	47.6	71.6	97.7	147	86.9	131	77.5	117	66.5	99.9
	24	40.1	60.3	82.1	123	73.0	110	65.1	97.9	55.9	84.0
	26	34.2	51.4	69.9	105	62.2	93.5	55.5	83.4	47.6	71.6
	28	29.5	44.3	60.3	90.6	53.6	80.6	47.9	71.9	41.0	61.7
	30	25.7	38.6	52.5	79.0	46.7	70.2	41.7	62.7	35.8	53.7
	32	22.6	33.9	46.2	69.4	41.1	61.7	36.6	55.1	31.4	47.2
	34	20.0	30.0	40.9	61.5	36.4	54.7	32.5	48.8	27.8	41.8
	36	17.8	26.8	36.5	54.8	32.4	48.8	29.0	43.5	24.8	37.3
	38	16.0	24.0								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		118	177	288	433	251	378	220	331	186	279
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		96.0	144	234	352	205	307	179	269	151	227
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		35.4	53.2	86.4	130	75.4	113	66.1	99.4	55.7	83.7
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		20.9	31.5	46.9	70.5	41.4	62.3	36.7	55.1	31.2	46.9
Properties											
Area, in.^{2}		3.94		9.62		8.40		7.36		6.20	
I, in.^{4}		22.0		45.4		40.5		36.1		30.9	
r, in.		2.37		2.17		2.19		2.21		2.23	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS6.625–
HSS6.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6.625×						HSS6.000×			
		0.280		0.250		0.188		0.500		0.375	
t_{des}, in.		0.280		0.250		0.188		0.500		0.375	
Nom. Weight, lb/ft		18.99		17.04		12.90		29.40		22.55	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	167	251	150	225	113	171	259	389	199	298
	1	167	251	150	225	113	170	258	388	198	298
	2	166	249	149	224	113	169	256	385	196	295
	3	164	246	147	221	111	167	252	379	194	291
	4	162	243	145	218	110	165	247	372	190	286
	5	159	238	142	214	108	162	241	363	186	279
	6	155	233	139	209	105	159	234	352	180	271
	7	151	227	136	204	103	154	226	339	174	262
	8	146	220	131	198	99.7	150	217	326	167	252
	9	141	212	127	191	96.3	145	207	311	160	241
	10	136	204	122	183	92.7	139	196	295	152	229
	11	130	195	117	176	88.8	133	185	278	144	216
	12	124	186	111	168	84.8	127	174	261	135	203
	13	118	177	106	159	80.6	121	162	243	127	190
	14	111	167	100	151	76.3	115	150	226	118	177
	15	105	157	94.3	142	71.9	108	139	209	109	164
	16	98.1	147	88.5	133	67.6	102	127	191	101	151
	17	91.6	138	82.7	124	63.2	95.0	116	175	92.1	138
	18	85.2	128	76.9	116	58.9	88.5	105	159	83.9	126
	19	78.9	119	71.3	107	54.6	82.1	95.0	143	75.9	114
	20	72.7	109	65.8	98.8	50.5	75.9	85.7	129	68.5	103
	22	60.9	91.6	55.2	82.9	42.5	63.9	70.9	106	56.6	85.1
	24	51.2	76.9	46.4	69.7	35.7	53.7	59.5	89.5	47.6	71.5
	26	43.6	65.6	39.5	59.4	30.4	45.7	50.7	76.2	40.5	60.9
	28	37.6	56.5	34.1	51.2	26.2	39.4	43.7	65.7	35.0	52.5
	30	32.8	49.2	29.7	44.6	22.8	34.3	38.1	57.3	30.5	45.8
	32	28.8	43.3	26.1	39.2	20.1	30.2	33.5	50.3	26.8	40.2
	34	25.5	38.3	23.1	34.7	17.8	26.7				
	36	22.8	34.2	20.6	31.0	15.9	23.8				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		167	251	150	225	113	171	259	389	199	298
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		136	204	122	183	92.4	139	211	316	162	242
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		50.1	75.3	45.0	67.6	34.0	51.2	77.6	117	59.6	89.5
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		28.2	42.4	25.4	38.3	19.4	29.1	37.9	57.0	29.7	44.6
Properties											
Area, in.^{2}		5.58		5.01		3.79		8.64		6.63	
I, in.^{4}		28.1		25.5		19.7		32.9		26.3	
r, in.		2.25		2.26		2.28		1.95		1.99	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS6.000–
HSS5.563

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS6.000×								HSS5.563×	
		0.313		0.280		0.250		0.188		0.500	
t_{des}, in.		0.313		0.280		0.250		0.188		0.500	
Nom. Weight, lb/ft		19.00		17.12		15.37		11.65		27.06	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	167	251	151	226	135	203	102	154	238	358
	1	167	250	150	226	135	203	102	154	237	357
	2	165	248	149	224	134	201	101	152	235	353
	3	163	245	147	221	132	199	100	151	231	347
	4	160	241	145	217	130	195	98.4	148	226	340
	5	157	235	141	212	127	191	96.2	145	219	330
	6	152	229	137	206	123	186	93.6	141	212	318
	7	147	221	133	199	119	179	90.7	136	203	305
	8	141	213	128	192	115	173	87.4	131	193	291
	9	135	203	122	184	110	165	83.8	126	183	275
	10	129	193	116	175	105	158	79.9	120	172	258
	11	122	183	110	166	99.3	149	75.8	114	161	241
	12	115	173	104	156	93.7	141	71.6	108	149	224
	13	108	162	97.4	146	87.9	132	67.3	101	137	207
	14	100	151	90.8	137	82.0	123	63.0	94.6	126	189
	15	92.9	140	84.3	127	76.2	114	58.6	88.1	115	172
	16	85.7	129	77.8	117	70.4	106	54.3	81.5	104	156
	17	78.7	118	71.4	107	64.7	97.2	50.0	75.1	93.1	140
	18	71.8	108	65.3	98.1	59.1	88.9	45.8	68.9	83.0	125
	19	65.2	98.0	59.3	89.2	53.8	80.9	41.8	62.8	74.5	112
	20	58.8	88.4	53.6	80.5	48.6	73.1	37.9	56.9	67.2	101
	22	48.6	73.1	44.3	66.5	40.2	60.4	31.3	47.0	55.6	83.5
	24	40.9	61.4	37.2	55.9	33.8	50.7	26.3	39.5	46.7	70.2
	26	34.8	52.3	31.7	47.6	28.8	43.2	22.4	33.7	39.8	59.8
	28	30.0	45.1	27.3	41.1	24.8	37.3	19.3	29.0	34.3	51.5
	30	26.1	39.3	23.8	35.8	21.6	32.5	16.8	25.3	29.9	44.9
	32	23.0	34.5	20.9	31.4	19.0	28.5	14.8	22.2		
	34							13.1	19.7		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		167	251	151	226	135	203	102	154	238	358
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		136	204	123	184	110	165	83.4	125	194	291
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		50.1	75.3	45.2	67.9	40.6	61.0	30.7	46.2	71.4	107
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		25.2	37.9	22.9	34.4	20.6	31.0	15.8	23.8	32.2	48.4
Properties											
Area, in.^{2}		5.58		5.03		4.52		3.42		7.95	
I, in.^{4}		22.6		20.6		18.7		14.5		25.7	
r, in.		2.01		2.02		2.03		2.06		1.80	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5.563–
HSS5.500

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS5.563×						HSS5.500×			
		0.375		0.258		0.188		0.500		0.375	
t_{des}, in.		0.375		0.258		0.188		0.500		0.375	
Nom. Weight, lb/ft		20.80		14.63		10.77		26.73		20.55	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	183	275	129	193	94.9	143	235	353	181	272
	1	182	274	128	193	94.6	142	234	352	180	271
	2	181	272	127	191	93.8	141	232	349	179	268
	3	178	267	125	188	92.5	139	228	343	176	264
	4	174	262	123	184	90.6	136	223	335	172	258
	5	169	254	120	180	88.2	133	216	325	167	251
	6	164	246	116	174	85.5	128	209	313	161	242
	7	157	236	111	167	82.3	124	200	300	155	233
	8	150	225	106	160	78.7	118	190	286	148	222
	9	142	214	101	152	74.9	113	180	270	140	210
	10	134	201	95.6	144	70.9	107	169	253	132	198
	11	126	189	89.8	135	66.7	100	157	236	123	185
	12	117	176	83.8	126	62.4	93.7	146	219	114	172
	13	108	163	77.8	117	58.0	87.1	134	201	106	159
	14	99.4	149	71.8	108	53.6	80.5	123	184	97.0	146
	15	90.9	137	65.9	99.0	49.2	74.0	111	167	88.4	133
	16	82.5	124	60.1	90.3	45.0	67.6	100	151	80.1	120
	17	74.5	112	54.4	81.8	40.9	61.4	89.8	135	72.2	108
	18	66.6	100	49.0	73.6	36.9	55.4	80.1	120	64.5	96.9
	19	59.8	89.9	43.9	66.0	33.1	49.7	71.9	108	57.8	86.9
	20	54.0	81.1	39.7	59.6	29.9	44.9	64.9	97.5	52.2	78.5
	22	44.6	67.1	32.8	49.3	24.7	37.1	53.6	80.6	43.1	64.9
	24	37.5	56.3	27.5	41.4	20.7	31.2	45.1	67.7	36.3	54.5
	26	31.9	48.0	23.5	35.3	17.7	26.6	38.4	57.7	30.9	46.4
	28	27.5	41.4	20.2	30.4	15.2	22.9	33.1	49.8	26.6	40.0
	30	24.0	36.1	17.6	26.5	13.3	19.9			23.2	34.9
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		183	275	129	194	94.9	143	235	353	181	272
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		149	223	105	157	77.3	116	191	287	147	221
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		54.9	82.5	38.6	58.1	28.5	42.8	70.5	106	54.3	81.5
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		25.2	37.9	18.1	27.3	13.5	20.3	31.2	46.9	24.6	37.0
Properties											
Area, in.^{2}		6.11		4.30		3.17		7.85		6.04	
I, in.^{4}		20.7		15.2		11.5		24.8		19.9	
r, in.		1.84		1.88		1.90		1.78		1.82	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5.500–
HSS5.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS5.500×		HSS5.000×							
		0.258		0.500		0.375		0.313		0.258	
t_{des}, in.		0.258		0.500		0.375		0.313		0.258	
Nom. Weight, lb/ft		14.46		24.05		18.54		15.66		13.08	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	127	191	212	318	163	245	138	207	115	173
	1	127	191	211	317	163	244	137	206	115	172
	2	126	189	208	313	161	241	136	204	113	170
	3	124	186	204	307	158	237	133	200	111	167
	4	121	182	198	298	153	230	130	195	108	163
	5	118	177	191	287	148	222	125	188	105	157
	6	114	171	183	274	142	213	120	180	101	151
	7	110	165	173	260	135	202	114	172	95.8	144
	8	105	157	163	245	127	191	108	162	90.6	136
	9	99.4	149	152	228	119	179	101	152	85.0	128
	10	93.9	141	140	211	110	166	94.0	141	79.2	119
	11	88.0	132	129	193	102	153	86.7	130	73.2	110
	12	82.1	123	117	176	92.9	140	79.4	119	67.2	101
	13	76.1	114	106	159	84.2	127	72.2	109	61.2	92.0
	14	70.1	105	94.5	142	75.8	114	65.1	97.9	55.3	83.2
	15	64.2	96.4	83.9	126	67.6	102	58.3	87.6	49.7	74.6
	16	58.4	87.7	73.8	111	59.8	89.8	51.7	77.7	44.2	66.4
	17	52.8	79.4	65.4	98.3	52.9	79.6	45.8	68.8	39.1	58.8
	18	47.4	71.2	58.3	87.6	47.2	71.0	40.8	61.4	34.9	52.5
	19	42.5	63.9	52.3	78.7	42.4	63.7	36.7	55.1	31.3	47.1
	20	38.4	57.7	47.2	71.0	38.3	57.5	33.1	49.7	28.3	42.5
	22	31.7	47.7	39.0	58.7	31.6	47.5	27.3	41.1	23.4	35.1
	24	26.6	40.0	32.8	49.3	26.6	39.9	23.0	34.5	19.6	29.5
	26	22.7	34.1	27.9	42.0	22.6	34.0	19.6	29.4	16.7	25.2
	28	19.6	29.4							14.4	21.7
	30	17.1	25.6								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		127	191	212	318	163	245	138	207	115	173
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		104	155	172	258	133	199	112	168	93.6	140
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		38.2	57.4	63.5	95.4	49.0	73.6	41.3	62.1	34.5	51.8
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		17.7	26.6	25.4	38.3	20.1	30.2	17.2	25.8	14.5	21.8
Properties											
Area, in.^{2}		4.25		7.07		5.45		4.60		3.84	
I, in.^{4}		14.6		18.1		14.7		12.7		10.8	
r, in.		1.86		1.60		1.64		1.66		1.68	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS5.000–
HSS4.500

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS5.000×				HSS4.500×					
		0.250		0.188		0.375		0.337		0.237	
t_{des}, in.		0.250		0.188		0.375		0.337		0.237	
Nom. Weight, lb/ft		12.69		9.65		16.54		15.00		10.80	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	112	168	84.7	127	146	219	132	198	94.9	143
	1	111	167	84.4	127	145	218	131	197	94.5	142
	2	110	165	83.5	126	143	214	130	195	93.2	140
	3	108	162	82.0	123	139	209	126	190	91.0	137
	4	105	158	79.9	120	134	202	122	184	88.2	132
	5	102	153	77.4	116	129	193	117	176	84.6	127
	6	97.6	147	74.3	112	122	183	111	167	80.4	121
	7	93.0	140	70.9	107	114	172	104	157	75.7	114
	8	88.0	132	67.1	101	106	159	97.1	146	70.6	106
	9	82.6	124	63.1	94.8	97.5	147	89.5	134	65.3	98.1
	10	76.9	116	58.9	88.5	88.8	133	81.6	123	59.8	89.9
	11	71.1	107	54.5	82.0	80.0	120	73.8	111	54.3	81.6
	12	65.3	98.1	50.1	75.4	71.4	107	66.1	99.3	48.8	73.4
	13	59.5	89.4	45.8	68.8	63.1	94.9	58.6	88.1	43.5	65.4
	14	53.8	80.8	41.5	62.4	55.2	82.9	51.4	77.3	38.4	57.7
	15	48.2	72.5	37.3	56.1	48.1	72.2	44.8	67.4	33.5	50.4
	16	42.9	64.5	33.3	50.1	42.2	63.5	39.4	59.2	29.5	44.3
	17	38.0	57.1	29.5	44.4	37.4	56.2	34.9	52.4	26.1	39.2
	18	33.9	51.0	26.3	39.6	33.4	50.2	31.1	46.8	23.3	35.0
	19	30.4	45.8	23.6	35.5	30.0	45.0	27.9	42.0	20.9	31.4
	20	27.5	41.3	21.3	32.1	27.0	40.6	25.2	37.9	18.9	28.3
	22	22.7	34.1	17.6	26.5	22.3	33.6	20.8	31.3	15.6	23.4
	24	19.1	28.7	14.8	22.3	18.8	28.2	17.5	26.3	13.1	19.7
	26	16.3	24.4	12.6	19.0						
	28	14.0	21.1	10.9	16.4						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		112	168	84.7	127	146	219	132	198	94.9	143
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		90.9	136	69.0	103	118	178	107	161	77.3	116
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		33.5	50.4	25.4	38.2	43.7	65.6	39.6	59.5	28.5	42.8
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		14.1	21.2	10.8	16.3	16.0	24.0	14.6	21.9	10.8	16.2
Properties											
Area, in.^{2}		3.73		2.83		4.86		4.41		3.17	
I, in.^{4}		10.6		8.22		10.4		9.61		7.23	
r, in.		1.68		1.70		1.46		1.48		1.51	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS4.500–
HSS4.000

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS4.500×		HSS4.000×							
		0.188		0.313		0.250		0.237		0.226	
t_{des}, in.		0.188		0.313		0.25		0.237		0.226	
Nom. Weight, lb/ft		8.64		12.32		10.02		9.53		9.12	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	76.0	114	108	163	88.3	133	83.8	126	80.2	121
	1	75.7	114	108	162	87.8	132	83.3	125	79.8	120
	2	74.7	112	106	159	86.2	130	81.9	123	78.4	118
	3	73.0	110	103	154	83.7	126	79.5	119	76.1	114
	4	70.8	106	98.2	148	80.3	121	76.2	115	73.1	110
	5	68.0	102	93.0	140	76.1	114	72.2	109	69.3	104
	6	64.7	97.2	86.9	131	71.3	107	67.7	102	65.0	97.6
	7	61.0	91.7	80.2	121	66.0	99.2	62.6	94.1	60.2	90.5
	8	57.0	85.7	73.2	110	60.3	90.7	57.3	86.1	55.1	82.9
	9	52.8	79.4	65.9	99.1	54.5	82.0	51.8	77.8	49.9	75.0
	10	48.5	72.9	58.7	88.2	48.7	73.2	46.2	69.5	44.6	67.1
	11	44.1	66.3	51.6	77.5	43.0	64.6	40.8	61.3	39.5	59.3
	12	39.8	59.8	44.8	67.3	37.5	56.3	35.6	53.5	34.5	51.8
	13	35.6	53.4	38.4	57.7	32.2	48.4	30.6	46.0	29.7	44.7
	14	31.5	47.3	33.1	49.7	27.8	41.8	26.4	39.6	25.6	38.5
	15	27.6	41.5	28.8	43.3	24.2	36.4	23.0	34.5	22.3	33.6
	16	24.2	36.4	25.3	38.1	21.3	32.0	20.2	30.4	19.6	29.5
	17	21.5	32.3	22.4	33.7	18.8	28.3	17.9	26.9	17.4	26.1
	18	19.2	28.8	20.0	30.1	16.8	25.3	16.0	24.0	15.5	23.3
	19	17.2	25.8	18.0	27.0	15.1	22.7	14.3	21.5	13.9	20.9
	20	15.5	23.3	16.2	24.4	13.6	20.5	12.9	19.4	12.6	18.9
	22	12.8	19.3			11.3	16.9	10.7	16.1	10.4	15.6
	24	10.8	16.2								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		76.0	114	108	163	88.3	133	83.8	126	80.2	121
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		61.9	92.9	88.2	132	71.9	108	68.3	102	65.3	98.0
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		22.8	34.3	32.5	48.9	26.5	39.8	25.1	37.8	24.1	36.2
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		8.71	13.1	10.6	16.0	8.78	13.2	8.38	12.6	8.03	12.1
Properties											
Area, in.^{2}		2.54		3.62		2.95		2.80		2.68	
I, in.^{4}		5.92		6.20		5.20		4.98		4.79	
r, in.		1.53		1.31		1.33		1.33		1.34	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS4.000–
HSS3.500

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS4.000×				HSS3.500×					
		0.220		0.188		0.313		0.300		0.250	
t_{des}, in.		0.220		0.188		0.313		0.300		0.250	
Nom. Weight, lb/ft		8.89		7.64		10.65		10.26		8.69	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	78.1	117	67.4	101	93.7	141	90.4	136	76.3	115
	1	77.7	117	67.0	101	92.9	140	89.7	135	75.7	114
	2	76.3	115	65.8	98.9	90.7	136	87.5	132	74.0	111
	3	74.1	111	64.0	96.1	87.0	131	84.1	126	71.1	107
	4	71.1	107	61.4	92.3	82.1	123	79.4	119	67.2	101
	5	67.5	101	58.3	87.6	76.3	115	73.8	111	62.6	94.0
	6	63.3	95.1	54.7	82.2	69.6	105	67.5	102	57.3	86.2
	7	58.6	88.1	50.8	76.3	62.6	94.0	60.8	91.4	51.7	77.7
	8	53.7	80.7	46.5	70.0	55.3	83.1	53.8	80.9	45.9	68.9
	9	48.6	73.0	42.2	63.4	48.1	72.2	46.9	70.5	40.1	60.2
	10	43.5	65.3	37.8	56.8	41.1	61.8	40.2	60.4	34.4	51.8
	11	38.4	57.8	33.5	50.3	34.5	51.8	33.9	50.9	29.1	43.7
	12	33.6	50.5	29.3	44.1	29.0	43.5	28.4	42.8	24.4	36.7
	13	28.9	43.5	25.3	38.1	24.7	37.1	24.2	36.4	20.8	31.3
	14	25.0	37.5	21.8	32.8	21.3	32.0	20.9	31.4	18.0	27.0
	15	21.7	32.7	19.0	28.6	18.5	27.9	18.2	27.4	15.6	23.5
	16	19.1	28.7	16.7	25.1	16.3	24.5	16.0	24.1	13.8	20.7
	17	16.9	25.4	14.8	22.3	14.4	21.7	14.2	21.3	12.2	18.3
	18	15.1	22.7	13.2	19.9	12.9	19.4	12.6	19.0	10.9	16.3
	19	13.6	20.4	11.9	17.8					9.75	14.7
	20	12.2	18.4	10.7	16.1						
	22	10.1	15.2	8.84	13.3						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		78.1	117	67.4	101	93.7	141	90.4	136	76.3	115
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		63.6	95.4	54.8	82.3	76.3	114	73.6	110	62.2	93.2
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		23.4	35.2	20.2	30.4	28.1	42.3	27.1	40.8	22.9	34.4
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		7.86	11.8	6.81	10.2	7.96	12.0	7.68	11.6	6.61	9.94
Properties											
Area, in.^{2}		2.61		2.25		3.13		3.02		2.55	
I, in.^{4}		4.68		4.09		4.01		3.89		3.39	
r, in.		1.34		1.35		1.13		1.14		1.15	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3.500–
HSS3.000

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS3.500×						HSS3.000×			
		0.216		0.203		0.188		0.250		0.216	
t_{des}, in.		0.216		0.203		0.188		0.250		0.216	
Nom. Weight, lb/ft		7.58		7.15		6.64		7.35		6.43	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	66.8	100	62.9	94.5	58.4	87.7	64.7	97.2	56.6	85.0
	1	66.2	99.6	62.4	93.8	57.9	87.1	64.0	96.1	56.0	84.1
	2	64.7	97.3	61.0	91.6	56.6	85.1	61.9	93.0	54.2	81.5
	3	62.2	93.5	58.7	88.2	54.5	81.9	58.5	88.0	51.3	77.2
	4	58.9	88.5	55.6	83.6	51.6	77.6	54.2	81.4	47.6	71.5
	5	54.9	82.5	51.9	78.0	48.2	72.4	49.1	73.7	43.2	64.9
	6	50.4	75.7	47.7	71.6	44.3	66.5	43.4	65.3	38.3	57.6
	7	45.5	68.4	43.1	64.8	40.1	60.2	37.6	56.6	33.3	50.1
	8	40.5	60.8	38.4	57.8	35.7	53.6	31.9	47.9	28.3	42.6
	9	35.4	53.2	33.7	50.7	31.3	47.1	26.4	39.7	23.6	35.4
	10	30.5	45.9	29.1	43.8	27.1	40.7	21.5	32.3	19.2	28.9
	11	25.9	38.9	24.8	37.3	23.0	34.6	17.7	26.7	15.9	23.9
	12	21.8	32.7	20.8	31.3	19.3	29.1	14.9	22.4	13.3	20.1
	13	18.5	27.9	17.8	26.7	16.5	24.8	12.7	19.1	11.4	17.1
	14	16.0	24.0	15.3	23.0	14.2	21.4	11.0	16.5	9.81	14.7
	15	13.9	20.9	13.3	20.0	12.4	18.6	9.55	14.3	8.54	12.8
	16	12.2	18.4	11.7	17.6	10.9	16.4	8.39	12.6	7.51	11.3
	17	10.8	16.3	10.4	15.6	9.64	14.5				
	18	9.67	14.5	9.26	13.9	8.60	12.9				
	19	8.68	13.0	8.31	12.5	7.72	11.6				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		66.8	100	62.9	94.5	58.4	87.8	64.7	97.2	56.6	85.1
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		54.4	81.5	51.2	76.8	47.5	71.3	52.7	79.0	46.1	69.1
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		20.0	30.1	18.9	28.4	17.5	26.3	19.4	29.2	17.0	25.5
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		5.81	8.74	5.51	8.29	5.14	7.73	4.74	7.13	4.19	6.30
Properties											
Area, in.^{2}		2.23		2.10		1.95		2.16		1.89	
I, in.^{4}		3.02		2.87		2.68		2.06		1.84	
r, in.		1.16		1.17		1.17		0.976		0.987	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS3.000–
HSS2.875

Table 6-G (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS3.000×						HSS2.875×			
		0.203		0.188		0.152		0.250		0.203	
t_{des}, in.		0.203		0.188		0.152		0.250		0.203	
Nom. Weight, lb/ft		6.07		5.64		4.63		7.02		5.80	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	53.3	80.1	49.7	74.7	40.7	61.2	61.7	92.7	50.9	76.5
	1	52.7	79.2	49.2	73.9	40.3	60.6	60.9	91.6	50.3	75.6
	2	51.1	76.7	47.6	71.6	39.1	58.7	58.8	88.3	48.6	73.0
	3	48.4	72.7	45.2	67.9	37.1	55.8	55.3	83.1	45.8	68.8
	4	44.9	67.5	42.0	63.1	34.5	51.9	50.8	76.4	42.2	63.4
	5	40.8	61.3	38.1	57.3	31.5	47.3	45.6	68.5	38.0	57.0
	6	36.2	54.5	33.9	51.0	28.1	42.2	39.9	59.9	33.4	50.1
	7	31.5	47.4	29.6	44.5	24.6	36.9	34.1	51.2	28.6	43.0
	8	26.8	40.3	25.2	37.9	21.0	31.6	28.4	42.7	24.0	36.1
	9	22.4	33.6	21.1	31.7	17.6	26.5	23.1	34.7	19.6	29.5
	10	18.2	27.4	17.2	25.9	14.5	21.8	18.7	28.1	15.9	23.9
	11	15.1	22.7	14.2	21.4	12.0	18.0	15.4	23.2	13.2	19.8
	12	12.7	19.0	12.0	18.0	10.1	15.1	13.0	19.5	11.1	16.6
	13	10.8	16.2	10.2	15.3	8.57	12.9	11.1	16.6	9.42	14.2
	14	9.31	14.0	8.79	13.2	7.39	11.1	9.53	14.3	8.12	12.2
	15	8.11	12.2	7.65	11.5	6.44	9.67	8.30	12.5	7.07	10.6
	16	7.13	10.7	6.73	10.1	5.66	8.50				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		53.3	80.1	49.7	74.7	40.7	61.2	61.7	92.7	50.9	76.5
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		43.4	65.1	40.5	60.7	33.2	49.7	50.2	75.3	41.4	62.2
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		16.0	24.0	14.9	22.4	12.2	18.4	18.5	27.8	15.3	23.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		3.97	5.96	3.72	5.59	3.07	4.61	4.32	6.49	3.62	5.44
Properties											
Area, in.^{2}		1.78		1.66		1.36		2.06		1.70	
I, in.^{4}		1.75		1.65		1.38		1.79		1.53	
r, in.		0.991		0.997		1.01		0.932		0.947	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS2.875–
HSS2.375

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS2.875×		HSS2.500×				HSS2.375×			
		0.188		0.250		0.188		0.250		0.218	
t_{des}, in.		0.188		0.250		0.188		0.250		0.218	
Nom. Weight, lb/ft		5.39		6.01		4.64		5.68		5.03	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	47.3	71.1	53.0	79.6	40.7	61.2	50.0	75.1	44.3	66.6
	1	46.8	70.3	52.1	78.4	40.1	60.2	49.1	73.8	43.5	65.4
	2	45.2	67.9	49.6	74.6	38.2	57.5	46.4	69.8	41.2	62.0
	3	42.6	64.0	45.7	68.7	35.4	53.2	42.4	63.7	37.7	56.7
	4	39.3	59.0	40.7	61.2	31.7	47.6	37.2	56.0	33.3	50.0
	5	35.4	53.2	35.1	52.8	27.5	41.4	31.5	47.4	28.3	42.5
	6	31.1	46.8	29.3	44.1	23.2	34.8	25.8	38.7	23.2	34.9
	7	26.8	40.2	23.7	35.6	18.9	28.4	20.3	30.5	18.4	27.6
	8	22.5	33.8	18.5	27.8	14.9	22.4	15.6	23.4	14.2	21.3
	9	18.5	27.7	14.6	21.9	11.8	17.7	12.3	18.5	11.2	16.8
	10	14.9	22.5	11.8	17.8	9.55	14.3	9.96	15.0	9.06	13.6
	11	12.4	18.6	9.77	14.7	7.89	11.9	8.23	12.4	7.49	11.3
	12	10.4	15.6	8.21	12.3	6.63	9.96	6.92	10.4	6.29	9.46
	13	8.84	13.3	7.00	10.5	5.65	8.49				
	14	7.63	11.5								
	15	6.64	9.98								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		47.3	71.1	53.0	79.7	40.7	61.2	50.0	75.2	44.3	66.6
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		38.5	57.8	43.1	64.7	33.2	49.7	40.7	61.1	36.1	54.1
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		14.2	21.3	15.9	23.9	12.2	18.4	15.0	22.5	13.3	20.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		3.39	5.10	3.17	4.76	2.50	3.75	2.82	4.24	2.54	3.83
Properties											
Area, in.^{2}		1.58		1.77		1.36		1.67		1.48	
I, in.^{4}		1.44		1.13		0.917		0.955		0.868	
r, in.		0.952		0.800		0.820		0.756		0.766	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS2.375–
HSS1.900

Table 6-G (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Shape		HSS2.375×				HSS1.900×	
		0.188		0.154		0.188	
t_{des}, in.		0.188		0.154		0.188	
Nom. Weight, lb/ft		4.38		3.66		3.43	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	38.6	58.0	32.0	48.1	30.2	45.4
	1	38.0	57.0	31.5	47.3	29.4	44.2
	2	36.0	54.1	29.9	45.0	27.0	40.6
	3	33.0	49.6	27.5	41.3	23.4	35.2
	4	29.2	43.9	24.4	36.7	19.2	28.9
	5	24.9	37.5	20.9	31.5	14.9	22.4
	6	20.6	30.9	17.4	26.1	10.9	16.3
	7	16.4	24.6	13.9	20.9	7.98	12.0
	8	12.7	19.0	10.8	16.2	6.11	9.18
	9	10.0	15.0	8.54	12.8	4.83	7.26
	10	8.11	12.2	6.92	10.4	3.91	5.88
	11	6.70	10.1	5.72	8.59		
	12	5.63	8.46	4.80	7.22		
	13			4.09	6.15		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		38.6	58.1	32.0	48.2	30.2	45.5
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		31.4	47.2	26.1	39.1	24.6	36.9
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		11.6	17.4	9.61	14.4	9.07	13.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		2.24	3.37	1.90	2.85	1.38	2.07
Properties							
Area, in.^{2}		1.29		1.07		1.01	
I, in.^{4}		0.776		0.666		0.374	
r, in.		0.776		0.787		0.609	

Notes:
1. Confirm ASTM A1085/A1085M material availability before specifying.
2. Heavy line indicates L_c/r equal to or greater than 200.

HSS28.000

Table 6-H
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS28.000×									
		1.000		0.875		0.750		0.625[f]		0.500[f]	
t_{des}, in.		0.930		0.814		0.698		0.581		0.465	
Nom. Weight, lb/ft		288.63		253.72		218.48		182.90		146.99	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	2370	3560	2080	3130	1790	2690	1500	2250	1200	1810
	1	2370	3560	2080	3130	1790	2690	1500	2250	1200	1810
	2	2370	3560	2080	3130	1790	2690	1500	2250	1200	1810
	3	2370	3560	2080	3120	1790	2690	1500	2250	1200	1810
	4	2360	3550	2080	3120	1790	2690	1500	2250	1200	1810
	5	2360	3550	2070	3120	1790	2680	1500	2250	1200	1800
	6	2360	3540	2070	3110	1780	2680	1490	2250	1200	1800
	7	2350	3540	2070	3110	1780	2680	1490	2240	1200	1800
	8	2350	3530	2070	3100	1780	2670	1490	2240	1200	1800
	9	2350	3530	2060	3100	1770	2670	1490	2230	1190	1790
	10	2340	3520	2060	3090	1770	2660	1480	2230	1190	1790
	11	2340	3510	2050	3080	1770	2650	1480	2220	1190	1780
	12	2330	3500	2050	3080	1760	2650	1480	2220	1180	1780
	13	2320	3490	2040	3070	1760	2640	1470	2210	1180	1780
	14	2320	3480	2030	3060	1750	2630	1470	2210	1180	1770
	15	2310	3470	2030	3050	1750	2620	1460	2200	1170	1760
	16	2300	3460	2020	3040	1740	2610	1460	2190	1170	1760
	17	2290	3440	2010	3030	1730	2600	1450	2180	1170	1750
	18	2280	3430	2010	3010	1730	2590	1450	2170	1160	1750
	19	2270	3420	2000	3000	1720	2580	1440	2170	1160	1740
	20	2260	3400	1990	2990	1710	2570	1430	2160	1150	1730
	22	2240	3370	1970	2960	1700	2550	1420	2140	1140	1710
	24	2220	3330	1950	2930	1680	2520	1410	2110	1130	1700
	26	2190	3290	1930	2900	1660	2490	1390	2090	1120	1680
	28	2160	3250	1900	2860	1640	2460	1370	2070	1100	1660
	30	2140	3210	1880	2820	1620	2430	1360	2040	1090	1640
	32	2110	3160	1850	2780	1600	2400	1340	2010	1070	1610
	34	2070	3120	1820	2740	1570	2360	1320	1980	1060	1590
	36	2040	3070	1800	2700	1550	2320	1300	1950	1040	1570
	38	2010	3020	1770	2650	1520	2290	1280	1920	1030	1540
	40	1970	2960	1730	2610	1490	2250	1250	1880	1010	1510
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		2370	3560	2080	3130	1790	2690	1500	2250	1200	1810
Available Strength in Tensile Rupture (A_e = 0.75A_g), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1840	2760	1620	2420	1390	2090	1160	1750	935	1400
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		710	1070	624	938	537	807	450	676	361	543
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1700	2560	1500	2260	1300	1950	1050	1580	816	1230
Properties											
Area, in.^{2}		79.1		69.5		59.8		50.1		40.2	
I, in.^{4}		7250		6430		5580		4710		3810	
r, in.		9.58		9.62		9.66		9.70		9.74	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS28.000–
HSS26.000

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS28.000×		HSS26.000×							
		0.375[c], [f]		0.750		0.625[f]		0.500[f]		0.375[c], [f]	
t_{des}, in.		0.349		0.698		0.581		0.465		0.349	
Nom. Weight, lb/ft		110.74		202.44		169.54		136.30		102.73	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	854	1280	1660	2490	1390	2090	1120	1680	809	1220
	1	854	1280	1660	2490	1390	2090	1120	1680	809	1220
	2	853	1280	1660	2490	1390	2090	1120	1680	809	1220
	3	853	1280	1660	2490	1390	2090	1120	1680	809	1220
	4	852	1280	1660	2490	1390	2080	1110	1680	808	1210
	5	851	1280	1650	2480	1380	2080	1110	1670	807	1210
	6	850	1280	1650	2480	1380	2080	1110	1670	806	1210
	7	849	1280	1650	2480	1380	2070	1110	1670	804	1210
	8	848	1270	1640	2470	1380	2070	1110	1660	803	1210
	9	846	1270	1640	2470	1370	2070	1110	1660	801	1200
	10	844	1270	1640	2460	1370	2060	1100	1660	799	1200
	11	842	1270	1630	2450	1370	2060	1100	1650	797	1200
	12	840	1260	1630	2450	1360	2050	1100	1650	795	1190
	13	838	1260	1620	2440	1360	2040	1090	1640	792	1190
	14	836	1260	1620	2430	1350	2040	1090	1640	789	1190
	15	833	1250	1610	2420	1350	2030	1080	1630	786	1180
	16	830	1250	1600	2410	1340	2020	1080	1620	783	1180
	17	827	1240	1600	2400	1340	2010	1080	1620	780	1170
	18	824	1240	1590	2390	1330	2000	1070	1610	777	1170
	19	821	1230	1580	2380	1330	1990	1070	1600	773	1160
	20	817	1230	1570	2370	1320	1980	1060	1590	769	1160
	22	809	1220	1560	2340	1300	1960	1050	1580	761	1140
	24	801	1200	1540	2310	1290	1940	1040	1560	752	1130
	26	793	1190	1520	2280	1270	1910	1020	1540	742	1120
	28	783	1180	1500	2250	1250	1890	1010	1520	732	1100
	30	773	1160	1470	2210	1240	1860	994	1490	721	1080
	32	763	1150	1450	2180	1220	1830	978	1470	710	1070
	34	752	1130	1420	2140	1190	1800	962	1450	698	1050
	36	740	1110	1400	2100	1170	1760	945	1420	686	1030
	38	728	1090	1370	2060	1150	1730	927	1390	673	1010
	40	716	1080	1340	2020	1130	1700	908	1370	660	991
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		907	1360	1660	2490	1390	2090	1120	1680	841	1260
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		704	1060	1290	1930	1080	1620	867	1300	653	980
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		272	409	498	748	417	626	335	504	252	379
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		595	894	1120	1680	918	1380	711	1070	517	776
Properties											
Area, in.^{2}		30.3		55.4		46.4		37.3		28.1	
I, in.^{4}		2900		4440		3750		3040		2310	
r, in.		9.78		8.95		8.99		9.03		9.07	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS26.000–
HSS24.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS26.000×		HSS24.000×							
		0.313[c], [f]		1.000		0.875		0.750		0.625[f]	
t_{des}, in.		0.291		0.930		0.814		0.698		0.581	
Nom. Weight, lb/ft		85.81		245.87		216.31		186.41		156.18	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	642	965	2020	3030	1780	2670	1530	2300	1280	1930
	1	642	965	2020	3030	1780	2670	1530	2300	1280	1930
	2	642	965	2020	3030	1770	2670	1530	2300	1280	1920
	3	642	964	2020	3030	1770	2660	1530	2300	1280	1920
	4	641	963	2010	3030	1770	2660	1530	2290	1280	1920
	5	640	962	2010	3020	1770	2660	1520	2290	1280	1920
	6	639	961	2010	3020	1770	2650	1520	2290	1270	1920
	7	638	959	2000	3010	1760	2650	1520	2280	1270	1910
	8	637	958	2000	3000	1760	2640	1510	2280	1270	1910
	9	636	956	1990	2990	1750	2630	1510	2270	1270	1900
	10	634	953	1990	2990	1750	2630	1510	2260	1260	1900
	11	632	951	1980	2980	1740	2620	1500	2260	1260	1890
	12	631	948	1970	2960	1740	2610	1500	2250	1250	1880
	13	629	945	1960	2950	1730	2600	1490	2240	1250	1880
	14	626	942	1960	2940	1720	2590	1480	2230	1240	1870
	15	624	938	1950	2930	1710	2580	1480	2220	1240	1860
	16	622	934	1940	2910	1710	2560	1470	2210	1230	1850
	17	619	931	1930	2900	1700	2550	1460	2200	1230	1840
	18	616	926	1920	2880	1690	2540	1450	2190	1220	1830
	19	613	922	1910	2860	1680	2520	1450	2170	1210	1820
	20	610	917	1890	2850	1670	2510	1440	2160	1210	1810
	22	604	908	1870	2810	1650	2470	1420	2130	1190	1790
	24	597	897	1840	2770	1620	2440	1400	2100	1170	1760
	26	589	886	1810	2730	1600	2400	1380	2070	1160	1740
	28	581	874	1780	2680	1570	2360	1350	2040	1140	1710
	30	573	861	1750	2630	1540	2320	1330	2000	1120	1680
	32	564	847	1720	2580	1510	2270	1310	1960	1090	1650
	34	554	833	1680	2530	1480	2230	1280	1920	1070	1610
	36	545	818	1640	2470	1450	2180	1250	1880	1050	1580
	38	534	803	1610	2410	1420	2130	1220	1840	1030	1540
	40	524	787	1570	2360	1380	2080	1190	1790	1000	1510
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		704	1060	2020	3030	1780	2670	1530	2300	1280	1930
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		546	820	1570	2350	1380	2070	1190	1780	995	1490
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		188	283	605	910	533	801	459	690	384	578
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		422	635	1240	1860	1090	1640	946	1420	788	1180
Properties											
Area, in.^{2}		23.5		67.4		59.3		51.1		42.8	
I, in.^{4}		1940		4490		3990		3470		2930	
r, in.		9.09		8.16		8.20		8.24		8.28	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS24.000–
HSS22.000

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS24.000×						HSS22.000×			
		0.500[f]		0.375[c], [f]		0.313[c], [f]		0.750		0.625	
t_{des}, in.		0.465		0.349		0.291		0.698		0.581	
Nom. Weight, lb/ft		125.61		94.71		79.13		170.37		142.81	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	1030	1550	765	1150	604	907	1400	2100	1170	1760
	1	1030	1550	765	1150	604	907	1400	2100	1170	1760
	2	1030	1550	765	1150	603	907	1400	2100	1170	1760
	3	1030	1550	764	1150	603	906	1400	2100	1170	1760
	4	1030	1540	764	1150	602	905	1390	2100	1170	1750
	5	1030	1540	763	1150	601	904	1390	2090	1170	1750
	6	1020	1540	761	1140	600	902	1390	2090	1160	1750
	7	1020	1540	760	1140	599	901	1390	2080	1160	1740
	8	1020	1530	758	1140	598	899	1380	2080	1160	1740
	9	1020	1530	756	1140	596	896	1380	2070	1150	1730
	10	1010	1520	754	1130	595	894	1370	2060	1150	1730
	11	1010	1520	752	1130	593	891	1370	2050	1140	1720
	12	1010	1510	749	1130	591	888	1360	2050	1140	1710
	13	1000	1510	746	1120	589	885	1360	2040	1130	1710
	14	1000	1500	743	1120	586	881	1350	2030	1130	1700
	15	995	1500	740	1110	584	877	1340	2020	1120	1690
	16	991	1490	736	1110	581	873	1330	2000	1120	1680
	17	986	1480	733	1100	578	869	1330	1990	1110	1670
	18	980	1470	729	1100	575	864	1320	1980	1100	1660
	19	975	1470	725	1090	572	860	1310	1970	1100	1650
	20	969	1460	721	1080	569	855	1300	1950	1090	1640
	22	957	1440	712	1070	561	844	1280	1920	1070	1610
	24	944	1420	702	1050	554	832	1260	1890	1050	1580
	26	929	1400	691	1040	546	820	1230	1850	1030	1550
	28	914	1370	680	1020	537	807	1210	1820	1010	1520
	30	898	1350	668	1000	527	793	1180	1780	993	1490
	32	881	1320	656	986	518	778	1160	1740	970	1460
	34	864	1300	643	967	508	763	1130	1700	947	1420
	36	846	1270	630	946	497	747	1100	1650	923	1390
	38	827	1240	616	925	486	731	1070	1610	898	1350
	40	807	1210	601	904	475	714	1040	1560	873	1310
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1030	1550	775	1170	647	972	1400	2100	1170	1760
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		800	1200	602	903	502	753	1090	1630	909	1360
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		309	464	233	350	194	292	419	630	351	528
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		611	918	443	666	364	546	791	1190	666	1000
Properties											
Area, in.^{2}		34.4		25.9		21.6		46.7		39.1	
I, in.^{4}		2380		1810		1520		2650		2240	
r, in.		8.32		8.36		8.38		7.54		7.58	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS22.000–HSS20.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS22.000×						HSS20.000×			
		0.500[f]		0.375[f]		0.313[c], [f]		1.000		0.875	
t_{des}, in.		0.465		0.349		0.291		0.930		0.814	
Nom. Weight, lb/ft		114.92		86.69		72.45		203.11		178.89	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	943	1420	710	1070	568	853	1670	2510	1470	2210
	1	943	1420	709	1070	568	853	1670	2510	1470	2200
	2	942	1420	709	1070	567	853	1670	2500	1470	2200
	3	942	1420	708	1060	567	852	1660	2500	1460	2200
	4	940	1410	708	1060	566	851	1660	2500	1460	2200
	5	939	1410	706	1060	565	850	1660	2490	1460	2190
	6	937	1410	705	1060	564	848	1650	2490	1460	2190
	7	935	1400	703	1060	563	846	1650	2480	1450	2180
	8	932	1400	701	1050	561	844	1640	2470	1450	2170
	9	929	1400	699	1050	560	841	1640	2460	1440	2160
	10	926	1390	697	1050	558	838	1630	2450	1430	2160
	11	923	1390	694	1040	556	835	1620	2440	1430	2140
	12	919	1380	691	1040	553	832	1610	2420	1420	2130
	13	915	1370	688	1030	551	828	1600	2410	1410	2120
	14	910	1370	685	1030	548	824	1590	2400	1400	2110
	15	905	1360	682	1020	545	820	1580	2380	1390	2090
	16	900	1350	678	1020	542	815	1570	2360	1380	2080
	17	895	1350	674	1010	539	811	1560	2340	1370	2060
	18	889	1340	670	1010	536	805	1550	2330	1360	2050
	19	883	1330	665	1000	532	800	1530	2310	1350	2030
	20	877	1320	660	993	529	795	1520	2290	1340	2010
	22	864	1300	651	978	521	783	1490	2240	1310	1970
	24	850	1280	640	962	512	770	1460	2190	1290	1930
	26	834	1250	629	945	503	756	1430	2140	1260	1890
	28	818	1230	616	927	494	742	1390	2090	1230	1840
	30	801	1200	604	907	484	727	1350	2040	1190	1800
	32	783	1180	590	887	473	711	1320	1980	1160	1750
	34	765	1150	577	867	462	694	1280	1920	1130	1690
	36	746	1120	562	845	451	677	1240	1860	1090	1640
	38	726	1090	548	823	439	659	1190	1800	1050	1590
	40	706	1060	532	800	427	641	1150	1730	1020	1530
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		943	1420	710	1070	593	891	1670	2510	1470	2210
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		732	1100	551	827	460	691	1300	1940	1140	1710
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		283	425	213	320	178	267	500	752	440	662
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		521	783	375	564	307	461	843	1270	749	1130
Properties											
Area, in.^{2}		31.5		23.7		19.8		55.7		49.0	
I, in.^{4}		1820		1390		1170		2540		2260	
r, in.		7.62		7.66		7.68		6.75		6.79	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS20.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS20.000×									
		0.750		0.625		0.500[f]		0.375[f]		0.313[c], [f]	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		154.34		129.45		104.00		78.67		65.77	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	1270	1900	1060	1600	853	1280	644	968	532	799
	1	1270	1900	1060	1600	853	1280	644	967	532	799
	2	1270	1900	1060	1600	853	1280	643	967	531	799
	3	1260	1900	1060	1590	852	1280	642	966	531	798
	4	1260	1900	1060	1590	850	1280	641	964	530	797
	5	1260	1890	1060	1590	849	1280	640	962	529	795
	6	1260	1890	1050	1580	847	1270	639	960	528	793
	7	1250	1880	1050	1580	844	1270	637	957	526	791
	8	1250	1880	1050	1570	841	1260	635	954	525	788
	9	1240	1870	1040	1570	838	1260	632	951	523	786
	10	1240	1860	1040	1560	835	1250	630	947	521	782
	11	1230	1850	1030	1550	831	1250	627	942	518	779
	12	1230	1840	1030	1550	827	1240	624	938	516	775
	13	1220	1830	1020	1540	822	1240	620	933	513	771
	14	1210	1820	1020	1530	817	1230	617	927	510	766
	15	1200	1810	1010	1520	812	1220	613	921	507	761
	16	1200	1800	1000	1510	806	1210	609	915	503	756
	17	1190	1780	997	1500	801	1200	604	908	500	751
	18	1180	1770	989	1490	794	1190	600	902	496	745
	19	1170	1750	981	1470	788	1180	595	894	492	739
	20	1160	1740	972	1460	781	1170	590	887	488	733
	22	1140	1710	954	1430	767	1150	579	871	479	720
	24	1110	1670	935	1400	752	1130	568	853	469	706
	26	1090	1630	914	1370	735	1100	556	835	459	691
	28	1060	1590	892	1340	718	1080	543	816	449	675
	30	1030	1550	870	1310	700	1050	529	795	438	658
	32	1010	1510	846	1270	681	1020	515	774	426	640
	34	976	1470	821	1230	661	994	500	752	414	622
	36	945	1420	796	1200	641	964	485	729	402	604
	38	914	1370	770	1160	621	933	470	706	389	585
	40	883	1330	744	1120	600	901	454	683	376	565
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1270	1900	1060	1600	853	1280	644	968	539	810
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		983	1480	825	1240	663	994	500	750	419	628
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		380	571	319	479	256	385	193	290	162	243
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		649	975	546	821	435	654	315	473	257	386
Properties											
Area, in.^{2}		42.3		35.5		28.5		21.5		18.0	
I, in.^{4}		1970		1670		1360		1040		874	
r, in.		6.83		6.87		6.91		6.95		6.97	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS20.000–
HSS18.000

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
$F_y = 50$ ksi
$F_u = 62$ ksi

Shape		HSS20.000×		HSS18.000×							
		0.250[c], [f]		1.000		0.875		0.750		0.625	
t_{des}, in.		0.233		0.930		0.814		0.698		0.581	
Nom. Weight, lb/ft		52.78		181.73		160.19		138.30		116.09	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	398	598	1490	2250	1310	1980	1130	1710	952	1430
	1	398	598	1490	2240	1310	1970	1130	1710	952	1430
	2	398	598	1490	2240	1310	1970	1130	1700	951	1430
	3	397	597	1490	2240	1310	1970	1130	1700	950	1430
	4	397	596	1490	2240	1310	1970	1130	1700	948	1420
	5	396	595	1480	2230	1310	1960	1130	1690	946	1420
	6	395	593	1480	2220	1300	1960	1120	1690	943	1420
	7	394	592	1470	2210	1300	1950	1120	1680	939	1410
	8	392	590	1470	2200	1290	1940	1110	1680	935	1410
	9	391	588	1460	2190	1280	1930	1110	1670	931	1400
	10	389	585	1450	2180	1280	1920	1100	1660	926	1390
	11	388	583	1440	2170	1270	1910	1100	1650	921	1380
	12	386	580	1430	2150	1260	1900	1090	1640	915	1370
	13	384	577	1420	2140	1250	1880	1080	1630	908	1370
	14	381	573	1410	2120	1240	1870	1070	1610	902	1360
	15	379	570	1400	2100	1230	1850	1070	1600	894	1340
	16	377	566	1390	2090	1220	1840	1060	1590	887	1330
	17	374	562	1370	2070	1210	1820	1050	1570	879	1320
	18	371	558	1360	2050	1200	1800	1040	1560	870	1310
	19	368	553	1350	2020	1190	1780	1030	1540	861	1290
	20	365	549	1330	2000	1170	1760	1010	1520	852	1280
	22	359	539	1300	1950	1150	1720	990	1490	832	1250
	24	351	528	1270	1900	1120	1680	965	1450	811	1220
	26	344	517	1230	1850	1080	1630	938	1410	789	1190
	28	336	505	1190	1790	1050	1580	910	1370	766	1150
	30	328	493	1150	1730	1020	1530	881	1320	742	1110
	32	319	480	1110	1670	982	1480	851	1280	717	1080
	34	310	466	1070	1610	946	1420	820	1230	691	1040
	36	301	452	1030	1540	909	1370	788	1180	665	999
	38	292	438	985	1480	871	1310	756	1140	638	959
	40	282	424	941	1420	833	1250	724	1090	611	918
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		431	648	1490	2250	1310	1980	1130	1710	952	1430
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		335	502	1160	1740	1020	1530	881	1320	739	1110
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		122	184	448	674	394	593	340	512	286	429
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		201	302	676	1020	601	904	521	784	439	660
Properties											
Area, in.^{2}		14.4		49.9		43.9		37.9		31.8	
I, in.^{4}		705		1820		1630		1420		1210	
r, in.		6.99		6.04		6.08		6.12		6.16	

[c]Shape is slender with respect to uniform compression for $F_y = 50$ ksi.
[f]Shape exceeds compact limit for flexure with $F_y = 50$ ksi.

HSS18.000–
HSS16.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS18.000×								HSS16.000×	
		0.500		0.375[f]		0.313[f]		0.250[c], [f]		1.000	
t_{des}, in.		0.465		0.349		0.291		0.233		0.930	
Nom. Weight, lb/ft		93.54		70.66		59.09		47.44		160.35	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	766	1150	581	873	485	729	370	557	1320	1980
	1	766	1150	581	873	485	729	370	556	1320	1980
	2	766	1150	580	872	485	728	370	556	1320	1980
	3	765	1150	579	871	484	727	369	555	1310	1970
	4	763	1150	578	869	483	726	369	554	1310	1970
	5	761	1140	577	867	482	724	368	553	1310	1960
	6	759	1140	575	865	480	722	367	551	1300	1950
	7	756	1140	573	862	479	719	366	549	1290	1940
	8	753	1130	571	858	477	717	364	547	1290	1930
	9	750	1130	568	854	475	713	362	545	1280	1920
	10	746	1120	565	850	472	710	361	542	1270	1910
	11	741	1110	562	845	470	706	359	539	1260	1890
	12	737	1110	559	840	467	701	356	536	1250	1880
	13	732	1100	555	834	463	697	354	532	1240	1860
	14	726	1090	551	828	460	692	351	528	1230	1840
	15	721	1080	547	821	457	686	349	524	1210	1820
	16	715	1070	542	815	453	681	346	520	1200	1800
	17	708	1060	537	807	449	675	343	515	1180	1780
	18	701	1050	532	800	445	668	340	510	1170	1760
	19	694	1040	527	792	440	662	336	505	1150	1730
	20	687	1030	521	784	436	655	333	500	1140	1710
	22	671	1010	510	766	426	640	325	489	1100	1660
	24	655	984	497	747	415	624	318	477	1060	1600
	26	637	957	484	727	404	608	309	465	1030	1540
	28	618	929	470	706	393	591	300	451	986	1480
	30	599	900	455	684	381	572	291	438	945	1420
	32	579	870	440	662	368	554	282	423	903	1360
	34	558	839	425	639	356	534	272	409	860	1290
	36	537	808	409	615	342	515	262	394	816	1230
	38	516	776	393	591	329	495	252	379	773	1160
	40	494	743	377	566	316	474	242	363	730	1100
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		766	1150	581	873	485	729	389	585	1320	1980
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		595	893	451	677	377	565	302	453	1020	1530
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		230	346	174	262	146	219	117	176	395	594
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		357	536	258	388	210	316	164	247	526	791
Properties											
Area, in.^{2}		25.6		19.4		16.2		13.0		44.0	
I, in.^{4}		985		754		634		512		1250	
r, in.		6.20		6.24		6.26		6.28		5.34	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS16.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16.000×									
		0.875		0.750		0.625		0.500		0.438	
t_{des}, in.		0.814		0.698		0.581		0.465		0.407	
Nom. Weight, lb/ft		141.48		122.27		103.00		82.85		72.87	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	1160	1750	1000	1510	841	1260	680	1020	596	896
	1	1160	1750	1000	1510	841	1260	679	1020	596	895
	2	1160	1740	1000	1510	840	1260	679	1020	595	894
	3	1160	1740	1000	1500	839	1260	678	1020	594	893
	4	1150	1740	997	1500	837	1260	676	1020	593	891
	5	1150	1730	994	1490	834	1250	674	1010	591	888
	6	1150	1720	990	1490	831	1250	671	1010	588	884
	7	1140	1720	986	1480	827	1240	668	1000	586	880
	8	1130	1710	980	1470	823	1240	665	999	583	876
	9	1130	1700	974	1460	818	1230	661	993	579	871
	10	1120	1680	968	1450	812	1220	656	986	575	865
	11	1110	1670	960	1440	806	1210	652	979	571	859
	12	1100	1660	953	1430	800	1200	646	971	567	852
	13	1090	1640	944	1420	793	1190	641	963	562	845
	14	1080	1630	935	1410	785	1180	635	954	557	837
	15	1070	1610	925	1390	777	1170	628	944	551	828
	16	1060	1590	915	1380	769	1160	621	934	545	819
	17	1050	1570	904	1360	760	1140	614	923	539	810
	18	1030	1550	893	1340	750	1130	607	912	532	800
	19	1020	1530	881	1320	741	1110	599	900	526	790
	20	1000	1510	869	1310	730	1100	591	888	519	780
	22	974	1460	843	1270	709	1070	574	863	504	757
	24	942	1420	816	1230	686	1030	556	835	488	733
	26	908	1370	787	1180	663	996	537	807	471	708
	28	873	1310	757	1140	638	959	517	777	454	682
	30	837	1260	726	1090	612	920	496	746	436	655
	32	800	1200	695	1040	586	881	475	714	418	628
	34	763	1150	663	996	559	841	454	682	399	600
	36	725	1090	630	947	532	800	432	650	380	571
	38	687	1030	598	898	505	759	410	617	361	543
	40	649	976	565	850	478	719	389	584	342	514
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		1160	1750	1000	1510	841	1260	680	1020	596	896
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		902	1350	779	1170	653	980	528	792	463	694
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		349	524	301	452	252	379	204	306	179	269
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		469	705	407	611	344	518	279	420	247	371
Properties											
Area, in.^{2}		38.8		33.5		28.1		22.7		19.9	
I, in.^{4}		1120		984		838		685		606	
r, in.		5.38		5.42		5.46		5.49		5.51	

HSS16.000–
HSS14.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS16.000×						HSS14.000×			
		0.375[f]		0.312[f]		0.250[c], [f]		1.000		0.875	
t_{des}, in.		0.349		0.291		0.233		0.930		0.814	
Nom. Weight, lb/ft		62.64		52.32		42.09		138.97		122.77	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	515	774	431	648	340	511	1140	1720	1010	1520
	1	515	774	431	648	340	511	1140	1720	1010	1520
	2	514	773	431	647	340	510	1140	1720	1010	1510
	3	513	772	430	646	339	509	1140	1710	1000	1510
	4	512	770	429	644	338	508	1130	1710	1000	1500
	5	511	767	427	642	337	507	1130	1700	997	1500
	6	509	764	426	640	336	505	1120	1690	992	1490
	7	506	761	424	637	334	503	1120	1680	985	1480
	8	504	757	422	634	333	500	1110	1670	978	1470
	9	501	753	419	630	331	497	1100	1650	970	1460
	10	498	748	417	626	329	494	1090	1640	961	1450
	11	494	742	414	622	326	491	1080	1620	952	1430
	12	490	737	410	617	324	487	1070	1600	941	1410
	13	486	730	407	612	321	483	1050	1580	930	1400
	14	481	723	403	606	318	478	1040	1560	918	1380
	15	477	716	399	600	315	474	1020	1540	905	1360
	16	472	709	395	594	312	469	1010	1520	892	1340
	17	466	701	391	587	308	463	992	1490	878	1320
	18	461	692	386	580	305	458	975	1470	863	1300
	19	455	684	381	573	301	452	958	1440	848	1270
	20	449	674	376	565	297	446	940	1410	832	1250
	22	436	655	365	549	289	434	902	1360	799	1200
	24	422	635	354	532	280	421	862	1300	764	1150
	26	408	613	342	514	271	407	821	1230	728	1090
	28	393	591	330	496	261	392	778	1170	691	1040
	30	378	568	317	476	251	377	735	1100	653	982
	32	362	544	304	457	240	361	692	1040	615	925
	34	346	520	290	436	230	346	648	974	577	868
	36	330	495	277	416	219	330	605	910	540	811
	38	313	471	263	396	209	314	563	846	502	755
	40	297	446	250	375	198	297	521	783	466	700
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		515	774	431	648	344	518	1140	1720	1010	1520
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		400	600	335	502	267	401	888	1330	784	1180
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		154	232	129	194	103	155	343	516	303	455
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		208	312	169	254	132	198	397	596	354	533
Properties											
Area, in.^{2}		17.2		14.4		11.5		38.2		33.7	
I, in.^{4}		526		443		359		820		735	
r, in.		5.53		5.55		5.58		4.63		4.67	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS14.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS14.000×									
		0.750		0.625		0.500		0.375		0.312[f]	
t_{des}, in.		0.698		0.581		0.465		0.349		0.291	
Nom. Weight, lb/ft		106.23		89.36		72.16		54.62		45.65	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	871	1310	734	1100	593	891	449	675	374	563
	1	871	1310	733	1100	593	891	449	675	374	562
	2	870	1310	732	1100	592	889	448	674	374	561
	3	868	1300	730	1100	590	887	447	672	373	560
	4	865	1300	728	1090	588	884	446	670	372	558
	5	861	1290	725	1090	586	881	444	667	370	556
	6	856	1290	721	1080	583	876	442	664	368	554
	7	851	1280	717	1080	580	871	439	660	366	550
	8	845	1270	712	1070	576	865	436	656	364	547
	9	838	1260	706	1060	571	858	433	651	361	542
	10	831	1250	700	1050	566	851	429	645	358	538
	11	823	1240	693	1040	561	843	425	639	355	533
	12	814	1220	686	1030	555	834	421	633	351	527
	13	804	1210	678	1020	549	825	416	625	347	522
	14	794	1190	669	1010	542	814	411	618	343	515
	15	783	1180	660	993	535	804	406	610	338	509
	16	772	1160	651	978	527	792	400	601	334	502
	17	760	1140	641	963	519	780	394	592	329	494
	18	747	1120	631	948	511	768	388	583	324	487
	19	734	1100	620	932	502	755	382	574	318	479
	20	721	1080	609	915	493	742	375	564	313	470
	22	692	1040	585	880	475	714	361	543	301	453
	24	663	996	561	843	455	684	346	520	289	435
	26	632	950	535	804	435	653	331	498	277	416
	28	601	903	509	765	414	622	315	474	263	396
	30	568	854	482	724	392	590	299	450	250	376
	32	536	805	455	684	371	557	283	425	237	356
	34	503	757	428	643	349	524	267	401	223	335
	36	471	708	401	602	327	492	250	376	210	315
	38	439	660	374	562	306	459	234	352	196	295
	40	408	613	348	523	284	428	218	328	183	275
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		871	1310	734	1100	593	891	449	675	374	563
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		677	1010	570	854	460	691	349	523	291	436
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		261	393	220	331	178	267	135	203	112	169
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		309	465	262	394	213	320	162	244	132	198
Properties											
Area, in.^{2}		29.1		24.5		19.8		15.0		12.5	
I, in.^{4}		647		552		453		349		295	
r, in.		4.71		4.75		4.79		4.83		4.85	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS14.000–
HSS13.375

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
$F_y = 50$ ksi
$F_u = 62$ ksi

Shape		HSS14.000×				HSS13.375×					
		0.250[f]		0.188[c], [f]		0.625		0.500		0.375	
t_{des}, in.		0.233		0.174		0.581		0.465		0.349	
Nom. Weight, lb/ft		36.75		27.69		85.19		68.82		52.11	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	302	455	213	321	701	1050	566	850	428	644
	1	302	454	213	320	700	1050	566	850	428	643
	2	302	454	213	320	699	1050	565	849	427	642
	3	301	453	212	319	697	1050	563	847	426	641
	4	300	451	212	318	695	1040	561	844	425	638
	5	299	449	211	317	692	1040	559	840	423	636
	6	298	447	210	316	688	1030	556	835	421	632
	7	296	445	209	314	683	1030	552	830	418	628
	8	294	442	207	312	678	1020	548	823	415	623
	9	292	438	206	309	672	1010	543	816	411	618
	10	289	435	204	307	666	1000	538	809	407	612
	11	287	431	202	304	658	990	532	800	403	606
	12	284	426	200	301	651	978	526	791	399	599
	13	281	422	198	298	642	966	520	781	394	592
	14	277	417	196	294	634	952	513	770	389	584
	15	274	411	193	290	624	938	505	759	383	576
	16	270	406	191	286	614	923	497	748	377	567
	17	266	400	188	282	604	908	489	735	371	558
	18	262	394	185	278	593	892	481	722	365	548
	19	258	387	182	273	582	875	472	709	358	538
	20	253	381	179	269	571	858	463	695	351	528
	22	244	367	172	259	547	821	443	666	337	506
	24	234	352	166	249	521	784	423	636	322	484
	26	224	337	158	238	495	744	402	605	306	460
	28	214	321	151	227	469	704	381	573	290	436
	30	203	305	144	216	441	664	359	540	274	412
	32	192	288	136	204	414	623	338	508	258	387
	34	181	272	128	193	387	582	316	475	241	363
	36	170	256	121	181	360	542	294	443	225	339
	38	159	239	113	170	334	502	273	411	209	315
	40	149	223	105	158	308	463	253	380	194	291
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		302	455	227	341	701	1050	566	851	428	644
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		235	352	176	264	544	816	439	659	332	499
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		90.7	136	68.0	102	210	316	170	255	128	193
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		102	154	74.4	112	238	357	193	291	148	222
Properties											
Area, in.^{2}		10.1		7.57		23.4		18.9		14.3	
I, in.^{4}		239		181		479		393		303	
r, in.		4.87		4.89		4.53		4.57		4.61	

[c]Shape is slender with respect to uniform compression for $F_y = 50$ ksi.
[f]Shape exceeds compact limit for flexure with $F_y = 50$ ksi.

HSS13.375–
HSS12.750

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS13.375×						HSS12.750×			
		0.313[f]		0.250[f]		0.188[c], [f]		0.750		0.625	
t_{des}, in.		0.291		0.233		0.174		0.698		0.581	
Nom. Weight, lb/ft		43.64		35.08		26.43		96.21		81.01	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	356	536	287	432	207	310	790	1190	665	999
	1	356	535	287	432	206	310	790	1190	664	998
	2	356	534	287	431	206	310	789	1190	663	997
	3	355	533	286	430	206	309	786	1180	661	994
	4	353	531	285	429	205	308	783	1180	659	990
	5	352	529	284	427	204	307	779	1170	655	985
	6	350	526	282	424	203	305	774	1160	651	979
	7	348	523	281	422	202	303	768	1150	646	972
	8	345	519	279	419	200	301	762	1140	641	963
	9	342	515	276	415	199	298	754	1130	635	954
	10	339	510	274	411	197	296	746	1120	628	944
	11	336	505	271	407	195	293	737	1110	621	933
	12	332	499	268	403	193	290	727	1090	613	921
	13	328	493	265	398	190	286	717	1080	604	908
	14	324	486	261	393	188	282	706	1060	595	894
	15	319	479	258	387	185	278	694	1040	585	879
	16	314	472	254	381	183	274	682	1020	575	864
	17	309	465	250	375	180	270	669	1010	564	848
	18	304	457	245	369	177	265	656	985	553	831
	19	298	448	241	362	173	261	642	964	542	814
	20	293	440	237	356	170	256	627	943	530	796
	22	281	422	227	341	163	246	598	898	505	759
	24	268	404	217	326	156	235	567	852	480	721
	26	256	384	207	311	149	224	535	804	453	681
	28	242	364	196	295	141	213	503	755	426	641
	30	229	344	185	279	134	201	470	706	399	600
	32	215	324	175	262	126	189	438	658	372	559
	34	202	304	164	246	118	178	405	609	345	519
	36	189	283	153	230	110	166	374	562	319	479
	38	175	263	142	214	103	155	343	516	293	441
	40	162	244	132	198	95.4	143	314	472	268	403
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		356	536	287	432	216	325	790	1190	665	999
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		277	415	223	335	168	252	614	921	516	774
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		107	161	86.2	130	64.9	97.6	237	356	199	300
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		121	181	93.7	141	68.2	103	252	379	215	323
Properties											
Area, in.^{2}		11.9		9.60		7.23		26.4		22.2	
I, in.^{4}		256		207		158		481		412	
r, in.		4.63		4.65		4.67		4.27		4.31	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS12.750–
HSS12.000

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12.750×								HSS12.000×	
		0.500		0.375		0.250[f]		0.188[c], [f]		0.625	
t_{des}, in.		0.465		0.349		0.233		0.174		0.581	
Nom. Weight, lb/ft		65.48		49.61		33.41		25.18		76.00	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	536	806	407	612	274	412	200	300	626	940
	1	536	805	407	612	274	412	200	300	625	940
	2	535	804	406	611	274	411	199	300	624	938
	3	533	801	405	609	273	410	199	299	622	935
	4	531	798	404	607	272	409	198	298	619	931
	5	529	794	402	604	271	407	197	296	616	925
	6	525	790	399	600	269	404	196	294	611	919
	7	522	784	396	596	267	402	195	292	606	911
	8	517	777	393	591	265	398	193	290	600	902
	9	512	770	390	586	263	395	191	288	594	893
	10	507	762	386	579	260	391	189	285	587	882
	11	501	753	381	573	257	386	187	281	579	870
	12	495	743	376	566	254	382	185	278	570	857
	13	488	733	371	558	250	376	183	274	561	843
	14	481	722	366	550	247	371	180	270	551	829
	15	473	711	360	541	243	365	177	266	541	813
	16	465	699	354	532	239	359	174	262	530	797
	17	456	686	348	523	235	353	171	257	519	781
	18	448	673	341	513	230	346	168	253	508	763
	19	438	659	334	502	226	340	165	248	496	745
	20	429	645	327	492	221	333	161	243	483	727
	22	409	615	313	470	212	318	154	232	458	688
	24	389	585	297	447	201	303	147	221	432	649
	26	368	553	281	423	191	287	139	210	405	608
	28	346	521	265	399	180	271	132	198	377	567
	30	325	488	249	374	169	254	124	186	350	526
	32	303	456	233	350	158	238	116	174	323	486
	34	282	423	217	325	148	222	108	162	297	446
	36	261	392	201	301	137	206	100	151	271	408
	38	240	361	185	278	126	190	92.7	139	247	371
	40	220	331	170	255	116	175	85.3	128	223	334
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		536	806	407	612	274	412	206	310	626	941
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		416	624	316	474	213	319	160	240	486	729
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		161	242	122	184	82.3	124	61.9	93.0	188	282
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		175	263	134	201	86.0	129	62.3	93.6	189	285
Properties											
Area, in.^{2}		17.9		13.6		9.16		6.89		20.9	
I, in.^{4}		339		262		180		136		341	
r, in.		4.35		4.39		4.43		4.45		4.04	

[c]Shape is slender with respect to uniform compression for F_y = 50 ksi.
[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS12.000–HSS11.750

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS12.000×						HSS11.750×			
		0.500		0.375		0.250[f]		0.625		0.500	
t_{des}, in.		0.465		0.349		0.233		0.581		0.465	
Nom. Weight, lb/ft		61.47		46.60		31.40		74.33		60.13	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	506	760	383	576	257	387	611	918	494	743
	1	506	760	383	576	257	387	610	917	494	742
	2	505	759	382	575	257	386	609	916	493	741
	3	503	756	381	573	256	385	607	912	491	738
	4	501	753	379	570	255	383	604	908	489	735
	5	498	749	377	567	254	381	601	903	486	730
	6	495	743	375	563	252	379	596	896	482	725
	7	491	737	372	559	250	376	591	888	478	719
	8	486	730	368	554	248	372	585	879	474	712
	9	481	723	364	548	245	368	578	869	468	704
	10	475	714	360	541	242	364	571	858	462	695
	11	469	704	356	534	239	360	563	846	456	685
	12	462	694	350	527	236	355	554	833	449	675
	13	455	683	345	519	232	349	545	819	442	664
	14	447	672	339	510	229	343	535	804	434	652
	15	439	660	333	501	225	337	525	789	426	640
	16	430	647	327	491	220	331	514	772	417	627
	17	421	633	320	481	216	325	503	755	408	613
	18	412	620	313	471	211	318	491	738	399	599
	19	403	605	306	460	207	311	479	720	389	585
	20	393	591	299	449	202	303	466	701	379	570
	22	373	560	284	427	192	288	441	662	359	539
	24	351	528	268	403	181	273	414	622	338	507
	26	330	496	252	379	171	257	387	582	316	475
	28	308	463	236	354	160	240	360	541	294	442
	30	286	430	219	330	149	224	333	500	272	409
	32	265	398	203	305	138	208	306	460	251	377
	34	244	366	187	281	127	192	280	421	230	346
	36	223	335	172	258	117	176	255	383	210	315
	38	203	305	156	235	107	161	230	346	190	285
	40	184	276	142	213	97.1	146	208	312	171	258
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		506	761	383	576	257	387	611	918	494	743
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		393	589	298	446	200	300	474	711	384	575
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		152	228	115	173	77.2	116	183	275	148	223
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		154	232	118	178	76.5	115	181	272	148	222
Properties											
Area, in.^{2}		16.9		12.8		8.60		20.4		16.5	
I, in.^{4}		281		217		149		319		263	
r, in.		4.08		4.12		4.16		3.95		3.99	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS11.750–
HSS10.750

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS11.750×						HSS10.750×			
		0.375		0.337		0.250[f]		0.625		0.500	
t_{des}, in.		0.349		0.313		0.233		0.581		0.465	
Nom. Weight, lb/ft		45.60		41.12		30.73		67.65		54.79	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	374	563	338	509	252	378	557	837	449	675
	1	374	562	338	508	252	378	556	836	449	674
	2	373	561	337	507	251	377	555	834	448	673
	3	372	559	336	506	250	376	553	831	446	670
	4	370	557	335	503	249	375	550	826	443	666
	5	368	553	333	500	248	372	546	820	440	662
	6	366	550	331	497	246	370	541	813	436	656
	7	363	545	328	493	244	367	535	804	432	649
	8	359	540	325	488	242	363	529	795	427	642
	9	355	534	321	483	239	359	521	784	421	633
	10	351	527	317	477	236	355	513	772	415	623
	11	346	520	313	470	233	350	505	759	408	613
	12	341	512	308	463	230	345	495	745	401	602
	13	335	504	303	456	226	340	485	730	393	590
	14	330	495	298	448	222	334	475	714	384	578
	15	323	486	293	440	218	328	464	697	376	564
	16	317	476	287	431	214	322	452	680	366	551
	17	310	466	281	422	210	315	440	662	357	536
	18	303	456	275	413	205	308	428	643	347	522
	19	296	445	268	403	200	301	415	624	337	507
	20	289	434	261	393	195	293	402	605	327	491
	22	273	411	248	372	185	278	376	565	306	459
	24	258	387	233	351	175	262	349	524	284	427
	26	241	363	219	329	164	246	322	483	262	394
	28	225	338	204	307	153	230	295	443	241	362
	30	209	314	189	285	142	214	268	403	220	330
	32	193	290	175	263	131	197	242	364	199	299
	34	177	266	160	241	121	182	218	327	179	269
	36	162	243	147	220	110	166	194	292	160	241
	38	147	221	133	200	101	151	174	262	144	216
	40	132	199	120	181	90.9	137	157	236	130	195
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		374	563	338	509	252	378	557	837	449	675
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		291	436	263	394	196	293	432	649	349	523
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		112	169	101	153	75.5	114	167	251	135	203
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		113	170	102	154	73.7	111	150	226	123	185
Properties											
Area, in.^{2}		12.5		11.3		8.41		18.6		15.0	
I, in.^{4}		203		184		140		241		199	
r, in.		4.03		4.04		4.07		3.60		3.64	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS10.750–
HSS10.000

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10.750×								HSS10.000×	
		0.375		0.313		0.250[f]		0.188[f]		0.625	
t_{des}, in.		0.349		0.291		0.233		0.174		0.581	
Nom. Weight, lb/ft		41.59		34.87		28.06		21.17		62.64	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	341	513	286	430	231	347	173	261	515	774
	1	341	513	286	429	230	346	173	260	514	773
	2	340	511	285	428	230	345	173	260	513	771
	3	339	509	284	427	229	344	172	259	511	767
	4	337	507	282	424	228	342	171	257	507	762
	5	335	503	280	422	226	340	170	256	503	756
	6	332	499	278	418	224	337	169	254	498	748
	7	329	494	275	414	222	334	167	251	492	739
	8	325	488	272	409	220	330	165	248	485	729
	9	320	482	269	404	217	326	163	245	477	717
	10	316	475	265	398	214	321	161	242	469	704
	11	311	467	261	392	210	316	158	238	459	690
	12	305	459	256	385	207	311	156	234	450	676
	13	299	450	251	377	203	305	153	229	439	660
	14	293	440	246	370	199	298	150	225	428	643
	15	287	431	240	361	194	292	146	220	416	626
	16	280	420	235	353	190	285	143	215	404	608
	17	273	410	229	344	185	278	139	210	392	589
	18	265	399	223	335	180	271	136	204	379	570
	19	258	387	217	326	175	263	132	199	366	551
	20	250	376	210	316	170	256	128	193	353	531
	22	234	352	197	296	160	240	120	181	326	490
	24	218	328	184	276	149	224	112	169	299	449
	26	202	303	170	256	138	207	104	157	272	409
	28	186	279	156	235	127	191	96.1	144	246	369
	30	170	255	143	215	116	175	88.0	132	220	331
	32	154	231	130	196	106	159	80.2	121	196	294
	34	139	209	118	177	95.7	144	72.6	109	173	260
	36	124	187	105	158	85.8	129	65.2	98.0	155	232
	38	112	168	94.5	142	77.0	116	58.5	88.0	139	208
	40	101	151	85.3	128	69.5	104	52.8	79.4	125	188
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		341	513	286	430	231	347	173	261	515	774
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		265	398	222	333	179	269	135	202	400	600
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		102	154	85.8	129	69.2	104	52.0	78.2	154	232
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		94.3	142	79.3	119	62.5	93.9	45.1	67.8	129	194
Properties											
Area, in.^{2}		11.4		9.55		7.70		5.79		17.2	
I, in.^{4}		154		131		106		81.0		191	
r, in.		3.68		3.70		3.72		3.74		3.34	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS10.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS10.000×									
		0.500		0.375		0.312		0.250[f]		0.188[f]	
t_{des}, in.		0.465		0.349		0.291		0.233		0.174	
Nom. Weight, lb/ft		50.78		38.58		32.31		26.06		19.72	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	416	626	317	477	266	400	214	322	161	242
	1	416	625	317	477	266	399	214	321	161	241
	2	415	623	316	475	265	398	213	321	160	241
	3	413	620	315	473	264	396	212	319	160	240
	4	410	616	313	470	262	394	211	317	159	238
	5	407	611	310	466	260	391	209	315	157	236
	6	403	605	307	462	257	387	207	312	156	234
	7	398	598	304	456	254	382	205	308	154	232
	8	392	590	299	450	251	377	202	304	152	228
	9	386	581	295	443	247	372	199	300	150	225
	10	380	570	290	436	243	365	196	295	147	221
	11	372	559	284	428	239	359	192	289	145	217
	12	364	548	279	419	234	351	188	283	142	213
	13	356	535	272	409	229	344	184	277	139	208
	14	347	522	266	399	223	335	180	271	135	204
	15	338	508	259	389	217	327	175	264	132	198
	16	329	494	252	378	211	318	171	257	129	193
	17	319	479	244	367	205	309	166	249	125	188
	18	309	464	237	356	199	299	161	242	121	182
	19	298	448	229	344	192	289	156	234	117	176
	20	288	433	221	332	186	279	150	226	113	170
	22	266	400	205	308	172	259	140	210	105	158
	24	245	368	188	283	159	239	129	193	97.2	146
	26	223	335	172	259	145	218	118	177	89.0	134
	28	202	304	156	235	132	198	107	161	81.0	122
	30	182	273	140	211	119	179	96.6	145	73.2	110
	32	162	243	126	189	106	160	86.5	130	65.7	98.7
	34	143	216	111	167	94.3	142	76.8	115	58.4	87.8
	36	128	192	99.3	149	84.1	126	68.5	103	52.1	78.3
	38	115	173	89.1	134	75.5	114	61.5	92.5	46.7	70.2
	40	104	156	80.4	121	68.2	102	55.5	83.4	42.2	63.4
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		416	626	317	477	266	400	214	322	161	242
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		323	485	246	370	206	310	166	249	125	187
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		125	188	95.2	143	79.8	120	64.2	96.5	48.2	72.5
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		106	159	81.1	122	68.4	103	54.8	82.3	39.3	59.1
Properties											
Area, in.^{2}		13.9		10.6		8.88		7.15		5.37	
I, in.^{4}		159		123		105		85.3		64.8	
r, in.		3.38		3.41		3.43		3.45		3.47	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS9.625

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS9.625×									
		0.625		0.500		0.375		0.312		0.250[f]	
t_{des}, in.		0.581		0.465		0.349		0.291		0.233	
Nom. Weight, lb/ft		60.13		48.77		37.08		31.06		25.06	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	494	742	401	603	305	459	255	384	206	309
	1	494	742	401	602	305	459	255	383	205	309
	2	492	739	400	601	304	457	254	382	205	308
	3	489	736	398	598	303	455	253	381	204	307
	4	486	730	395	593	301	452	251	378	203	304
	5	481	724	391	588	298	448	249	375	201	302
	6	476	716	387	582	295	443	247	371	199	299
	7	470	706	382	574	291	438	244	366	196	295
	8	463	695	376	566	287	431	240	361	193	291
	9	455	683	370	556	282	424	236	355	190	286
	10	446	670	363	545	277	416	232	348	187	281
	11	436	656	355	534	271	408	227	341	183	275
	12	426	640	347	522	265	399	222	334	179	269
	13	415	624	339	509	259	389	217	326	175	263
	14	404	607	330	495	252	379	211	318	171	256
	15	392	589	320	481	245	368	205	309	166	249
	16	380	571	310	466	238	357	199	300	161	242
	17	367	552	300	451	230	346	193	290	156	235
	18	354	532	290	436	222	334	187	281	151	227
	19	341	512	279	420	214	322	180	271	146	219
	20	327	492	269	404	206	310	173	261	140	211
	22	300	451	247	371	190	286	160	240	130	195
	24	273	411	225	338	174	261	146	220	119	178
	26	247	371	204	306	158	237	133	200	108	162
	28	221	332	183	275	142	213	120	180	97.3	146
	30	196	294	163	245	127	190	107	161	87.1	131
	32	172	259	143	216	112	168	94.7	142	77.2	116
	34	153	229	127	191	99.1	149	83.9	126	68.4	103
	36	136	205	113	170	88.4	133	74.8	112	61.0	91.7
	38	122	184	102	153	79.3	119	67.1	101	54.7	82.3
	40	110	166	91.8	138	71.6	108	60.6	91.1	49.4	74.2
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		494	743	401	603	305	459	255	384	206	309
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		384	575	312	467	237	356	198	297	160	240
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		148	223	120	181	91.6	138	76.6	115	61.7	92.7
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		119	179	97.3	146	74.9	113	63.4	95.3	51.0	76.7
Properties											
Area, in.^{2}		16.5		13.4		10.2		8.53		6.87	
I, in.^{4}		170		141		110		93.0		75.9	
r, in.		3.20		3.24		3.28		3.30		3.32	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS9.625–
HSS8.625

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS9.625×		HSS8.625×							
		0.188[f]		0.625		0.500		0.375		0.322	
t_{des}, in.		0.174		0.581		0.465		0.349		0.300	
Nom. Weight, lb/ft		18.97		53.45		43.43		33.07		28.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	155	233	440	661	356	535	272	408	235	353
	1	155	232	440	661	356	535	271	408	235	353
	2	154	232	438	658	354	533	270	406	234	352
	3	153	231	435	654	352	529	269	404	232	349
	4	152	229	431	648	349	525	266	400	231	346
	5	151	227	426	640	345	519	263	396	228	343
	6	150	225	420	631	340	512	260	391	225	338
	7	148	222	413	621	335	503	256	384	222	333
	8	146	219	405	609	329	494	251	377	218	327
	9	143	216	396	596	322	484	246	370	213	320
	10	141	212	387	581	314	472	240	361	208	313
	11	138	208	376	565	306	460	234	352	203	305
	12	135	203	365	549	297	447	228	342	197	297
	13	132	198	354	531	288	433	221	332	192	288
	14	129	193	341	513	278	418	214	321	185	279
	15	125	188	329	494	268	403	206	310	179	269
	16	122	183	316	475	258	388	198	298	172	259
	17	118	177	303	455	248	372	191	286	166	249
	18	114	171	289	435	237	356	183	274	159	239
	19	110	165	276	414	226	340	174	262	152	228
	20	106	159	262	394	215	323	166	250	145	218
	22	98.0	147	235	353	194	291	150	225	131	197
	24	89.9	135	209	314	172	259	134	201	117	176
	26	81.8	123	183	275	152	228	119	178	104	156
	28	73.9	111	159	239	132	199	104	156	91.0	137
	30	66.2	99.5	138	208	115	173	90.3	136	79.2	119
	32	58.8	88.4	122	183	101	152	79.4	119	69.6	105
	34	52.1	78.3	108	162	89.7	135	70.3	106	61.7	92.7
	36	46.5	69.8	96.2	145	80.0	120	62.7	94.3	55.0	82.7
	38	41.7	62.7	86.3	130	71.8	108	56.3	84.6	49.4	74.2
	40	37.6	56.6	77.9	117	64.8	97.5	50.8	76.3	44.6	67.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		155	233	440	662	356	536	272	408	235	353
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		120	180	342	513	277	415	211	316	183	274
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		46.4	69.8	132	198	107	161	81.5	122	70.5	106
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		36.5	54.9	94.1	141	77.3	116	59.6	89.6	51.9	78.0
Properties											
Area, in.^{2}		5.17		14.7		11.9		9.07		7.85	
I, in.^{4}		57.7		119		100		77.8		68.1	
r, in.		3.34		2.85		2.89		2.93		2.95	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS8.625–
HSS7.500

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS8.625×				HSS7.500×					
		0.250		0.188[f]		0.500		0.375		0.312	
t_{des}, in.		0.233		0.174		0.465		0.349		0.291	
Nom. Weight, lb/ft		22.38		16.96		37.42		28.56		23.97	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	184	276	138	208	308	463	235	353	197	297
	1	184	276	138	208	308	463	234	352	197	296
	2	183	275	138	207	306	460	233	350	196	295
	3	182	273	137	206	304	456	231	348	194	292
	4	180	271	136	204	300	451	229	344	192	289
	5	178	268	134	202	296	444	225	339	189	285
	6	176	265	133	199	290	436	221	333	186	280
	7	173	261	131	196	284	426	217	325	182	274
	8	170	256	128	193	277	416	211	318	178	267
	9	167	251	126	189	269	404	205	309	173	260
	10	163	245	123	185	260	391	199	299	168	252
	11	159	239	120	180	251	377	192	289	162	244
	12	155	233	117	175	241	363	185	278	156	235
	13	150	226	113	170	231	348	178	267	150	226
	14	145	219	110	165	221	332	170	256	144	216
	15	141	211	106	160	210	316	162	244	137	206
	16	135	204	102	154	200	300	154	232	130	196
	17	130	196	98.4	148	189	284	146	219	124	186
	18	125	188	94.4	142	178	267	138	207	117	175
	19	119	180	90.4	136	167	251	130	195	110	165
	20	114	171	86.4	130	156	235	122	183	103	155
	22	103	155	78.2	118	136	204	106	159	90.1	135
	24	92.4	139	70.2	105	116	174	90.9	137	77.6	117
	26	82.0	123	62.4	93.8	98.6	148	77.5	116	66.2	99.4
	28	72.1	108	54.9	82.6	85.0	128	66.8	100	57.1	85.7
	30	62.8	94.4	47.9	72.0	74.1	111	58.2	87.5	49.7	74.7
	32	55.2	83.0	42.1	63.3	65.1	97.8	51.2	76.9	43.7	65.7
	34	48.9	73.5	37.3	56.1	57.7	86.7	45.3	68.1	38.7	58.2
	36	43.6	65.6	33.3	50.0	51.4	77.3	40.4	60.7	34.5	51.9
	38	39.2	58.8	29.9	44.9	46.2	69.4	36.3	54.5	31.0	46.6
	40	35.3	53.1	26.9	40.5	41.7	62.6	32.7	49.2	28.0	42.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		184	276	138	208	308	464	235	353	197	297
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		143	214	107	161	239	359	182	273	153	230
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		55.1	82.9	41.5	62.4	92.5	139	70.4	106	59.2	89.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		40.9	61.5	29.7	44.7	57.4	86.3	44.7	67.1	37.7	56.6
Properties											
Area, in.^{2}		6.14		4.62		10.3		7.84		6.59	
I, in.^{4}		54.1		41.3		63.9		50.2		42.9	
r, in.		2.97		2.99		2.49		2.53		2.55	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.

HSS7.500–
HSS7.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS7.500×				HSS7.000×					
		0.250		0.188[f]		0.500		0.375		0.312	
t_{des}, in.		0.233		0.174		0.465		0.349		0.291	
Nom. Weight, lb/ft		19.38		14.70		34.74		26.56		22.31	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	159	239	120	180	286	430	218	328	184	276
	1	159	239	120	180	285	429	218	327	183	275
	2	158	238	119	179	284	426	217	326	182	274
	3	157	236	118	177	281	422	215	322	180	271
	4	155	233	117	176	277	417	212	318	178	268
	5	153	230	115	173	272	409	208	313	175	263
	6	150	226	113	170	266	401	204	306	172	258
	7	147	221	111	167	260	390	199	299	167	252
	8	144	216	108	163	252	379	193	290	163	245
	9	140	210	105	159	244	367	187	281	158	237
	10	136	204	102	154	235	353	180	271	152	229
	11	131	197	99.0	149	226	339	173	260	146	220
	12	127	190	95.5	144	216	324	166	249	140	211
	13	122	183	91.9	138	205	309	158	238	134	201
	14	117	175	88.0	132	195	293	150	226	127	191
	15	111	167	84.1	126	184	277	142	214	120	181
	16	106	159	80.1	120	173	260	134	201	114	171
	17	100	151	76.1	114	162	244	126	189	107	160
	18	95.0	143	72.0	108	152	228	118	177	100	150
	19	89.6	135	68.0	102	141	212	110	165	93.3	140
	20	84.2	127	63.9	96.1	131	197	102	153	86.7	130
	22	73.6	111	56.0	84.2	111	167	86.7	130	74.1	111
	24	63.6	95.6	48.5	72.9	93.1	140	73.0	110	62.4	93.8
	26	54.3	81.5	41.4	62.3	79.4	119	62.2	93.4	53.2	79.9
	28	46.8	70.3	35.7	53.7	68.4	103	53.6	80.6	45.8	68.9
	30	40.8	61.3	31.1	46.8	59.6	89.6	46.7	70.2	39.9	60.0
	32	35.8	53.8	27.4	41.1	52.4	78.8	41.0	61.7	35.1	52.8
	34	31.7	47.7	24.2	36.4	46.4	69.8	36.4	54.6	31.1	46.7
	36	28.3	42.5	21.6	32.5	41.4	62.2	32.4	48.7	27.7	41.7
	38	25.4	38.2	19.4	29.2	37.2	55.8	29.1	43.7	24.9	37.4
	40	22.9	34.5	17.5	26.3						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		159	239	120	180	286	430	218	328	184	276
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		124	186	93.0	140	222	333	169	254	143	214
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		47.8	71.8	35.9	54.0	85.8	129	65.5	98.4	55.1	82.8
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		30.7	46.1	22.9	34.5	49.7	74.6	38.7	58.1	32.7	49.1
Properties											
Area, in.^{2}		5.32		4.00		9.55		7.29		6.13	
I, in.^{4}		35.2		26.9		51.2		40.4		34.6	
r, in.		2.57		2.59		2.32		2.35		2.37	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS7.000–
HSS6.875

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS7.000×						HSS6.875×			
		0.250		0.188		0.125[f]		0.375		0.312	
t_{des}, in.		0.233		0.174		0.116		0.349		0.291	
Nom. Weight, lb/ft		18.04		13.69		9.19		26.06		21.89	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	148	223	112	168	75.1	113	214	322	180	271
	1	148	222	111	168	75.0	113	214	322	180	270
	2	147	221	111	167	74.6	112	213	320	179	269
	3	146	219	110	165	74.0	111	211	317	177	266
	4	144	216	108	163	73.0	110	208	312	175	263
	5	142	213	107	160	71.9	108	204	307	172	258
	6	139	208	105	157	70.5	106	200	300	168	253
	7	135	204	102	154	68.9	104	195	293	164	246
	8	132	198	99.4	149	67.0	101	189	284	159	239
	9	128	192	96.4	145	65.0	97.8	183	275	154	232
	10	123	185	93.2	140	62.9	94.5	176	265	148	223
	11	119	178	89.7	135	60.6	91.0	169	254	143	214
	12	114	171	86.0	129	58.1	87.4	161	243	136	205
	13	109	163	82.2	124	55.6	83.6	154	231	130	195
	14	103	155	78.3	118	53.0	79.6	146	219	123	185
	15	97.9	147	74.3	112	50.3	75.6	138	207	117	175
	16	92.5	139	70.2	106	47.6	71.6	129	194	110	165
	17	87.0	131	66.1	99.4	44.9	67.5	121	182	103	155
	18	81.6	123	62.1	93.3	42.2	63.4	113	170	96.2	145
	19	76.2	115	58.0	87.2	39.5	59.3	105	158	89.5	135
	20	70.9	107	54.1	81.3	36.8	55.4	97.4	146	83.0	125
	22	60.7	91.3	46.4	69.8	31.7	47.7	82.4	124	70.5	106
	24	51.2	77.0	39.3	59.0	26.9	40.4	69.2	104	59.2	89.0
	26	43.7	65.6	33.5	50.3	22.9	34.4	59.0	88.7	50.5	75.8
	28	37.6	56.6	28.8	43.4	19.7	29.7	50.9	76.5	43.5	65.4
	30	32.8	49.3	25.1	37.8	17.2	25.8	44.3	66.6	37.9	57.0
	32	28.8	43.3	22.1	33.2	15.1	22.7	38.9	58.5	33.3	50.1
	34	25.5	38.4	19.6	29.4	13.4	20.1	34.5	51.9	29.5	44.4
	36	22.8	34.2	17.4	26.2	11.9	17.9	30.8	46.2	26.3	39.6
	38	20.4	30.7	15.7	23.5	10.7	16.1	27.6	41.5	23.6	35.5
	40			14.1	21.2	9.67	14.5				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		148	223	112	168	75.1	113	214	322	180	271
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		115	173	86.7	130	58.4	87.5	166	250	140	210
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		44.5	66.8	33.5	50.4	22.5	33.9	64.3	96.7	54.1	81.3
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		26.7	40.1	20.2	30.4	12.7	19.2	37.2	55.9	31.4	47.3
Properties											
Area, in.^{2}		4.95		3.73		2.51		7.16		6.02	
I, in.^{4}		28.4		21.7		14.9		38.2		32.7	
r, in.		2.39		2.41		2.43		2.31		2.33	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS6.875–
HSS6.625

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6.875×				HSS6.625×					
		0.250		0.188		0.500		0.432		0.375	
t_{des}, in.		0.233		0.174		0.465		0.402		0.349	
Nom. Weight, lb/ft		17.71		13.44		32.74		28.60		25.06	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	146	219	110	165	269	405	235	354	206	310
	1	145	218	109	164	269	404	235	353	206	309
	2	144	217	109	163	267	401	233	351	204	307
	3	143	215	108	162	264	397	231	347	202	304
	4	141	212	106	160	260	391	227	342	199	299
	5	139	209	105	157	255	383	223	335	195	293
	6	136	204	102	154	249	374	218	327	191	287
	7	133	199	100	150	242	363	212	318	186	279
	8	129	194	97.2	146	234	351	205	308	180	270
	9	125	187	94.1	141	225	338	197	297	173	260
	10	120	181	90.9	137	216	325	189	285	166	250
	11	116	174	87.3	131	206	310	181	272	159	239
	12	111	166	83.7	126	196	294	172	259	151	228
	13	105	158	79.8	120	185	279	163	245	144	216
	14	100	151	75.9	114	175	262	154	231	136	204
	15	94.8	142	71.9	108	164	246	144	217	127	191
	16	89.3	134	67.8	102	153	230	135	203	119	179
	17	83.9	126	63.7	95.8	142	213	125	189	111	167
	18	78.5	118	59.7	89.7	131	198	116	175	103	155
	19	73.1	110	55.7	83.7	121	182	107	161	95.3	143
	20	67.9	102	51.8	77.8	111	167	98.6	148	87.6	132
	22	57.8	86.9	44.2	66.5	92.2	139	82.0	123	73.1	110
	24	48.6	73.1	37.3	56.0	77.5	116	68.9	104	61.4	92.4
	26	41.4	62.3	31.7	47.7	66.0	99.3	58.7	88.3	52.4	78.7
	28	35.7	53.7	27.4	41.1	56.9	85.6	50.6	76.1	45.1	67.9
	30	31.1	46.8	23.8	35.8	49.6	74.6	44.1	66.3	39.3	59.1
	32	27.4	41.1	21.0	31.5	43.6	65.5	38.8	58.3	34.6	51.9
	34	24.2	36.4	18.6	27.9	38.6	58.0	34.4	51.6	30.6	46.0
	36	21.6	32.5	16.6	24.9	34.4	51.8	30.6	46.1	27.3	41.0
	38	19.4	29.2	14.9	22.3						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		146	219	110	165	269	405	235	354	206	310
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		113	169	85.1	128	209	314	183	274	160	240
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		43.7	65.6	32.9	49.4	80.8	122	70.6	106	61.8	92.9
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		25.7	38.6	19.5	29.3	44.2	66.4	38.9	58.5	34.4	51.8
Properties											
Area, in.^{2}		4.86		3.66		9.00		7.86		6.88	
I, in.^{4}		26.8		20.6		42.9		38.2		34.0	
r, in.		2.35		2.37		2.18		2.20		2.22	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS6.625

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6.625×									
		0.312		0.280		0.250		0.188		0.125[f]	
t_{des}, in.		0.291		0.260		0.233		0.174		0.116	
Nom. Weight, lb/ft		21.06		18.99		17.04		12.94		8.69	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	173	261	156	234	140	211	106	159	71.0	107
	1	173	260	155	234	140	210	105	159	70.8	106
	2	172	258	154	232	139	209	105	158	70.4	106
	3	170	256	153	230	138	207	104	156	69.7	105
	4	168	252	151	226	136	204	102	154	68.7	103
	5	164	247	148	222	133	200	100	151	67.5	101
	6	161	242	144	217	130	196	98.3	148	66.1	99.3
	7	156	235	141	211	127	190	95.7	144	64.4	96.7
	8	152	228	136	205	123	185	92.8	140	62.5	93.9
	9	146	220	132	198	119	178	89.7	135	60.4	90.8
	10	141	211	126	190	114	171	86.3	130	58.2	87.4
	11	134	202	121	182	109	164	82.7	124	55.8	83.8
	12	128	193	115	173	104	157	79.0	119	53.3	80.1
	13	122	183	110	165	98.9	149	75.1	113	50.7	76.2
	14	115	173	104	156	93.5	141	71.1	107	48.0	72.2
	15	108	162	97.5	147	88.1	132	67.0	101	45.3	68.2
	16	101	152	91.4	137	82.7	124	62.9	94.6	42.6	64.1
	17	94.5	142	85.4	128	77.2	116	58.9	88.5	39.9	60.0
	18	87.8	132	79.4	119	71.9	108	54.8	82.4	37.2	56.0
	19	81.3	122	73.5	110	66.6	100	50.9	76.5	34.6	52.0
	20	74.9	113	67.8	102	61.4	92.3	47.0	70.7	32.0	48.1
	22	62.7	94.2	56.8	85.3	51.6	77.5	39.6	59.5	27.0	40.6
	24	52.6	79.1	47.7	71.7	43.3	65.1	33.3	50.0	22.7	34.1
	26	44.9	67.4	40.6	61.1	36.9	55.5	28.3	42.6	19.4	29.1
	28	38.7	58.1	35.0	52.7	31.8	47.8	24.4	36.7	16.7	25.1
	30	33.7	50.6	30.5	45.9	27.7	41.7	21.3	32.0	14.5	21.9
	32	29.6	44.5	26.8	40.3	24.4	36.6	18.7	28.1	12.8	19.2
	34	26.2	39.4	23.8	35.7	21.6	32.4	16.6	24.9	11.3	17.0
	36	23.4	35.2	21.2	31.9	19.3	28.9	14.8	22.2	10.1	15.2
	38									9.06	13.6
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		173	261	156	234	140	211	106	159	71.0	107
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		135	202	121	181	109	163	82.1	123	55.1	82.7
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		52.0	78.2	46.7	70.2	42.0	63.2	31.7	47.7	21.3	32.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		29.2	43.9	26.2	39.4	23.8	35.7	18.1	27.2	11.5	17.2
Properties											
Area, in.^{2}		5.79		5.20		4.68		3.53		2.37	
I, in.^{4}		29.1		26.4		23.9		18.4		12.6	
r, in.		2.24		2.25		2.26		2.28		2.30	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS6.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6.000×									
		0.500		0.375		0.312		0.280		0.250	
t_{des}, in.		0.465		0.349		0.291		0.260		0.233	
Nom. Weight, lb/ft		29.40		22.55		18.97		17.12		15.37	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	242	364	186	279	156	235	140	211	126	190
	1	242	363	185	278	156	234	140	211	126	189
	2	240	360	184	276	155	232	139	209	125	188
	3	236	355	181	272	153	230	137	206	124	186
	4	232	348	178	267	150	225	135	203	121	182
	5	226	340	174	261	147	220	132	198	119	178
	6	219	330	169	254	142	214	128	193	115	173
	7	212	318	163	245	138	207	124	186	112	168
	8	203	305	157	236	132	199	119	179	107	162
	9	194	292	150	225	127	191	114	172	103	155
	10	184	277	143	214	121	181	109	163	98.1	147
	11	174	261	135	203	114	172	103	155	93.0	140
	12	163	245	127	191	108	162	97.2	146	87.8	132
	13	152	229	119	179	101	152	91.2	137	82.4	124
	14	142	213	111	167	94.2	142	85.1	128	76.9	116
	15	131	196	103	154	87.5	131	79.0	119	71.5	107
	16	120	180	94.6	142	80.7	121	73.0	110	66.1	99.4
	17	110	165	86.8	130	74.1	111	67.1	101	60.8	91.4
	18	99.7	150	79.1	119	67.7	102	61.4	92.2	55.7	83.7
	19	89.9	135	71.7	108	61.6	92.5	55.8	83.9	50.7	76.2
	20	81.1	122	64.7	97.3	55.6	83.5	50.4	75.8	45.8	68.9
	22	67.0	101	53.5	80.4	45.9	69.0	41.7	62.6	37.9	56.9
	24	56.3	84.6	44.9	67.5	38.6	58.0	35.0	52.6	31.8	47.8
	26	48.0	72.1	38.3	57.6	32.9	49.4	29.8	44.9	27.1	40.8
	28	41.4	62.2	33.0	49.6	28.4	42.6	25.7	38.7	23.4	35.1
	30	36.0	54.2	28.8	43.2	24.7	37.1	22.4	33.7	20.4	30.6
	32	31.7	47.6	25.3	38.0	21.7	32.6	19.7	29.6	17.9	26.9
	34									15.9	23.8
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		242	364	186	279	156	235	140	211	126	190
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		188	282	144	216	121	182	109	164	98.1	147
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		72.7	109	55.7	83.7	46.9	70.5	42.1	63.3	37.9	57.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		35.7	53.6	27.9	42.0	23.7	35.6	21.4	32.1	19.3	29.1
Properties											
Area, in.^{2}		8.09		6.20		5.22		4.69		4.22	
I, in.^{4}		31.2		24.8		21.3		19.3		17.6	
r, in.		1.96		2.00		2.02		2.03		2.04	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS6.000–
HSS5.563

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS6.000×				HSS5.563×					
		0.188		0.125[f]		0.500		0.375		0.258	
t_{des}, in.		0.174		0.116		0.465		0.349		0.240	
Nom. Weight, lb/ft		11.68		7.85		27.06		20.80		14.63	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	95.2	143	64.1	96.3	223	335	171	257	120	180
	1	95.0	143	63.9	96.1	222	334	171	257	120	180
	2	94.3	142	63.5	95.4	220	331	169	254	119	178
	3	93.1	140	62.7	94.2	217	326	167	250	117	176
	4	91.5	138	61.6	92.6	212	318	163	245	114	172
	5	89.5	134	60.3	90.6	206	309	159	238	111	167
	6	87.1	131	58.7	88.2	199	299	153	230	108	162
	7	84.3	127	56.9	85.5	191	286	147	221	104	156
	8	81.2	122	54.8	82.4	182	273	141	211	99.2	149
	9	77.9	117	52.6	79.1	172	258	133	201	94.3	142
	10	74.3	112	50.2	75.5	162	243	126	189	89.1	134
	11	70.5	106	47.7	71.7	151	227	118	177	83.7	126
	12	66.6	100	45.1	67.8	140	211	110	165	78.2	118
	13	62.6	94.1	42.5	63.8	130	195	102	153	72.6	109
	14	58.5	88.0	39.8	59.8	119	179	93.7	141	67.0	101
	15	54.5	81.9	37.1	55.7	108	163	85.7	129	61.4	92.3
	16	50.4	75.8	34.4	51.6	98.0	147	77.9	117	56.0	84.2
	17	46.5	69.9	31.7	47.7	88.1	132	70.4	106	50.8	76.3
	18	42.6	64.0	29.1	43.8	78.6	118	63.1	94.8	45.7	68.6
	19	38.9	58.4	26.6	40.0	70.6	106	56.6	85.1	41.0	61.6
	20	35.2	52.9	24.2	36.3	63.7	95.7	51.1	76.8	37.0	55.6
	22	29.1	43.7	20.0	30.0	52.6	79.1	42.2	63.5	30.6	45.9
	24	24.5	36.8	16.8	25.2	44.2	66.5	35.5	53.3	25.7	38.6
	26	20.8	31.3	14.3	21.5	37.7	56.6	30.2	45.4	21.9	32.9
	28	18.0	27.0	12.3	18.5	32.5	48.8	26.1	39.2	18.9	28.4
	30	15.7	23.5	10.7	16.1	28.3	42.5	22.7	34.1	16.4	24.7
	32	13.8	20.7	9.44	14.2						
	34	12.2	18.3	8.36	12.6						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		95.2	143	64.1	96.3	223	335	171	257	120	180
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		73.9	111	49.8	74.6	173	260	133	199	93.2	140
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		28.6	42.9	19.2	28.9	66.9	101	51.4	77.2	36.0	54.1
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		14.7	22.2	9.53	14.3	30.2	45.4	23.7	35.6	17.0	25.5
Properties											
Area, in.^{2}		3.18		2.14		7.45		5.72		4.01	
I, in.^{4}		13.5		9.28		24.4		19.5		14.2	
r, in.		2.06		2.08		1.81		1.85		1.88	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS5.563–
HSS5.500

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5.563×				HSS5.500×					
		0.188		0.134[f]		0.500		0.375		0.258	
t_{des}, in.		0.174		0.124		0.465		0.349		0.240	
Nom. Weight, lb/ft		10.80		7.78		26.73		20.55		14.46	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	88.3	133	63.5	95.4	220	331	169	254	119	179
	1	88.1	132	63.3	95.1	220	330	169	253	119	178
	2	87.3	131	62.8	94.3	217	327	167	251	117	176
	3	86.1	129	61.9	93.0	214	322	164	247	116	174
	4	84.3	127	60.6	91.1	209	314	161	242	113	170
	5	82.2	124	59.1	88.8	203	305	156	235	110	166
	6	79.6	120	57.3	86.1	196	294	151	227	107	160
	7	76.7	115	55.2	82.9	188	282	145	218	102	154
	8	73.4	110	52.9	79.5	179	268	138	208	97.8	147
	9	69.9	105	50.4	75.7	169	254	131	197	92.9	140
	10	66.2	99.5	47.7	71.7	159	238	124	186	87.7	132
	11	62.3	93.6	44.9	67.5	148	223	116	174	82.2	124
	12	58.3	87.6	42.1	63.2	137	206	108	162	76.7	115
	13	54.2	81.5	39.2	58.9	126	190	99.4	149	71.1	107
	14	50.2	75.4	36.3	54.5	116	174	91.3	137	65.5	98.4
	15	46.1	69.3	33.4	50.2	105	158	83.4	125	59.9	90.1
	16	42.2	63.4	30.6	45.9	95.0	143	75.6	114	54.5	82.0
	17	38.4	57.6	27.8	41.8	85.2	128	68.2	102	49.3	74.1
	18	34.7	52.1	25.2	37.8	76.0	114	61.0	91.6	44.2	66.5
	19	31.1	46.8	22.6	34.0	68.2	102	54.7	82.2	39.7	59.7
	20	28.1	42.2	20.4	30.7	61.5	92.5	49.4	74.2	35.8	53.9
	22	23.2	34.9	16.9	25.3	50.9	76.4	40.8	61.3	29.6	44.5
	24	19.5	29.3	14.2	21.3	42.7	64.2	34.3	51.5	24.9	37.4
	26	16.6	25.0	12.1	18.1	36.4	54.7	29.2	43.9	21.2	31.9
	28	14.3	21.5	10.4	15.6	31.4	47.2	25.2	37.9	18.3	27.5
	30	12.5	18.8	9.06	13.6			21.9	33.0	15.9	23.9
	32			7.97	12.0						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		88.3	133	63.5	95.4	220	331	169	254	119	179
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		68.6	103	49.3	73.9	171	257	131	197	92.3	138
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		26.5	39.8	19.0	28.6	66.1	99.4	50.7	76.3	35.7	53.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		12.6	18.9	8.94	13.4	29.4	44.3	23.1	34.8	16.6	24.9
Properties											
Area, in.^{2}		2.95		2.12		7.36		5.65		3.97	
I, in.^{4}		10.7		7.84		23.5		18.8		13.7	
r, in.		1.91		1.92		1.79		1.83		1.86	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS5.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5.000×									
		0.500		0.375		0.312		0.258		0.250	
t_{des}, in.		0.465		0.349		0.291		0.24		0.233	
Nom. Weight, lb/ft		24.05		18.54		15.64		13.08		12.69	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	198	298	153	229	129	193	107	162	104	157
	1	197	297	152	229	128	193	107	161	104	156
	2	195	293	150	226	127	191	106	159	103	155
	3	191	287	147	222	124	187	104	156	101	152
	4	186	279	144	216	121	182	101	152	98.5	148
	5	179	269	139	208	117	176	98.0	147	95.3	143
	6	171	257	133	200	112	169	94.1	141	91.5	138
	7	162	244	126	190	107	161	89.7	135	87.2	131
	8	153	230	119	179	101	152	84.9	128	82.5	124
	9	143	214	112	168	94.8	143	79.7	120	77.5	117
	10	132	198	104	156	88.3	133	74.3	112	72.3	109
	11	121	182	95.6	144	81.5	123	68.8	103	66.9	101
	12	110	166	87.5	131	74.8	112	63.2	95.0	61.5	92.4
	13	99.8	150	79.4	119	68.0	102	57.6	86.6	56.0	84.2
	14	89.4	134	71.6	108	61.4	92.3	52.2	78.4	50.7	76.3
	15	79.5	119	64.0	96.1	55.1	82.8	46.9	70.5	45.6	68.5
	16	70.0	105	56.6	85.1	48.9	73.5	41.8	62.8	40.6	61.1
	17	62.0	93.2	50.1	75.4	43.3	65.1	37.0	55.7	36.0	54.1
	18	55.3	83.1	44.7	67.2	38.6	58.1	33.0	49.6	32.1	48.3
	19	49.6	74.6	40.1	60.3	34.7	52.1	29.6	44.6	28.8	43.3
	20	44.8	67.3	36.2	54.5	31.3	47.0	26.8	40.2	26.0	39.1
	22	37.0	55.6	29.9	45.0	25.9	38.9	22.1	33.2	21.5	32.3
	24	31.1	46.7	25.2	37.8	21.7	32.7	18.6	27.9	18.1	27.1
	26	26.5	39.8	21.4	32.2	18.5	27.8	15.8	23.8	15.4	23.1
	28							13.7	20.5	13.3	19.9
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		198	298	153	230	129	194	107	162	104	157
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		154	231	119	178	100	150	83.5	125	81.1	122
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		59.5	89.4	45.8	68.9	38.6	58.1	32.2	48.5	31.3	47.1
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		24.0	36.0	18.9	28.4	16.1	24.2	13.6	20.4	13.2	19.9
Properties											
Area, in.^{2}		6.62		5.10		4.30		3.59		3.49	
I, in.^{4}		17.2		13.9		12.0		10.2		9.94	
r, in.		1.61		1.65		1.67		1.69		1.69	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS5.000–
HSS4.500

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS5.000×				HSS4.500×					
		0.188		0.125[f]		0.375		0.337		0.237	
t_{des}, in.		0.174		0.116		0.349		0.313		0.220	
Nom. Weight, lb/ft		9.67		6.51		16.54		15.00		10.80	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	79.0	119	53.3	80.1	136	205	123	185	88.6	133
	1	78.8	118	53.1	79.8	136	204	123	185	88.2	133
	2	77.9	117	52.5	79.0	134	201	121	182	87.0	131
	3	76.5	115	51.6	77.6	130	196	118	178	85.1	128
	4	74.6	112	50.4	75.7	126	189	114	172	82.4	124
	5	72.2	109	48.8	73.4	121	181	109	164	79.1	119
	6	69.4	104	47.0	70.6	114	172	104	156	75.2	113
	7	66.3	99.6	44.9	67.4	107	161	97.5	146	70.9	107
	8	62.8	94.3	42.5	64.0	99.7	150	90.7	136	66.2	99.5
	9	59.0	88.7	40.1	60.2	91.8	138	83.6	126	61.3	92.1
	10	55.1	82.9	37.5	56.3	83.7	126	76.3	115	56.2	84.4
	11	51.1	76.8	34.8	52.3	75.5	114	69.0	104	51.1	76.7
	12	47.1	70.7	32.1	48.3	67.5	102	61.7	92.8	46.0	69.1
	13	43.0	64.6	29.4	44.2	59.8	89.9	54.7	82.3	41.0	61.7
	14	39.0	58.7	26.7	40.2	52.4	78.7	48.1	72.2	36.3	54.5
	15	35.2	52.8	24.1	36.3	45.6	68.6	41.9	62.9	31.7	47.7
	16	31.4	47.3	21.7	32.5	40.1	60.3	36.8	55.3	27.9	41.9
	17	27.9	41.9	19.2	28.9	35.5	53.4	32.6	49.0	24.7	37.1
	18	24.9	37.4	17.2	25.8	31.7	47.6	29.1	43.7	22.0	33.1
	19	22.3	33.5	15.4	23.2	28.4	42.7	26.1	39.2	19.8	29.7
	20	20.1	30.3	13.9	20.9	25.7	38.6	23.5	35.4	17.8	26.8
	22	16.6	25.0	11.5	17.3	21.2	31.9	19.5	29.3	14.7	22.2
	24	14.0	21.0	9.65	14.5	17.8	26.8	16.4	24.6	12.4	18.6
	26	11.9	17.9	8.23	12.4						
	28	10.3	15.4	7.09	10.7						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		79.0	119	53.3	80.1	136	205	123	185	88.6	133
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		61.4	92.1	41.4	62.1	106	159	95.8	144	68.8	103
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		23.7	35.6	16.0	24.0	40.9	61.4	37.0	55.6	26.6	40.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		10.1	15.2	6.78	10.2	15.0	22.6	13.7	20.6	10.1	15.1
Properties											
Area, in.^{2}		2.64		1.78		4.55		4.12		2.96	
I, in.^{4}		7.69		5.31		9.87		9.07		6.79	
r, in.		1.71		1.73		1.47		1.48		1.52	

[f]Shape exceeds compact limit for flexure with F_y = 50 ksi.
Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS4.500–
HSS4.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS4.500×				HSS4.000×					
		0.188		0.125		0.313		0.250		0.237	
t_{des}, in.		0.174		0.116		0.291		0.233		0.22	
Nom. Weight, lb/ft		8.67		5.85		12.34		10.00		9.53	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	70.7	106	47.9	72.0	101	153	82.6	124	78.1	117
	1	70.3	106	47.7	71.7	101	152	82.1	123	77.7	117
	2	69.4	104	47.1	70.7	99.1	149	80.7	121	76.3	115
	3	67.9	102	46.1	69.2	96.1	144	78.3	118	74.1	111
	4	65.8	98.8	44.7	67.1	92.1	138	75.1	113	71.1	107
	5	63.1	94.9	42.9	64.5	87.3	131	71.2	107	67.5	101
	6	60.1	90.3	40.9	61.5	81.7	123	66.7	100	63.3	95.1
	7	56.7	85.2	38.6	58.1	75.5	113	61.7	92.8	58.6	88.1
	8	53.0	79.6	36.2	54.4	68.9	104	56.5	84.9	53.7	80.7
	9	49.1	73.8	33.6	50.5	62.2	93.5	51.0	76.7	48.6	73.0
	10	45.1	67.7	30.9	46.5	55.5	83.4	45.6	68.5	43.5	65.3
	11	41.0	61.6	28.2	42.4	48.9	73.4	40.2	60.4	38.4	57.8
	12	37.0	55.6	25.5	38.3	42.5	63.9	35.1	52.7	33.6	50.5
	13	33.0	49.7	22.8	34.3	36.5	54.8	30.2	45.3	28.9	43.5
	14	29.3	44.0	20.3	30.5	31.5	47.3	26.0	39.1	25.0	37.5
	15	25.6	38.5	17.8	26.8	27.4	41.2	22.6	34.0	21.7	32.7
	16	22.5	33.9	15.7	23.6	24.1	36.2	19.9	29.9	19.1	28.7
	17	20.0	30.0	13.9	20.9	21.3	32.1	17.6	26.5	16.9	25.4
	18	17.8	26.8	12.4	18.6	19.0	28.6	15.7	23.6	15.1	22.7
	19	16.0	24.0	11.1	16.7	17.1	25.7	14.1	21.2	13.6	20.4
	20	14.4	21.7	10.0	15.1	15.4	23.2	12.7	19.1	12.2	18.4
	22	11.9	17.9	8.29	12.5	12.7	19.1	10.5	15.8	10.1	15.2
	24	10.0	15.0	6.97	10.5						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		70.7	106	47.9	72.0	101	153	82.6	124	78.1	117
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		54.9	82.3	37.2	55.8	78.8	118	64.2	96.3	60.7	91.0
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		21.2	31.9	14.4	21.6	30.4	45.8	24.8	37.3	23.4	35.2
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		8.13	12.2	5.56	8.36	10.0	15.0	8.26	12.4	7.86	11.8
Properties											
Area, in.^{2}		2.36		1.60		3.39		2.76		2.61	
I, in.^{4}		5.54		3.84		5.87		4.91		4.68	
r, in.		1.53		1.55		1.32		1.33		1.34	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS4.000–
HSS3.500

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS4.000×								HSS3.500×	
		0.226		0.220		0.188		0.125		0.313	
t_{des}, in.		0.210		0.205		0.174		0.116		0.291	
Nom. Weight, lb/ft		9.12		8.89		7.66		5.18		10.66	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	74.9	112	73.1	110	62.6	94.0	42.5	63.9	87.7	132
	1	74.4	112	72.6	109	62.2	93.5	42.3	63.5	87.0	131
	2	73.1	110	71.4	107	61.1	91.9	41.6	62.5	84.9	128
	3	71.0	107	69.3	104	59.4	89.3	40.4	60.8	81.6	123
	4	68.1	102	66.5	100	57.1	85.7	38.9	58.4	77.1	116
	5	64.6	97.2	63.1	94.8	54.2	81.4	37.0	55.5	71.6	108
	6	60.6	91.1	59.2	88.9	50.8	76.4	34.7	52.2	65.5	98.5
	7	56.2	84.4	54.8	82.4	47.1	70.9	32.3	48.5	59.0	88.6
	8	51.4	77.3	50.2	75.4	43.2	65.0	29.7	44.6	52.2	78.5
	9	46.6	70.0	45.4	68.3	39.2	58.9	27.0	40.6	45.5	68.4
	10	41.6	62.6	40.6	61.1	35.1	52.8	24.3	36.5	39.0	58.6
	11	36.8	55.3	35.9	54.0	31.1	46.7	21.6	32.4	32.8	49.4
	12	32.2	48.4	31.4	47.2	27.2	40.9	19.0	28.5	27.6	41.5
	13	27.7	41.7	27.1	40.7	23.5	35.4	16.5	24.7	23.5	35.3
	14	23.9	35.9	23.3	35.1	20.3	30.5	14.2	21.3	20.3	30.5
	15	20.8	31.3	20.3	30.5	17.7	26.6	12.4	18.6	17.7	26.6
	16	18.3	27.5	17.9	26.8	15.5	23.3	10.9	16.3	15.5	23.3
	17	16.2	24.4	15.8	23.8	13.8	20.7	9.63	14.5	13.8	20.7
	18	14.5	21.7	14.1	21.2	12.3	18.4	8.59	12.9	12.3	18.4
	19	13.0	19.5	12.7	19.0	11.0	16.6	7.71	11.6		
	20	11.7	17.6	11.4	17.2	9.94	14.9	6.95	10.5		
	22	9.68	14.6	9.45	14.2	8.21	12.3	5.75	8.64		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		74.9	113	73.1	110	62.6	94.1	42.5	63.9	87.7	132
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		58.1	87.2	56.7	85.1	48.6	72.9	33.0	49.5	68.1	102
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		22.5	33.8	21.9	32.9	18.8	28.2	12.8	19.2	26.3	39.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		7.53	11.3	7.39	11.1	6.36	9.56	4.37	6.56	7.49	11.3
Properties											
Area, in.^{2}		2.50		2.44		2.09		1.42		2.93	
I, in.^{4}		4.50		4.41		3.83		2.67		3.81	
r, in.		1.34		1.34		1.35		1.37		1.14	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS3.500

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3.500×									
		0.300		0.250		0.216		0.203		0.188	
t_{des}, in.		0.279		0.233		0.201		0.189		0.174	
Nom. Weight, lb/ft		10.26		8.69		7.58		7.15		6.66	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	84.4	127	71.6	108	62.3	93.6	59.0	88.6	54.5	81.9
	1	83.7	126	71.0	107	61.8	92.9	58.5	88.0	54.1	81.3
	2	81.7	123	69.4	104	60.4	90.8	57.2	86.0	52.9	79.5
	3	78.5	118	66.7	100	58.1	87.3	55.0	82.7	50.9	76.5
	4	74.2	111	63.1	94.9	55.1	82.8	52.2	78.4	48.3	72.6
	5	69.0	104	58.8	88.4	51.4	77.2	48.7	73.1	45.1	67.8
	6	63.1	94.8	54.0	81.1	47.2	71.0	44.7	67.2	41.5	62.4
	7	56.8	85.3	48.8	73.3	42.7	64.2	40.5	60.8	37.6	56.5
	8	50.3	75.6	43.4	65.2	38.1	57.2	36.1	54.2	33.6	50.5
	9	43.8	65.8	38.0	57.1	33.4	50.2	31.6	47.5	29.5	44.4
	10	37.6	56.4	32.7	49.2	28.9	43.4	27.3	41.1	25.6	38.4
	11	31.6	47.5	27.7	41.7	24.6	36.9	23.3	35.0	21.8	32.8
	12	26.6	39.9	23.3	35.0	20.6	31.0	19.5	29.4	18.4	27.6
	13	22.6	34.0	19.9	29.9	17.6	26.4	16.7	25.0	15.7	23.5
	14	19.5	29.3	17.1	25.7	15.2	22.8	14.4	21.6	13.5	20.3
	15	17.0	25.6	14.9	22.4	13.2	19.9	12.5	18.8	11.8	17.7
	16	14.9	22.5	13.1	19.7	11.6	17.4	11.0	16.5	10.3	15.5
	17	13.2	19.9	11.6	17.5	10.3	15.5	9.74	14.6	9.15	13.8
	18	11.8	17.7	10.4	15.6	9.17	13.8	8.69	13.1	8.16	12.3
	19			9.30	14.0	8.23	12.4	7.80	11.7	7.33	11.0
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		84.4	127	71.6	108	62.3	93.6	59.0	88.7	54.5	81.9
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		65.6	98.3	55.6	83.4	48.4	72.5	45.8	68.7	42.3	63.5
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		25.3	38.1	21.5	32.3	18.7	28.1	17.7	26.6	16.3	24.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		7.24	10.9	6.21	9.34	5.46	8.21	5.16	7.76	4.82	7.24
Properties											
Area, in.^{2}		2.82		2.39		2.08		1.97		1.82	
I, in.^{4}		3.69		3.21		2.84		2.70		2.52	
r, in.		1.14		1.16		1.17		1.17		1.18	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS3.500–
HSS3.000

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3.500×		HSS3.000×							
		0.125		0.250		0.216		0.203		0.188	
t_{des}, in.		0.116		0.233		0.201		0.189		0.174	
Nom. Weight, lb/ft		4.51		7.35		6.43		6.07		5.65	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	36.8	55.3	60.8	91.3	53.0	79.6	50.0	75.1	46.1	69.3
	1	36.6	54.9	60.1	90.4	52.4	78.8	49.5	74.4	45.6	68.6
	2	35.8	53.8	58.2	87.4	50.8	76.3	47.9	72.0	44.2	66.4
	3	34.5	51.8	55.1	82.8	48.1	72.3	45.4	68.3	41.9	63.0
	4	32.8	49.2	51.0	76.7	44.7	67.1	42.2	63.4	39.0	58.6
	5	30.7	46.1	46.3	69.5	40.6	61.0	38.3	57.6	35.4	53.3
	6	28.3	42.5	41.0	61.7	36.1	54.2	34.1	51.3	31.6	47.4
	7	25.7	38.7	35.6	53.5	31.4	47.2	29.7	44.7	27.5	41.4
	8	23.1	34.7	30.2	45.4	26.7	40.2	25.3	38.1	23.5	35.3
	9	20.4	30.6	25.1	37.7	22.3	33.5	21.2	31.8	19.7	29.5
	10	17.7	26.6	20.4	30.7	18.2	27.3	17.3	26.0	16.1	24.2
	11	15.2	22.9	16.9	25.4	15.0	22.6	14.3	21.5	13.3	20.0
	12	12.8	19.3	14.2	21.3	12.6	19.0	12.0	18.0	11.2	16.8
	13	10.9	16.4	12.1	18.2	10.8	16.2	10.2	15.4	9.51	14.3
	14	9.43	14.2	10.4	15.7	9.28	13.9	8.82	13.3	8.20	12.3
	15	8.22	12.3	9.08	13.6	8.08	12.1	7.69	11.6	7.14	10.7
	16	7.22	10.9	7.98	12.0	7.10	10.7	6.75	10.2	6.28	9.44
	17	6.40	9.61								
	18	5.71	8.58								
	19	5.12	7.70								
	20	4.62	6.95								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		36.8	55.4	60.8	91.4	53.0	79.7	50.0	75.2	46.1	69.3
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		28.6	42.9	47.2	70.8	41.2	61.7	38.8	58.2	35.8	53.7
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		11.0	16.6	18.2	27.4	15.9	23.9	15.0	22.5	13.8	20.8
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		3.32	4.99	4.47	6.71	3.94	5.93	3.74	5.63	3.47	5.21
Properties											
Area, in.^{2}		1.23		2.03		1.77		1.67		1.54	
I, in.^{4}		1.77		1.95		1.74		1.66		1.55	
r, in.		1.20		0.982		0.992		0.996		1.00	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS3.000–
HSS2.875

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS3.000×						HSS2.875×			
		0.152		0.134		0.125		0.250		0.203	
t_{des}, in.		0.141		0.124		0.116		0.233		0.189	
Nom. Weight, lb/ft		4.63		4.11		3.84		7.02		5.80	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	38.0	57.1	33.5	50.4	31.4	47.2	57.8	86.8	47.6	71.5
	1	37.6	56.6	33.2	49.9	31.1	46.8	57.1	85.8	47.1	70.7
	2	36.5	54.8	32.2	48.4	30.2	45.4	55.1	82.8	45.4	68.3
	3	34.7	52.1	30.6	46.0	28.7	43.1	51.9	78.0	42.9	64.4
	4	32.2	48.5	28.5	42.9	26.7	40.2	47.7	71.7	39.5	59.4
	5	29.4	44.2	26.0	39.1	24.4	36.7	42.8	64.4	35.6	53.5
	6	26.2	39.4	23.3	35.0	21.8	32.8	37.6	56.5	31.3	47.1
	7	22.9	34.5	20.4	30.7	19.1	28.8	32.1	48.3	26.9	40.5
	8	19.6	29.5	17.5	26.4	16.4	24.7	26.9	40.4	22.6	34.0
	9	16.5	24.8	14.8	22.2	13.8	20.8	21.9	32.9	18.6	27.9
	10	13.5	20.3	12.2	18.3	11.4	17.1	17.7	26.6	15.0	22.6
	11	11.2	16.8	10.1	15.1	9.42	14.2	14.6	22.0	12.4	18.7
	12	9.39	14.1	8.45	12.7	7.92	11.9	12.3	18.5	10.4	15.7
	13	8.00	12.0	7.20	10.8	6.75	10.1	10.5	15.8	8.90	13.4
	14	6.90	10.4	6.21	9.33	5.82	8.74	9.04	13.6	7.67	11.5
	15	6.01	9.03	5.41	8.12	5.07	7.62	7.88	11.8	6.69	10.0
	16	5.28	7.94	4.75	7.14	4.45	6.69				
	17			4.21	6.33	3.95	5.93				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		38.0	57.2	33.5	50.4	31.4	47.3	57.8	86.9	47.6	71.6
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		29.5	44.3	26.0	39.1	24.4	36.6	44.9	67.3	37.0	55.5
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		11.4	17.1	10.1	15.1	9.43	14.2	17.3	26.1	14.3	21.5
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		2.87	4.31	2.57	3.86	2.41	3.62	4.07	6.11	3.42	5.14
Properties											
Area, in.^{2}		1.27		1.12		1.05		1.93		1.59	
I, in.^{4}		1.30		1.16		1.09		1.70		1.45	
r, in.		1.01		1.02		1.02		0.938		0.952	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS2.875–
HSS2.500

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS2.875×				HSS2.500×					
		0.188		0.125		0.250		0.188		0.125	
t_{des}, in.		0.174		0.116		0.233		0.174		0.116	
Nom. Weight, lb/ft		5.40		3.67		6.01		4.65		3.17	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	44.3	66.6	30.2	45.4	49.7	74.7	38.0	57.1	26.0	39.1
	1	43.8	65.8	29.9	45.0	48.9	73.5	37.4	56.3	25.6	38.5
	2	42.3	63.6	28.9	43.5	46.6	70.0	35.7	53.7	24.5	36.9
	3	40.0	60.1	27.4	41.1	43.0	64.6	33.1	49.7	22.8	34.2
	4	36.9	55.4	25.3	38.1	38.3	57.6	29.7	44.6	20.5	30.9
	5	33.2	50.0	22.9	34.5	33.1	49.8	25.8	38.8	18.0	27.0
	6	29.3	44.0	20.3	30.5	27.7	41.7	21.8	32.7	15.3	23.0
	7	25.2	37.9	17.6	26.4	22.5	33.8	17.8	26.8	12.6	19.0
	8	21.2	31.9	14.9	22.4	17.6	26.4	14.1	21.2	10.1	15.2
	9	17.5	26.2	12.4	18.6	13.9	20.9	11.1	16.7	7.98	12.0
	10	14.1	21.3	10.0	15.1	11.3	16.9	9.02	13.6	6.46	9.71
	11	11.7	17.6	8.30	12.5	9.30	14.0	7.46	11.2	5.34	8.03
	12	9.83	14.8	6.97	10.5	7.82	11.7	6.27	9.42	4.49	6.74
	13	8.37	12.6	5.94	8.93	6.66	10.0	5.34	8.02	3.82	5.75
	14	7.22	10.8	5.12	7.70					3.30	4.95
	15	6.29	9.45	4.46	6.71						
	16			3.92	5.90						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		44.3	66.6	30.2	45.5	49.7	74.7	38.0	57.2	26.0	39.1
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		34.4	51.6	23.5	35.2	38.6	57.9	29.5	44.3	20.2	30.3
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		13.3	20.0	9.07	13.6	14.9	22.4	11.4	17.1	7.81	11.7
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		3.17	4.76	2.21	3.32	2.99	4.50	2.35	3.54	1.65	2.48
Properties											
Area, in.^{2}		1.48		1.01		1.66		1.27		0.869	
I, in.^{4}		1.35		0.958		1.08		0.865		0.619	
r, in.		0.957		0.976		0.806		0.825		0.844	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS2.375

Table 6-H (continued)
Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces
Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS2.375×									
		0.250		0.218		0.188		0.154		0.125	
t_{des}, in.		0.233		0.203		0.174		0.143		0.116	
Nom. Weight, lb/ft		5.68		5.03		4.40		3.66		3.01	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	47.0	70.6	41.6	62.5	35.9	54.0	29.9	45.0	24.6	37.0
	1	46.2	69.4	40.9	61.5	35.3	53.1	29.4	44.2	24.2	36.4
	2	43.7	65.7	38.8	58.3	33.5	50.4	28.0	42.1	23.1	34.7
	3	39.9	60.0	35.5	53.3	30.8	46.2	25.7	38.7	21.2	31.9
	4	35.2	52.9	31.3	47.1	27.3	41.0	22.9	34.4	18.9	28.5
	5	29.9	44.9	26.7	40.2	23.3	35.1	19.7	29.5	16.3	24.5
	6	24.5	36.8	22.0	33.1	19.3	29.0	16.3	24.6	13.6	20.5
	7	19.3	29.1	17.5	26.3	15.4	23.2	13.1	19.7	11.0	16.5
	8	14.9	22.3	13.5	20.3	11.9	17.9	10.2	15.3	8.59	12.9
	9	11.7	17.7	10.6	16.0	9.43	14.2	8.06	12.1	6.79	10.2
	10	9.52	14.3	8.62	13.0	7.64	11.5	6.53	9.82	5.50	8.26
	11	7.86	11.8	7.13	10.7	6.31	9.49	5.40	8.11	4.54	6.83
	12	6.61	9.93	5.99	9.00	5.31	7.97	4.54	6.82	3.82	5.74
	13					4.52	6.79	3.86	5.81	3.25	4.89
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		47.0	70.7	41.6	62.6	35.9	54.0	29.9	45.0	24.6	37.0
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		36.5	54.8	32.3	48.5	27.9	41.9	23.3	34.9	19.1	28.7
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		14.1	21.2	12.5	18.8	10.8	16.2	8.98	13.5	7.39	11.1
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		2.67	4.01	2.40	3.60	2.11	3.17	1.78	2.67	1.48	2.22
Properties											
Area, in.^{2}		1.57		1.39		1.20		1.00		0.823	
I, in.^{4}		0.910		0.824		0.733		0.627		0.527	
r, in.		0.762		0.771		0.781		0.791		0.800	

Note: Heavy line indicates L_c/r equal to or greater than 200.

HSS1.900–
HSS1.660

Table 6-H (continued)

Available Strength for Members Subject to Axial, Shear, Flexure, or Combined Forces

Round HSS

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Shape		HSS1.900×						HSS1.660×	
		0.188		0.145		0.120		0.140	
t_{des}, in.		0.174		0.135		0.111		0.130	
Nom. Weight, lb/ft		3.44		2.72		2.28		2.27	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r.	0	28.2	42.4	22.4	33.7	18.7	28.1	18.7	28.1
	1	27.5	41.3	21.8	32.8	18.2	27.4	18.1	27.1
	2	25.2	37.9	20.1	30.3	16.8	25.3	16.2	24.4
	3	21.9	33.0	17.6	26.5	14.8	22.2	13.6	20.4
	4	18.0	27.1	14.6	21.9	12.3	18.5	10.6	15.9
	5	14.0	21.1	11.5	17.2	9.71	14.6	7.66	11.5
	6	10.3	15.4	8.51	12.8	7.27	10.9	5.34	8.03
	7	7.55	11.3	6.25	9.40	5.34	8.03	3.93	5.90
	8	5.78	8.69	4.79	7.19	4.09	6.15	3.01	4.52
	9	4.57	6.86	3.78	5.68	3.23	4.86	2.37	3.57
	10	3.70	5.56	3.06	4.60	2.62	3.93		
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		28.2	42.4	22.4	33.7	18.7	28.1	18.7	28.1
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		21.9	32.9	17.4	26.1	14.5	21.8	14.5	21.8
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		8.47	12.7	6.73	10.1	5.60	8.42	5.61	8.44
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1.30	1.95	1.05	1.58	0.888	1.34	0.761	1.14
Properties									
Area, in.^{2}		0.943		0.749		0.624		0.625	
I, in.^{4}		0.355		0.293		0.251		0.184	
r, in.		0.613		0.626		0.634		0.543	

Note: Heavy line indicates L_c/r equal to or greater than 200.

PIPE 26–
PIPE 20

Table 6-I
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 26				Pipe 24				Pipe 20	
		x-Strong		Std[f]		x-Strong		Std[f]		x-Strong	
t_{des}, in.		0.465		0.349		0.465		0.349		0.465	
lb/ft		136		103		126		94.7		104	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	757	1140	591	888	698	1050	545	819	578	869
	1	757	1140	591	888	698	1050	545	819	578	869
	2	756	1140	591	888	698	1050	545	819	578	869
	3	756	1140	591	888	697	1050	544	818	578	868
	4	755	1140	590	887	697	1050	544	818	577	867
	5	755	1130	590	886	696	1050	543	817	576	866
	6	754	1130	589	885	695	1040	543	816	575	865
	7	753	1130	588	884	694	1040	542	815	574	863
	8	752	1130	588	883	693	1040	541	813	573	861
	9	751	1130	587	882	692	1040	540	812	571	859
	10	750	1130	586	880	691	1040	539	810	570	856
	11	748	1120	585	879	689	1040	538	809	568	853
	12	747	1120	583	877	687	1030	537	807	566	850
	13	745	1120	582	875	685	1030	535	805	564	847
	14	743	1120	581	873	684	1030	534	802	561	843
	15	741	1110	579	871	681	1020	532	800	559	840
	16	739	1110	578	868	679	1020	530	797	556	836
	17	737	1110	576	866	677	1020	529	794	553	831
	18	735	1100	574	863	674	1010	527	791	550	827
	19	732	1100	572	860	672	1010	525	788	547	822
	20	730	1100	570	857	669	1010	522	785	544	817
	22	724	1090	566	851	663	996	518	778	537	807
	24	718	1080	561	844	656	987	513	771	529	795
	26	712	1070	556	836	650	976	507	763	521	783
	28	705	1060	551	828	642	965	502	754	513	770
	30	697	1050	545	819	634	953	496	745	503	757
	32	690	1040	539	810	626	941	489	735	494	742
	34	682	1020	533	801	617	928	482	725	484	727
	36	673	1010	526	791	608	914	475	714	474	712
	38	664	998	519	781	599	900	468	703	463	696
	40	655	984	512	770	589	885	460	692	452	679
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		757	1140	591	888	698	1050	545	819	578	869
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		812	1220	635	952	749	1120	585	878	621	932
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		227	341	177	266	209	315	163	246	174	261
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		513	772	383	576	437	656	333	500	300	452
Properties											
Area, in.^{2}		36.1		28.2		33.3		26.0		27.6	
I, in.^{4}		2950		2320		2310		1820		1320	
r, in.		9.03		9.07		8.33		8.36		6.91	

[f]Shape exceeds the compact limit for flexure for F_y = 35 ksi.

PIPE 20–
PIPE 16

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 20		Pipe 18				Pipe 16			
		Std		x-Strong		Std		x-Strong		Std	
t_{des}, in.		0.349		0.465		0.349		0.465		0.349	
lb/ft		78.7		93.5		70.7		82.9		62.6	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	453	680	520	781	407	611	461	693	360	542
	1	453	680	520	781	407	611	461	693	360	542
	2	452	680	519	781	406	611	461	692	360	541
	3	452	679	519	780	406	610	460	691	360	541
	4	452	679	518	779	405	609	459	690	359	540
	5	451	678	517	777	405	608	458	689	358	539
	6	450	677	516	776	404	607	457	687	357	537
	7	449	675	515	774	403	605	456	685	356	535
	8	448	674	513	772	402	604	454	682	355	534
	9	447	672	512	769	400	602	452	679	354	531
	10	446	670	510	766	399	600	450	676	352	529
	11	444	668	508	763	397	597	448	673	350	526
	12	443	666	506	760	396	595	445	669	348	523
	13	441	663	503	756	394	592	442	665	346	520
	14	439	660	501	752	392	589	440	661	344	517
	15	437	657	498	748	390	586	436	656	341	513
	16	435	654	495	744	387	582	433	651	339	509
	17	433	651	492	739	385	579	430	646	336	505
	18	431	648	489	734	382	575	426	640	333	501
	19	428	644	485	729	380	571	422	635	330	497
	20	426	640	482	724	377	567	418	629	327	492
	22	420	632	474	712	371	558	410	616	321	482
	24	415	623	466	700	365	548	401	602	314	472
	26	408	614	457	687	358	538	391	588	306	460
	28	402	604	447	672	351	527	381	573	298	449
	30	395	593	438	658	343	515	370	557	290	436
	32	387	582	427	642	335	503	359	540	282	423
	34	379	570	417	626	327	491	348	523	273	410
	36	371	558	406	610	318	478	336	505	264	396
	38	363	546	394	593	309	465	324	487	255	383
	40	355	533	383	575	300	451	312	469	245	368
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		453	680	520	781	407	611	461	693	360	542
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		486	729	558	837	437	655	495	743	387	581
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		136	204	156	234	122	183	138	208	108	163
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		236	354	243	365	190	286	190	286	150	225
Properties											
Area, in.^{2}		21.6		24.8		19.4		22.0		17.2	
I, in.^{4}		1040		956		756		665		527	
r, in.		6.95		6.21		6.24		5.50		5.53	

PIPE 14–
PIPE 12

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 14				Pipe 12					
		x-Strong		Std		xx-Strong		x-Strong		Std	
t_{des}, in.		0.465		0.349		0.930		0.465		0.349	
lb/ft		72.2		54.6		126		65.5		49.6	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	402	605	314	472	742	1120	367	551	287	432
	1	402	605	314	472	742	1110	367	551	287	431
	2	402	604	314	472	741	1110	366	550	287	431
	3	401	603	313	471	739	1110	365	549	286	430
	4	400	602	313	470	737	1110	364	548	285	429
	5	399	600	312	469	734	1100	363	546	284	427
	6	398	598	311	467	731	1100	362	544	283	426
	7	396	595	310	465	727	1090	360	541	282	424
	8	394	592	308	463	722	1090	358	538	280	421
	9	392	589	306	461	717	1080	355	534	278	418
	10	390	586	305	458	712	1070	353	530	276	415
	11	387	582	303	455	705	1060	350	526	274	412
	12	384	577	300	451	699	1050	347	521	272	408
	13	381	573	298	448	691	1040	343	516	269	405
	14	378	568	295	444	684	1030	340	511	266	400
	15	374	563	293	440	675	1020	336	505	263	396
	16	371	557	290	436	667	1000	332	499	260	391
	17	367	551	287	431	658	988	328	493	257	386
	18	363	545	284	427	648	974	323	486	254	381
	19	358	539	280	422	638	959	319	479	250	376
	20	354	532	277	416	628	943	314	472	246	370
	22	344	518	270	406	606	911	304	457	239	359
	24	334	503	262	394	583	877	293	440	230	346
	26	324	487	254	382	559	841	282	424	222	333
	28	313	470	245	369	535	804	270	406	213	320
	30	301	453	237	356	509	766	258	388	204	306
	32	290	435	227	342	484	727	246	370	194	292
	34	278	417	218	328	458	688	234	351	185	277
	36	265	399	209	314	432	649	221	333	175	263
	38	253	380	199	299	406	610	209	314	165	248
	40	241	362	190	285	380	571	197	296	156	234
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		402	605	314	473	742	1120	367	551	287	432
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		432	648	338	506	797	1190	394	591	308	462
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		121	181	94.3	142	223	335	110	165	86.1	129
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		144	217	114	171	234	352	123	184	93.8	141
Properties											
Area, in.^{2}		19.2		15.0		35.4		17.5		13.7	
I, in.^{4}		440		350		625		339		262	
r, in.		4.79		4.83		4.20		4.35		4.39	

PIPE 10–
PIPE 8

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 10						Pipe 8			
		xx-Strong		x-Strong		Std		xx-Strong		x-Strong	
t_{des}, in.		0.930		0.465		0.340		0.816		0.465	
lb/ft		104		54.8		40.5		72.5		43.4	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	604	907	316	476	241	362	419	630	249	375
	1	603	907	316	475	241	362	419	629	249	375
	2	602	905	316	475	240	361	418	628	249	374
	3	600	902	315	473	240	360	416	625	247	372
	4	598	899	314	471	239	359	413	620	246	370
	5	595	894	312	469	238	357	409	615	244	367
	6	591	888	310	466	236	355	405	609	242	363
	7	586	881	308	463	235	353	400	601	239	359
	8	581	873	305	459	233	350	394	593	236	354
	9	575	864	303	455	231	347	388	583	232	349
	10	569	855	299	450	228	343	381	573	228	343
	11	561	844	296	445	226	339	373	561	224	337
	12	554	832	292	439	223	335	365	549	220	330
	13	546	820	288	433	220	330	357	536	215	323
	14	537	807	284	427	217	326	348	523	210	315
	15	528	793	279	420	213	320	338	508	204	307
	16	518	778	274	413	210	315	328	494	199	299
	17	508	763	269	405	206	310	318	478	193	290
	18	497	747	264	397	202	304	308	463	187	282
	19	486	731	259	389	198	298	297	447	181	273
	20	475	714	253	381	194	291	286	430	175	263
	22	452	679	242	363	185	278	264	397	163	245
	24	428	643	230	345	176	265	242	364	150	225
	26	403	605	217	327	167	251	220	331	137	206
	28	378	568	205	308	157	236	198	298	125	188
	30	352	530	192	288	148	222	178	267	113	169
	32	327	492	179	269	138	207	158	237	101	152
	34	302	454	166	250	128	193	140	210	89.7	135
	36	278	418	154	231	119	179	124	187	80.0	120
	38	254	382	142	213	110	165	112	168	71.8	108
	40	231	348	130	195	101	152	101	152	64.8	97.5
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		604	907	316	476	241	362	419	630	249	375
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		648	972	340	510	259	388	450	675	268	402
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		181	272	94.9	143	72.3	109	126	189	74.8	112
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		159	239	85.9	129	64.4	96.9	87.2	131	54.1	81.4
Properties											
Area, in.^{2}		28.8		15.1		11.5		20.0		11.9	
I, in.^{4}		354		199		151		154		100	
r, in.		3.51		3.64		3.68		2.78		2.89	

PIPE 8–
PIPE 5

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 8		Pipe 6						Pipe 5	
		Std		xx-Strong		x-Strong		Std		xx-Strong	
t_{des}, in.		0.300		0.805		0.403		0.261		0.699	
lb/ft		28.6		53.2		28.6		19.0		38.6	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	165	247	308	463	164	247	109	164	224	337
	1	164	247	308	462	164	246	109	164	224	336
	2	164	246	306	460	163	245	108	163	222	334
	3	163	245	303	456	162	243	108	162	219	330
	4	162	244	300	451	160	241	106	160	216	324
	5	161	242	295	444	158	237	105	158	211	317
	6	160	240	290	436	155	233	103	155	205	309
	7	158	237	283	426	152	229	101	153	199	299
	8	156	234	276	415	149	224	99.3	149	192	288
	9	154	231	268	403	145	218	96.9	146	184	277
	10	151	227	260	391	141	212	94.2	142	176	264
	11	148	223	251	377	136	205	91.4	137	167	251
	12	146	219	241	362	132	198	88.4	133	158	237
	13	143	214	231	347	127	191	85.2	128	149	223
	14	139	209	221	332	122	183	81.9	123	139	209
	15	136	204	210	316	116	175	78.5	118	130	195
	16	132	199	199	299	111	167	75.1	113	120	181
	17	129	194	188	283	106	159	71.6	108	111	167
	18	125	188	177	267	100	151	68.0	102	102	153
	19	121	182	167	250	94.7	142	64.4	96.8	93.1	140
	20	117	176	156	234	89.2	134	60.9	91.5	84.5	127
	22	109	164	135	203	78.5	118	53.9	81.0	69.9	105
	24	101	152	115	173	68.3	103	47.1	70.8	58.7	88.2
	26	92.8	139	98.2	148	58.5	88.0	40.6	61.1	50.0	75.2
	28	84.7	127	84.7	127	50.5	75.8	35.0	52.7	43.1	64.8
	30	76.8	115	73.8	111	44.0	66.1	30.5	45.9		
	32	69.1	104	64.8	97.4	38.6	58.1	26.8	40.3		
	34	61.7	92.7	57.4	86.3	34.2	51.4	23.8	35.7		
	36	55.0	82.7			30.5	45.9	21.2	31.9		
	38	49.4	74.2								
	40	44.6	67.0								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		165	247	308	463	164	247	109	164	224	337
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		177	265	331	496	176	264	117	176	241	361
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		49.4	74.2	92.4	139	49.2	74.0	32.7	49.1	67.3	101
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		36.3	54.6	47.9	71.9	27.2	41.0	18.5	27.8	29.2	43.8
Properties											
Area, in.^{2}		7.85		14.7		7.83		5.20		10.7	
I, in.^{4}		68.1		63.5		38.3		26.5		32.2	
r, in.		2.95		2.08		2.20		2.25		1.74	

Note: Heavy line indicates L_c/r equal to or greater than 200.

PIPE 5–
PIPE 4

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 5				Pipe 4					
		x-Strong		Std		xx-Strong		x-Strong		Std	
t_{des}, in.		0.349		0.241		0.628		0.315		0.221	
lb/ft		20.8		14.6		27.6		15.0		10.8	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	120	180	84.0	126	161	241	86.8	130	62.0	93.2
	1	120	180	83.9	126	160	240	86.5	130	61.8	92.9
	2	119	179	83.3	125	158	238	85.6	129	61.2	92.0
	3	118	177	82.5	124	155	233	84.2	127	60.3	90.6
	4	116	174	81.3	122	151	227	82.2	124	58.9	88.5
	5	114	171	79.8	120	146	219	79.8	120	57.2	86.0
	6	111	167	78.0	117	140	210	76.9	116	55.2	83.0
	7	108	162	75.9	114	133	200	73.6	111	52.9	79.6
	8	105	157	73.5	111	126	189	70.0	105	50.4	75.8
	9	101	152	71.0	107	118	177	66.1	99.3	47.7	71.8
	10	96.8	146	68.2	103	110	165	62.0	93.1	44.9	67.5
	11	92.5	139	65.3	98.1	101	152	57.7	86.8	42.0	63.1
	12	88.1	132	62.2	93.6	92.7	139	53.4	80.3	38.9	58.5
	13	83.5	125	59.1	88.8	84.3	127	49.1	73.8	35.9	54.0
	14	78.7	118	55.8	83.9	76.0	114	44.9	67.4	32.9	49.5
	15	74.0	111	52.6	79.0	68.1	102	40.7	61.2	30.0	45.1
	16	69.2	104	49.3	74.1	60.3	90.7	36.7	55.1	27.1	40.8
	17	64.4	96.9	46.0	69.1	53.5	80.3	32.8	49.2	24.4	36.6
	18	59.8	89.8	42.8	64.3	47.7	71.7	29.2	43.9	21.7	32.7
	19	55.2	83.0	39.6	59.5	42.8	64.3	26.2	39.4	19.5	29.3
	20	50.7	76.3	36.5	54.9	38.6	58.0	23.7	35.6	17.6	26.5
	22	42.3	63.6	30.6	45.9	31.9	48.0	19.6	29.4	14.6	21.9
	24	35.5	53.4	25.7	38.6			16.4	24.7	12.2	18.4
	26	30.3	45.5	21.9	32.9						
	28	26.1	39.2	18.9	28.4						
	30	22.7	34.2	16.4	24.7						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		120	180	84.0	126	161	241	86.8	130	62.0	93.2
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		129	193	90.2	135	172	259	93.2	140	66.6	99.9
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		36.0	54.1	25.2	37.9	48.2	72.4	26.0	39.1	18.6	28.0
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		16.6	24.9	11.9	17.9	16.6	24.9	9.66	14.5	7.07	10.6
Properties											
Area, in.^{2}		5.73		4.01		7.66		4.14		2.96	
I, in.^{4}		19.5		14.3		14.7		9.12		6.82	
r, in.		1.85		1.88		1.39		1.48		1.51	

Note: Heavy line indicates L_c/r equal to or greater than 200.

PIPE 3½–
PIPE 3

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 3½				Pipe 3					
		x-Strong		Std		xx-Strong		x-Strong		Std	
t_{des}, in.		0.296		0.211		0.559		0.280		0.201	
lb/ft		12.5		9.12		18.6		10.3		7.58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	71.9	108	52.4	78.7	108	163	59.3	89.1	43.4	65.2
	1	71.6	108	52.2	78.4	108	162	59.0	88.6	43.2	64.9
	2	70.7	106	51.5	77.5	106	159	58.0	87.1	42.5	63.8
	3	69.2	104	50.5	75.9	102	154	56.4	84.7	41.3	62.1
	4	67.1	101	49.1	73.7	97.6	147	54.2	81.4	39.8	59.8
	5	64.6	97.0	47.3	71.1	92.0	138	51.5	77.4	37.9	57.0
	6	61.6	92.6	45.2	67.9	85.6	129	48.4	72.7	35.7	53.7
	7	58.2	87.5	42.8	64.4	78.6	118	44.9	67.5	33.3	50.1
	8	54.6	82.1	40.3	60.6	71.2	107	41.3	62.0	30.7	46.2
	9	50.8	76.3	37.6	56.5	63.7	95.7	37.5	56.3	28.0	42.2
	10	46.8	70.3	34.8	52.2	56.2	84.5	33.6	50.6	25.3	38.1
	11	42.8	64.3	31.9	47.9	49.0	73.6	29.9	44.9	22.6	34.0
	12	38.7	58.2	29.0	43.6	42.1	63.3	26.2	39.4	20.0	30.0
	13	34.8	52.3	26.2	39.4	35.9	53.9	22.7	34.1	17.5	26.2
	14	31.0	46.6	23.4	35.2	30.9	46.5	19.6	29.4	15.1	22.7
	15	27.3	41.0	20.8	31.3	26.9	40.5	17.1	25.6	13.1	19.8
	16	24.0	36.1	18.3	27.5	23.7	35.6	15.0	22.5	11.6	17.4
	17	21.3	32.0	16.2	24.4	21.0	31.5	13.3	20.0	10.2	15.4
	18	19.0	28.5	14.5	21.7			11.8	17.8	9.13	13.7
	19	17.0	25.6	13.0	19.5			10.6	16.0	8.19	12.3
	20	15.4	23.1	11.7	17.6						
	22			9.68	14.6						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		71.9	108	52.4	78.8	108	163	59.3	89.1	43.4	65.2
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		77.2	116	56.3	84.4	116	174	63.7	95.5	46.6	69.9
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		21.6	32.4	15.7	23.6	32.5	48.9	17.8	26.7	13.0	19.6
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		7.11	10.7	5.29	7.95	8.54	12.8	5.08	7.64	3.82	5.75
Properties											
Area, in.^{2}		3.43		2.50		5.17		2.83		2.07	
I, in.^{4}		5.94		4.52		5.79		3.70		2.85	
r, in.		1.31		1.34		1.06		1.14		1.17	

Note: Heavy line indicates L_c/r equal to or greater than 200.

PIPE 2½–
PIPE 2

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 2½						Pipe 2			
		xx-Strong		x-Strong		Std		xx-Strong		x-Strong	
t_{des}, in.		0.514		0.257		0.189		0.406		0.204	
lb/ft		13.7		7.67		5.80		9.04		5.03	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	80.3	121	44.0	66.1	33.7	50.7	52.6	79.1	29.3	44.1
	1	79.5	119	43.6	65.6	33.5	50.3	51.8	77.9	29.0	43.6
	2	77.1	116	42.5	63.9	32.7	49.1	49.6	74.6	27.9	42.0
	3	73.3	110	40.8	61.3	31.4	47.1	46.1	69.3	26.2	39.4
	4	68.3	103	38.4	57.7	29.6	44.5	41.7	62.6	24.1	36.2
	5	62.3	93.7	35.6	53.5	27.5	41.4	36.5	54.9	21.5	32.3
	6	55.8	83.9	32.4	48.7	25.2	37.8	31.1	46.8	18.8	28.2
	7	48.9	73.5	29.0	43.6	22.7	34.0	25.7	38.7	16.0	24.0
	8	42.0	63.2	25.5	38.3	20.1	30.1	20.7	31.1	13.3	19.9
	9	35.4	53.2	22.1	33.2	17.5	26.2	16.4	24.6	10.7	16.1
	10	29.2	43.8	18.8	28.2	15.0	22.5	13.2	19.9	8.69	13.1
	11	24.1	36.2	15.7	23.5	12.6	18.9	10.9	16.5	7.18	10.8
	12	20.2	30.4	13.2	19.8	10.6	15.9			6.03	9.07
	13	17.3	25.9	11.2	16.9	9.01	13.5				
	14	14.9	22.4	9.67	14.5	7.77	11.7				
	15			8.43	12.7	6.77	10.2				
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		80.3	121	44.0	66.2	33.7	50.7	52.6	79.1	29.3	44.1
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		86.2	129	47.3	70.9	36.2	54.3	56.5	84.7	31.5	47.3
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		24.1	36.2	13.2	19.8	10.1	15.2	15.8	23.7	8.80	13.2
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		5.08	7.64	3.09	4.65	2.39	3.60	2.79	4.20	1.68	2.53
Properties											
Area, in.^{2}		3.83		2.10		1.61		2.51		1.40	
I, in.^{4}		2.78		1.83		1.45		1.27		0.827	
r, in.		0.854		0.930		0.952		0.711		0.771	

Note: Heavy line indicates L_c/r equal to or greater than 200.

PIPE 2–
PIPE 1¼

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 2		Pipe 1½				Pipe 1¼			
		Std		x-Strong		Std		x-Strong		Std	
t_{des}, in.		0.143		0.186		0.135		0.178		0.130	
lb/ft		3.66		3.63		2.72		3.00		2.27	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	21.4	32.1	21.0	31.5	15.7	23.6	17.5	26.4	13.1	19.7
	1	21.1	31.8	20.5	30.9	15.4	23.2	17.1	25.7	12.8	19.2
	2	20.4	30.7	19.4	29.1	14.6	21.9	15.8	23.7	11.9	17.8
	3	19.2	28.9	17.5	26.4	13.3	19.9	13.8	20.8	10.5	15.7
	4	17.7	26.6	15.3	22.9	11.6	17.5	11.5	17.3	8.78	13.2
	5	15.9	23.9	12.8	19.2	9.81	14.7	9.06	13.6	7.01	10.5
	6	14.0	21.0	10.3	15.4	7.98	12.0	6.77	10.2	5.33	8.01
	7	12.0	18.0	7.93	11.9	6.25	9.39	4.97	7.47	3.93	5.90
	8	10.1	15.1	6.07	9.12	4.79	7.19	3.81	5.72	3.01	4.52
	9	8.22	12.4	4.80	7.21	3.78	5.68			2.37	3.57
	10	6.66	10.0	3.88	5.84	3.06	4.60				
	11	5.51	8.27								
	12	4.63	6.95								
	13	3.94	5.92								
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		21.4	32.1	21.0	31.5	15.7	23.6	17.5	26.4	13.1	19.7
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		23.0	34.4	22.5	33.8	16.9	25.3	18.8	28.2	14.1	21.1
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		6.41	9.64	6.29	9.45	4.71	7.08	5.26	7.91	3.93	5.91
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		1.25	1.87	0.959	1.44	0.735	1.11	0.686	1.03	0.533	0.801
Properties											
Area, in.^{2}		1.02		1.00		0.749		0.837		0.625	
I, in.^{4}		0.627		0.372		0.293		0.231		0.184	
r, in.		0.791		0.610		0.626		0.528		0.543	

Note: Heavy line indicates L_c/r equal to or greater than 200.

PIPE 1–
PIPE ½

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe 1				Pipe ¾				Pipe ½	
		x-Strong		Std		x-Strong		Std		x-Strong	
t_{des}, in.		0.166		0.124		0.143		0.105		0.137	
lb/ft		2.17		1.68		1.48		1.13		1.09	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Available Compressive Strength, kips		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	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	12.6	19.0	9.83	14.8	8.53	12.8	6.54	9.83	6.35	9.54
	1	12.1	18.1	9.43	14.2	7.96	12.0	6.13	9.21	5.66	8.51
	2	10.6	15.9	8.34	12.5	6.45	9.70	5.04	7.57	4.01	6.02
	3	8.50	12.8	6.78	10.2	4.55	6.84	3.63	5.46	2.25	3.38
	4	6.26	9.40	5.09	7.64	2.80	4.22	2.30	3.45	1.27	1.90
	5	4.23	6.35	3.50	5.27	1.79	2.70	1.47	2.21		
	6	2.93	4.41	2.43	3.66						
	7			1.79	2.69						
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		12.6	19.0	9.83	14.8	8.53	12.8	6.54	9.83	6.35	9.54
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$	P_n/Ω_t	$\phi_t P_n$
		13.5	20.3	10.6	15.8	9.16	13.7	7.02	10.5	6.82	10.2
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$	V_n/Ω_v	$\phi_v V_n$
		3.79	5.69	2.95	4.43	2.56	3.85	1.96	2.95	1.91	2.86
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$	M_n/Ω_b	$\phi_b M_n$
		0.386	0.580	0.309	0.465	0.208	0.312	0.165	0.247	0.120	0.180
Properties											
Area, in.^{2}		0.602		0.469		0.407		0.312		0.303	
I, in.^{4}		0.101		0.0830		0.0430		0.0350		0.0190	
r, in.		0.410		0.423		0.325		0.336		0.253	

Note: Heavy line indicates L_c/r equal to or greater than 200.

PIPE ½

Table 6-I (continued)
Available Strength for Members Subject to Axial, Shear, Flexural, and Combined Forces
Pipe

ASTM A53/A53M
Grade B
F_y = 35 ksi
F_u = 60 ksi

Shape		Pipe ½	
		Std	
t_{des}, in.		0.101	
lb/ft		0.850	
Design		ASD	LRFD
Available Compressive Strength, kips		P_n/Ω_c	$\phi_c P_n$
Effective length, L_c (ft), with respect to the radius of gyration, r	0	4.90	7.37
	1	4.41	6.63
	2	3.21	4.83
	3	1.89	2.84
	4	1.06	1.60
Available Strength in Tensile Yielding, kips		P_n/Ω_t	$\phi_t P_n$
		4.90	7.37
Available Strength in Tensile Rupture ($A_e = 0.75A_g$), kips		P_n/Ω_t	$\phi_t P_n$
		5.27	7.90
Available Strength in Shear, kips		V_n/Ω_v	$\phi_v V_n$
		1.47	2.21
Available Strength in Flexure, kip-ft		M_n/Ω_b	$\phi_b M_n$
		0.0969	0.146

Properties	
Area, in.^{2}	0.234
I, in.^{4}	0.0160
r, in.	0.264

Note: Heavy line indicates L_c/r equal to or greater than 200.

W44

Table 6-J
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W44×											
		408[h]				368				335[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.278	0.185	0.178	0.119	0.309	0.206	0.198	0.132	0.345	0.229	0.220	0.146
	11	0.308	0.205	0.178	0.119	0.342	0.228	0.198	0.132	0.377	0.251	0.220	0.146
	12	0.314	0.209	0.178	0.119	0.349	0.232	0.198	0.132	0.384	0.256	0.220	0.146
	13	0.320	0.213	0.179	0.119	0.356	0.237	0.199	0.133	0.392	0.261	0.222	0.148
	14	0.328	0.218	0.181	0.121	0.365	0.243	0.202	0.134	0.402	0.267	0.225	0.150
	15	0.336	0.223	0.184	0.122	0.374	0.249	0.205	0.136	0.412	0.274	0.229	0.152
	16	0.344	0.229	0.186	0.124	0.383	0.255	0.208	0.138	0.423	0.281	0.232	0.155
	17	0.354	0.235	0.189	0.126	0.394	0.262	0.211	0.140	0.435	0.290	0.236	0.157
	18	0.364	0.242	0.192	0.127	0.406	0.270	0.214	0.143	0.449	0.299	0.240	0.160
	19	0.376	0.250	0.194	0.129	0.419	0.279	0.218	0.145	0.463	0.308	0.244	0.162
	20	0.388	0.258	0.197	0.131	0.433	0.288	0.221	0.147	0.479	0.319	0.248	0.165
	22	0.416	0.277	0.203	0.135	0.464	0.309	0.228	0.152	0.515	0.343	0.256	0.171
	24	0.449	0.299	0.209	0.139	0.502	0.334	0.236	0.157	0.558	0.371	0.266	0.177
	26	0.488	0.325	0.216	0.143	0.546	0.363	0.244	0.162	0.608	0.405	0.275	0.183
	28	0.534	0.355	0.223	0.148	0.598	0.398	0.252	0.168	0.668	0.444	0.286	0.190
	30	0.588	0.391	0.230	0.153	0.659	0.438	0.262	0.174	0.738	0.491	0.297	0.198
	32	0.652	0.434	0.238	0.158	0.731	0.486	0.272	0.181	0.822	0.547	0.310	0.206
	34	0.728	0.485	0.247	0.164	0.818	0.544	0.283	0.188	0.923	0.614	0.323	0.215
	36	0.816	0.543	0.256	0.170	0.917	0.610	0.294	0.196	1.03	0.689	0.338	0.225
	38	0.910	0.605	0.266	0.177	1.02	0.680	0.307	0.204	1.15	0.767	0.354	0.235
	40	1.01	0.671	0.276	0.184	1.13	0.754	0.321	0.213	1.28	0.850	0.377	0.251
	42	1.11	0.739	0.288	0.192	1.25	0.831	0.341	0.227	1.41	0.937	0.404	0.269
	44	1.22	0.811	0.303	0.202	1.37	0.912	0.363	0.242	1.55	1.03	0.431	0.287
	46	1.33	0.887	0.322	0.214	1.50	0.997	0.386	0.257	1.69	1.12	0.459	0.305
	48	1.45	0.966	0.340	0.226	1.63	1.09	0.408	0.271	1.84	1.22	0.486	0.323
	50	1.57	1.05	0.358	0.238	1.77	1.18	0.430	0.286	2.00	1.33	0.514	0.342
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.20		0.798		1.34		0.894		1.51		1.00	
$t_y \times 10^3$, (kips)$^{-1}$		0.278		0.185		0.309		0.206		0.339		0.226	
$t_r \times 10^3$, (kips)$^{-1}$		0.342		0.228		0.380		0.253		0.417		0.278	
r_x/r_y		5.06				5.06				5.10			
r_y, in.		3.56				3.54				3.49			

[c] Shape is slender for compression for F_y = 50 ksi.

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W44

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W44×											
		290[c]				262[c]				230[c], [v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.416	0.277	0.253	0.168	0.473	0.315	0.281	0.187	0.555	0.369	0.324	0.215
	11	0.455	0.303	0.253	0.168	0.518	0.345	0.281	0.187	0.609	0.405	0.324	0.215
	12	0.463	0.308	0.253	0.168	0.527	0.351	0.281	0.187	0.620	0.413	0.324	0.215
	13	0.472	0.314	0.255	0.170	0.537	0.357	0.284	0.189	0.632	0.421	0.329	0.219
	14	0.482	0.320	0.259	0.173	0.548	0.365	0.289	0.192	0.646	0.430	0.335	0.223
	15	0.492	0.327	0.264	0.175	0.560	0.373	0.294	0.196	0.660	0.439	0.341	0.227
	16	0.504	0.335	0.268	0.178	0.574	0.382	0.299	0.199	0.676	0.450	0.347	0.231
	17	0.516	0.343	0.273	0.181	0.588	0.391	0.304	0.203	0.694	0.461	0.354	0.235
	18	0.530	0.353	0.277	0.184	0.604	0.402	0.310	0.206	0.712	0.474	0.360	0.240
	19	0.545	0.362	0.282	0.188	0.621	0.413	0.316	0.210	0.733	0.488	0.367	0.244
	20	0.561	0.373	0.287	0.191	0.640	0.426	0.322	0.214	0.755	0.503	0.375	0.249
	22	0.597	0.397	0.298	0.198	0.681	0.453	0.335	0.223	0.806	0.536	0.390	0.260
	24	0.643	0.428	0.309	0.206	0.730	0.486	0.348	0.232	0.865	0.575	0.407	0.271
	26	0.702	0.467	0.321	0.214	0.787	0.524	0.363	0.242	0.934	0.621	0.425	0.283
	28	0.770	0.512	0.335	0.223	0.859	0.571	0.379	0.252	1.01	0.675	0.446	0.296
	30	0.851	0.567	0.349	0.232	0.950	0.632	0.397	0.264	1.11	0.738	0.468	0.311
	32	0.948	0.631	0.365	0.243	1.06	0.705	0.417	0.277	1.23	0.820	0.492	0.327
	34	1.06	0.708	0.382	0.254	1.19	0.793	0.438	0.292	1.39	0.924	0.519	0.346
	36	1.19	0.794	0.401	0.267	1.34	0.889	0.465	0.310	1.56	1.04	0.568	0.378
	38	1.33	0.885	0.429	0.286	1.49	0.990	0.507	0.337	1.73	1.15	0.621	0.413
	40	1.47	0.980	0.464	0.309	1.65	1.10	0.549	0.365	1.92	1.28	0.674	0.449
	42	1.62	1.08	0.499	0.332	1.82	1.21	0.592	0.394	2.12	1.41	0.729	0.485
	44	1.78	1.19	0.534	0.355	2.00	1.33	0.635	0.423	2.33	1.55	0.784	0.522
	46	1.95	1.30	0.570	0.379	2.18	1.45	0.679	0.452	2.54	1.69	0.840	0.559
	48	2.12	1.41	0.605	0.403	2.37	1.58	0.722	0.481	2.77	1.84	0.897	0.597
	50	2.30	1.53	0.641	0.426	2.58	1.71	0.766	0.510	3.00	2.00	0.954	0.634

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	1.74	1.16	1.96	1.30	2.27	1.51
$t_y \times 10^3$, (kips)$^{-1}$	0.391	0.260	0.433	0.288	0.493	0.328
$t_r \times 10^3$, (kips)$^{-1}$	0.480	0.320	0.531	0.354	0.605	0.403
r_x/r_y	5.10		5.10		5.10	
r_y, in.	3.49		3.47		3.43	

[c] Shape is slender for compression for F_y = 50 ksi.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		655[h]				593[h]				503[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.173	0.115	0.116	0.0770	0.192	0.128	0.129	0.0859	0.226	0.150	0.154	0.102
	11	0.189	0.125	0.116	0.0770	0.210	0.139	0.129	0.0859	0.247	0.165	0.154	0.102
	12	0.192	0.127	0.116	0.0770	0.213	0.142	0.129	0.0859	0.252	0.168	0.154	0.102
	13	0.195	0.130	0.116	0.0770	0.217	0.144	0.129	0.0859	0.257	0.171	0.154	0.102
	14	0.199	0.132	0.116	0.0772	0.221	0.147	0.130	0.0863	0.262	0.174	0.155	0.103
	15	0.203	0.135	0.117	0.0777	0.226	0.150	0.131	0.0870	0.268	0.178	0.156	0.104
	16	0.207	0.138	0.118	0.0783	0.231	0.154	0.132	0.0877	0.274	0.182	0.158	0.105
	17	0.212	0.141	0.119	0.0789	0.237	0.158	0.133	0.0884	0.281	0.187	0.159	0.106
	18	0.218	0.145	0.119	0.0795	0.243	0.162	0.134	0.0892	0.289	0.192	0.161	0.107
	19	0.223	0.149	0.120	0.0801	0.250	0.166	0.135	0.0899	0.297	0.198	0.163	0.108
	20	0.230	0.153	0.121	0.0807	0.257	0.171	0.136	0.0907	0.306	0.204	0.164	0.109
	22	0.244	0.162	0.123	0.0820	0.273	0.182	0.139	0.0923	0.326	0.217	0.168	0.112
	24	0.260	0.173	0.125	0.0833	0.292	0.194	0.141	0.0939	0.350	0.233	0.171	0.114
	26	0.279	0.186	0.127	0.0846	0.314	0.209	0.144	0.0956	0.377	0.251	0.175	0.117
	28	0.301	0.200	0.129	0.0860	0.340	0.226	0.146	0.0973	0.410	0.273	0.179	0.119
	30	0.327	0.217	0.131	0.0874	0.370	0.246	0.149	0.0991	0.448	0.298	0.183	0.122
	32	0.357	0.237	0.134	0.0889	0.405	0.269	0.152	0.101	0.492	0.327	0.187	0.125
	34	0.392	0.261	0.136	0.0904	0.446	0.297	0.155	0.103	0.544	0.362	0.192	0.128
	36	0.432	0.288	0.138	0.0920	0.494	0.329	0.158	0.105	0.606	0.403	0.197	0.131
	38	0.481	0.320	0.141	0.0936	0.551	0.366	0.161	0.107	0.675	0.449	0.201	0.134
	40	0.533	0.355	0.143	0.0953	0.610	0.406	0.164	0.109	0.748	0.498	0.207	0.138
	42	0.588	0.391	0.146	0.0971	0.673	0.448	0.168	0.112	0.825	0.549	0.212	0.141
	44	0.645	0.429	0.149	0.0989	0.738	0.491	0.171	0.114	0.906	0.603	0.218	0.145
	46	0.705	0.469	0.152	0.101	0.807	0.537	0.175	0.116	0.990	0.659	0.224	0.149
	48	0.768	0.511	0.154	0.103	0.879	0.585	0.179	0.119	1.08	0.717	0.230	0.153
	50	0.833	0.554	0.158	0.105	0.953	0.634	0.183	0.122	1.17	0.778	0.237	0.158
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.657		0.437		0.741		0.493		0.904		0.602	
$t_y \times 10^3$, (kips)$^{-1}$		0.173		0.115		0.192		0.128		0.226		0.150	
$t_r \times 10^3$, (kips)$^{-1}$		0.213		0.142		0.236		0.157		0.277		0.185	
r_x/r_y		4.43				4.47				4.52			
r_y, in.		3.86				3.80				3.72			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		431[h]				397[h]				392[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.263	0.175	0.182	0.121	0.285	0.190	0.198	0.132	0.288	0.192	0.208	0.139
	11	0.289	0.193	0.182	0.121	0.314	0.209	0.198	0.132	0.346	0.230	0.213	0.142
	12	0.295	0.196	0.182	0.121	0.320	0.213	0.198	0.132	0.358	0.238	0.217	0.144
	13	0.301	0.200	0.182	0.121	0.327	0.217	0.198	0.132	0.372	0.247	0.220	0.146
	14	0.307	0.204	0.184	0.122	0.334	0.222	0.201	0.133	0.387	0.258	0.223	0.148
	15	0.314	0.209	0.186	0.124	0.341	0.227	0.203	0.135	0.404	0.269	0.227	0.151
	16	0.322	0.214	0.188	0.125	0.350	0.233	0.205	0.137	0.424	0.282	0.23	0.153
	17	0.330	0.220	0.190	0.127	0.359	0.239	0.208	0.138	0.446	0.296	0.234	0.156
	18	0.340	0.226	0.193	0.128	0.369	0.246	0.211	0.140	0.470	0.313	0.238	0.158
	19	0.350	0.233	0.195	0.130	0.380	0.253	0.213	0.142	0.497	0.331	0.241	0.161
	20	0.361	0.240	0.197	0.131	0.392	0.261	0.216	0.144	0.527	0.351	0.245	0.163
	22	0.386	0.257	0.202	0.134	0.419	0.279	0.221	0.147	0.598	0.398	0.254	0.169
	24	0.415	0.276	0.207	0.138	0.451	0.300	0.227	0.151	0.687	0.457	0.263	0.175
	26	0.449	0.299	0.212	0.141	0.488	0.325	0.234	0.155	0.801	0.533	0.273	0.181
	28	0.489	0.325	0.218	0.145	0.532	0.354	0.240	0.160	0.929	0.618	0.283	0.188
	30	0.536	0.356	0.224	0.149	0.584	0.388	0.247	0.164	1.07	0.710	0.295	0.196
	32	0.591	0.393	0.230	0.153	0.644	0.429	0.255	0.169	1.21	0.807	0.307	0.204
	34	0.656	0.436	0.236	0.157	0.715	0.476	0.262	0.175	1.37	0.911	0.320	0.213
	36	0.734	0.488	0.243	0.162	0.801	0.533	0.271	0.180	1.54	1.02	0.335	0.223
	38	0.818	0.544	0.251	0.167	0.892	0.594	0.280	0.186	1.71	1.14	0.351	0.233
	40	0.906	0.603	0.259	0.172	0.989	0.658	0.289	0.192	1.90	1.26	0.372	0.248
	42	0.999	0.665	0.267	0.178	1.09	0.725	0.299	0.199	2.09	1.39	0.394	0.262
	44	1.10	0.729	0.276	0.184	1.20	0.796	0.310	0.206	2.29	1.53	0.415	0.276
	46	1.20	0.797	0.285	0.190	1.31	0.870	0.322	0.214				
	48	1.30	0.868	0.295	0.197	1.42	0.947	0.338	0.225				
	50	1.42	0.942	0.308	0.205	1.55	1.03	0.356	0.237				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.09	0.723	1.19	0.790	1.71	1.14
$t_y \times 10^3$, (kips)$^{-1}$	0.263	0.175	0.285	0.190	0.288	0.192
$t_r \times 10^3$, (kips)$^{-1}$	0.323	0.215	0.351	0.234	0.354	0.236
r_x/r_y	4.55		4.56		6.10	
r_y, in.	3.65		3.64		2.64	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		372[h]				362[h]				331[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.304	0.202	0.212	0.141	0.315	0.210	0.217	0.145	0.342	0.227	0.249	0.166
	11	0.335	0.223	0.212	0.141	0.348	0.231	0.217	0.145	0.415	0.276	0.257	0.171
	12	0.341	0.227	0.212	0.141	0.354	0.236	0.217	0.145	0.430	0.286	0.262	0.174
	13	0.348	0.232	0.213	0.142	0.361	0.240	0.218	0.145	0.448	0.298	0.266	0.177
	14	0.356	0.237	0.215	0.143	0.369	0.246	0.221	0.147	0.467	0.311	0.271	0.180
	15	0.365	0.243	0.218	0.145	0.378	0.252	0.224	0.149	0.489	0.326	0.276	0.184
	16	0.374	0.249	0.221	0.147	0.388	0.258	0.227	0.151	0.514	0.342	0.281	0.187
	17	0.384	0.255	0.224	0.149	0.398	0.265	0.230	0.153	0.542	0.361	0.287	0.191
	18	0.395	0.263	0.227	0.151	0.410	0.273	0.233	0.155	0.573	0.381	0.292	0.194
	19	0.407	0.271	0.230	0.153	0.422	0.281	0.236	0.157	0.608	0.404	0.298	0.198
	20	0.420	0.280	0.233	0.155	0.436	0.290	0.239	0.159	0.647	0.430	0.304	0.202
	22	0.450	0.299	0.240	0.159	0.467	0.311	0.246	0.164	0.739	0.492	0.317	0.211
	24	0.485	0.323	0.246	0.164	0.503	0.335	0.253	0.168	0.856	0.570	0.331	0.220
	26	0.526	0.350	0.254	0.169	0.546	0.363	0.261	0.174	1.00	0.668	0.346	0.230
	28	0.574	0.382	0.261	0.174	0.596	0.396	0.269	0.179	1.16	0.774	0.362	0.241
	30	0.631	0.420	0.270	0.179	0.655	0.436	0.278	0.185	1.34	0.889	0.381	0.253
	32	0.698	0.464	0.278	0.185	0.724	0.482	0.287	0.191	1.52	1.01	0.401	0.267
	34	0.777	0.517	0.288	0.191	0.806	0.536	0.297	0.197	1.72	1.14	0.425	0.283
	36	0.871	0.579	0.298	0.198	0.904	0.601	0.307	0.204	1.92	1.28	0.456	0.304
	38	0.970	0.646	0.308	0.205	1.01	0.670	0.319	0.212	2.14	1.43	0.488	0.324
	40	1.08	0.715	0.320	0.213	1.12	0.742	0.331	0.220	2.38	1.58	0.519	0.345
	42	1.19	0.789	0.332	0.221	1.23	0.818	0.344	0.229	2.62	1.74	0.550	0.366
	44	1.30	0.866	0.345	0.230	1.35	0.898	0.358	0.238				
	46	1.42	0.946	0.365	0.243	1.48	0.982	0.380	0.253				
	48	1.55	1.03	0.385	0.256	1.61	1.07	0.401	0.267				
	50	1.68	1.12	0.405	0.270	1.74	1.16	0.422	0.281				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.29		0.856		1.32		0.878		2.10		1.40	
$t_y \times 10^3$, (kips)$^{-1}$		0.304		0.202		0.315		0.210		0.342		0.227	
$t_r \times 10^3$, (kips)$^{-1}$		0.373		0.249		0.387		0.258		0.420		0.280	
r_x/r_y		4.58				4.58				6.19			
r_y, in.		3.60				3.60				2.57			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		327[h]				324				297[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.348	0.232	0.253	0.168	0.350	0.233	0.244	0.162	0.385	0.256	0.268	0.178
	11	0.422	0.281	0.261	0.174	0.387	0.258	0.244	0.162	0.424	0.282	0.268	0.178
	12	0.437	0.291	0.265	0.177	0.394	0.262	0.244	0.162	0.432	0.287	0.268	0.178
	13	0.455	0.303	0.270	0.180	0.403	0.268	0.245	0.163	0.441	0.293	0.270	0.179
	14	0.475	0.316	0.275	0.183	0.412	0.274	0.249	0.165	0.451	0.300	0.274	0.182
	15	0.497	0.331	0.280	0.186	0.422	0.281	0.252	0.168	0.462	0.308	0.278	0.185
	16	0.522	0.347	0.285	0.190	0.433	0.288	0.256	0.170	0.474	0.316	0.282	0.188
	17	0.550	0.366	0.290	0.193	0.444	0.296	0.259	0.173	0.488	0.325	0.286	0.190
	18	0.581	0.387	0.296	0.197	0.457	0.304	0.263	0.175	0.502	0.334	0.291	0.193
	19	0.616	0.410	0.302	0.201	0.471	0.314	0.267	0.178	0.518	0.345	0.295	0.197
	20	0.656	0.436	0.308	0.205	0.487	0.324	0.271	0.180	0.535	0.356	0.300	0.200
	22	0.749	0.498	0.321	0.213	0.522	0.347	0.279	0.186	0.575	0.382	0.310	0.206
	24	0.866	0.576	0.335	0.223	0.563	0.374	0.288	0.192	0.621	0.413	0.321	0.213
	26	1.01	0.675	0.350	0.233	0.611	0.406	0.298	0.198	0.675	0.449	0.332	0.221
	28	1.18	0.783	0.367	0.244	0.667	0.444	0.308	0.205	0.739	0.492	0.344	0.229
	30	1.35	0.899	0.385	0.256	0.734	0.488	0.319	0.212	0.815	0.542	0.357	0.238
	32	1.54	1.02	0.406	0.270	0.813	0.541	0.330	0.220	0.904	0.602	0.372	0.247
	34	1.73	1.15	0.430	0.286	0.907	0.603	0.343	0.228	1.01	0.674	0.387	0.257
	36	1.95	1.29	0.462	0.307	1.02	0.676	0.357	0.237	1.13	0.755	0.404	0.269
	38	2.17	1.44	0.494	0.329	1.13	0.754	0.371	0.247	1.26	0.841	0.422	0.281
	40	2.40	1.60	0.526	0.350	1.25	0.835	0.387	0.258	1.40	0.932	0.446	0.297
	42	2.65	1.76	0.557	0.371	1.38	0.921	0.408	0.272	1.54	1.03	0.478	0.318
	44					1.52	1.01	0.435	0.289	1.70	1.13	0.509	0.339
	46					1.66	1.10	0.461	0.307	1.85	1.23	0.541	0.360
	48					1.81	1.20	0.488	0.324	2.02	1.34	0.573	0.381
	50					1.96	1.30	0.514	0.342	2.19	1.46	0.605	0.403

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	2.12	1.41	1.49	0.992	1.66	1.10
$t_y \times 10^3$, (kips)$^{-1}$	0.348	0.232	0.350	0.233	0.383	0.255
$t_r \times 10^3$, (kips)$^{-1}$	0.428	0.285	0.430	0.287	0.470	0.313
r_x/r_y	6.20		4.58		4.60	
r_y, in.	2.58		3.58		3.54	

[c] Shape is slender for compression for F_y = 50 ksi.

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		294				278				277[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.387	0.258	0.281	0.187	0.406	0.270	0.299	0.199	0.424	0.282	0.285	0.190
	11	0.471	0.314	0.291	0.194	0.496	0.330	0.312	0.207	0.462	0.308	0.285	0.190
	12	0.489	0.325	0.296	0.197	0.515	0.343	0.318	0.211	0.470	0.313	0.285	0.190
	13	0.509	0.339	0.302	0.201	0.537	0.357	0.324	0.216	0.479	0.319	0.287	0.191
	14	0.532	0.354	0.308	0.205	0.562	0.374	0.331	0.220	0.488	0.325	0.291	0.193
	15	0.558	0.371	0.314	0.209	0.589	0.392	0.338	0.225	0.498	0.332	0.295	0.196
	16	0.586	0.390	0.321	0.214	0.620	0.413	0.345	0.229	0.510	0.339	0.300	0.199
	17	0.619	0.412	0.328	0.218	0.655	0.436	0.352	0.234	0.522	0.347	0.304	0.203
	18	0.655	0.436	0.335	0.223	0.694	0.462	0.360	0.240	0.535	0.356	0.309	0.206
	19	0.695	0.463	0.342	0.228	0.738	0.491	0.369	0.245	0.551	0.367	0.314	0.209
	20	0.740	0.493	0.350	0.233	0.788	0.524	0.377	0.251	0.569	0.379	0.320	0.213
	22	0.848	0.564	0.366	0.244	0.905	0.602	0.396	0.263	0.610	0.406	0.330	0.220
	24	0.985	0.655	0.384	0.256	1.06	0.702	0.416	0.277	0.658	0.438	0.342	0.228
	26	1.16	0.769	0.404	0.269	1.24	0.824	0.439	0.292	0.714	0.475	0.355	0.236
	28	1.34	0.892	0.426	0.284	1.44	0.956	0.464	0.309	0.780	0.519	0.368	0.245
	30	1.54	1.02	0.451	0.300	1.65	1.10	0.493	0.328	0.858	0.571	0.382	0.254
	32	1.75	1.16	0.482	0.320	1.88	1.25	0.535	0.356	0.950	0.632	0.398	0.265
	34	1.98	1.31	0.521	0.347	2.12	1.41	0.580	0.386	1.06	0.705	0.415	0.276
	36	2.22	1.47	0.561	0.373	2.38	1.58	0.624	0.415	1.19	0.791	0.434	0.289
	38	2.47	1.64	0.601	0.400	2.65	1.76	0.669	0.445	1.32	0.881	0.454	0.302
	40	2.73	1.82	0.640	0.426	2.93	1.95	0.714	0.475	1.47	0.976	0.484	0.322
	42	3.02	2.01	0.679	0.452	3.23	2.15	0.758	0.504	1.62	1.08	0.519	0.345
	44									1.78	1.18	0.555	0.369
	46									1.94	1.29	0.590	0.393
	48									2.11	1.41	0.625	0.416
	50									2.29	1.53	0.661	0.440

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.38	1.58	2.56	1.70	1.75	1.16
$t_y \times 10^3$, (kips)$^{-1}$	0.387	0.258	0.406	0.270	0.410	0.273
$t_r \times 10^3$, (kips)$^{-1}$	0.476	0.317	0.498	0.332	0.503	0.336
r_x/r_y	6.24		6.27		4.58	
r_y, in.	2.55		2.52		3.58	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		264				249[c]				235[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.432	0.287	0.315	0.210	0.482	0.320	0.318	0.212	0.503	0.335	0.353	0.235
	11	0.527	0.351	0.329	0.219	0.526	0.350	0.318	0.212	0.596	0.396	0.368	0.245
	12	0.548	0.365	0.335	0.223	0.535	0.356	0.318	0.212	0.615	0.409	0.376	0.250
	13	0.571	0.380	0.342	0.228	0.545	0.363	0.320	0.213	0.637	0.424	0.384	0.255
	14	0.597	0.397	0.349	0.233	0.556	0.370	0.325	0.217	0.666	0.443	0.393	0.261
	15	0.627	0.417	0.357	0.238	0.568	0.378	0.331	0.220	0.698	0.464	0.402	0.267
	16	0.660	0.439	0.365	0.243	0.581	0.387	0.336	0.224	0.734	0.488	0.411	0.274
	17	0.697	0.464	0.373	0.248	0.595	0.396	0.342	0.227	0.775	0.515	0.421	0.280
	18	0.738	0.491	0.382	0.254	0.611	0.406	0.347	0.231	0.820	0.546	0.431	0.287
	19	0.785	0.522	0.391	0.260	0.628	0.418	0.353	0.235	0.871	0.580	0.442	0.294
	20	0.838	0.557	0.401	0.267	0.646	0.430	0.359	0.239	0.928	0.618	0.454	0.302
	22	0.963	0.641	0.421	0.280	0.687	0.457	0.372	0.248	1.06	0.709	0.479	0.319
	24	1.12	0.747	0.444	0.295	0.735	0.489	0.386	0.257	1.24	0.823	0.507	0.337
	26	1.32	0.877	0.469	0.312	0.799	0.532	0.401	0.267	1.45	0.967	0.538	0.358
	28	1.53	1.02	0.498	0.331	0.875	0.582	0.417	0.278	1.68	1.12	0.573	0.381
	30	1.75	1.17	0.533	0.354	0.964	0.641	0.435	0.289	1.93	1.29	0.629	0.419
	32	2.00	1.33	0.582	0.387	1.07	0.711	0.454	0.302	2.20	1.46	0.690	0.459
	34	2.25	1.50	0.632	0.420	1.20	0.795	0.475	0.316	2.48	1.65	0.750	0.499
	36	2.53	1.68	0.681	0.453	1.34	0.892	0.498	0.331	2.79	1.85	0.811	0.540
	38	2.81	1.87	0.730	0.486	1.49	0.994	0.530	0.353	3.10	2.06	0.872	0.580
	40	3.12	2.07	0.780	0.519	1.65	1.10	0.573	0.381	3.44	2.29	0.932	0.620
	42	3.44	2.29	0.829	0.552	1.82	1.21	0.616	0.410	3.79	2.52	0.993	0.661
	44					2.00	1.33	0.659	0.438				
	46					2.19	1.46	0.702	0.467				
	48					2.38	1.59	0.746	0.496				
	50					2.59	1.72	0.790	0.525				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.70		1.80		1.96		1.30		3.02		2.01	
$t_y \times 10^3$, (kips)$^{-1}$		0.432		0.287		0.454		0.302		0.483		0.322	
$t_r \times 10^3$, (kips)$^{-1}$		0.530		0.353		0.558		0.372		0.594		0.396	
r_x/r_y		6.27				4.59				6.26			
r_y, in.		2.52				3.55				2.54			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		215[c]				211[c]				199[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.577	0.384	0.370	0.246	0.576	0.383	0.393	0.262	0.628	0.418	0.410	0.273
	11	0.631	0.420	0.370	0.246	0.685	0.456	0.412	0.274	0.689	0.458	0.410	0.273
	12	0.642	0.427	0.370	0.246	0.708	0.471	0.422	0.281	0.701	0.467	0.410	0.273
	13	0.654	0.435	0.373	0.248	0.734	0.488	0.432	0.287	0.715	0.476	0.416	0.277
	14	0.667	0.444	0.379	0.252	0.763	0.507	0.442	0.294	0.730	0.486	0.423	0.282
	15	0.681	0.453	0.385	0.256	0.795	0.529	0.453	0.301	0.747	0.497	0.431	0.287
	16	0.697	0.464	0.392	0.261	0.831	0.553	0.464	0.309	0.765	0.509	0.439	0.292
	17	0.714	0.475	0.399	0.265	0.872	0.580	0.476	0.317	0.784	0.522	0.447	0.297
	18	0.733	0.488	0.406	0.270	0.924	0.615	0.489	0.325	0.806	0.536	0.455	0.303
	19	0.753	0.501	0.413	0.275	0.983	0.654	0.503	0.334	0.829	0.551	0.464	0.309
	20	0.775	0.516	0.421	0.280	1.05	0.698	0.517	0.344	0.854	0.568	0.473	0.315
	22	0.825	0.549	0.437	0.291	1.21	0.803	0.548	0.364	0.911	0.606	0.493	0.328
	24	0.883	0.588	0.455	0.302	1.41	0.938	0.582	0.388	0.978	0.651	0.514	0.342
	26	0.951	0.633	0.473	0.315	1.66	1.10	0.622	0.414	1.06	0.702	0.537	0.357
	28	1.03	0.685	0.494	0.329	1.92	1.28	0.679	0.452	1.15	0.763	0.562	0.374
	30	1.12	0.746	0.516	0.344	2.20	1.47	0.753	0.501	1.26	0.838	0.590	0.393
	32	1.24	0.827	0.541	0.360	2.51	1.67	0.827	0.550	1.41	0.935	0.621	0.413
	34	1.39	0.926	0.568	0.378	2.83	1.88	0.902	0.600	1.58	1.05	0.655	0.436
	36	1.56	1.04	0.603	0.401	3.17	2.11	0.978	0.650	1.77	1.18	0.716	0.476
	38	1.74	1.16	0.657	0.437	3.54	2.35	1.05	0.701	1.98	1.32	0.782	0.520
	40	1.93	1.28	0.712	0.474	3.92	2.61	1.13	0.751	2.19	1.46	0.849	0.565
	42	2.12	1.41	0.768	0.511					2.41	1.61	0.918	0.610
	44	2.33	1.55	0.825	0.549					2.65	1.76	0.987	0.657
	46	2.55	1.69	0.882	0.587					2.90	1.93	1.06	0.703
	48	2.77	1.85	0.939	0.625					3.15	2.10	1.13	0.750
	50	3.01	2.00	0.997	0.663					3.42	2.28	1.20	0.797
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.28		1.52		3.39		2.26		2.60		1.73	
$t_y \times 10^3$, (kips)$^{-1}$		0.526		0.350		0.538		0.358		0.568		0.378	
$t_r \times 10^3$, (kips)$^{-1}$		0.646		0.431		0.661		0.440		0.698		0.465	
r_x/r_y		4.58				6.29				4.64			
r_y, in.		3.54				2.51				3.45			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W40

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		183[c]				167[c]				149[c], [v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.700	0.466	0.460	0.306	0.764	0.508	0.514	0.342	0.879	0.585	0.596	0.396
	11	0.835	0.555	0.485	0.323	0.921	0.613	0.547	0.364	1.08	0.716	0.644	0.429
	12	0.863	0.574	0.497	0.330	0.954	0.635	0.562	0.374	1.12	0.744	0.663	0.441
	13	0.895	0.595	0.509	0.339	0.991	0.660	0.577	0.384	1.17	0.775	0.682	0.454
	14	0.931	0.619	0.522	0.348	1.03	0.688	0.593	0.395	1.22	0.811	0.703	0.468
	15	0.971	0.646	0.536	0.357	1.08	0.719	0.610	0.406	1.28	0.851	0.725	0.483
	16	1.02	0.676	0.551	0.367	1.13	0.754	0.628	0.418	1.35	0.896	0.749	0.498
	17	1.07	0.709	0.567	0.377	1.19	0.793	0.647	0.431	1.42	0.946	0.774	0.515
	18	1.12	0.746	0.583	0.388	1.26	0.837	0.668	0.444	1.51	1.00	0.801	0.533
	19	1.18	0.787	0.600	0.399	1.33	0.886	0.689	0.459	1.60	1.07	0.830	0.552
	20	1.25	0.833	0.619	0.412	1.41	0.941	0.712	0.474	1.71	1.14	0.861	0.573
	22	1.43	0.948	0.659	0.439	1.64	1.09	0.763	0.508	2.02	1.34	0.930	0.619
	24	1.67	1.11	0.705	0.469	1.94	1.29	0.822	0.547	2.40	1.60	1.03	0.683
	26	1.96	1.30	0.763	0.507	2.28	1.52	0.919	0.611	2.82	1.88	1.18	0.783
	28	2.27	1.51	0.859	0.571	2.65	1.76	1.04	0.690	3.27	2.18	1.33	0.887
	30	2.61	1.74	0.957	0.636	3.04	2.02	1.16	0.771	3.75	2.50	1.49	0.993
	32	2.97	1.98	1.06	0.702	3.45	2.30	1.28	0.853	4.27	2.84	1.66	1.10
	34	3.35	2.23	1.16	0.769	3.90	2.59	1.41	0.937	4.82	3.21	1.82	1.21
	36	3.76	2.50	1.26	0.837	4.37	2.91	1.53	1.02	5.41	3.60	1.99	1.33
	38	4.19	2.79	1.36	0.905	4.87	3.24	1.66	1.11	6.02	4.01	2.16	1.44
	40	4.64	3.09	1.46	0.973	5.40	3.59	1.79	1.19				
	42												
	44												
	46												
	48												
	50												
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		4.03		2.68		4.69		3.12		5.74		3.82	
$t_y \times 10^3$, (kips)$^{-1}$		0.627		0.417		0.677		0.451		0.763		0.507	
$t_r \times 10^3$, (kips)$^{-1}$		0.770		0.513		0.832		0.555		0.937		0.624	
r_x/r_y		6.31				6.38				6.55			
r_y, in.		2.49				2.40				2.29			

[c] Shape is slender for compression for F_y = 50 ksi.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		925[h]				853[h]				802[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.123	0.0817	0.0863	0.0574	0.133	0.0885	0.0909	0.0605	0.142	0.0942	0.0973	0.0648
	11	0.132	0.0876	0.0863	0.0574	0.143	0.0949	0.0909	0.0605	0.152	0.101	0.0973	0.0648
	12	0.133	0.0888	0.0863	0.0574	0.145	0.0962	0.0909	0.0605	0.154	0.103	0.0973	0.0648
	13	0.135	0.0901	0.0863	0.0574	0.147	0.0976	0.0909	0.0605	0.156	0.104	0.0973	0.0648
	14	0.138	0.0915	0.0863	0.0574	0.149	0.0991	0.0909	0.0605	0.159	0.106	0.0973	0.0648
	15	0.140	0.0931	0.0863	0.0574	0.151	0.101	0.0909	0.0605	0.162	0.108	0.0974	0.0648
	16	0.142	0.0948	0.0866	0.0576	0.154	0.103	0.0913	0.0607	0.165	0.110	0.0979	0.0651
	17	0.145	0.0966	0.0871	0.0579	0.157	0.105	0.0917	0.0610	0.168	0.112	0.0984	0.0655
	18	0.148	0.0986	0.0875	0.0582	0.160	0.107	0.0922	0.0613	0.171	0.114	0.0990	0.0658
	19	0.151	0.101	0.0879	0.0585	0.164	0.109	0.0927	0.0617	0.175	0.117	0.100	0.0662
	20	0.155	0.103	0.0883	0.0587	0.167	0.111	0.0931	0.0620	0.179	0.119	0.100	0.0665
	22	0.163	0.108	0.0891	0.0593	0.176	0.117	0.0941	0.0626	0.188	0.125	0.101	0.0673
	24	0.172	0.114	0.0900	0.0599	0.185	0.123	0.0951	0.0632	0.199	0.132	0.102	0.0680
	26	0.182	0.121	0.0909	0.0605	0.196	0.131	0.0961	0.0639	0.211	0.140	0.103	0.0688
	28	0.194	0.129	0.0918	0.0611	0.209	0.139	0.0971	0.0646	0.225	0.150	0.105	0.0696
	30	0.207	0.138	0.0927	0.0617	0.223	0.149	0.0981	0.0653	0.241	0.160	0.106	0.0703
	32	0.222	0.148	0.0936	0.0623	0.240	0.159	0.0992	0.0660	0.259	0.173	0.107	0.0712
	34	0.240	0.160	0.0946	0.0629	0.259	0.172	0.100	0.0667	0.280	0.187	0.108	0.0720
	36	0.260	0.173	0.0956	0.0636	0.280	0.186	0.101	0.0674	0.305	0.203	0.109	0.0728
	38	0.284	0.189	0.0966	0.0642	0.305	0.203	0.102	0.0682	0.332	0.221	0.111	0.0737
	40	0.311	0.207	0.0976	0.0649	0.334	0.222	0.104	0.0689	0.365	0.243	0.112	0.0746
	42	0.342	0.228	0.0986	0.0656	0.368	0.245	0.105	0.0697	0.402	0.268	0.114	0.0755
	44	0.376	0.250	0.100	0.0663	0.403	0.268	0.106	0.0705	0.441	0.294	0.115	0.0765
	46	0.411	0.273	0.101	0.0670	0.441	0.293	0.107	0.0714	0.482	0.321	0.116	0.0774
	48	0.447	0.298	0.102	0.0678	0.480	0.319	0.109	0.0722	0.525	0.349	0.118	0.0784
	50	0.485	0.323	0.103	0.0685	0.521	0.347	0.110	0.0731	0.570	0.379	0.119	0.0794
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.419		0.279		0.443		0.294		0.479		0.319	
$t_y \times 10^3$, (kips)$^{-1}$		0.123		0.0817		0.133		0.0885		0.142		0.0942	
$t_r \times 10^3$, (kips)$^{-1}$		0.151		0.101		0.163		0.109		0.174		0.116	
r_x/r_y		3.85				3.90				3.93			
r_y, in.		4.26				4.28				4.22			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		723[h]				652[h]				529[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.157	0.104	0.109	0.0725	0.174	0.116	0.122	0.0815	0.214	0.142	0.153	0.102
	11	0.169	0.112	0.109	0.0725	0.188	0.125	0.122	0.0815	0.232	0.154	0.153	0.102
	12	0.171	0.114	0.109	0.0725	0.190	0.127	0.122	0.0815	0.235	0.157	0.153	0.102
	13	0.174	0.116	0.109	0.0725	0.193	0.129	0.122	0.0815	0.239	0.159	0.153	0.102
	14	0.177	0.117	0.109	0.0725	0.197	0.131	0.122	0.0815	0.244	0.162	0.153	0.102
	15	0.180	0.120	0.109	0.0726	0.200	0.133	0.123	0.0817	0.248	0.165	0.154	0.102
	16	0.183	0.122	0.110	0.0730	0.204	0.136	0.124	0.0823	0.253	0.169	0.155	0.103
	17	0.187	0.124	0.110	0.0735	0.208	0.139	0.124	0.0828	0.259	0.172	0.157	0.104
	18	0.191	0.127	0.111	0.0739	0.213	0.142	0.125	0.0833	0.265	0.176	0.158	0.105
	19	0.195	0.130	0.112	0.0743	0.218	0.145	0.126	0.0839	0.272	0.181	0.159	0.106
	20	0.200	0.133	0.112	0.0748	0.223	0.149	0.127	0.0845	0.279	0.185	0.160	0.107
	22	0.210	0.140	0.114	0.0757	0.236	0.157	0.129	0.0856	0.294	0.196	0.163	0.109
	24	0.222	0.148	0.115	0.0766	0.250	0.166	0.130	0.0868	0.313	0.208	0.166	0.110
	26	0.236	0.157	0.117	0.0776	0.266	0.177	0.132	0.0880	0.334	0.222	0.169	0.112
	28	0.252	0.168	0.118	0.0786	0.284	0.189	0.134	0.0892	0.359	0.239	0.172	0.114
	30	0.270	0.180	0.120	0.0796	0.306	0.203	0.136	0.0905	0.387	0.258	0.175	0.117
	32	0.292	0.194	0.121	0.0806	0.330	0.220	0.138	0.0918	0.420	0.279	0.178	0.119
	34	0.316	0.210	0.123	0.0817	0.359	0.239	0.140	0.0932	0.458	0.305	0.182	0.121
	36	0.344	0.229	0.124	0.0828	0.392	0.261	0.142	0.0946	0.502	0.334	0.185	0.123
	38	0.376	0.250	0.126	0.0839	0.430	0.286	0.144	0.0960	0.554	0.369	0.189	0.126
	40	0.414	0.275	0.128	0.0850	0.475	0.316	0.147	0.0975	0.614	0.409	0.193	0.128
	42	0.456	0.304	0.130	0.0862	0.524	0.348	0.149	0.0990	0.677	0.450	0.197	0.131
	44	0.501	0.333	0.131	0.0874	0.575	0.382	0.151	0.101	0.743	0.494	0.201	0.134
	46	0.547	0.364	0.133	0.0887	0.628	0.418	0.154	0.102	0.812	0.540	0.205	0.137
	48	0.596	0.397	0.135	0.0900	0.684	0.455	0.156	0.104	0.884	0.588	0.210	0.140
	50	0.647	0.430	0.137	0.0913	0.742	0.494	0.159	0.106	0.960	0.638	0.215	0.143
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.541		0.360		0.613		0.408		0.785		0.522	
$t_y \times 10^3$, (kips)$^{-1}$		0.157		0.104		0.174		0.116		0.214		0.142	
$t_r \times 10^3$, (kips)$^{-1}$		0.193		0.128		0.214		0.142		0.263		0.175	
r_x/r_y		3.93				3.95				4.00			
r_y, in.		4.17				4.10				4.00			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		487[h]				441[h]				395[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.234	0.155	0.167	0.111	0.257	0.171	0.187	0.124	0.288	0.192	0.208	0.139
	11	0.253	0.169	0.167	0.111	0.279	0.186	0.187	0.124	0.313	0.208	0.208	0.139
	12	0.257	0.171	0.167	0.111	0.284	0.189	0.187	0.124	0.318	0.212	0.208	0.139
	13	0.262	0.174	0.167	0.111	0.288	0.192	0.187	0.124	0.324	0.216	0.208	0.139
	14	0.266	0.177	0.167	0.111	0.294	0.196	0.187	0.124	0.330	0.220	0.209	0.139
	15	0.272	0.181	0.169	0.112	0.300	0.199	0.189	0.125	0.337	0.224	0.211	0.141
	16	0.277	0.185	0.170	0.113	0.306	0.204	0.190	0.127	0.344	0.229	0.213	0.142
	17	0.284	0.189	0.172	0.114	0.313	0.208	0.192	0.128	0.352	0.234	0.216	0.144
	18	0.290	0.193	0.173	0.115	0.321	0.213	0.194	0.129	0.361	0.240	0.218	0.145
	19	0.298	0.198	0.175	0.116	0.329	0.219	0.196	0.130	0.371	0.247	0.221	0.147
	20	0.306	0.203	0.176	0.117	0.338	0.225	0.198	0.132	0.381	0.253	0.223	0.148
	22	0.323	0.215	0.180	0.120	0.358	0.238	0.202	0.135	0.404	0.269	0.228	0.152
	24	0.344	0.229	0.183	0.122	0.381	0.254	0.206	0.137	0.431	0.287	0.234	0.155
	26	0.368	0.245	0.187	0.124	0.408	0.272	0.211	0.140	0.462	0.307	0.239	0.159
	28	0.395	0.263	0.190	0.127	0.440	0.293	0.215	0.143	0.498	0.331	0.245	0.163
	30	0.427	0.284	0.194	0.129	0.476	0.317	0.220	0.147	0.540	0.359	0.251	0.167
	32	0.465	0.309	0.198	0.132	0.518	0.345	0.225	0.150	0.589	0.392	0.258	0.172
	34	0.508	0.338	0.202	0.135	0.567	0.377	0.231	0.153	0.646	0.430	0.265	0.176
	36	0.558	0.371	0.207	0.138	0.624	0.415	0.236	0.157	0.713	0.474	0.272	0.181
	38	0.617	0.410	0.211	0.141	0.693	0.461	0.242	0.161	0.792	0.527	0.280	0.186
	40	0.684	0.455	0.216	0.144	0.767	0.511	0.248	0.165	0.878	0.584	0.288	0.191
	42	0.754	0.501	0.221	0.147	0.846	0.563	0.255	0.169	0.968	0.644	0.296	0.197
	44	0.827	0.550	0.226	0.150	0.928	0.618	0.261	0.174	1.06	0.707	0.305	0.203
	46	0.904	0.601	0.232	0.154	1.01	0.675	0.269	0.179	1.16	0.772	0.315	0.210
	48	0.984	0.655	0.237	0.158	1.10	0.735	0.276	0.184	1.26	0.841	0.325	0.216
	50	1.07	0.711	0.243	0.162	1.20	0.798	0.284	0.189	1.37	0.913	0.336	0.224
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.865		0.575		0.968		0.644		1.10		0.729	
$t_y \times 10^3$, (kips)$^{-1}$		0.234		0.155		0.257		0.171		0.288		0.192	
$t_r \times 10^3$, (kips)$^{-1}$		0.287		0.191		0.316		0.210		0.354		0.236	
r_x/r_y		3.99				4.01				4.05			
r_y, in.		3.96				3.92				3.88			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		387[h]				361[h]				350[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.293	0.195	0.221	0.147	0.315	0.210	0.230	0.153	0.324	0.216	0.247	0.165
	11	0.345	0.230	0.225	0.149	0.343	0.228	0.230	0.153	0.384	0.255	0.252	0.168
	12	0.356	0.237	0.228	0.151	0.349	0.232	0.230	0.153	0.396	0.264	0.256	0.170
	13	0.369	0.245	0.231	0.153	0.355	0.236	0.230	0.153	0.410	0.273	0.259	0.173
	14	0.383	0.255	0.234	0.156	0.362	0.241	0.231	0.154	0.426	0.283	0.263	0.175
	15	0.398	0.265	0.237	0.158	0.370	0.246	0.234	0.155	0.444	0.295	0.267	0.178
	16	0.415	0.276	0.240	0.160	0.378	0.251	0.236	0.157	0.463	0.308	0.271	0.180
	17	0.434	0.289	0.244	0.162	0.387	0.257	0.239	0.159	0.485	0.323	0.275	0.183
	18	0.456	0.303	0.247	0.164	0.397	0.264	0.242	0.161	0.509	0.339	0.280	0.186
	19	0.479	0.319	0.251	0.167	0.407	0.271	0.245	0.163	0.536	0.357	0.284	0.189
	20	0.505	0.336	0.254	0.169	0.419	0.279	0.248	0.165	0.566	0.377	0.289	0.192
	22	0.567	0.377	0.262	0.174	0.444	0.296	0.254	0.169	0.636	0.423	0.298	0.199
	24	0.642	0.427	0.270	0.180	0.474	0.316	0.260	0.173	0.723	0.481	0.309	0.205
	26	0.736	0.490	0.279	0.186	0.509	0.339	0.267	0.178	0.831	0.553	0.320	0.213
	28	0.853	0.567	0.288	0.192	0.550	0.366	0.274	0.183	0.964	0.642	0.332	0.221
	30	0.979	0.651	0.298	0.198	0.597	0.397	0.282	0.188	1.11	0.736	0.345	0.229
	32	1.11	0.741	0.309	0.206	0.652	0.434	0.290	0.193	1.26	0.838	0.359	0.239
	34	1.26	0.836	0.320	0.213	0.716	0.477	0.299	0.199	1.42	0.946	0.374	0.249
	36	1.41	0.938	0.333	0.221	0.791	0.526	0.308	0.205	1.59	1.06	0.390	0.260
	38	1.57	1.04	0.346	0.230	0.880	0.586	0.317	0.211	1.78	1.18	0.408	0.272
	40	1.74	1.16	0.360	0.240	0.976	0.649	0.327	0.218	1.97	1.31	0.431	0.287
	42	1.92	1.28	0.377	0.251	1.08	0.716	0.338	0.225	2.17	1.44	0.456	0.304
	44	2.11	1.40	0.397	0.264	1.18	0.785	0.350	0.233	2.38	1.58	0.482	0.320
	46	2.30	1.53	0.418	0.278	1.29	0.858	0.362	0.241				
	48					1.40	0.935	0.376	0.250				
	50					1.52	1.01	0.395	0.263				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.60		1.07		1.22		0.809		1.80		1.19	
$t_y \times 10^3$, (kips)$^{-1}$		0.293		0.195		0.315		0.210		0.324		0.216	
$t_r \times 10^3$, (kips)$^{-1}$		0.360		0.240		0.387		0.258		0.398		0.266	
r_x/r_y		5.47				4.05				5.49			
r_y, in.		2.78				3.85				2.75			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		330				318[h]				302			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.345	0.229	0.253	0.168	0.358	0.238	0.274	0.182	0.375	0.250	0.278	0.185
	11	0.376	0.250	0.253	0.168	0.426	0.283	0.280	0.186	0.410	0.272	0.278	0.185
	12	0.382	0.254	0.253	0.168	0.440	0.293	0.285	0.189	0.416	0.277	0.278	0.185
	13	0.389	0.259	0.253	0.168	0.456	0.304	0.289	0.192	0.424	0.282	0.278	0.185
	14	0.397	0.264	0.254	0.169	0.475	0.316	0.294	0.196	0.432	0.288	0.280	0.186
	15	0.405	0.270	0.257	0.171	0.495	0.329	0.299	0.199	0.441	0.294	0.284	0.189
	16	0.414	0.276	0.260	0.173	0.518	0.344	0.304	0.202	0.451	0.300	0.287	0.191
	17	0.424	0.282	0.264	0.175	0.543	0.361	0.309	0.206	0.462	0.308	0.291	0.194
	18	0.435	0.289	0.267	0.178	0.571	0.380	0.315	0.209	0.474	0.315	0.295	0.196
	19	0.447	0.297	0.270	0.180	0.602	0.401	0.320	0.213	0.487	0.324	0.299	0.199
	20	0.459	0.306	0.274	0.182	0.637	0.424	0.326	0.217	0.501	0.333	0.303	0.202
	22	0.488	0.325	0.281	0.187	0.719	0.479	0.338	0.225	0.532	0.354	0.312	0.208
	24	0.521	0.347	0.289	0.192	0.822	0.547	0.351	0.234	0.569	0.378	0.321	0.214
	26	0.560	0.373	0.297	0.198	0.951	0.633	0.366	0.243	0.611	0.407	0.331	0.220
	28	0.605	0.403	0.306	0.204	1.10	0.734	0.381	0.254	0.661	0.440	0.341	0.227
	30	0.658	0.438	0.315	0.210	1.27	0.843	0.398	0.265	0.718	0.478	0.352	0.234
	32	0.719	0.478	0.325	0.216	1.44	0.959	0.416	0.277	0.786	0.523	0.364	0.242
	34	0.790	0.526	0.335	0.223	1.63	1.08	0.437	0.290	0.864	0.575	0.376	0.250
	36	0.874	0.581	0.346	0.230	1.82	1.21	0.459	0.306	0.956	0.636	0.389	0.259
	38	0.973	0.648	0.358	0.238	2.03	1.35	0.491	0.327	1.07	0.709	0.404	0.269
	40	1.08	0.717	0.371	0.247	2.25	1.50	0.522	0.347	1.18	0.785	0.419	0.279
	42	1.19	0.791	0.384	0.256	2.48	1.65	0.554	0.368	1.30	0.866	0.436	0.290
	44	1.30	0.868	0.399	0.265	2.72	1.81	0.585	0.389	1.43	0.950	0.456	0.303
	46	1.43	0.949	0.417	0.277					1.56	1.04	0.484	0.322
	48	1.55	1.03	0.441	0.293					1.70	1.13	0.513	0.341
	50	1.69	1.12	0.465	0.309					1.84	1.23	0.541	0.360
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.34		0.894		2.02		1.35		1.48		0.984	
$t_y \times 10^3$, (kips)$^{-1}$		0.345		0.229		0.358		0.238		0.375		0.250	
$t_r \times 10^3$, (kips)$^{-1}$		0.423		0.282		0.439		0.293		0.461		0.307	
r_x/r_y		4.05				5.59				4.03			
r_y, in.		3.83				2.70				3.82			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		286				282[c]				262[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.398	0.265	0.307	0.204	0.404	0.269	0.299	0.199	0.439	0.292	0.324	0.215
	11	0.475	0.316	0.315	0.210	0.440	0.293	0.299	0.199	0.475	0.316	0.324	0.215
	12	0.492	0.327	0.320	0.213	0.447	0.298	0.299	0.199	0.483	0.321	0.324	0.215
	13	0.510	0.339	0.326	0.217	0.456	0.303	0.299	0.199	0.491	0.326	0.324	0.215
	14	0.531	0.353	0.332	0.221	0.465	0.309	0.302	0.201	0.501	0.333	0.327	0.218
	15	0.554	0.368	0.338	0.225	0.475	0.316	0.306	0.203	0.512	0.340	0.332	0.221
	16	0.579	0.385	0.344	0.229	0.486	0.323	0.310	0.206	0.524	0.348	0.337	0.224
	17	0.608	0.405	0.350	0.233	0.497	0.331	0.314	0.209	0.537	0.357	0.342	0.227
	18	0.640	0.426	0.357	0.238	0.510	0.339	0.319	0.212	0.551	0.366	0.347	0.231
	19	0.676	0.450	0.364	0.242	0.524	0.349	0.323	0.215	0.566	0.377	0.352	0.234
	20	0.716	0.476	0.371	0.247	0.539	0.359	0.328	0.218	0.583	0.388	0.357	0.238
	22	0.809	0.538	0.387	0.257	0.573	0.382	0.338	0.225	0.620	0.413	0.369	0.245
	24	0.926	0.616	0.403	0.268	0.613	0.408	0.348	0.232	0.664	0.442	0.381	0.253
	26	1.07	0.715	0.421	0.280	0.660	0.439	0.359	0.239	0.716	0.476	0.394	0.262
	28	1.25	0.829	0.441	0.294	0.714	0.475	0.371	0.247	0.776	0.516	0.408	0.271
	30	1.43	0.952	0.463	0.308	0.777	0.517	0.384	0.255	0.846	0.563	0.423	0.281
	32	1.63	1.08	0.487	0.324	0.850	0.566	0.397	0.264	0.928	0.617	0.439	0.292
	34	1.84	1.22	0.517	0.344	0.936	0.623	0.412	0.274	1.02	0.681	0.456	0.303
	36	2.06	1.37	0.556	0.370	1.04	0.690	0.428	0.284	1.14	0.757	0.474	0.316
	38	2.30	1.53	0.595	0.396	1.16	0.769	0.444	0.296	1.27	0.843	0.495	0.329
	40	2.54	1.69	0.634	0.422	1.28	0.852	0.463	0.308	1.40	0.934	0.517	0.344
	42	2.80	1.87	0.673	0.448	1.41	0.939	0.482	0.321	1.55	1.03	0.551	0.367
	44	3.08	2.05	0.712	0.473	1.55	1.03	0.514	0.342	1.70	1.13	0.589	0.392
	46					1.69	1.13	0.547	0.364	1.86	1.24	0.628	0.418
	48					1.84	1.23	0.580	0.386	2.02	1.35	0.666	0.443
	50					2.00	1.33	0.612	0.407	2.19	1.46	0.705	0.469
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.28		1.52		1.60		1.06		1.75		1.16	
$t_y \times 10^3$, (kips)$^{-1}$		0.398		0.265		0.403		0.268		0.433		0.288	
$t_r \times 10^3$, (kips)$^{-1}$		0.489		0.326		0.495		0.330		0.531		0.354	
r_x/r_y		5.60				4.05				4.07			
r_y, in.		2.68				3.80				3.76			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		256				247[c]				232[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.444	0.295	0.343	0.228	0.473	0.315	0.346	0.230	0.497	0.330	0.381	0.253
	11	0.532	0.354	0.353	0.235	0.513	0.341	0.346	0.230	0.591	0.393	0.394	0.262
	12	0.550	0.366	0.360	0.239	0.521	0.346	0.346	0.230	0.613	0.408	0.402	0.267
	13	0.571	0.380	0.367	0.244	0.529	0.352	0.346	0.230	0.637	0.424	0.410	0.273
	14	0.595	0.396	0.374	0.249	0.539	0.359	0.350	0.233	0.663	0.441	0.419	0.278
	15	0.622	0.414	0.381	0.254	0.549	0.365	0.355	0.236	0.694	0.461	0.427	0.284
	16	0.651	0.433	0.389	0.259	0.561	0.373	0.360	0.240	0.727	0.484	0.437	0.291
	17	0.684	0.455	0.397	0.264	0.573	0.381	0.366	0.243	0.765	0.509	0.447	0.297
	18	0.721	0.480	0.406	0.270	0.588	0.391	0.372	0.247	0.807	0.537	0.457	0.304
	19	0.762	0.507	0.414	0.276	0.605	0.402	0.378	0.251	0.855	0.569	0.468	0.311
	20	0.808	0.538	0.424	0.282	0.623	0.414	0.384	0.255	0.907	0.604	0.479	0.319
	22	0.916	0.610	0.443	0.295	0.663	0.441	0.396	0.264	1.03	0.687	0.503	0.335
	24	1.05	0.700	0.465	0.309	0.711	0.473	0.410	0.273	1.19	0.791	0.530	0.352
	26	1.22	0.815	0.489	0.325	0.766	0.510	0.424	0.282	1.39	0.923	0.559	0.372
	28	1.42	0.945	0.515	0.343	0.831	0.553	0.440	0.293	1.61	1.07	0.592	0.394
	30	1.63	1.08	0.545	0.362	0.907	0.603	0.457	0.304	1.85	1.23	0.631	0.420
	32	1.86	1.23	0.582	0.387	0.996	0.663	0.475	0.316	2.10	1.40	0.691	0.460
	34	2.09	1.39	0.632	0.420	1.10	0.732	0.495	0.329	2.37	1.58	0.751	0.500
	36	2.35	1.56	0.681	0.453	1.22	0.815	0.516	0.343	2.66	1.77	0.812	0.540
	38	2.62	1.74	0.730	0.486	1.36	0.908	0.539	0.359	2.96	1.97	0.872	0.580
	40	2.90	1.93	0.779	0.519	1.51	1.01	0.570	0.379	3.28	2.18	0.932	0.620
	42	3.20	2.13	0.828	0.551	1.67	1.11	0.613	0.408	3.62	2.41	0.992	0.660
	44	3.51	2.33	0.877	0.584	1.83	1.22	0.657	0.437				
	46					2.00	1.33	0.700	0.466				
	48					2.18	1.45	0.744	0.495				
	50					2.36	1.57	0.788	0.524				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.60		1.73		1.88		1.25		2.92		1.94	
$t_y \times 10^3$, (kips)$^{-1}$		0.444		0.295		0.461		0.307		0.491		0.327	
$t_r \times 10^3$, (kips)$^{-1}$		0.545		0.363		0.566		0.377		0.603		0.402	
r_x/r_y		5.62				4.06				5.65			
r_y, in.		2.65				3.74				2.62			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		231[c]				210[c]				194[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.510	0.339	0.370	0.246	0.554	0.368	0.428	0.285	0.616	0.410	0.464	0.309
	11	0.553	0.368	0.370	0.246	0.653	0.435	0.445	0.296	0.727	0.484	0.485	0.322
	12	0.562	0.374	0.370	0.246	0.678	0.451	0.454	0.302	0.750	0.499	0.496	0.330
	13	0.571	0.380	0.370	0.246	0.705	0.469	0.465	0.309	0.776	0.516	0.507	0.337
	14	0.581	0.387	0.375	0.249	0.736	0.489	0.475	0.316	0.805	0.536	0.519	0.345
	15	0.593	0.394	0.381	0.253	0.770	0.512	0.486	0.323	0.841	0.560	0.532	0.354
	16	0.605	0.403	0.387	0.257	0.809	0.538	0.498	0.331	0.884	0.588	0.545	0.363
	17	0.619	0.412	0.393	0.261	0.852	0.567	0.510	0.339	0.932	0.620	0.559	0.372
	18	0.633	0.421	0.399	0.266	0.901	0.599	0.523	0.348	0.986	0.656	0.574	0.382
	19	0.649	0.432	0.406	0.270	0.955	0.635	0.536	0.357	1.05	0.696	0.589	0.392
	20	0.667	0.443	0.412	0.274	1.02	0.676	0.550	0.366	1.11	0.741	0.606	0.403
	22	0.709	0.472	0.426	0.284	1.16	0.772	0.580	0.386	1.28	0.848	0.641	0.427
	24	0.761	0.506	0.442	0.294	1.34	0.893	0.614	0.409	1.48	0.984	0.681	0.453
	26	0.821	0.546	0.458	0.305	1.57	1.05	0.653	0.434	1.73	1.15	0.726	0.483
	28	0.892	0.594	0.476	0.316	1.82	1.21	0.696	0.463	2.01	1.34	0.786	0.523
	30	0.975	0.649	0.494	0.329	2.09	1.39	0.765	0.509	2.31	1.54	0.873	0.581
	32	1.07	0.713	0.515	0.343	2.38	1.58	0.841	0.559	2.63	1.75	0.961	0.639
	34	1.19	0.789	0.537	0.357	2.69	1.79	0.917	0.610	2.96	1.97	1.05	0.699
	36	1.32	0.880	0.562	0.374	3.01	2.00	0.993	0.661	3.32	2.21	1.14	0.758
	38	1.47	0.981	0.588	0.391	3.36	2.23	1.07	0.712	3.70	2.46	1.23	0.818
	40	1.63	1.09	0.631	0.420	3.72	2.48	1.15	0.763	4.10	2.73	1.32	0.878
	42	1.80	1.20	0.680	0.452	4.10	2.73	1.22	0.814	4.52	3.01	1.41	0.938
	44	1.98	1.31	0.729	0.485								
	46	2.16	1.44	0.778	0.518								
	48	2.35	1.56	0.828	0.551								
	50	2.55	1.70	0.878	0.584								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.02		1.35		3.33		2.22		3.65		2.43	
$t_y \times 10^3$, (kips)$^{-1}$		0.490		0.326		0.540		0.359		0.586		0.390	
$t_r \times 10^3$, (kips)$^{-1}$		0.602		0.401		0.663		0.442		0.720		0.480	
r_x/r_y		4.07				5.66				5.70			
r_y, in.		3.71				2.58				2.56			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W36

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		182[c]				170[c]				160[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.667	0.444	0.496	0.330	0.729	0.485	0.533	0.355	0.788	0.524	0.571	0.380
	11	0.787	0.524	0.519	0.345	0.863	0.574	0.559	0.372	0.936	0.623	0.601	0.400
	12	0.813	0.541	0.531	0.353	0.891	0.593	0.573	0.381	0.967	0.643	0.616	0.410
	13	0.841	0.559	0.544	0.362	0.923	0.614	0.587	0.390	1.00	0.667	0.632	0.420
	14	0.873	0.581	0.557	0.371	0.958	0.637	0.602	0.400	1.04	0.693	0.648	0.431
	15	0.908	0.604	0.571	0.380	0.997	0.664	0.617	0.411	1.08	0.722	0.666	0.443
	16	0.947	0.630	0.586	0.390	1.04	0.693	0.634	0.422	1.13	0.754	0.684	0.455
	17	0.995	0.662	0.601	0.400	1.09	0.725	0.651	0.433	1.19	0.790	0.703	0.468
	18	1.05	0.701	0.618	0.411	1.14	0.762	0.670	0.445	1.25	0.831	0.724	0.482
	19	1.12	0.744	0.635	0.422	1.21	0.805	0.689	0.458	1.32	0.876	0.746	0.496
	20	1.19	0.792	0.653	0.435	1.29	0.858	0.710	0.472	1.39	0.928	0.769	0.511
	22	1.36	0.908	0.693	0.461	1.48	0.985	0.755	0.502	1.61	1.07	0.820	0.545
	24	1.58	1.05	0.738	0.491	1.72	1.15	0.806	0.536	1.88	1.25	0.878	0.584
	26	1.86	1.24	0.789	0.525	2.02	1.35	0.864	0.575	2.20	1.47	0.950	0.632
	28	2.16	1.43	0.868	0.577	2.35	1.56	0.966	0.643	2.56	1.70	1.07	0.714
	30	2.47	1.65	0.966	0.642	2.69	1.79	1.08	0.717	2.94	1.95	1.20	0.797
	32	2.81	1.87	1.07	0.709	3.07	2.04	1.19	0.792	3.34	2.22	1.33	0.883
	34	3.18	2.11	1.17	0.775	3.46	2.30	1.31	0.869	3.77	2.51	1.46	0.969
	36	3.56	2.37	1.27	0.843	3.88	2.58	1.42	0.946	4.23	2.81	1.59	1.06
	38	3.97	2.64	1.37	0.911	4.32	2.88	1.54	1.02	4.71	3.13	1.72	1.15
	40	4.40	2.93	1.47	0.979	4.79	3.19	1.66	1.10	5.22	3.47	1.86	1.23
	42	4.85	3.23	1.57	1.05	5.28	3.51	1.77	1.18				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	3.93	2.61	4.25	2.83	4.61	3.07
$t_y \times 10^3$, (kips)$^{-1}$	0.623	0.415	0.668	0.444	0.711	0.473
$t_r \times 10^3$, (kips)$^{-1}$	0.765	0.510	0.821	0.547	0.873	0.582
r_x/r_y	5.69		5.73		5.76	
r_y, in.	2.55		2.53		2.50	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W36–W33

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×								W33×			
		150[c]				135[c], [v]				387[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.848	0.564	0.613	0.408	0.963	0.641	0.700	0.466	0.293	0.195	0.228	0.152
	11	1.01	0.673	0.648	0.431	1.16	0.772	0.748	0.498	0.320	0.213	0.228	0.152
	12	1.05	0.696	0.665	0.442	1.20	0.800	0.769	0.512	0.326	0.217	0.228	0.152
	13	1.08	0.721	0.682	0.454	1.25	0.832	0.791	0.526	0.332	0.221	0.228	0.152
	14	1.13	0.750	0.701	0.466	1.30	0.867	0.814	0.541	0.339	0.225	0.230	0.153
	15	1.18	0.782	0.721	0.479	1.36	0.907	0.838	0.558	0.346	0.230	0.232	0.155
	16	1.23	0.818	0.741	0.493	1.43	0.951	0.864	0.575	0.354	0.236	0.235	0.156
	17	1.29	0.858	0.763	0.508	1.50	1.00	0.892	0.593	0.363	0.241	0.237	0.158
	18	1.36	0.903	0.786	0.523	1.59	1.06	0.921	0.613	0.372	0.248	0.239	0.159
	19	1.43	0.953	0.811	0.540	1.68	1.12	0.952	0.634	0.383	0.255	0.242	0.161
	20	1.52	1.01	0.837	0.557	1.78	1.19	0.986	0.656	0.394	0.262	0.244	0.163
	22	1.74	1.16	0.895	0.596	2.06	1.37	1.06	0.706	0.419	0.279	0.250	0.166
	24	2.04	1.36	0.962	0.640	2.44	1.62	1.15	0.763	0.449	0.299	0.255	0.170
	26	2.40	1.59	1.06	0.706	2.87	1.91	1.31	0.871	0.483	0.322	0.261	0.174
	28	2.78	1.85	1.20	0.799	3.32	2.21	1.49	0.989	0.524	0.348	0.267	0.178
	30	3.19	2.12	1.34	0.894	3.82	2.54	1.67	1.11	0.571	0.380	0.273	0.182
	32	3.63	2.42	1.49	0.991	4.34	2.89	1.85	1.23	0.626	0.416	0.280	0.186
	34	4.10	2.73	1.64	1.09	4.90	3.26	2.05	1.36	0.690	0.459	0.287	0.191
	36	4.59	3.06	1.79	1.19	5.49	3.66	2.24	1.49	0.766	0.510	0.294	0.196
	38	5.12	3.41	1.94	1.29	6.12	4.07	2.44	1.62	0.854	0.568	0.302	0.201
	40	5.67	3.77	2.10	1.40					0.946	0.629	0.310	0.206
	42									1.04	0.694	0.318	0.212
	44									1.14	0.762	0.327	0.218
	46									1.25	0.832	0.337	0.224
	48									1.36	0.906	0.347	0.231
	50									1.48	0.984	0.358	0.238

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	5.02	3.34	5.97	3.97	1.14	0.760
$t_y \times 10^3$, (kips)$^{-1}$	0.754	0.502	0.837	0.557	0.293	0.195
$t_r \times 10^3$, (kips)$^{-1}$	0.926	0.617	1.03	0.685	0.360	0.240
r_x/r_y	5.79		5.88		3.87	
r_y, in.	2.47		2.38		3.77	

[c] Shape is slender for compression for F_y = 50 ksi.

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W33

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W33×											
		354[h]				318				291			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.321	0.214	0.251	0.167	0.356	0.237	0.281	0.187	0.390	0.260	0.307	0.204
	11	0.352	0.234	0.251	0.167	0.391	0.260	0.281	0.187	0.429	0.285	0.307	0.204
	12	0.358	0.238	0.251	0.167	0.398	0.265	0.281	0.187	0.436	0.290	0.307	0.204
	13	0.365	0.243	0.251	0.167	0.406	0.270	0.281	0.187	0.445	0.296	0.307	0.204
	14	0.372	0.248	0.253	0.168	0.414	0.276	0.283	0.189	0.454	0.302	0.311	0.207
	15	0.380	0.253	0.256	0.170	0.423	0.282	0.287	0.191	0.465	0.309	0.315	0.210
	16	0.389	0.259	0.259	0.172	0.434	0.288	0.290	0.193	0.476	0.317	0.319	0.212
	17	0.399	0.266	0.261	0.174	0.445	0.296	0.294	0.195	0.488	0.325	0.323	0.215
	18	0.410	0.273	0.264	0.176	0.457	0.304	0.297	0.198	0.502	0.334	0.328	0.218
	19	0.421	0.280	0.267	0.178	0.470	0.313	0.301	0.200	0.517	0.344	0.332	0.221
	20	0.434	0.289	0.270	0.180	0.484	0.322	0.305	0.203	0.533	0.354	0.337	0.224
	22	0.462	0.308	0.277	0.184	0.516	0.343	0.313	0.208	0.568	0.378	0.346	0.230
	24	0.495	0.330	0.283	0.189	0.554	0.368	0.321	0.214	0.611	0.406	0.356	0.237
	26	0.534	0.355	0.290	0.193	0.598	0.398	0.330	0.220	0.660	0.439	0.367	0.244
	28	0.579	0.386	0.298	0.198	0.649	0.432	0.339	0.226	0.718	0.478	0.378	0.251
	30	0.632	0.421	0.305	0.203	0.710	0.472	0.349	0.232	0.786	0.523	0.390	0.259
	32	0.694	0.462	0.313	0.208	0.780	0.519	0.359	0.239	0.865	0.576	0.403	0.268
	34	0.767	0.510	0.322	0.214	0.863	0.574	0.370	0.246	0.959	0.638	0.416	0.277
	36	0.854	0.568	0.331	0.220	0.963	0.641	0.382	0.254	1.07	0.713	0.431	0.287
	38	0.951	0.633	0.340	0.227	1.07	0.714	0.395	0.263	1.19	0.794	0.447	0.297
	40	1.05	0.701	0.351	0.233	1.19	0.791	0.408	0.271	1.32	0.880	0.463	0.308
	42	1.16	0.773	0.361	0.240	1.31	0.872	0.422	0.281	1.46	0.970	0.482	0.320
	44	1.28	0.848	0.373	0.248	1.44	0.957	0.438	0.291	1.60	1.06	0.503	0.335
	46	1.39	0.927	0.385	0.256	1.57	1.05	0.454	0.302	1.75	1.16	0.533	0.354
	48	1.52	1.01	0.398	0.265	1.71	1.14	0.477	0.318	1.90	1.27	0.563	0.374
	50	1.65	1.10	0.412	0.274	1.86	1.24	0.502	0.334	2.07	1.37	0.592	0.394
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.26		0.841		1.43		0.948		1.58		1.05	
$t_y \times 10^3$, (kips)$^{-1}$		0.321		0.214		0.356		0.237		0.390		0.260	
$t_r \times 10^3$, (kips)$^{-1}$		0.394		0.263		0.438		0.292		0.479		0.320	
r_x/r_y		3.88				3.91				3.91			
r_y, in.		3.74				3.71				3.68			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W33

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W33×											
		263				241[c]				221[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.432	0.287	0.343	0.228	0.470	0.313	0.379	0.252	0.520	0.346	0.416	0.277
	11	0.475	0.316	0.343	0.228	0.518	0.344	0.379	0.252	0.568	0.378	0.416	0.277
	12	0.483	0.322	0.343	0.228	0.527	0.351	0.379	0.252	0.577	0.384	0.416	0.277
	13	0.493	0.328	0.343	0.228	0.538	0.358	0.380	0.253	0.587	0.391	0.418	0.278
	14	0.503	0.335	0.348	0.231	0.550	0.366	0.386	0.257	0.600	0.399	0.424	0.282
	15	0.515	0.343	0.352	0.234	0.563	0.374	0.391	0.260	0.615	0.409	0.431	0.286
	16	0.528	0.351	0.357	0.238	0.577	0.384	0.397	0.264	0.630	0.419	0.437	0.291
	17	0.542	0.360	0.362	0.241	0.593	0.394	0.403	0.268	0.648	0.431	0.444	0.296
	18	0.557	0.370	0.367	0.244	0.609	0.405	0.409	0.272	0.666	0.443	0.451	0.300
	19	0.573	0.381	0.373	0.248	0.628	0.418	0.416	0.276	0.687	0.457	0.459	0.305
	20	0.591	0.393	0.378	0.252	0.648	0.431	0.422	0.281	0.709	0.472	0.467	0.310
	22	0.631	0.420	0.390	0.259	0.693	0.461	0.436	0.290	0.760	0.505	0.483	0.321
	24	0.679	0.452	0.402	0.267	0.746	0.496	0.450	0.300	0.819	0.545	0.500	0.333
	26	0.734	0.488	0.415	0.276	0.809	0.538	0.466	0.310	0.889	0.591	0.519	0.345
	28	0.799	0.532	0.428	0.285	0.882	0.587	0.483	0.321	0.970	0.646	0.539	0.358
	30	0.875	0.582	0.443	0.295	0.968	0.644	0.501	0.333	1.07	0.710	0.560	0.373
	32	0.965	0.642	0.459	0.305	1.07	0.712	0.520	0.346	1.18	0.786	0.584	0.388
	34	1.07	0.712	0.476	0.317	1.19	0.791	0.541	0.360	1.32	0.876	0.609	0.405
	36	1.20	0.797	0.494	0.329	1.33	0.887	0.564	0.375	1.48	0.982	0.637	0.424
	38	1.33	0.888	0.514	0.342	1.48	0.988	0.589	0.392	1.64	1.09	0.667	0.444
	40	1.48	0.984	0.535	0.356	1.65	1.09	0.619	0.412	1.82	1.21	0.719	0.478
	42	1.63	1.08	0.562	0.374	1.81	1.21	0.663	0.441	2.01	1.34	0.772	0.514
	44	1.79	1.19	0.598	0.398	1.99	1.32	0.708	0.471	2.20	1.47	0.825	0.549
	46	1.96	1.30	0.635	0.422	2.18	1.45	0.753	0.501	2.41	1.60	0.879	0.585
	48	2.13	1.42	0.672	0.447	2.37	1.58	0.797	0.530	2.62	1.75	0.932	0.620
	50	2.31	1.54	0.708	0.471	2.57	1.71	0.842	0.560	2.85	1.89	0.986	0.656
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.76		1.17		1.96		1.30		2.17		1.45	
$t_y \times 10^3$, (kips)$^{-1}$		0.432		0.287		0.470		0.313		0.511		0.340	
$t_r \times 10^3$, (kips)$^{-1}$		0.530		0.353		0.577		0.385		0.628		0.419	
r_x/r_y		3.91				3.90				3.93			
r_y, in.		3.66				3.62				3.59			

[c] Shape is slender for compression for F_y = 50 ksi.

W33

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W33×											
		201[c]				169[c]				152[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.587	0.390	0.461	0.307	0.718	0.478	0.566	0.377	0.807	0.537	0.637	0.424
	11	0.641	0.426	0.461	0.307	0.855	0.569	0.595	0.396	0.964	0.641	0.673	0.447
	12	0.652	0.434	0.461	0.307	0.884	0.588	0.608	0.405	0.997	0.663	0.689	0.459
	13	0.664	0.441	0.464	0.309	0.917	0.610	0.623	0.415	1.03	0.688	0.707	0.470
	14	0.677	0.450	0.471	0.314	0.953	0.634	0.638	0.425	1.08	0.716	0.725	0.483
	15	0.691	0.460	0.479	0.319	0.994	0.661	0.654	0.435	1.12	0.747	0.745	0.496
	16	0.707	0.470	0.487	0.324	1.04	0.692	0.671	0.447	1.18	0.782	0.765	0.509
	17	0.724	0.482	0.495	0.329	1.10	0.731	0.689	0.458	1.23	0.821	0.787	0.524
	18	0.743	0.494	0.504	0.335	1.16	0.775	0.708	0.471	1.30	0.866	0.810	0.539
	19	0.763	0.508	0.512	0.341	1.24	0.825	0.728	0.484	1.39	0.923	0.834	0.555
	20	0.788	0.524	0.522	0.347	1.32	0.881	0.749	0.498	1.48	0.987	0.860	0.572
	22	0.845	0.562	0.541	0.360	1.52	1.01	0.794	0.528	1.71	1.14	0.917	0.610
	24	0.912	0.607	0.561	0.374	1.78	1.19	0.846	0.563	2.01	1.34	0.982	0.653
	26	0.991	0.659	0.584	0.388	2.09	1.39	0.905	0.602	2.36	1.57	1.07	0.709
	28	1.08	0.721	0.608	0.404	2.43	1.62	0.999	0.664	2.74	1.82	1.20	0.798
	30	1.19	0.794	0.634	0.422	2.79	1.85	1.11	0.737	3.15	2.09	1.33	0.888
	32	1.32	0.880	0.663	0.441	3.17	2.11	1.22	0.810	3.58	2.38	1.47	0.979
	34	1.48	0.984	0.694	0.462	3.58	2.38	1.33	0.883	4.04	2.69	1.61	1.07
	36	1.66	1.10	0.728	0.484	4.01	2.67	1.44	0.957	4.53	3.02	1.75	1.16
	38	1.85	1.23	0.782	0.520	4.47	2.98	1.55	1.03	5.05	3.36	1.89	1.26
	40	2.05	1.36	0.846	0.563	4.95	3.30	1.66	1.10	5.60	3.72	2.03	1.35
	42	2.26	1.50	0.910	0.606								
	44	2.48	1.65	0.975	0.649								
	46	2.71	1.80	1.04	0.692								
	48	2.95	1.96	1.11	0.736								
	50	3.20	2.13	1.17	0.780								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.42		1.61		4.22		2.81		4.82		3.21	
$t_y \times 10^3$, (kips)$^{-1}$		0.565		0.376		0.675		0.449		0.744		0.495	
$t_r \times 10^3$, (kips)$^{-1}$		0.694		0.463		0.829		0.553		0.914		0.609	
r_x/r_y		3.93				5.48				5.47			
r_y, in.		3.56				2.50				2.47			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W33

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W33×											
		141[c]				130[c]				118[c], [v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.888	0.591	0.693	0.461	0.979	0.651	0.763	0.508	1.11	0.736	0.858	0.571
	11	1.07	0.710	0.735	0.489	1.18	0.786	0.814	0.542	1.35	0.897	0.926	0.616
	12	1.10	0.735	0.754	0.502	1.22	0.815	0.837	0.557	1.40	0.931	0.952	0.634
	13	1.15	0.763	0.774	0.515	1.27	0.847	0.860	0.572	1.46	0.970	0.98	0.652
	14	1.19	0.795	0.796	0.529	1.33	0.883	0.885	0.589	1.52	1.01	1.01	0.672
	15	1.25	0.830	0.818	0.544	1.39	0.924	0.911	0.606	1.60	1.06	1.04	0.693
	16	1.31	0.870	0.841	0.560	1.46	0.969	0.939	0.624	1.68	1.12	1.08	0.716
	17	1.37	0.915	0.866	0.576	1.53	1.02	0.968	0.644	1.77	1.18	1.11	0.740
	18	1.45	0.964	0.893	0.594	1.62	1.08	0.999	0.665	1.88	1.25	1.15	0.765
	19	1.53	1.02	0.921	0.613	1.71	1.14	1.03	0.687	1.99	1.33	1.19	0.793
	20	1.64	1.09	0.951	0.633	1.82	1.21	1.07	0.711	2.12	1.41	1.24	0.822
	22	1.91	1.27	1.02	0.677	2.13	1.42	1.15	0.764	2.48	1.65	1.34	0.888
	24	2.25	1.50	1.09	0.728	2.52	1.68	1.24	0.826	2.95	1.97	1.48	0.984
	26	2.64	1.76	1.21	0.808	2.96	1.97	1.41	0.939	3.47	2.31	1.70	1.13
	28	3.07	2.04	1.37	0.911	3.43	2.28	1.60	1.06	4.02	2.68	1.92	1.28
	30	3.52	2.34	1.53	1.02	3.94	2.62	1.78	1.19	4.62	3.07	2.16	1.44
	32	4.00	2.66	1.69	1.12	4.48	2.98	1.98	1.32	5.25	3.49	2.40	1.59
	34	4.52	3.01	1.85	1.23	5.06	3.37	2.17	1.45	5.93	3.95	2.64	1.76
	36	5.07	3.37	2.02	1.34	5.68	3.78	2.37	1.58	6.65	4.42	2.89	1.92
	38	5.65	3.76	2.18	1.45	6.32	4.21	2.57	1.71	7.41	4.93	3.14	2.09
	40	6.26	4.16	2.35	1.56								
	42												
	44												
	46												
	48												
	50												
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		5.33		3.54		5.99		3.98		6.94		4.62	
$t_y \times 10^3$, (kips)$^{-1}$		0.805		0.535		0.872		0.580		0.963		0.640	
$t_r \times 10^3$, (kips)$^{-1}$		0.989		0.659		1.07		0.714		1.18		0.788	
r_x/r_y		5.51				5.52				5.60			
r_y, in.		2.43				2.39				2.32			

[c] Shape is slender for compression for F_y = 50 ksi.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W30

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×											
		391[h]				357[h]				326[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.290	0.193	0.246	0.163	0.318	0.212	0.270	0.180	0.348	0.232	0.299	0.199
	11	0.319	0.212	0.246	0.163	0.350	0.233	0.270	0.180	0.384	0.256	0.299	0.199
	12	0.325	0.216	0.246	0.163	0.357	0.237	0.270	0.180	0.392	0.260	0.299	0.199
	13	0.331	0.221	0.246	0.164	0.364	0.242	0.270	0.180	0.400	0.266	0.300	0.200
	14	0.339	0.225	0.248	0.165	0.372	0.247	0.273	0.182	0.408	0.272	0.303	0.202
	15	0.346	0.230	0.250	0.166	0.380	0.253	0.276	0.183	0.418	0.278	0.307	0.204
	16	0.355	0.236	0.252	0.168	0.390	0.259	0.278	0.185	0.429	0.285	0.310	0.206
	17	0.364	0.242	0.255	0.169	0.400	0.266	0.281	0.187	0.440	0.293	0.313	0.208
	18	0.374	0.249	0.257	0.171	0.412	0.274	0.284	0.189	0.453	0.301	0.317	0.211
	19	0.385	0.256	0.259	0.172	0.424	0.282	0.287	0.191	0.467	0.311	0.320	0.213
	20	0.397	0.264	0.262	0.174	0.437	0.291	0.290	0.193	0.482	0.321	0.324	0.215
	22	0.424	0.282	0.267	0.177	0.467	0.311	0.296	0.197	0.516	0.343	0.331	0.220
	24	0.456	0.303	0.272	0.181	0.503	0.334	0.302	0.201	0.556	0.370	0.339	0.225
	26	0.493	0.328	0.277	0.184	0.544	0.362	0.308	0.205	0.603	0.401	0.347	0.231
	28	0.536	0.357	0.282	0.188	0.593	0.395	0.315	0.210	0.658	0.438	0.355	0.236
	30	0.587	0.391	0.288	0.192	0.650	0.433	0.322	0.215	0.724	0.481	0.364	0.242
	32	0.647	0.430	0.294	0.196	0.718	0.478	0.330	0.220	0.800	0.532	0.373	0.248
	34	0.717	0.477	0.300	0.200	0.797	0.530	0.338	0.225	0.891	0.593	0.383	0.255
	36	0.802	0.533	0.307	0.204	0.892	0.594	0.346	0.230	0.999	0.665	0.393	0.262
	38	0.893	0.594	0.314	0.209	0.994	0.662	0.355	0.236	1.11	0.741	0.404	0.269
	40	0.990	0.658	0.321	0.213	1.10	0.733	0.364	0.242	1.23	0.821	0.416	0.277
	42	1.09	0.726	0.328	0.218	1.21	0.808	0.373	0.248	1.36	0.905	0.428	0.285
	44	1.20	0.797	0.336	0.224	1.33	0.887	0.383	0.255	1.49	0.993	0.441	0.293
	46	1.31	0.871	0.344	0.229	1.46	0.969	0.394	0.262	1.63	1.09	0.454	0.302
	48	1.43	0.948	0.353	0.235	1.59	1.06	0.405	0.270	1.78	1.18	0.469	0.312
	50	1.55	1.03	0.362	0.241	1.72	1.15	0.417	0.278	1.93	1.28	0.485	0.322
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.15		0.765		1.28		0.850		1.41		0.941	
$t_y \times 10^3$, (kips)$^{-1}$		0.290		0.193		0.318		0.212		0.348		0.232	
$t_r \times 10^3$, (kips)$^{-1}$		0.357		0.238		0.391		0.260		0.428		0.285	
r_x/r_y		3.65				3.65				3.67			
r_y, in.		3.67				3.64				3.60			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W30

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W30×											
		292				261				235			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.388	0.258	0.336	0.224	0.434	0.289	0.378	0.251	0.482	0.321	0.421	0.280
	11	0.429	0.285	0.336	0.224	0.480	0.320	0.378	0.251	0.534	0.356	0.421	0.280
	12	0.437	0.291	0.336	0.224	0.490	0.326	0.378	0.251	0.545	0.363	0.421	0.280
	13	0.446	0.297	0.337	0.225	0.500	0.333	0.380	0.253	0.557	0.370	0.424	0.282
	14	0.456	0.304	0.341	0.227	0.512	0.341	0.385	0.256	0.570	0.379	0.430	0.286
	15	0.467	0.311	0.345	0.230	0.525	0.349	0.390	0.260	0.584	0.389	0.436	0.290
	16	0.479	0.319	0.349	0.232	0.539	0.358	0.395	0.263	0.600	0.399	0.442	0.294
	17	0.492	0.328	0.353	0.235	0.554	0.368	0.400	0.266	0.617	0.411	0.448	0.298
	18	0.507	0.337	0.358	0.238	0.570	0.379	0.406	0.270	0.636	0.423	0.455	0.302
	19	0.522	0.348	0.362	0.241	0.588	0.392	0.411	0.274	0.656	0.437	0.461	0.307
	20	0.539	0.359	0.366	0.244	0.608	0.405	0.417	0.277	0.678	0.451	0.468	0.311
	22	0.578	0.385	0.376	0.250	0.653	0.434	0.429	0.285	0.729	0.485	0.483	0.321
	24	0.623	0.415	0.385	0.256	0.706	0.470	0.441	0.294	0.788	0.525	0.498	0.331
	26	0.677	0.450	0.396	0.263	0.768	0.511	0.454	0.302	0.859	0.571	0.514	0.342
	28	0.740	0.492	0.406	0.270	0.841	0.560	0.468	0.312	0.942	0.627	0.531	0.354
	30	0.813	0.541	0.418	0.278	0.928	0.617	0.483	0.322	1.04	0.692	0.550	0.366
	32	0.901	0.599	0.430	0.286	1.03	0.686	0.499	0.332	1.16	0.769	0.570	0.379
	34	1.00	0.669	0.443	0.295	1.15	0.768	0.516	0.343	1.30	0.863	0.591	0.393
	36	1.13	0.749	0.456	0.304	1.29	0.861	0.534	0.356	1.45	0.968	0.614	0.409
	38	1.26	0.835	0.471	0.313	1.44	0.959	0.554	0.368	1.62	1.08	0.639	0.425
	40	1.39	0.925	0.486	0.323	1.60	1.06	0.575	0.382	1.80	1.19	0.666	0.443
	42	1.53	1.02	0.502	0.334	1.76	1.17	0.597	0.398	1.98	1.32	0.704	0.468
	44	1.68	1.12	0.520	0.346	1.93	1.29	0.626	0.416	2.17	1.45	0.748	0.498
	46	1.84	1.22	0.539	0.358	2.11	1.41	0.662	0.440	2.37	1.58	0.792	0.527
	48	2.00	1.33	0.564	0.375	2.30	1.53	0.698	0.464	2.59	1.72	0.837	0.557
	50	2.17	1.45	0.592	0.394	2.50	1.66	0.734	0.488	2.81	1.87	0.881	0.586

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.60	1.06	1.82	1.21	2.04	1.35
$t_y \times 10^3$, (kips)$^{-1}$	0.388	0.258	0.434	0.289	0.482	0.321
$t_r \times 10^3$, (kips)$^{-1}$	0.477	0.318	0.533	0.355	0.592	0.395
r_x/r_y	3.69		3.71		3.70	
r_y, in.	3.58		3.53		3.51	

W30

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×											
		211				191[c]				173[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.536	0.357	0.474	0.316	0.602	0.401	0.528	0.351	0.677	0.450	0.587	0.391
	11	0.595	0.396	0.474	0.316	0.662	0.441	0.528	0.351	0.745	0.495	0.587	0.391
	12	0.607	0.404	0.474	0.316	0.676	0.450	0.528	0.351	0.758	0.505	0.587	0.391
	13	0.620	0.413	0.479	0.319	0.691	0.460	0.534	0.355	0.774	0.515	0.596	0.396
	14	0.635	0.423	0.486	0.323	0.707	0.471	0.543	0.361	0.790	0.526	0.606	0.403
	15	0.651	0.433	0.493	0.328	0.726	0.483	0.551	0.367	0.809	0.538	0.616	0.410
	16	0.669	0.445	0.501	0.333	0.746	0.496	0.560	0.373	0.829	0.551	0.626	0.417
	17	0.688	0.458	0.509	0.338	0.768	0.511	0.570	0.379	0.851	0.566	0.637	0.424
	18	0.709	0.472	0.517	0.344	0.792	0.527	0.579	0.385	0.878	0.584	0.649	0.432
	19	0.732	0.487	0.525	0.349	0.818	0.544	0.589	0.392	0.908	0.604	0.660	0.439
	20	0.758	0.504	0.533	0.355	0.846	0.563	0.599	0.399	0.941	0.626	0.673	0.447
	22	0.815	0.542	0.551	0.367	0.911	0.606	0.621	0.413	1.01	0.675	0.698	0.465
	24	0.882	0.587	0.570	0.379	0.988	0.657	0.644	0.429	1.10	0.733	0.726	0.483
	26	0.962	0.640	0.591	0.393	1.08	0.718	0.669	0.445	1.21	0.802	0.756	0.503
	28	1.06	0.702	0.613	0.408	1.19	0.789	0.696	0.463	1.33	0.884	0.789	0.525
	30	1.17	0.777	0.636	0.423	1.31	0.874	0.726	0.483	1.48	0.982	0.825	0.549
	32	1.30	0.864	0.662	0.440	1.47	0.975	0.758	0.504	1.65	1.10	0.864	0.575
	34	1.46	0.971	0.690	0.459	1.65	1.10	0.793	0.527	1.86	1.24	0.906	0.603
	36	1.64	1.09	0.720	0.479	1.85	1.23	0.831	0.553	2.09	1.39	0.964	0.641
	38	1.82	1.21	0.753	0.501	2.06	1.37	0.889	0.591	2.32	1.55	1.05	0.696
	40	2.02	1.34	0.802	0.533	2.28	1.52	0.957	0.637	2.57	1.71	1.13	0.751
	42	2.23	1.48	0.858	0.571	2.52	1.67	1.03	0.683	2.84	1.89	1.21	0.807
	44	2.44	1.63	0.914	0.608	2.76	1.84	1.10	0.729	3.12	2.07	1.30	0.863
	46	2.67	1.78	0.970	0.645	3.02	2.01	1.16	0.775	3.41	2.27	1.38	0.919
	48	2.91	1.94	1.03	0.683	3.29	2.19	1.23	0.821	3.71	2.47	1.47	0.976
	50	3.16	2.10	1.08	0.720	3.57	2.37	1.30	0.867	4.02	2.68	1.55	1.03

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.30	1.53	2.58	1.72	2.90	1.93
$t_y \times 10^3$, (kips)$^{-1}$	0.536	0.357	0.595	0.396	0.656	0.437
$t_r \times 10^3$, (kips)$^{-1}$	0.659	0.439	0.731	0.488	0.806	0.537
r_x/r_y	3.70		3.70		3.71	
r_y, in.	3.49		3.46		3.42	

[c] Shape is slender for compression for F_y = 50 ksi.

W30

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×											
		148[c]				132[c]				124[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.799	0.531	0.713	0.474	0.914	0.608	0.815	0.542	0.988	0.657	0.873	0.581
	11	0.986	0.656	0.765	0.509	1.13	0.753	0.882	0.587	1.23	0.817	0.949	0.631
	12	1.03	0.683	0.784	0.522	1.18	0.785	0.906	0.603	1.28	0.851	0.976	0.649
	13	1.08	0.718	0.804	0.535	1.23	0.820	0.931	0.620	1.34	0.890	1.00	0.668
	14	1.14	0.758	0.826	0.550	1.29	0.861	0.958	0.638	1.40	0.935	1.03	0.688
	15	1.21	0.804	0.849	0.565	1.37	0.915	0.987	0.657	1.48	0.985	1.07	0.710
	16	1.29	0.856	0.873	0.581	1.47	0.975	1.02	0.677	1.57	1.05	1.10	0.732
	17	1.38	0.915	0.898	0.598	1.57	1.04	1.05	0.699	1.69	1.12	1.14	0.757
	18	1.48	0.982	0.925	0.616	1.69	1.12	1.08	0.721	1.82	1.21	1.18	0.782
	19	1.59	1.06	0.954	0.635	1.82	1.21	1.12	0.746	1.97	1.31	1.22	0.810
	20	1.72	1.15	0.984	0.655	1.98	1.32	1.16	0.772	2.13	1.42	1.26	0.840
	22	2.05	1.36	1.05	0.700	2.36	1.57	1.25	0.831	2.55	1.70	1.36	0.907
	24	2.43	1.62	1.13	0.751	2.81	1.87	1.36	0.904	3.04	2.02	1.51	1.01
	26	2.86	1.90	1.25	0.828	3.30	2.19	1.54	1.02	3.57	2.37	1.72	1.14
	28	3.31	2.20	1.39	0.923	3.82	2.54	1.72	1.15	4.14	2.75	1.92	1.28
	30	3.80	2.53	1.53	1.02	4.39	2.92	1.91	1.27	4.75	3.16	2.13	1.42
	32	4.33	2.88	1.67	1.11	4.99	3.32	2.09	1.39	5.40	3.60	2.35	1.56
	34	4.89	3.25	1.82	1.21	5.64	3.75	2.28	1.52	6.10	4.06	2.56	1.70
	36	5.48	3.64	1.96	1.3	6.32	4.21	2.47	1.64	6.84	4.55	2.78	1.85

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	5.24	3.49	6.10	4.06	6.60	4.39
$t_y \times 10^3$, (kips)$^{-1}$	0.766	0.510	0.861	0.573	0.915	0.609
$t_r \times 10^3$, (kips)$^{-1}$	0.941	0.627	1.06	0.705	1.12	0.749
r_x/r_y	5.44		5.42		5.43	
r_y, in.	2.28		2.25		2.23	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W30

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×											
		116[c]				108[c]				99[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
	0	1.07	0.711	0.943	0.627	1.17	0.779	1.03	0.685	1.31	0.868	1.14	0.760
	11	1.34	0.889	1.03	0.686	1.47	0.981	1.14	0.755	1.66	1.10	1.27	0.846
	12	1.39	0.928	1.06	0.706	1.54	1.02	1.17	0.779	1.74	1.16	1.31	0.874
	13	1.46	0.972	1.09	0.728	1.62	1.08	1.21	0.804	1.82	1.21	1.36	0.903
	14	1.54	1.02	1.13	0.750	1.70	1.13	1.25	0.830	1.93	1.28	1.41	0.935
	15	1.62	1.08	1.16	0.775	1.80	1.20	1.29	0.859	2.04	1.36	1.46	0.969
	16	1.72	1.14	1.20	0.801	1.91	1.27	1.34	0.889	2.17	1.44	1.51	1.01
	17	1.84	1.23	1.24	0.828	2.04	1.35	1.39	0.922	2.31	1.54	1.57	1.04
	18	1.99	1.32	1.29	0.858	2.20	1.47	1.44	0.957	2.50	1.66	1.63	1.09
	19	2.16	1.44	1.34	0.890	2.40	1.60	1.50	0.995	2.73	1.81	1.7	1.13
	20	2.35	1.56	1.39	0.924	2.62	1.74	1.56	1.04	3.00	1.99	1.78	1.18
	22	2.83	1.88	1.51	1.00	3.16	2.11	1.7	1.13	3.63	2.41	2.00	1.33
	24	3.36	2.24	1.70	1.13	3.77	2.51	1.96	1.31	4.31	2.87	2.32	1.54
	26	3.95	2.63	1.94	1.29	4.42	2.94	2.24	1.49	5.06	3.37	2.65	1.76
	28	4.58	3.05	2.18	1.45	5.13	3.41	2.52	1.68	5.87	3.91	2.99	1.99
	30	5.26	3.50	2.42	1.61	5.88	3.91	2.81	1.87	6.74	4.49	3.34	2.22
	32	5.98	3.98	2.67	1.78	6.69	4.45	3.10	2.06	7.67	5.10	3.69	2.46
	34	6.75	4.49	2.92	1.94	7.56	5.03	3.40	2.26	8.66	5.76	4.06	2.70
	36	7.57	5.04	3.17	2.11								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	7.24	4.82	8.12	5.40	9.23	6.14
$t_y \times 10^3$, (kips)$^{-1}$	0.977	0.650	1.05	0.701	1.15	0.766
$t_r \times 10^3$, (kips)$^{-1}$	1.20	0.800	1.290	0.863	1.41	0.943
r_x/r_y	5.48		5.53		5.57	
r_y, in.	2.19		2.15		2.10	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W30–W27

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×				W27×							
		90[c], [v]				539[h]				368[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.49	0.990	1.26	0.838	0.210	0.140	0.189	0.125	0.306	0.204	0.287	0.191
	11	1.90	1.26	1.41	0.936	0.231	0.154	0.189	0.125	0.340	0.226	0.287	0.191
	12	1.99	1.32	1.45	0.968	0.235	0.157	0.189	0.125	0.347	0.231	0.287	0.191
	13	2.09	1.39	1.51	1.00	0.240	0.160	0.189	0.125	0.355	0.236	0.289	0.192
	14	2.21	1.47	1.56	1.04	0.245	0.163	0.190	0.126	0.363	0.242	0.291	0.194
	15	2.34	1.56	1.62	1.08	0.251	0.167	0.191	0.127	0.373	0.248	0.294	0.195
	16	2.49	1.65	1.68	1.12	0.257	0.171	0.192	0.128	0.383	0.255	0.296	0.197
	17	2.66	1.77	1.75	1.16	0.264	0.176	0.193	0.128	0.394	0.262	0.299	0.199
	18	2.85	1.90	1.82	1.21	0.271	0.181	0.194	0.129	0.406	0.270	0.301	0.200
	19	3.07	2.04	1.90	1.27	0.279	0.186	0.195	0.130	0.419	0.279	0.304	0.202
	20	3.34	2.22	1.99	1.32	0.288	0.192	0.196	0.131	0.434	0.289	0.306	0.204
	22	4.04	2.69	2.28	1.52	0.308	0.205	0.199	0.132	0.467	0.311	0.312	0.207
	24	4.80	3.20	2.65	1.76	0.331	0.220	0.201	0.134	0.506	0.336	0.317	0.211
	26	5.64	3.75	3.04	2.02	0.358	0.238	0.203	0.135	0.552	0.367	0.323	0.215
	28	6.54	4.35	3.44	2.29	0.390	0.260	0.206	0.137	0.606	0.403	0.329	0.219
	30	7.51	4.99	3.85	2.56	0.428	0.285	0.208	0.139	0.670	0.446	0.335	0.223
	32	8.54	5.68	4.27	2.84	0.472	0.314	0.211	0.140	0.746	0.497	0.342	0.227
	34	9.64	6.41	4.70	3.13	0.524	0.348	0.213	0.142	0.839	0.558	0.348	0.232
	36					0.586	0.390	0.216	0.144	0.941	0.626	0.355	0.236
	38					0.653	0.435	0.219	0.146	1.05	0.697	0.363	0.241
	40					0.724	0.481	0.222	0.148	1.16	0.773	0.370	0.246
	42					0.798	0.531	0.225	0.149	1.28	0.852	0.378	0.252
	44					0.876	0.583	0.228	0.151	1.41	0.935	0.386	0.257
	46					0.957	0.637	0.231	0.154	1.54	1.02	0.395	0.263
	48					1.04	0.693	0.234	0.156	1.67	1.11	0.404	0.269
	50					1.13	0.752	0.237	0.158	1.81	1.21	0.413	0.275
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		10.3		6.83		0.815		0.542		1.28		0.850	
$t_y \times 10^3$, (kips)$^{-1}$		1.27		0.845		0.210		0.140		0.306		0.204	
$t_r \times 10^3$, (kips)$^{-1}$		1.56		1.04		0.258		0.172		0.376		0.251	
r_x/r_y		5.60				3.48				3.51			
r_y, in.		2.09				3.65				3.48			

[c] Shape is slender for compression for F_y = 50 ksi.

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W27

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×											
		336[h]				307[h]				281			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.337	0.224	0.315	0.210	0.370	0.246	0.346	0.230	0.402	0.267	0.381	0.253
	11	0.375	0.249	0.315	0.210	0.413	0.275	0.346	0.230	0.449	0.299	0.381	0.253
	12	0.382	0.254	0.315	0.210	0.422	0.281	0.346	0.230	0.459	0.305	0.381	0.253
	13	0.391	0.260	0.318	0.211	0.432	0.287	0.349	0.232	0.469	0.312	0.385	0.256
	14	0.400	0.266	0.320	0.213	0.442	0.294	0.353	0.235	0.481	0.320	0.389	0.259
	15	0.411	0.273	0.323	0.215	0.454	0.302	0.356	0.237	0.494	0.329	0.393	0.262
	16	0.422	0.281	0.326	0.217	0.467	0.311	0.360	0.239	0.508	0.338	0.397	0.264
	17	0.435	0.289	0.329	0.219	0.481	0.320	0.364	0.242	0.524	0.348	0.402	0.267
	18	0.448	0.298	0.332	0.221	0.497	0.330	0.367	0.244	0.541	0.360	0.406	0.270
	19	0.463	0.308	0.336	0.223	0.513	0.342	0.371	0.247	0.559	0.372	0.411	0.273
	20	0.480	0.319	0.339	0.225	0.532	0.354	0.375	0.250	0.580	0.386	0.416	0.277
	22	0.517	0.344	0.345	0.230	0.574	0.382	0.383	0.255	0.626	0.417	0.426	0.283
	24	0.560	0.373	0.352	0.234	0.624	0.415	0.392	0.261	0.681	0.453	0.436	0.290
	26	0.612	0.407	0.359	0.239	0.683	0.454	0.401	0.267	0.747	0.497	0.447	0.297
	28	0.674	0.448	0.367	0.244	0.753	0.501	0.410	0.273	0.824	0.548	0.458	0.305
	30	0.746	0.497	0.375	0.249	0.836	0.557	0.420	0.279	0.917	0.610	0.470	0.313
	32	0.833	0.554	0.383	0.255	0.936	0.623	0.430	0.286	1.03	0.683	0.482	0.321
	34	0.938	0.624	0.391	0.260	1.06	0.703	0.441	0.293	1.16	0.772	0.496	0.330
	36	1.05	0.700	0.400	0.266	1.18	0.788	0.452	0.301	1.30	0.865	0.510	0.339
	38	1.17	0.780	0.409	0.272	1.32	0.878	0.464	0.309	1.45	0.964	0.524	0.349
	40	1.30	0.864	0.419	0.279	1.46	0.972	0.476	0.317	1.61	1.07	0.540	0.359
	42	1.43	0.952	0.429	0.285	1.61	1.07	0.490	0.326	1.77	1.18	0.557	0.370
	44	1.57	1.05	0.439	0.292	1.77	1.18	0.504	0.335	1.94	1.29	0.574	0.382
	46	1.72	1.14	0.451	0.300	1.93	1.29	0.518	0.345	2.12	1.41	0.593	0.395
	48	1.87	1.24	0.462	0.308	2.10	1.40	0.534	0.355	2.31	1.54	0.614	0.408
	50	2.03	1.35	0.475	0.316	2.28	1.52	0.551	0.367	2.51	1.67	0.639	0.425

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.41	0.941	1.57	1.04	1.73	1.15
$t_y \times 10^3$, (kips)$^{-1}$	0.337	0.224	0.370	0.246	0.402	0.267
$t_r \times 10^3$, (kips)$^{-1}$	0.414	0.276	0.455	0.303	0.494	0.329
r_x/r_y	3.51		3.52		3.54	
r_y, in.	3.45		3.41		3.39	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W27

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×											
		258				235				217			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.439	0.292	0.418	0.278	0.481	0.320	0.461	0.307	0.523	0.348	0.501	0.333
	11	0.491	0.327	0.418	0.278	0.540	0.359	0.461	0.307	0.587	0.390	0.501	0.333
	12	0.502	0.334	0.419	0.279	0.552	0.367	0.463	0.308	0.600	0.399	0.503	0.335
	13	0.514	0.342	0.424	0.282	0.565	0.376	0.469	0.312	0.614	0.409	0.510	0.339
	14	0.527	0.351	0.429	0.285	0.580	0.386	0.475	0.316	0.630	0.419	0.517	0.344
	15	0.541	0.360	0.434	0.289	0.596	0.396	0.481	0.320	0.648	0.431	0.524	0.348
	16	0.557	0.371	0.439	0.292	0.614	0.408	0.487	0.324	0.667	0.444	0.531	0.353
	17	0.575	0.382	0.444	0.296	0.633	0.421	0.494	0.328	0.689	0.458	0.538	0.358
	18	0.594	0.395	0.450	0.299	0.655	0.436	0.500	0.333	0.712	0.474	0.546	0.363
	19	0.615	0.409	0.455	0.303	0.678	0.451	0.507	0.337	0.738	0.491	0.554	0.369
	20	0.637	0.424	0.461	0.307	0.704	0.468	0.514	0.342	0.766	0.510	0.562	0.374
	22	0.689	0.459	0.473	0.315	0.762	0.507	0.529	0.352	0.830	0.552	0.579	0.385
	24	0.751	0.500	0.485	0.323	0.832	0.553	0.544	0.362	0.906	0.603	0.597	0.398
	26	0.824	0.549	0.498	0.332	0.914	0.608	0.560	0.373	0.997	0.663	0.617	0.410
	28	0.912	0.607	0.512	0.341	1.01	0.674	0.578	0.384	1.11	0.735	0.637	0.424
	30	1.02	0.676	0.527	0.351	1.13	0.753	0.596	0.397	1.23	0.822	0.660	0.439
	32	1.14	0.760	0.543	0.361	1.27	0.848	0.616	0.410	1.39	0.927	0.683	0.455
	34	1.29	0.858	0.559	0.372	1.44	0.957	0.637	0.424	1.57	1.05	0.709	0.471
	36	1.45	0.962	0.577	0.384	1.61	1.07	0.660	0.439	1.76	1.17	0.736	0.490
	38	1.61	1.07	0.596	0.396	1.80	1.20	0.684	0.455	1.96	1.31	0.766	0.509
	40	1.78	1.19	0.616	0.410	1.99	1.33	0.710	0.472	2.18	1.45	0.798	0.531
	42	1.97	1.31	0.637	0.424	2.20	1.46	0.738	0.491	2.40	1.60	0.842	0.560
	44	2.16	1.44	0.660	0.439	2.41	1.60	0.776	0.516	2.63	1.75	0.892	0.593
	46	2.36	1.57	0.685	0.456	2.63	1.75	0.818	0.544	2.88	1.91	0.942	0.627
	48	2.57	1.71	0.721	0.479	2.87	1.91	0.861	0.573	3.13	2.09	0.992	0.660
	50	2.79	1.85	0.756	0.503	3.11	2.07	0.904	0.601	3.40	2.26	1.04	0.693

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.91	1.27	2.12	1.41	2.31	1.540
$t_y \times 10^3$, (kips)$^{-1}$	0.439	0.292	0.481	0.320	0.523	0.348
$t_r \times 10^3$, (kips)$^{-1}$	0.539	0.359	0.591	0.394	0.642	0.428
r_x/r_y	3.54		3.54		3.55	
r_y, in.	3.36		3.33		3.32	

W27

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×											
		194				178				161[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.585	0.389	0.565	0.376	0.636	0.423	0.625	0.416	0.703	0.467	0.692	0.460
	11	0.658	0.438	0.565	0.376	0.718	0.478	0.625	0.416	0.793	0.527	0.692	0.460
	12	0.673	0.448	0.568	0.378	0.734	0.489	0.630	0.419	0.811	0.540	0.698	0.465
	13	0.689	0.459	0.576	0.383	0.753	0.501	0.640	0.426	0.832	0.554	0.710	0.472
	14	0.708	0.471	0.584	0.389	0.773	0.515	0.650	0.432	0.855	0.569	0.722	0.480
	15	0.728	0.484	0.593	0.395	0.796	0.530	0.661	0.439	0.881	0.586	0.735	0.489
	16	0.750	0.499	0.602	0.401	0.821	0.546	0.671	0.447	0.909	0.604	0.747	0.497
	17	0.775	0.516	0.612	0.407	0.849	0.565	0.683	0.454	0.939	0.625	0.761	0.506
	18	0.802	0.533	0.621	0.413	0.879	0.585	0.694	0.462	0.973	0.647	0.775	0.515
	19	0.831	0.553	0.631	0.420	0.912	0.607	0.706	0.470	1.01	0.672	0.789	0.525
	20	0.863	0.574	0.641	0.427	0.948	0.631	0.718	0.478	1.05	0.699	0.804	0.535
	22	0.937	0.623	0.663	0.441	1.03	0.686	0.745	0.495	1.14	0.761	0.835	0.556
	24	1.02	0.682	0.686	0.456	1.13	0.752	0.773	0.514	1.25	0.835	0.869	0.578
	26	1.13	0.751	0.711	0.473	1.25	0.830	0.803	0.534	1.39	0.924	0.906	0.603
	28	1.25	0.834	0.737	0.490	1.39	0.925	0.836	0.556	1.55	1.03	0.946	0.630
	30	1.40	0.934	0.766	0.509	1.56	1.04	0.871	0.580	1.74	1.16	0.990	0.659
	32	1.59	1.06	0.797	0.530	1.77	1.18	0.910	0.606	1.98	1.31	1.04	0.691
	34	1.79	1.19	0.830	0.552	2.00	1.33	0.952	0.634	2.23	1.48	1.09	0.726
	36	2.01	1.34	0.867	0.577	2.24	1.49	0.999	0.665	2.50	1.66	1.17	0.781
	38	2.24	1.49	0.906	0.603	2.49	1.66	1.07	0.713	2.79	1.85	1.27	0.844
	40	2.48	1.65	0.968	0.644	2.76	1.84	1.15	0.765	3.09	2.05	1.36	0.907
	42	2.73	1.82	1.03	0.687	3.05	2.03	1.23	0.817	3.40	2.26	1.46	0.970
	44	3.00	2.00	1.10	0.729	3.34	2.23	1.31	0.869	3.73	2.48	1.55	1.03
	46	3.28	2.18	1.16	0.771	3.66	2.43	1.38	0.920	4.08	2.72	1.65	1.10
	48	3.57	2.38	1.22	0.813	3.98	2.65	1.46	0.972	4.44	2.96	1.74	1.16
	50	3.88	2.58	1.29	0.855	4.32	2.87	1.54	1.02	4.82	3.21	1.84	1.22

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.62	1.74	2.92	1.94	3.27	2.17
$t_y \times 10^3$, (kips)$^{-1}$	0.585	0.389	0.636	0.423	0.702	0.467
$t_r \times 10^3$, (kips)$^{-1}$	0.718	0.479	0.781	0.521	0.862	0.575
r_x/r_y	3.56		3.57		3.56	
r_y, in.	3.29		3.25		3.23	

[c] Shape is slender for compression for F_y = 50 ksi.

W27

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×											
		146[c]				129[c]				114[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.790	0.526	0.768	0.511	0.908	0.604	0.902	0.600	1.04	0.694	1.04	0.691
	11	0.882	0.587	0.768	0.511	1.15	0.763	0.976	0.649	1.31	0.873	1.13	0.754
	12	0.901	0.599	0.777	0.517	1.21	0.802	1.00	0.666	1.37	0.912	1.17	0.775
	13	0.921	0.613	0.791	0.526	1.27	0.846	1.03	0.684	1.45	0.962	1.20	0.798
	14	0.946	0.629	0.805	0.535	1.35	0.897	1.06	0.703	1.53	1.02	1.24	0.822
	15	0.974	0.648	0.819	0.545	1.44	0.955	1.09	0.723	1.64	1.09	1.27	0.847
	16	1.01	0.669	0.835	0.555	1.53	1.02	1.12	0.744	1.75	1.17	1.31	0.874
	17	1.04	0.692	0.850	0.566	1.65	1.10	1.15	0.767	1.89	1.25	1.36	0.903
	18	1.08	0.718	0.867	0.577	1.78	1.18	1.19	0.791	2.04	1.36	1.40	0.934
	19	1.12	0.746	0.884	0.588	1.92	1.28	1.23	0.816	2.21	1.47	1.45	0.967
	20	1.17	0.776	0.901	0.600	2.09	1.39	1.27	0.843	2.41	1.60	1.51	1.00
	22	1.27	0.846	0.939	0.625	2.51	1.67	1.36	0.903	2.90	1.93	1.63	1.08
	24	1.40	0.930	0.980	0.652	2.99	1.99	1.46	0.973	3.46	2.30	1.80	1.20
	26	1.55	1.03	1.02	0.681	3.51	2.33	1.64	1.09	4.06	2.70	2.04	1.36
	28	1.73	1.15	1.07	0.714	4.07	2.71	1.82	1.21	4.70	3.13	2.27	1.51
	30	1.95	1.30	1.13	0.750	4.67	3.11	2.00	1.33	5.40	3.59	2.51	1.67
	32	2.22	1.48	1.19	0.789	5.31	3.54	2.18	1.45	6.14	4.09	2.75	1.83
	34	2.50	1.67	1.27	0.843	6.00	3.99	2.36	1.57	6.94	4.61	2.99	1.99
	36	2.81	1.87	1.38	0.919	6.73	4.47	2.54	1.69	7.78	5.17	3.23	2.15
	38	3.13	2.08	1.50	0.995								
	40	3.47	2.31	1.61	1.07								
	42	3.82	2.54	1.73	1.15								
	44	4.19	2.79	1.84	1.23								
	46	4.58	3.05	1.96	1.30								
	48	4.99	3.32	2.07	1.38								
	50	5.41	3.60	2.19	1.46								

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	3.65	2.43	6.19	4.12	7.23	4.81
$t_y \times 10^3$, (kips)$^{-1}$	0.773	0.514	0.884	0.588	0.994	0.661
$t_r \times 10^3$, (kips)$^{-1}$	0.950	0.633	1.09	0.724	1.22	0.814
r_x/r_y	3.59		5.07		5.05	
r_y, in.	3.20		2.21		2.18	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W27

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×											
		102[c]				94[c]				84[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.20	0.802	1.17	0.777	1.33	0.887	1.28	0.853	1.53	1.02	1.46	0.971
	11	1.52	1.01	1.28	0.854	1.70	1.13	1.42	0.944	1.96	1.30	1.63	1.09
	12	1.59	1.06	1.32	0.880	1.78	1.18	1.46	0.974	2.06	1.37	1.69	1.12
	13	1.67	1.11	1.36	0.907	1.87	1.24	1.51	1.01	2.17	1.44	1.75	1.16
	14	1.76	1.17	1.41	0.935	1.97	1.31	1.56	1.04	2.29	1.52	1.81	1.20
	15	1.87	1.24	1.45	0.966	2.09	1.39	1.62	1.07	2.43	1.62	1.88	1.25
	16	1.99	1.33	1.50	0.999	2.22	1.48	1.67	1.11	2.59	1.73	1.95	1.30
	17	2.15	1.43	1.55	1.03	2.38	1.58	1.74	1.15	2.78	1.85	2.03	1.35
	18	2.33	1.55	1.61	1.07	2.59	1.72	1.80	1.20	3.00	1.99	2.11	1.41
	19	2.53	1.69	1.67	1.11	2.82	1.88	1.88	1.25	3.28	2.18	2.21	1.47
	20	2.77	1.84	1.74	1.16	3.09	2.06	1.95	1.30	3.62	2.41	2.31	1.53
	22	3.34	2.22	1.89	1.25	3.74	2.49	2.16	1.44	4.38	2.91	2.64	1.76
	24	3.98	2.65	2.15	1.43	4.45	2.96	2.50	1.66	5.21	3.47	3.06	2.04
	26	4.67	3.11	2.44	1.63	5.22	3.47	2.84	1.89	6.12	4.07	3.49	2.32
	28	5.42	3.60	2.74	1.82	6.06	4.03	3.19	2.12	7.10	4.72	3.93	2.62
	30	6.22	4.14	3.03	2.02	6.95	4.62	3.54	2.36	8.15	5.42	4.38	2.92
	32	7.07	4.71	3.33	2.22	7.91	5.26	3.90	2.59	9.27	6.17	4.84	3.22
	34	7.99	5.31	3.63	2.42	8.93	5.94	4.26	2.83	10.5	6.96	5.31	3.53
	36												
	38												
	40												
	42												
	44												
	46												
	48												
	50												

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	8.21	5.46	9.18	6.11	10.7	7.14
$t_y \times 10^3$, (kips)$^{-1}$	1.11	0.741	1.21	0.805	1.35	0.900
$t_r \times 10^3$, (kips)$^{-1}$	1.37	0.912	1.49	0.991	1.66	1.11
r_x/r_y	5.12		5.14		5.17	
r_y, in.	2.15		2.12		2.07	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W24

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		370[h]				335[h]				306[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.306	0.204	0.315	0.210	0.340	0.226	0.349	0.232	0.372	0.248	0.386	0.257
	11	0.345	0.230	0.315	0.210	0.384	0.255	0.349	0.232	0.422	0.281	0.386	0.257
	12	0.353	0.235	0.316	0.210	0.393	0.261	0.351	0.233	0.432	0.287	0.389	0.259
	13	0.362	0.241	0.319	0.212	0.403	0.268	0.354	0.235	0.443	0.295	0.392	0.261
	14	0.372	0.247	0.321	0.213	0.414	0.276	0.357	0.237	0.455	0.303	0.396	0.263
	15	0.382	0.254	0.323	0.215	0.426	0.284	0.359	0.239	0.469	0.312	0.399	0.266
	16	0.394	0.262	0.326	0.217	0.440	0.293	0.362	0.241	0.484	0.322	0.403	0.268
	17	0.407	0.271	0.328	0.218	0.455	0.303	0.365	0.243	0.501	0.333	0.406	0.270
	18	0.422	0.280	0.330	0.220	0.471	0.314	0.368	0.245	0.520	0.346	0.410	0.273
	19	0.437	0.291	0.333	0.221	0.489	0.325	0.371	0.247	0.540	0.359	0.414	0.275
	20	0.454	0.302	0.335	0.223	0.509	0.338	0.375	0.249	0.562	0.374	0.418	0.278
	22	0.494	0.328	0.340	0.226	0.554	0.368	0.381	0.254	0.612	0.407	0.426	0.283
	24	0.540	0.359	0.346	0.230	0.608	0.404	0.388	0.258	0.673	0.448	0.434	0.289
	26	0.596	0.397	0.351	0.234	0.672	0.447	0.395	0.263	0.746	0.496	0.442	0.294
	28	0.663	0.441	0.357	0.237	0.750	0.499	0.402	0.267	0.834	0.555	0.451	0.300
	30	0.743	0.495	0.363	0.241	0.843	0.561	0.409	0.272	0.939	0.625	0.461	0.306
	32	0.842	0.560	0.369	0.245	0.957	0.636	0.417	0.277	1.07	0.711	0.470	0.313
	34	0.950	0.632	0.375	0.249	1.08	0.718	0.425	0.283	1.21	0.802	0.480	0.320
	36	1.07	0.709	0.381	0.254	1.21	0.806	0.433	0.288	1.35	0.899	0.491	0.327
	38	1.19	0.790	0.388	0.258	1.35	0.897	0.442	0.294	1.51	1.00	0.502	0.334
	40	1.32	0.875	0.395	0.263	1.49	0.994	0.451	0.300	1.67	1.11	0.513	0.341
	42	1.45	0.965	0.402	0.267	1.65	1.10	0.460	0.306	1.84	1.22	0.525	0.349
	44	1.59	1.06	0.409	0.272	1.81	1.20	0.470	0.313	2.02	1.34	0.538	0.358
	46	1.74	1.16	0.417	0.277	1.98	1.32	0.480	0.319	2.21	1.47	0.551	0.367
	48	1.89	1.26	0.425	0.283	2.15	1.43	0.491	0.326	2.40	1.60	0.565	0.376
	50	2.05	1.37	0.433	0.288	2.34	1.55	0.502	0.334	2.61	1.73	0.579	0.386

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.33	0.888	1.50	0.996	1.66	1.11
$t_y \times 10^3$, (kips)$^{-1}$	0.306	0.204	0.340	0.226	0.372	0.248
$t_r \times 10^3$, (kips)$^{-1}$	0.376	0.251	0.417	0.278	0.457	0.305
r_x/r_y	3.39		3.41		3.41	
r_y, in.	3.27		3.23		3.20	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W24

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		279[h]				250				229			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.408	0.271	0.427	0.284	0.454	0.302	0.479	0.319	0.497	0.331	0.528	0.351
	11	0.463	0.308	0.427	0.284	0.517	0.344	0.479	0.319	0.567	0.377	0.528	0.351
	12	0.474	0.316	0.430	0.286	0.530	0.353	0.483	0.322	0.581	0.387	0.534	0.355
	13	0.487	0.324	0.434	0.289	0.544	0.362	0.489	0.325	0.597	0.397	0.540	0.359
	14	0.501	0.333	0.438	0.292	0.560	0.373	0.494	0.329	0.615	0.409	0.547	0.364
	15	0.516	0.343	0.443	0.294	0.578	0.384	0.499	0.332	0.635	0.422	0.553	0.368
	16	0.533	0.355	0.447	0.297	0.597	0.397	0.505	0.336	0.657	0.437	0.560	0.372
	17	0.552	0.367	0.451	0.300	0.619	0.412	0.510	0.340	0.681	0.453	0.567	0.377
	18	0.573	0.381	0.456	0.303	0.642	0.427	0.516	0.343	0.707	0.471	0.574	0.382
	19	0.595	0.396	0.461	0.306	0.668	0.445	0.522	0.347	0.736	0.490	0.581	0.387
	20	0.620	0.413	0.465	0.310	0.697	0.463	0.528	0.351	0.768	0.511	0.588	0.391
	22	0.677	0.451	0.475	0.316	0.762	0.507	0.541	0.360	0.842	0.560	0.604	0.402
	24	0.746	0.496	0.485	0.323	0.841	0.559	0.554	0.368	0.930	0.619	0.620	0.412
	26	0.828	0.551	0.496	0.330	0.935	0.622	0.567	0.378	1.04	0.690	0.637	0.424
	28	0.927	0.617	0.507	0.337	1.05	0.698	0.582	0.387	1.17	0.776	0.655	0.436
	30	1.05	0.697	0.519	0.345	1.19	0.792	0.597	0.397	1.33	0.883	0.674	0.448
	32	1.19	0.793	0.531	0.353	1.35	0.901	0.613	0.408	1.51	1.00	0.694	0.462
	34	1.35	0.895	0.544	0.362	1.53	1.02	0.630	0.419	1.70	1.13	0.716	0.476
	36	1.51	1.00	0.557	0.371	1.71	1.14	0.648	0.431	1.91	1.27	0.739	0.491
	38	1.68	1.12	0.571	0.380	1.91	1.27	0.667	0.444	2.13	1.42	0.763	0.508
	40	1.86	1.24	0.586	0.390	2.12	1.41	0.687	0.457	2.36	1.57	0.789	0.525
	42	2.05	1.37	0.601	0.400	2.33	1.55	0.708	0.471	2.60	1.73	0.817	0.544
	44	2.25	1.50	0.618	0.411	2.56	1.70	0.731	0.486	2.85	1.90	0.847	0.563
	46	2.46	1.64	0.635	0.423	2.80	1.86	0.755	0.502	3.12	2.08	0.884	0.588
	48	2.68	1.78	0.653	0.435	3.05	2.03	0.781	0.519	3.40	2.26	0.928	0.617
	50	2.91	1.94	0.673	0.448	3.31	2.20	0.814	0.541	3.68	2.45	0.971	0.646

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.85	1.23	2.08	1.39	2.31	1.54
$t_y \times 10^3$, (kips)$^{-1}$	0.408	0.271	0.454	0.302	0.497	0.331
$t_r \times 10^3$, (kips)$^{-1}$	0.501	0.334	0.558	0.372	0.611	0.407
r_x/r_y	3.41		3.41		3.44	
r_y, in.	3.17		3.14		3.11	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W24

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		207				192				176			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.550	0.366	0.588	0.391	0.591	0.393	0.637	0.424	0.646	0.430	0.697	0.464
	11	0.629	0.419	0.589	0.392	0.677	0.450	0.639	0.425	0.742	0.493	0.700	0.466
	12	0.646	0.430	0.596	0.397	0.694	0.462	0.647	0.431	0.761	0.506	0.710	0.472
	13	0.664	0.442	0.604	0.402	0.714	0.475	0.656	0.437	0.783	0.521	0.721	0.479
	14	0.684	0.455	0.612	0.407	0.736	0.490	0.665	0.443	0.808	0.537	0.731	0.487
	15	0.706	0.470	0.620	0.412	0.760	0.506	0.675	0.449	0.835	0.555	0.743	0.494
	16	0.731	0.486	0.628	0.418	0.787	0.524	0.684	0.455	0.865	0.575	0.754	0.502
	17	0.758	0.505	0.637	0.424	0.816	0.543	0.694	0.462	0.898	0.597	0.766	0.510
	18	0.788	0.525	0.646	0.429	0.849	0.565	0.705	0.469	0.934	0.622	0.778	0.518
	19	0.821	0.547	0.655	0.435	0.885	0.589	0.715	0.476	0.975	0.649	0.791	0.526
	20	0.858	0.571	0.664	0.442	0.924	0.615	0.726	0.483	1.02	0.678	0.804	0.535
	22	0.942	0.626	0.683	0.454	1.02	0.675	0.749	0.498	1.12	0.746	0.832	0.553
	24	1.04	0.694	0.704	0.468	1.13	0.749	0.773	0.514	1.25	0.829	0.861	0.573
	26	1.17	0.775	0.725	0.483	1.26	0.837	0.799	0.532	1.40	0.928	0.893	0.594
	28	1.31	0.874	0.749	0.498	1.42	0.944	0.827	0.550	1.58	1.05	0.927	0.617
	30	1.50	0.996	0.773	0.514	1.62	1.08	0.857	0.570	1.80	1.20	0.964	0.641
	32	1.70	1.13	0.800	0.532	1.84	1.23	0.888	0.591	2.05	1.37	1.00	0.668
	34	1.92	1.28	0.828	0.551	2.08	1.38	0.923	0.614	2.32	1.54	1.05	0.697
	36	2.16	1.43	0.858	0.571	2.33	1.55	0.960	0.639	2.60	1.73	1.09	0.728
	38	2.40	1.60	0.891	0.593	2.60	1.73	1.00	0.666	2.90	1.93	1.15	0.767
	40	2.66	1.77	0.926	0.616	2.88	1.92	1.05	0.697	3.21	2.13	1.23	0.818
	42	2.93	1.95	0.967	0.643	3.17	2.11	1.11	0.740	3.54	2.35	1.31	0.869
	44	3.22	2.14	1.02	0.679	3.48	2.32	1.17	0.782	3.88	2.58	1.38	0.920
	46	3.52	2.34	1.07	0.715	3.81	2.53	1.24	0.824	4.24	2.82	1.46	0.970
	48	3.83	2.55	1.13	0.751	4.15	2.76	1.30	0.866	4.62	3.07	1.53	1.02
	50	4.16	2.77	1.18	0.787	4.50	2.99	1.36	0.908	5.01	3.34	1.61	1.07

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.60	1.73	2.83	1.88	3.10	2.06
$t_y \times 10^3$, (kips)$^{-1}$	0.550	0.366	0.591	0.393	0.646	0.430
$t_r \times 10^3$, (kips)$^{-1}$	0.676	0.451	0.726	0.484	0.794	0.529
r_x/r_y	3.44		3.42		3.45	
r_y, in.	3.08		3.07		3.04	

W24

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		162				146				131			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.699	0.465	0.761	0.506	0.777	0.517	0.852	0.567	0.865	0.576	0.963	0.641
	11	0.801	0.533	0.764	0.508	0.894	0.595	0.857	0.571	1.00	0.665	0.972	0.646
	12	0.822	0.547	0.776	0.516	0.918	0.611	0.872	0.580	1.03	0.684	0.989	0.658
	13	0.846	0.563	0.788	0.524	0.945	0.629	0.887	0.590	1.06	0.704	1.01	0.670
	14	0.872	0.580	0.801	0.533	0.975	0.649	0.902	0.600	1.09	0.727	1.03	0.683
	15	0.901	0.600	0.814	0.541	1.01	0.671	0.918	0.611	1.13	0.753	1.05	0.696
	16	0.934	0.621	0.827	0.550	1.05	0.696	0.935	0.622	1.17	0.781	1.07	0.710
	17	0.969	0.645	0.841	0.560	1.09	0.723	0.952	0.633	1.22	0.813	1.09	0.724
	18	1.01	0.671	0.855	0.569	1.13	0.753	0.970	0.645	1.27	0.848	1.11	0.739
	19	1.05	0.700	0.870	0.579	1.18	0.786	0.988	0.657	1.33	0.886	1.13	0.754
	20	1.10	0.731	0.886	0.589	1.24	0.823	1.01	0.670	1.39	0.928	1.16	0.770
	22	1.21	0.804	0.918	0.611	1.36	0.907	1.05	0.697	1.54	1.03	1.21	0.804
	24	1.34	0.892	0.953	0.634	1.52	1.01	1.09	0.727	1.72	1.14	1.26	0.841
	26	1.50	0.999	0.991	0.660	1.70	1.13	1.14	0.759	1.94	1.29	1.33	0.882
	28	1.70	1.13	1.03	0.687	1.93	1.29	1.19	0.794	2.21	1.47	1.39	0.928
	30	1.94	1.29	1.08	0.716	2.21	1.47	1.25	0.832	2.53	1.68	1.47	0.977
	32	2.21	1.47	1.13	0.749	2.52	1.68	1.31	0.874	2.88	1.92	1.56	1.04
	34	2.49	1.66	1.18	0.784	2.84	1.89	1.39	0.926	3.25	2.16	1.70	1.13
	36	2.79	1.86	1.24	0.826	3.19	2.12	1.50	1.00	3.65	2.43	1.84	1.23
	38	3.11	2.07	1.33	0.886	3.55	2.36	1.62	1.08	4.06	2.70	1.99	1.32
	40	3.45	2.29	1.42	0.947	3.93	2.62	1.73	1.15	4.50	3.00	2.13	1.42
	42	3.80	2.53	1.51	1.01	4.34	2.89	1.85	1.23	4.96	3.30	2.28	1.52
	44	4.17	2.78	1.60	1.07	4.76	3.17	1.96	1.30	5.45	3.62	2.42	1.61
	46	4.56	3.03	1.69	1.13	5.20	3.46	2.07	1.38	5.95	3.96	2.57	1.71
	48	4.96	3.30	1.78	1.19	5.67	3.77	2.19	1.45	6.48	4.31	2.71	1.80
	50	5.39	3.58	1.87	1.25	6.15	4.09	2.30	1.53				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	3.39	2.26	3.82	2.54	4.37	2.91
$t_y \times 10^3$, (kips)$^{-1}$	0.699	0.465	0.777	0.517	0.865	0.576
$t_r \times 10^3$, (kips)$^{-1}$	0.858	0.572	0.954	0.636	1.06	0.709
r_x/r_y	3.41		3.42		3.43	
r_y, in.	3.05		3.01		2.97	

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W24

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		117[c]				104[c]				103[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.992	0.660	1.09	0.725	1.14	0.757	1.23	0.820	1.13	0.751	1.27	0.847
	11	1.13	0.751	1.10	0.733	1.30	0.864	1.25	0.832	1.52	1.01	1.42	0.944
	12	1.16	0.770	1.12	0.748	1.33	0.886	1.28	0.849	1.62	1.08	1.46	0.972
	13	1.19	0.794	1.15	0.762	1.37	0.910	1.30	0.867	1.73	1.15	1.51	1.00
	14	1.23	0.820	1.17	0.778	1.41	0.938	1.33	0.886	1.86	1.23	1.55	1.03
	15	1.28	0.850	1.19	0.794	1.45	0.968	1.36	0.905	2.00	1.33	1.61	1.07
	16	1.33	0.882	1.22	0.810	1.50	1.00	1.39	0.925	2.18	1.45	1.66	1.10
	17	1.38	0.919	1.24	0.828	1.56	1.04	1.42	0.946	2.38	1.58	1.72	1.14
	18	1.44	0.959	1.27	0.846	1.63	1.08	1.46	0.969	2.61	1.74	1.78	1.19
	19	1.51	1.00	1.30	0.865	1.70	1.13	1.49	0.992	2.88	1.92	1.85	1.23
	20	1.58	1.05	1.33	0.885	1.79	1.19	1.53	1.02	3.19	2.12	1.92	1.28
	22	1.75	1.16	1.39	0.927	1.99	1.32	1.61	1.07	3.86	2.57	2.09	1.39
	24	1.96	1.30	1.46	0.974	2.23	1.48	1.69	1.13	4.60	3.06	2.37	1.58
	26	2.21	1.47	1.54	1.03	2.52	1.68	1.79	1.19	5.40	3.59	2.65	1.77
	28	2.53	1.68	1.63	1.08	2.89	1.92	1.90	1.27	6.26	4.16	2.94	1.95
	30	2.90	1.93	1.73	1.15	3.32	2.21	2.06	1.37	7.19	4.78	3.22	2.14
	32	3.30	2.20	1.89	1.26	3.77	2.51	2.29	1.52	8.18	5.44	3.50	2.33
	34	3.72	2.48	2.07	1.38	4.26	2.83	2.51	1.67				
	36	4.18	2.78	2.25	1.50	4.78	3.18	2.74	1.82				
	38	4.65	3.10	2.43	1.62	5.32	3.54	2.97	1.98				
	40	5.16	3.43	2.62	1.74	5.90	3.92	3.20	2.13				
	42	5.68	3.78	2.80	1.86	6.50	4.33	3.44	2.29				
	44	6.24	4.15	2.98	1.99	7.13	4.75	3.67	2.44				
	46	6.82	4.54	3.17	2.11	7.80	5.19	3.91	2.60				
	48	7.42	4.94	3.35	2.23	8.49	5.65	4.14	2.76				

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	4.99	3.32	5.71	3.80	8.58	5.71
$t_y \times 10^3$, (kips)$^{-1}$	0.971	0.646	1.09	0.724	1.10	0.733
$t_r \times 10^3$, (kips)$^{-1}$	1.19	0.795	1.34	0.891	1.35	0.903
r_x/r_y	3.44		3.47		5.03	
r_y, in.	2.94		2.91		1.99	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W24

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		94[c]				84[c]				76[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.26	0.838	1.40	0.933	1.45	0.965	1.59	1.06	1.63	1.09	1.78	1.19
	6	1.37	0.910	1.40	0.933	1.58	1.05	1.59	1.06	1.78	1.19	1.78	1.19
	7	1.41	0.938	1.40	0.933	1.63	1.08	1.60	1.06	1.84	1.23	1.79	1.19
	8	1.46	0.971	1.44	0.960	1.69	1.12	1.64	1.09	1.91	1.27	1.85	1.23
	9	1.52	1.01	1.48	0.987	1.76	1.17	1.69	1.13	1.99	1.32	1.91	1.27
	10	1.59	1.06	1.53	1.02	1.84	1.22	1.75	1.16	2.09	1.39	1.97	1.31
	11	1.67	1.11	1.57	1.05	1.93	1.29	1.80	1.20	2.19	1.46	2.04	1.36
	12	1.78	1.18	1.62	1.08	2.04	1.36	1.87	1.24	2.32	1.54	2.11	1.41
	13	1.90	1.26	1.68	1.12	2.17	1.44	1.93	1.28	2.47	1.64	2.19	1.46
	14	2.04	1.36	1.73	1.15	2.33	1.55	2.00	1.33	2.63	1.75	2.28	1.52
	15	2.21	1.47	1.79	1.19	2.52	1.68	2.08	1.38	2.84	1.89	2.37	1.58
	16	2.40	1.60	1.86	1.24	2.75	1.83	2.16	1.44	3.10	2.06	2.47	1.64
	17	2.62	1.74	1.93	1.28	3.01	2.00	2.25	1.49	3.40	2.26	2.58	1.71
	18	2.88	1.92	2.01	1.33	3.32	2.21	2.34	1.56	3.76	2.50	2.69	1.79
	19	3.18	2.12	2.09	1.39	3.68	2.45	2.45	1.63	4.19	2.79	2.82	1.88
	20	3.53	2.35	2.17	1.45	4.08	2.71	2.56	1.70	4.64	3.09	3.02	2.01
	22	4.27	2.84	2.43	1.61	4.94	3.28	2.95	1.96	5.62	3.74	3.53	2.35
	24	5.08	3.38	2.76	1.84	5.88	3.91	3.37	2.24	6.68	4.45	4.05	2.69
	26	5.96	3.97	3.10	2.06	6.90	4.59	3.80	2.53	7.84	5.22	4.58	3.05
	28	6.92	4.60	3.44	2.29	8.00	5.32	4.24	2.82	9.10	6.05	5.12	3.41
	30	7.94	5.28	3.79	2.52	9.18	6.11	4.67	3.11	10.4	6.95	5.66	3.77
	32	9.03	6.01	4.13	2.75	10.4	6.95	5.11	3.40	11.9	7.90	6.21	4.13

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	9.50	6.32	10.9	7.27	12.5	8.29
$t_y \times 10^3$, (kips)$^{-1}$	1.21	0.802	1.35	0.900	1.49	0.992
$t_r \times 10^3$, (kips)$^{-1}$	1.48	0.987	1.66	1.11	1.83	1.22
r_x/r_y	4.98		5.02		5.05	
r_y, in.	1.98		1.95		1.92	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W24

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		68[c]				62[c]				55[c], [v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.86	1.24	2.01	1.34	2.07	1.38	2.33	1.55	2.41	1.60	2.66	1.77
	6	2.04	1.36	2.01	1.34	2.44	1.62	2.44	1.63	2.86	1.90	2.82	1.87
	7	2.11	1.41	2.04	1.36	2.58	1.72	2.56	1.70	3.04	2.03	2.95	1.96
	8	2.19	1.46	2.11	1.40	2.76	1.84	2.68	1.78	3.27	2.18	3.10	2.07
	9	2.29	1.52	2.18	1.45	2.99	1.99	2.82	1.87	3.55	2.36	3.27	2.18
	10	2.41	1.60	2.26	1.50	3.26	2.17	2.97	1.97	3.88	2.58	3.46	2.30
	11	2.54	1.69	2.34	1.56	3.58	2.38	3.13	2.08	4.29	2.86	3.67	2.44
	12	2.69	1.79	2.43	1.62	4.07	2.71	3.32	2.21	4.80	3.19	3.91	2.60
	13	2.87	1.91	2.53	1.68	4.67	3.11	3.53	2.35	5.57	3.70	4.18	2.78
	14	3.07	2.04	2.63	1.75	5.42	3.60	3.77	2.51	6.46	4.29	4.51	3.00
	15	3.30	2.20	2.75	1.83	6.22	4.14	4.15	2.76	7.41	4.93	5.08	3.38
	16	3.59	2.39	2.87	1.91	7.08	4.71	4.62	3.08	8.43	5.61	5.68	3.78
	17	3.97	2.64	3.01	2.00	7.99	5.31	5.11	3.40	9.52	6.33	6.29	4.18
	18	4.42	2.94	3.16	2.10	8.96	5.96	5.60	3.72	10.7	7.10	6.91	4.60
	19	4.92	3.27	3.35	2.23	9.98	6.64	6.10	4.06	11.9	7.91	7.55	5.02
	20	5.45	3.63	3.66	2.43	11.1	7.36	6.61	4.40	13.2	8.77	8.20	5.46
	22	6.60	4.39	4.29	2.85	13.4	8.90	7.64	5.08	15.9	10.6	9.52	6.34
	24	7.85	5.22	4.94	3.29								
	26	9.21	6.13	5.61	3.74								
	28	10.7	7.11	6.30	4.19								
	30	12.3	8.16	6.99	4.65								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	14.5	9.67	22.7	15.1	26.8	17.8
$t_y \times 10^3$, (kips)$^{-1}$	1.66	1.11	1.84	1.22	2.06	1.37
$t_r \times 10^3$, (kips)$^{-1}$	2.04	1.36	2.25	1.50	2.53	1.69
r_x/r_y	5.11		6.69		6.80	
r_y, in.	1.87		1.38		1.34	

[c] Shape is slender for compression for F_y = 50 ksi.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W21

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		275[h]				248				223			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.408	0.272	0.476	0.316	0.453	0.301	0.531	0.353	0.502	0.334	0.593	0.394
	6	0.425	0.283	0.476	0.316	0.471	0.313	0.531	0.353	0.523	0.348	0.593	0.394
	7	0.431	0.287	0.476	0.316	0.478	0.318	0.531	0.353	0.531	0.353	0.593	0.394
	8	0.438	0.291	0.476	0.316	0.486	0.323	0.531	0.353	0.540	0.359	0.593	0.394
	9	0.446	0.297	0.476	0.316	0.495	0.329	0.531	0.353	0.551	0.366	0.593	0.394
	10	0.456	0.303	0.476	0.316	0.506	0.336	0.531	0.353	0.563	0.374	0.593	0.394
	11	0.466	0.310	0.476	0.317	0.518	0.344	0.532	0.354	0.576	0.384	0.594	0.395
	12	0.478	0.318	0.480	0.319	0.531	0.353	0.536	0.357	0.592	0.394	0.600	0.399
	13	0.491	0.327	0.483	0.322	0.546	0.363	0.541	0.360	0.609	0.405	0.606	0.403
	14	0.506	0.337	0.487	0.324	0.563	0.374	0.546	0.363	0.628	0.418	0.612	0.407
	15	0.522	0.348	0.491	0.327	0.581	0.387	0.551	0.366	0.649	0.432	0.618	0.411
	16	0.541	0.360	0.495	0.329	0.601	0.400	0.556	0.370	0.672	0.447	0.625	0.416
	17	0.560	0.373	0.499	0.332	0.624	0.415	0.561	0.373	0.698	0.464	0.631	0.420
	18	0.582	0.387	0.503	0.335	0.648	0.431	0.566	0.376	0.727	0.483	0.638	0.424
	19	0.606	0.403	0.508	0.338	0.676	0.450	0.571	0.380	0.758	0.504	0.644	0.429
	20	0.633	0.421	0.512	0.341	0.706	0.469	0.576	0.383	0.792	0.527	0.651	0.433
	22	0.694	0.462	0.521	0.346	0.774	0.515	0.587	0.391	0.872	0.580	0.665	0.443
	24	0.767	0.511	0.530	0.352	0.858	0.571	0.599	0.398	0.968	0.644	0.680	0.453
	26	0.856	0.570	0.539	0.359	0.958	0.638	0.611	0.406	1.08	0.722	0.696	0.463
	28	0.964	0.641	0.549	0.365	1.08	0.719	0.623	0.415	1.23	0.816	0.712	0.474
	30	1.10	0.730	0.559	0.372	1.23	0.819	0.636	0.423	1.40	0.933	0.729	0.485
	32	1.25	0.830	0.569	0.379	1.40	0.932	0.649	0.432	1.60	1.06	0.747	0.497
	34	1.41	0.937	0.580	0.386	1.58	1.05	0.663	0.441	1.80	1.20	0.765	0.509
	36	1.58	1.05	0.592	0.394	1.77	1.18	0.678	0.451	2.02	1.34	0.785	0.522
	38	1.76	1.17	0.603	0.401	1.98	1.31	0.693	0.461	2.25	1.50	0.806	0.536
	40	1.95	1.30	0.616	0.410	2.19	1.46	0.709	0.472	2.49	1.66	0.827	0.550

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.87	1.24	2.10	1.39	2.38	1.58
$t_y \times 10^3$, (kips)$^{-1}$	0.408	0.272	0.453	0.301	0.502	0.334
$t_r \times 10^3$, (kips)$^{-1}$	0.502	0.334	0.556	0.371	0.617	0.411
r_x/r_y	3.13		3.12		3.14	
r_y, in.	3.10		3.08		3.04	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W21

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		201				182				166			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.563	0.375	0.672	0.447	0.623	0.415	0.748	0.498	0.684	0.455	0.825	0.549
	6	0.587	0.391	0.672	0.447	0.650	0.432	0.748	0.498	0.714	0.475	0.825	0.549
	7	0.596	0.397	0.672	0.447	0.660	0.439	0.748	0.498	0.725	0.482	0.825	0.549
	8	0.606	0.403	0.672	0.447	0.672	0.447	0.748	0.498	0.738	0.491	0.825	0.549
	9	0.618	0.411	0.672	0.447	0.685	0.456	0.748	0.498	0.753	0.501	0.825	0.549
	10	0.632	0.421	0.672	0.447	0.700	0.466	0.748	0.498	0.770	0.512	0.825	0.549
	11	0.648	0.431	0.675	0.449	0.718	0.478	0.752	0.500	0.789	0.525	0.829	0.552
	12	0.665	0.443	0.682	0.454	0.737	0.491	0.761	0.507	0.811	0.540	0.841	0.559
	13	0.685	0.455	0.690	0.459	0.759	0.505	0.771	0.513	0.835	0.556	0.852	0.567
	14	0.706	0.470	0.698	0.464	0.784	0.521	0.780	0.519	0.862	0.574	0.864	0.575
	15	0.730	0.486	0.706	0.470	0.811	0.539	0.790	0.526	0.892	0.594	0.876	0.583
	16	0.757	0.504	0.714	0.475	0.841	0.559	0.801	0.533	0.925	0.616	0.888	0.591
	17	0.786	0.523	0.723	0.481	0.874	0.581	0.811	0.540	0.962	0.640	0.901	0.599
	18	0.819	0.545	0.731	0.487	0.910	0.606	0.822	0.547	1.00	0.667	0.914	0.608
	19	0.854	0.568	0.740	0.492	0.951	0.632	0.833	0.554	1.05	0.697	0.927	0.617
	20	0.894	0.595	0.749	0.498	0.995	0.662	0.844	0.562	1.10	0.729	0.941	0.626
	22	0.985	0.655	0.768	0.511	1.10	0.730	0.868	0.577	1.21	0.805	0.970	0.645
	24	1.10	0.729	0.788	0.524	1.22	0.813	0.893	0.594	1.35	0.897	1.00	0.666
	26	1.23	0.818	0.809	0.538	1.37	0.914	0.919	0.612	1.52	1.01	1.03	0.688
	28	1.39	0.926	0.831	0.553	1.56	1.04	0.947	0.630	1.72	1.15	1.07	0.711
	30	1.59	1.06	0.854	0.568	1.79	1.19	0.977	0.650	1.98	1.31	1.11	0.736
	32	1.81	1.21	0.878	0.584	2.03	1.35	1.01	0.671	2.25	1.50	1.15	0.763
	34	2.05	1.36	0.904	0.602	2.30	1.53	1.04	0.694	2.54	1.69	1.19	0.792
	36	2.30	1.53	0.932	0.620	2.57	1.71	1.08	0.718	2.85	1.89	1.24	0.823
	38	2.56	1.70	0.961	0.640	2.87	1.91	1.12	0.744	3.17	2.11	1.29	0.857
	40	2.83	1.89	0.993	0.660	3.18	2.11	1.16	0.772	3.51	2.34	1.34	0.895

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.68	1.78	2.99	1.99	3.30	2.19
$t_y \times 10^3$, (kips)$^{-1}$	0.563	0.375	0.623	0.415	0.684	0.455
$t_r \times 10^3$, (kips)$^{-1}$	0.692	0.461	0.765	0.510	0.841	0.560
r_x/r_y	3.14		3.13		3.13	
r_y, in.	3.02		3.00		2.99	

W21

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		147				132				122			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.773	0.514	0.955	0.635	0.861	0.573	1.07	0.712	0.930	0.619	1.16	0.772
	6	0.808	0.537	0.955	0.635	0.900	0.599	1.07	0.712	0.973	0.647	1.16	0.772
	7	0.820	0.546	0.955	0.635	0.914	0.608	1.07	0.712	0.988	0.658	1.16	0.772
	8	0.835	0.556	0.955	0.635	0.931	0.620	1.07	0.712	1.01	0.670	1.16	0.772
	9	0.853	0.567	0.955	0.635	0.951	0.633	1.07	0.712	1.03	0.684	1.16	0.772
	10	0.873	0.581	0.955	0.635	0.973	0.647	1.07	0.712	1.05	0.700	1.16	0.772
	11	0.895	0.596	0.963	0.641	0.999	0.664	1.08	0.719	1.08	0.719	1.17	0.781
	12	0.920	0.612	0.978	0.651	1.03	0.683	1.10	0.731	1.11	0.739	1.19	0.795
	13	0.949	0.631	0.993	0.661	1.06	0.705	1.12	0.743	1.15	0.763	1.22	0.809
	14	0.980	0.652	1.01	0.671	1.09	0.728	1.14	0.756	1.19	0.789	1.24	0.823
	15	1.02	0.675	1.02	0.682	1.13	0.755	1.16	0.769	1.23	0.817	1.26	0.838
	16	1.05	0.701	1.04	0.693	1.18	0.784	1.18	0.782	1.28	0.849	1.28	0.854
	17	1.10	0.730	1.06	0.704	1.23	0.816	1.20	0.796	1.33	0.884	1.31	0.870
	18	1.14	0.761	1.08	0.716	1.28	0.852	1.22	0.811	1.39	0.924	1.33	0.887
	19	1.20	0.796	1.09	0.728	1.34	0.892	1.24	0.826	1.45	0.967	1.36	0.905
	20	1.25	0.835	1.11	0.740	1.41	0.935	1.26	0.841	1.52	1.01	1.39	0.923
	22	1.39	0.924	1.15	0.767	1.56	1.04	1.31	0.874	1.69	1.13	1.45	0.961
	24	1.55	1.03	1.19	0.795	1.74	1.16	1.37	0.910	1.89	1.26	1.51	1.00
	26	1.75	1.17	1.24	0.825	1.97	1.31	1.43	0.948	2.14	1.43	1.58	1.05
	28	2.00	1.33	1.29	0.858	2.25	1.50	1.49	0.990	2.45	1.63	1.65	1.10
	30	2.29	1.53	1.34	0.894	2.59	1.72	1.56	1.04	2.82	1.87	1.74	1.16
	32	2.61	1.74	1.40	0.933	2.95	1.96	1.63	1.09	3.20	2.13	1.83	1.22
	34	2.95	1.96	1.47	0.975	3.32	2.21	1.72	1.14	3.62	2.41	1.97	1.31
	36	3.30	2.20	1.54	1.02	3.73	2.48	1.85	1.23	4.06	2.70	2.12	1.41
	38	3.68	2.45	1.64	1.09	4.15	2.76	1.98	1.32	4.52	3.01	2.28	1.52
	40	4.08	2.71	1.75	1.16	4.60	3.06	2.12	1.41	5.01	3.33	2.44	1.62

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	3.85	2.56	4.33	2.88	4.71	3.14
$t_y \times 10^3$, (kips)$^{-1}$	0.773	0.514	0.861	0.573	0.930	0.619
$t_r \times 10^3$, (kips)$^{-1}$	0.950	0.633	1.06	0.705	1.14	0.762
r_x/r_y	3.11		3.11		3.11	
r_y, in.	2.95		2.93		2.92	

W21

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		111				101[c]				93			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.02	0.682	1.28	0.850	1.13	0.753	1.41	0.937	1.22	0.814	1.61	1.07
	6	1.07	0.713	1.28	0.850	1.18	0.784	1.41	0.937	1.37	0.910	1.61	1.07
	7	1.09	0.725	1.28	0.850	1.20	0.796	1.41	0.937	1.42	0.948	1.63	1.09
	8	1.11	0.739	1.28	0.850	1.22	0.809	1.41	0.937	1.49	0.993	1.68	1.12
	9	1.13	0.754	1.28	0.850	1.24	0.826	1.41	0.937	1.57	1.05	1.73	1.15
	10	1.16	0.773	1.28	0.850	1.27	0.846	1.41	0.937	1.67	1.11	1.78	1.18
	11	1.19	0.793	1.29	0.861	1.31	0.869	1.43	0.951	1.78	1.19	1.83	1.22
	12	1.23	0.816	1.32	0.877	1.34	0.894	1.46	0.969	1.91	1.27	1.89	1.25
	13	1.27	0.842	1.34	0.894	1.39	0.923	1.49	0.989	2.07	1.38	1.95	1.29
	14	1.31	0.871	1.37	0.911	1.43	0.955	1.52	1.01	2.25	1.50	2.01	1.34
	15	1.36	0.903	1.40	0.929	1.49	0.990	1.55	1.03	2.46	1.64	2.08	1.38
	16	1.41	0.939	1.42	0.947	1.55	1.03	1.58	1.05	2.71	1.80	2.15	1.43
	17	1.47	0.979	1.45	0.966	1.61	1.07	1.61	1.07	3.01	2.00	2.23	1.48
	18	1.54	1.02	1.48	0.986	1.69	1.12	1.65	1.10	3.36	2.23	2.32	1.54
	19	1.61	1.07	1.51	1.01	1.77	1.18	1.69	1.12	3.74	2.49	2.41	1.60
	20	1.69	1.12	1.55	1.03	1.86	1.23	1.72	1.15	4.15	2.76	2.51	1.67
	22	1.88	1.25	1.62	1.08	2.06	1.37	1.81	1.20	5.02	3.34	2.77	1.84
	24	2.11	1.40	1.69	1.13	2.32	1.54	1.90	1.26	5.97	3.97	3.12	2.07
	26	2.39	1.59	1.78	1.18	2.63	1.75	2.00	1.33	7.01	4.66	3.46	2.30
	28	2.74	1.82	1.87	1.24	3.02	2.01	2.11	1.41	8.13	5.41	3.81	2.54
	30	3.14	2.09	1.97	1.31	3.46	2.30	2.24	1.49	9.33	6.21	4.16	2.77
	32	3.58	2.38	2.12	1.41	3.94	2.62	2.46	1.64				
	34	4.04	2.69	2.31	1.53	4.45	2.96	2.69	1.79				
	36	4.53	3.01	2.50	1.66	4.99	3.32	2.92	1.94				
	38	5.05	3.36	2.69	1.79	5.56	3.70	3.14	2.09				
	40	5.59	3.72	2.88	1.91	6.16	4.10	3.37	2.24				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	5.22	3.48	5.77	3.84	10.3	6.83
$t_y \times 10^3$, (kips)$^{-1}$	1.02	0.682	1.12	0.746	1.22	0.814
$t_r \times 10^3$, (kips)$^{-1}$	1.26	0.839	1.38	0.918	1.50	1.00
r_x/r_y	3.12		3.12		4.73	
r_y, in.	2.90		2.89		1.84	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W21

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		83[c]				73[c]				68[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.37	0.914	1.82	1.21	1.61	1.07	2.07	1.38	1.76	1.17	2.23	1.48
	6	1.53	1.02	1.82	1.21	1.78	1.19	2.07	1.38	1.95	1.30	2.23	1.48
	7	1.60	1.06	1.85	1.23	1.85	1.23	2.11	1.40	2.02	1.35	2.27	1.51
	8	1.67	1.11	1.90	1.26	1.93	1.28	2.18	1.45	2.11	1.40	2.35	1.56
	9	1.77	1.17	1.96	1.30	2.02	1.34	2.25	1.49	2.21	1.47	2.43	1.62
	10	1.87	1.25	2.02	1.34	2.14	1.43	2.32	1.55	2.33	1.55	2.51	1.67
	11	2.00	1.33	2.09	1.39	2.29	1.52	2.40	1.60	2.47	1.65	2.61	1.73
	12	2.15	1.43	2.16	1.43	2.47	1.64	2.49	1.66	2.67	1.77	2.70	1.80
	13	2.33	1.55	2.23	1.48	2.67	1.78	2.58	1.72	2.89	1.92	2.81	1.87
	14	2.53	1.69	2.31	1.54	2.92	1.94	2.68	1.79	3.16	2.10	2.93	1.95
	15	2.78	1.85	2.40	1.60	3.20	2.13	2.79	1.86	3.47	2.31	3.05	2.03
	16	3.06	2.04	2.49	1.66	3.54	2.35	2.91	1.94	3.84	2.55	3.19	2.12
	17	3.40	2.26	2.59	1.72	3.93	2.62	3.04	2.02	4.27	2.84	3.34	2.22
	18	3.80	2.53	2.70	1.80	4.41	2.93	3.18	2.11	4.79	3.19	3.50	2.33
	19	4.23	2.82	2.82	1.88	4.91	3.27	3.33	2.22	5.34	3.55	3.72	2.48
	20	4.69	3.12	2.95	1.96	5.44	3.62	3.58	2.38	5.91	3.93	4.03	2.68
	22	5.67	3.78	3.37	2.24	6.58	4.38	4.13	2.75	7.16	4.76	4.66	3.10
	24	6.75	4.49	3.81	2.53	7.83	5.21	4.68	3.12	8.52	5.67	5.31	3.53
	26	7.93	5.27	4.25	2.83	9.19	6.12	5.24	3.49	9.99	6.65	5.95	3.96
	28	9.19	6.12	4.69	3.12	10.7	7.09	5.81	3.86	11.6	7.71	6.60	4.39
	30	10.6	7.02	5.13	3.41	12.2	8.14	6.37	4.24	13.3	8.85	7.26	4.83

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	11.7	7.77	13.4	8.91	14.6	9.71
$t_y \times 10^3$, (kips)$^{-1}$	1.37	0.911	1.55	1.03	1.67	1.11
$t_r \times 10^3$, (kips)$^{-1}$	1.68	1.12	1.91	1.27	2.05	1.37
r_x/r_y	4.74		4.77		4.78	
r_y, in.	1.83		1.81		1.80	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W21

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W21×											
		62[c]				57[c]				55[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.97	1.31	2.47	1.65	2.17	1.44	2.76	1.84	2.28	1.52	2.83	1.88
	6	2.19	1.45	2.47	1.65	2.58	1.72	2.91	1.94	2.54	1.69	2.83	1.88
	7	2.27	1.51	2.54	1.69	2.75	1.83	3.04	2.03	2.64	1.76	2.92	1.94
	8	2.37	1.58	2.62	1.74	2.96	1.97	3.19	2.12	2.76	1.84	3.02	2.01
	9	2.49	1.66	2.71	1.81	3.21	2.14	3.35	2.23	2.90	1.93	3.14	2.09
	10	2.63	1.75	2.81	1.87	3.56	2.37	3.53	2.35	3.07	2.04	3.27	2.17
	11	2.79	1.86	2.92	1.94	4.02	2.68	3.73	2.48	3.27	2.18	3.40	2.26
	12	2.98	1.98	3.04	2.02	4.60	3.06	3.95	2.63	3.50	2.33	3.55	2.36
	13	3.22	2.14	3.16	2.10	5.32	3.54	4.20	2.79	3.78	2.51	3.71	2.47
	14	3.53	2.35	3.30	2.19	6.17	4.10	4.48	2.98	4.11	2.73	3.89	2.58
	15	3.89	2.59	3.44	2.29	7.08	4.71	4.94	3.29	4.55	3.03	4.08	2.71
	16	4.31	2.87	3.61	2.40	8.06	5.36	5.47	3.64	5.07	3.38	4.29	2.86
	17	4.83	3.21	3.78	2.52	9.10	6.05	6.01	4.00	5.71	3.80	4.53	3.01
	18	5.41	3.60	3.98	2.65	10.2	6.79	6.55	4.36	6.40	4.26	4.92	3.27
	19	6.03	4.01	4.33	2.88	11.4	7.56	7.10	4.72	7.13	4.75	5.38	3.58
	20	6.68	4.45	4.70	3.13	12.6	8.38	7.65	5.09	7.90	5.26	5.86	3.90
	21	7.37	4.90	5.08	3.38	13.9	9.24	8.20	5.46	8.71	5.80	6.34	4.22
	22	8.09	5.38	5.46	3.63	15.2	10.1	8.76	5.83	9.56	6.36	6.84	4.55
	23	8.84	5.88	5.85	3.89					10.5	6.95	7.34	4.88
	24	9.63	6.40	6.24	4.15					11.4	7.57	7.84	5.22
	25	10.4	6.95	6.63	4.41					12.3	8.22	8.35	5.56
	26	11.3	7.52	7.02	4.67					13.4	8.89	8.86	5.90
	27	12.2	8.10	7.42	4.94					14.4	9.58	9.38	6.24
	28	13.1	8.72	7.81	5.20					15.5	10.3	9.90	6.59
	29	14.1	9.35	8.21	5.46								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	16.4	10.9	24.1	16.0	19.4	12.9
$t_y \times 10^3$, (kips)$^{-1}$	1.83	1.21	2.00	1.33	2.06	1.37
$t_r \times 10^3$, (kips)$^{-1}$	2.24	1.49	2.46	1.64	2.53	1.69
r_x/r_y	4.82		6.19		4.86	
r_y, in.	1.77		1.35		1.73	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W21

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		50[c]				48[c], [f]				44[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.53	1.69	3.24	2.15	2.70	1.80	3.36	2.23	2.96	1.97	3.73	2.48
	6	3.05	2.03	3.45	2.30	3.03	2.02	3.36	2.23	3.61	2.40	4.03	2.68
	7	3.26	2.17	3.63	2.41	3.16	2.10	3.47	2.31	3.87	2.58	4.24	2.82
	8	3.53	2.35	3.81	2.54	3.31	2.20	3.61	2.40	4.20	2.79	4.48	2.98
	9	3.85	2.56	4.02	2.68	3.50	2.33	3.76	2.50	4.61	3.07	4.75	3.16
	10	4.25	2.83	4.26	2.83	3.72	2.47	3.92	2.61	5.11	3.40	5.05	3.36
	11	4.83	3.21	4.52	3.01	3.98	2.65	4.10	2.73	5.73	3.81	5.39	3.59
	12	5.57	3.71	4.82	3.21	4.28	2.85	4.30	2.86	6.68	4.45	5.79	3.85
	13	6.52	4.34	5.16	3.43	4.63	3.08	4.51	3.00	7.84	5.22	6.25	4.16
	14	7.56	5.03	5.67	3.77	5.05	3.36	4.74	3.16	9.10	6.05	7.11	4.73
	15	8.68	5.77	6.36	4.23	5.60	3.72	5.01	3.33	10.4	6.95	7.99	5.32
	16	9.87	6.57	7.06	4.70	6.31	4.20	5.30	3.52	11.9	7.91	8.90	5.92
	17	11.1	7.42	7.78	5.17	7.13	4.74	5.75	3.82	13.4	8.93	9.83	6.54
	18	12.5	8.31	8.51	5.66	7.99	5.32	6.35	4.22	15.0	10.0	10.8	7.18
	19	13.9	9.26	9.24	6.15	8.90	5.92	6.97	4.63	16.8	11.1	11.8	7.82
	20	15.4	10.3	9.99	6.65	9.86	6.56	7.60	5.06	18.6	12.4	12.7	8.47
	21	17.0	11.3	10.7	7.15	10.9	7.23	8.25	5.49	20.5	13.6	13.7	9.13
	22					11.9	7.94	8.91	5.93				
	23					13.0	8.68	9.58	6.37				
	24					14.2	9.45	10.3	6.82				
	25					15.4	10.3	10.9	7.28				
	26					16.7	11.1	11.6	7.75				
	27					18.0	12.0	12.3	8.22				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	29.2	19.4	24.2	16.1	35.0	23.3
$t_y \times 10^3$, (kips)$^{-1}$	2.27	1.51	2.37	1.58	2.57	1.71
$t_r \times 10^3$, (kips)$^{-1}$	2.79	1.86	2.91	1.94	3.16	2.10
r_x/r_y	6.29		4.96		6.40	
r_y, in.	1.30		1.66		1.26	

[c] Shape is slender for compression for F_y = 50 ksi.

[f] Shape does not meet compact limit for flexure for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W18

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		311[h]				283[h]				258[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.365	0.243	0.473	0.314	0.401	0.267	0.527	0.351	0.439	0.292	0.583	0.388
	6	0.381	0.253	0.473	0.314	0.419	0.279	0.527	0.351	0.460	0.306	0.583	0.388
	7	0.387	0.257	0.473	0.314	0.426	0.284	0.527	0.351	0.468	0.311	0.583	0.388
	8	0.394	0.262	0.473	0.314	0.434	0.289	0.527	0.351	0.477	0.317	0.583	0.388
	9	0.402	0.268	0.473	0.314	0.443	0.295	0.527	0.351	0.487	0.324	0.583	0.388
	10	0.412	0.274	0.473	0.314	0.454	0.302	0.527	0.351	0.499	0.332	0.583	0.388
	11	0.422	0.281	0.474	0.315	0.466	0.310	0.530	0.352	0.512	0.341	0.587	0.390
	12	0.434	0.289	0.477	0.317	0.480	0.319	0.533	0.355	0.528	0.351	0.591	0.393
	13	0.447	0.298	0.480	0.319	0.495	0.329	0.537	0.357	0.545	0.362	0.595	0.396
	14	0.462	0.308	0.483	0.321	0.512	0.340	0.540	0.359	0.564	0.375	0.600	0.399
	15	0.479	0.319	0.486	0.323	0.530	0.353	0.544	0.362	0.585	0.389	0.604	0.402
	16	0.497	0.331	0.489	0.325	0.551	0.367	0.548	0.364	0.608	0.405	0.609	0.405
	17	0.517	0.344	0.492	0.327	0.574	0.382	0.551	0.367	0.634	0.422	0.613	0.408
	18	0.540	0.359	0.495	0.329	0.600	0.399	0.555	0.369	0.663	0.441	0.618	0.411
	19	0.564	0.375	0.498	0.331	0.628	0.418	0.559	0.372	0.695	0.462	0.623	0.414
	20	0.592	0.394	0.501	0.333	0.659	0.439	0.563	0.374	0.730	0.486	0.627	0.417
	22	0.655	0.436	0.507	0.338	0.732	0.487	0.571	0.380	0.812	0.541	0.637	0.424
	24	0.732	0.487	0.514	0.342	0.821	0.546	0.579	0.385	0.913	0.607	0.648	0.431
	26	0.826	0.550	0.521	0.347	0.929	0.618	0.588	0.391	1.04	0.690	0.658	0.438
	28	0.942	0.627	0.528	0.351	1.06	0.708	0.596	0.397	1.19	0.793	0.669	0.445
	30	1.08	0.720	0.535	0.356	1.22	0.813	0.605	0.403	1.37	0.910	0.680	0.453
	32	1.23	0.819	0.542	0.361	1.39	0.925	0.614	0.409	1.56	1.04	0.692	0.460
	34	1.39	0.924	0.550	0.366	1.57	1.04	0.624	0.415	1.76	1.17	0.704	0.468
	36	1.56	1.04	0.557	0.371	1.76	1.17	0.634	0.422	1.97	1.31	0.716	0.477
	38	1.74	1.15	0.565	0.376	1.96	1.30	0.644	0.428	2.19	1.46	0.729	0.485
	40	1.92	1.28	0.573	0.382	2.17	1.45	0.654	0.435	2.43	1.62	0.743	0.494
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.72		1.15		1.93		1.28		2.15		1.43	
$t_y \times 10^3$, (kips)$^{-1}$		0.365		0.243		0.401		0.267		0.439		0.292	
$t_r \times 10^3$, (kips)$^{-1}$		0.448		0.299		0.493		0.328		0.540		0.360	
r_x/r_y		2.96				2.96				2.96			
r_y, in.		2.95				2.91				2.88			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W18

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		234[h]				211				192			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.487	0.324	0.649	0.432	0.536	0.357	0.727	0.484	0.594	0.395	0.806	0.536
	6	0.510	0.339	0.649	0.432	0.562	0.374	0.727	0.484	0.624	0.415	0.806	0.536
	7	0.519	0.345	0.649	0.432	0.572	0.381	0.727	0.484	0.635	0.423	0.806	0.536
	8	0.529	0.352	0.649	0.432	0.584	0.388	0.727	0.484	0.648	0.431	0.806	0.536
	9	0.541	0.360	0.649	0.432	0.597	0.397	0.727	0.484	0.663	0.441	0.806	0.536
	10	0.554	0.369	0.649	0.432	0.612	0.407	0.727	0.484	0.680	0.453	0.807	0.537
	11	0.570	0.379	0.654	0.435	0.629	0.419	0.734	0.488	0.700	0.466	0.815	0.542
	12	0.587	0.390	0.659	0.438	0.649	0.432	0.740	0.493	0.722	0.480	0.823	0.548
	13	0.606	0.403	0.664	0.442	0.671	0.446	0.747	0.497	0.747	0.497	0.831	0.553
	14	0.628	0.418	0.670	0.446	0.695	0.462	0.754	0.502	0.775	0.515	0.840	0.559
	15	0.652	0.434	0.675	0.449	0.722	0.480	0.761	0.506	0.806	0.536	0.848	0.564
	16	0.678	0.451	0.681	0.453	0.752	0.501	0.768	0.511	0.840	0.559	0.857	0.570
	17	0.708	0.471	0.687	0.457	0.786	0.523	0.775	0.516	0.879	0.585	0.866	0.576
	18	0.741	0.493	0.692	0.461	0.823	0.548	0.782	0.520	0.921	0.613	0.875	0.582
	19	0.777	0.517	0.698	0.465	0.865	0.575	0.790	0.525	0.968	0.644	0.884	0.588
	20	0.818	0.544	0.704	0.469	0.910	0.606	0.797	0.531	1.02	0.679	0.894	0.595
	22	0.912	0.607	0.717	0.477	1.02	0.677	0.813	0.541	1.14	0.761	0.913	0.608
	24	1.03	0.683	0.729	0.485	1.15	0.765	0.829	0.552	1.30	0.862	0.934	0.621
	26	1.17	0.778	0.742	0.494	1.31	0.873	0.846	0.563	1.48	0.987	0.955	0.636
	28	1.35	0.897	0.756	0.503	1.52	1.01	0.864	0.575	1.72	1.14	0.978	0.651
	30	1.55	1.03	0.770	0.513	1.74	1.16	0.882	0.587	1.97	1.31	1.00	0.666
	32	1.76	1.17	0.785	0.522	1.98	1.32	0.902	0.600	2.24	1.49	1.03	0.683
	34	1.99	1.32	0.800	0.533	2.24	1.49	0.922	0.613	2.53	1.68	1.05	0.700
	36	2.23	1.48	0.816	0.543	2.51	1.67	0.943	0.627	2.84	1.89	1.08	0.718
	38	2.48	1.65	0.833	0.554	2.79	1.86	0.965	0.642	3.16	2.10	1.11	0.737
	40	2.75	1.83	0.850	0.566	3.09	2.06	0.988	0.657	3.50	2.33	1.14	0.757

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.39	1.59	2.70	1.80	2.99	1.99
$t_y \times 10^3$, (kips)$^{-1}$	0.487	0.324	0.536	0.357	0.594	0.395
$t_r \times 10^3$, (kips)$^{-1}$	0.598	0.399	0.659	0.439	0.730	0.487
r_x/r_y	2.96		2.96		2.97	
r_y, in.	2.85		2.82		2.79	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W18

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W18×											
		175				158				143			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.650	0.432	0.895	0.596	0.721	0.480	1.00	0.666	0.795	0.529	1.11	0.736
	6	0.683	0.454	0.895	0.596	0.759	0.505	1.00	0.666	0.837	0.557	1.11	0.736
	7	0.695	0.463	0.895	0.596	0.773	0.514	1.00	0.666	0.853	0.567	1.11	0.736
	8	0.710	0.472	0.895	0.596	0.789	0.525	1.00	0.666	0.871	0.580	1.11	0.736
	9	0.727	0.484	0.895	0.596	0.808	0.538	1.00	0.666	0.892	0.594	1.11	0.736
	10	0.746	0.496	0.898	0.597	0.830	0.552	1.00	0.668	0.917	0.610	1.11	0.740
	11	0.768	0.511	0.907	0.604	0.855	0.569	1.02	0.676	0.945	0.629	1.13	0.750
	12	0.793	0.528	0.917	0.610	0.883	0.587	1.03	0.685	0.976	0.649	1.14	0.760
	13	0.821	0.546	0.927	0.617	0.914	0.608	1.04	0.693	1.01	0.673	1.16	0.770
	14	0.852	0.567	0.938	0.624	0.950	0.632	1.05	0.702	1.05	0.699	1.17	0.780
	15	0.887	0.590	0.948	0.631	0.989	0.658	1.07	0.710	1.10	0.729	1.19	0.791
	16	0.926	0.616	0.959	0.638	1.03	0.687	1.08	0.719	1.14	0.762	1.21	0.802
	17	0.969	0.645	0.970	0.645	1.08	0.720	1.10	0.729	1.20	0.798	1.22	0.814
	18	1.02	0.677	0.981	0.653	1.14	0.756	1.11	0.738	1.26	0.839	1.24	0.825
	19	1.07	0.712	0.993	0.661	1.20	0.796	1.12	0.748	1.33	0.884	1.26	0.838
	20	1.13	0.752	1.00	0.669	1.26	0.841	1.14	0.758	1.41	0.935	1.28	0.850
	22	1.27	0.844	1.03	0.685	1.42	0.946	1.17	0.779	1.58	1.05	1.32	0.876
	24	1.44	0.958	1.06	0.702	1.62	1.08	1.20	0.801	1.81	1.20	1.36	0.904
	26	1.65	1.10	1.08	0.720	1.86	1.24	1.24	0.824	2.08	1.39	1.40	0.933
	28	1.92	1.28	1.11	0.739	2.16	1.44	1.28	0.849	2.42	1.61	1.45	0.965
	30	2.20	1.47	1.14	0.759	2.48	1.65	1.32	0.875	2.77	1.85	1.50	0.999
	32	2.51	1.67	1.17	0.780	2.82	1.88	1.36	0.903	3.16	2.10	1.56	1.03
	34	2.83	1.88	1.21	0.803	3.19	2.12	1.40	0.933	3.56	2.37	1.61	1.07
	36	3.17	2.11	1.24	0.827	3.57	2.38	1.45	0.965	4.00	2.66	1.68	1.12
	38	3.53	2.35	1.28	0.852	3.98	2.65	1.50	0.999	4.45	2.96	1.74	1.16
	40	3.91	2.60	1.32	0.878	4.41	2.93	1.56	1.04	4.93	3.28	1.82	1.21

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	3.36	2.24	3.76	2.50	4.17	2.78
$t_y \times 10^3$, (kips)$^{-1}$	0.650	0.432	0.721	0.480	0.795	0.529
$t_r \times 10^3$, (kips)$^{-1}$	0.798	0.532	0.886	0.591	0.977	0.651
r_x/r_y	2.97		2.96		2.97	
r_y, in.	2.76		2.74		2.72	

W18

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W18×											
		130				119				106			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.872	0.580	1.23	0.817	0.952	0.633	1.36	0.905	1.07	0.715	1.55	1.03
	6	0.919	0.611	1.23	0.817	1.00	0.667	1.36	0.905	1.13	0.754	1.55	1.03
	7	0.936	0.623	1.23	0.817	1.02	0.680	1.36	0.905	1.16	0.769	1.55	1.03
	8	0.957	0.636	1.23	0.817	1.04	0.695	1.36	0.905	1.18	0.786	1.55	1.03
	9	0.980	0.652	1.23	0.817	1.07	0.712	1.36	0.905	1.21	0.806	1.55	1.03
	10	1.01	0.670	1.24	0.823	1.10	0.732	1.37	0.912	1.25	0.829	1.56	1.04
	11	1.04	0.691	1.25	0.835	1.13	0.755	1.39	0.926	1.29	0.856	1.59	1.06
	12	1.07	0.714	1.27	0.847	1.17	0.781	1.41	0.941	1.33	0.885	1.62	1.08
	13	1.11	0.741	1.29	0.859	1.22	0.810	1.44	0.956	1.38	0.919	1.65	1.10
	14	1.16	0.770	1.31	0.872	1.27	0.842	1.46	0.972	1.44	0.957	1.68	1.12
	15	1.21	0.803	1.33	0.886	1.32	0.878	1.49	0.989	1.50	0.999	1.71	1.14
	16	1.26	0.840	1.35	0.899	1.38	0.919	1.51	1.01	1.57	1.05	1.74	1.16
	17	1.32	0.881	1.37	0.913	1.45	0.964	1.54	1.02	1.65	1.10	1.78	1.18
	18	1.39	0.926	1.39	0.928	1.52	1.01	1.57	1.04	1.74	1.16	1.81	1.21
	19	1.47	0.977	1.42	0.943	1.61	1.07	1.59	1.06	1.84	1.22	1.85	1.23
	20	1.55	1.03	1.44	0.959	1.70	1.13	1.62	1.08	1.95	1.30	1.89	1.26
	22	1.75	1.17	1.49	0.992	1.92	1.28	1.69	1.12	2.21	1.47	1.97	1.31
	24	2.00	1.33	1.54	1.03	2.20	1.46	1.75	1.17	2.53	1.68	2.06	1.37
	26	2.32	1.54	1.60	1.06	2.55	1.70	1.83	1.21	2.94	1.96	2.15	1.43
	28	2.69	1.79	1.66	1.10	2.96	1.97	1.90	1.27	3.41	2.27	2.26	1.50
	30	3.09	2.05	1.73	1.15	3.39	2.26	1.99	1.32	3.92	2.61	2.38	1.58
	32	3.51	2.34	1.80	1.20	3.86	2.57	2.08	1.39	4.46	2.97	2.51	1.67
	34	3.97	2.64	1.87	1.25	4.36	2.90	2.19	1.46	5.03	3.35	2.72	1.81
	36	4.45	2.96	1.96	1.30	4.89	3.25	2.34	1.56	5.64	3.75	2.92	1.94
	38	4.95	3.30	2.08	1.38	5.45	3.62	2.50	1.66	6.29	4.18	3.12	2.08
	40	5.49	3.65	2.20	1.47	6.04	4.02	2.65	1.77	6.97	4.63	3.32	2.21

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	4.64	3.09	5.16	3.43	5.89	3.92
$t_y \times 10^3$, (kips)$^{-1}$	0.872	0.580	0.952	0.633	1.07	0.715
$t_r \times 10^3$, (kips)$^{-1}$	1.07	0.714	1.17	0.779	1.32	0.879
r_x/r_y	2.97		2.94		2.95	
r_y, in.	2.70		2.69		2.66	

W18

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		97				86				76[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.17	0.780	1.69	1.12	1.32	0.878	1.92	1.27	1.51	1.01	2.19	1.45
	6	1.24	0.823	1.69	1.12	1.39	0.928	1.92	1.27	1.59	1.06	2.19	1.45
	7	1.26	0.839	1.69	1.12	1.42	0.946	1.92	1.27	1.62	1.08	2.19	1.45
	8	1.29	0.858	1.69	1.12	1.46	0.968	1.92	1.27	1.65	1.10	2.19	1.45
	9	1.32	0.880	1.69	1.12	1.49	0.994	1.92	1.27	1.70	1.13	2.19	1.45
	10	1.36	0.906	1.71	1.14	1.54	1.02	1.94	1.29	1.75	1.16	2.22	1.48
	11	1.41	0.935	1.74	1.16	1.59	1.06	1.98	1.32	1.81	1.20	2.27	1.51
	12	1.45	0.968	1.77	1.18	1.64	1.09	2.02	1.35	1.87	1.24	2.32	1.54
	13	1.51	1.00	1.81	1.20	1.71	1.14	2.06	1.37	1.94	1.29	2.37	1.58
	14	1.57	1.05	1.84	1.23	1.78	1.18	2.11	1.40	2.03	1.35	2.43	1.62
	15	1.64	1.09	1.88	1.25	1.86	1.24	2.15	1.43	2.12	1.41	2.49	1.65
	16	1.72	1.14	1.92	1.28	1.95	1.30	2.20	1.47	2.22	1.48	2.55	1.69
	17	1.81	1.20	1.96	1.30	2.05	1.36	2.25	1.50	2.34	1.56	2.61	1.74
	18	1.90	1.27	2.00	1.33	2.16	1.44	2.31	1.53	2.47	1.64	2.68	1.78
	19	2.01	1.34	2.04	1.36	2.29	1.52	2.36	1.57	2.62	1.74	2.75	1.83
	20	2.13	1.42	2.09	1.39	2.43	1.61	2.42	1.61	2.78	1.85	2.82	1.88
	22	2.42	1.61	2.18	1.45	2.76	1.83	2.54	1.69	3.16	2.11	2.98	1.98
	24	2.78	1.85	2.29	1.52	3.17	2.11	2.68	1.79	3.65	2.43	3.16	2.10
	26	3.24	2.15	2.41	1.60	3.70	2.46	2.84	1.89	4.26	2.84	3.36	2.24
	28	3.75	2.50	2.54	1.69	4.29	2.86	3.01	2.00	4.94	3.29	3.67	2.44
	30	4.31	2.87	2.68	1.78	4.93	3.28	3.29	2.19	5.68	3.78	4.06	2.70
	32	4.90	3.26	2.91	1.93	5.61	3.73	3.59	2.39	6.46	4.30	4.45	2.96
	34	5.53	3.68	3.15	2.09	6.33	4.21	3.90	2.60	7.29	4.85	4.85	3.22
	36	6.20	4.13	3.38	2.25	7.10	4.72	4.21	2.80	8.17	5.44	5.24	3.49
	38	6.91	4.60	3.62	2.41	7.91	5.26	4.51	3.00	9.11	6.06	5.64	3.75
	40	7.66	5.10	3.86	2.57	8.76	5.83	4.82	3.21	10.1	6.71	6.04	4.02

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	6.44	4.29	7.36	4.90	8.44	5.62
$t_y \times 10^3$, (kips)$^{-1}$	1.17	0.780	1.32	0.878	1.50	0.997
$t_r \times 10^3$, (kips)$^{-1}$	1.44	0.960	1.62	1.08	1.84	1.23
r_x/r_y	2.95		2.95		2.96	
r_y, in.	2.65		2.63		2.61	

[c] Shape is slender for compression for F_y = 50 ksi.

W18

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		71				65				60[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.60	1.06	2.44	1.62	1.75	1.16	2.68	1.78	1.94	1.29	2.90	1.93
	6	1.82	1.21	2.44	1.62	2.00	1.33	2.68	1.78	2.18	1.45	2.90	1.93
	7	1.91	1.27	2.51	1.67	2.09	1.39	2.76	1.84	2.28	1.52	3.00	1.99
	8	2.02	1.34	2.59	1.72	2.21	1.47	2.85	1.90	2.41	1.60	3.10	2.06
	9	2.15	1.43	2.67	1.78	2.36	1.57	2.95	1.96	2.57	1.71	3.20	2.13
	10	2.30	1.53	2.76	1.83	2.53	1.68	3.05	2.03	2.76	1.83	3.32	2.21
	11	2.48	1.65	2.85	1.90	2.73	1.82	3.15	2.10	2.98	1.98	3.44	2.29
	12	2.70	1.80	2.95	1.96	2.97	1.98	3.27	2.18	3.25	2.16	3.58	2.38
	13	2.96	1.97	3.05	2.03	3.26	2.17	3.39	2.26	3.56	2.37	3.72	2.48
	14	3.26	2.17	3.17	2.11	3.60	2.40	3.53	2.35	3.94	2.62	3.88	2.58
	15	3.63	2.41	3.29	2.19	4.01	2.67	3.67	2.44	4.39	2.92	4.05	2.69
	16	4.06	2.70	3.42	2.28	4.50	2.99	3.83	2.55	4.94	3.28	4.23	2.82
	17	4.58	3.05	3.57	2.37	5.08	3.38	4.00	2.66	5.57	3.71	4.44	2.95
	18	5.14	3.42	3.72	2.48	5.69	3.79	4.19	2.79	6.25	4.16	4.66	3.10
	19	5.73	3.81	3.89	2.59	6.34	4.22	4.43	2.95	6.96	4.63	5.02	3.34
	20	6.34	4.22	4.12	2.74	7.02	4.67	4.76	3.17	7.71	5.13	5.41	3.60
	22	7.68	5.11	4.69	3.12	8.50	5.66	5.44	3.62	9.33	6.21	6.19	4.12
	24	9.14	6.08	5.25	3.50	10.1	6.73	6.11	4.07	11.1	7.39	6.98	4.64
	26	10.7	7.13	5.82	3.87	11.9	7.90	6.79	4.51	13.0	8.67	7.76	5.16
	28	12.4	8.27	6.38	4.25	13.8	9.16	7.46	4.96	15.1	10.1	8.55	5.69

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	14.4	9.60	15.8	10.5	17.3	11.5
$t_y \times 10^3$, (kips)$^{-1}$	1.60	1.06	1.75	1.16	1.90	1.26
$t_r \times 10^3$, (kips)$^{-1}$	1.96	1.31	2.15	1.43	2.33	1.55
r_x/r_y	4.41		4.43		4.45	
r_y, in.	1.70		1.69		1.68	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W18

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		55[c]				50[c]				46[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.14	1.42	3.18	2.12	2.42	1.61	3.53	2.35	2.64	1.76	3.93	2.61
	6	2.41	1.60	3.19	2.12	2.73	1.81	3.55	2.36	3.20	2.13	4.19	2.79
	7	2.51	1.67	3.30	2.20	2.85	1.90	3.68	2.45	3.44	2.29	4.39	2.92
	8	2.64	1.75	3.42	2.27	3.00	1.99	3.81	2.54	3.73	2.48	4.61	3.07
	9	2.80	1.86	3.54	2.36	3.17	2.11	3.96	2.64	4.13	2.75	4.85	3.23
	10	3.01	2.00	3.68	2.45	3.38	2.25	4.12	2.74	4.66	3.10	5.12	3.41
	11	3.26	2.17	3.83	2.55	3.63	2.41	4.29	2.86	5.32	3.54	5.43	3.61
	12	3.55	2.36	3.99	2.65	3.97	2.64	4.48	2.98	6.15	4.09	5.77	3.84
	13	3.90	2.60	4.16	2.77	4.37	2.91	4.69	3.12	7.21	4.80	6.16	4.10
	14	4.32	2.87	4.35	2.89	4.85	3.23	4.91	3.27	8.36	5.56	6.69	4.45
	15	4.82	3.21	4.55	3.03	5.42	3.61	5.16	3.43	9.60	6.38	7.45	4.95
	16	5.43	3.61	4.78	3.18	6.13	4.08	5.44	3.62	10.9	7.26	8.21	5.46
	17	6.13	4.08	5.03	3.35	6.92	4.60	5.76	3.83	12.3	8.20	8.98	5.97
	18	6.87	4.57	5.39	3.59	7.76	5.16	6.31	4.20	13.8	9.19	9.75	6.49
	19	7.65	5.09	5.85	3.89	8.64	5.75	6.86	4.57	15.4	10.2	10.5	7.01
	20	8.48	5.64	6.32	4.20	9.58	6.37	7.43	4.94	17.1	11.3	11.3	7.53
	21	9.35	6.22	6.78	4.51	10.6	7.02	7.99	5.32	18.8	12.5	12.1	8.05
	22	10.3	6.83	7.26	4.83	11.6	7.71	8.56	5.70				
	23	11.2	7.46	7.73	5.14	12.7	8.43	9.14	6.08				
	24	12.2	8.13	8.20	5.46	13.8	9.17	9.72	6.47				
	25	13.3	8.82	8.68	5.78	15.0	9.95	10.3	6.85				
	26	14.3	9.54	9.16	6.09	16.2	10.8	10.9	7.24				
	27	15.5	10.3	9.63	6.41	17.5	11.6	11.5	7.63				

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	19.3	12.8	21.5	14.3	30.5	20.3
$t_y \times 10^3$, (kips)$^{-1}$	2.06	1.37	2.27	1.51	2.47	1.65
$t_r \times 10^3$, (kips)$^{-1}$	2.53	1.69	2.79	1.86	3.04	2.03
r_x/r_y	4.44		4.47		5.62	
r_y, in.	1.67		1.65		1.29	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W18

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×							
		40[c]				35[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	3.14	2.09	4.54	3.02	3.69	2.46	5.36	3.56
	6	3.84	2.55	4.88	3.25	4.57	3.04	5.84	3.89
	7	4.12	2.74	5.13	3.41	4.94	3.29	6.17	4.11
	8	4.48	2.98	5.40	3.59	5.40	3.59	6.54	4.35
	9	4.93	3.28	5.71	3.80	5.97	3.97	6.96	4.63
	10	5.47	3.64	6.05	4.03	6.68	4.44	7.43	4.94
	11	6.24	4.15	6.44	4.28	7.63	5.08	7.97	5.30
	12	7.25	4.82	6.88	4.58	9.00	5.99	8.60	5.72
	13	8.51	5.66	7.38	4.91	10.6	7.03	9.67	6.43
	14	9.87	6.56	8.30	5.52	12.2	8.15	11.0	7.29
	15	11.3	7.54	9.27	6.17	14.1	9.36	12.3	8.17
	16	12.9	8.57	10.3	6.83	16.0	10.6	13.6	9.07
	17	14.5	9.68	11.3	7.50	18.1	12.0	15.0	10.0
	18	16.3	10.9	12.3	8.17	20.2	13.5	16.4	10.9
	19	18.2	12.1	13.3	8.85	22.6	15.0	17.9	11.9
	20	20.1	13.4	14.3	9.54	25.0	16.6	19.3	12.8
	21	22.2	14.8	15.4	10.2				
	22								
	23								
	24								
	25								
	26								
	27								
	28								
	29								
	30								

Other Constants and Properties				
$b_y \times 10^3$, (kip-ft)$^{-1}$	35.6	23.7	44.2	29.4
$t_y \times 10^3$, (kips)$^{-1}$	2.83	1.88	3.24	2.16
$t_r \times 10^3$, (kips)$^{-1}$	3.48	2.32	3.98	2.66
r_x/r_y	5.68		5.77	
r_y, in.	1.27		1.22	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W16

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W16×											
		100				89				77			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.14	0.756	1.80	1.20	1.27	0.848	2.04	1.35	1.48	0.983	2.38	1.58
	6	1.21	0.803	1.80	1.20	1.36	0.902	2.04	1.35	1.57	1.05	2.38	1.58
	7	1.23	0.820	1.80	1.20	1.39	0.922	2.04	1.35	1.61	1.07	2.38	1.58
	8	1.26	0.841	1.80	1.20	1.42	0.946	2.04	1.35	1.65	1.10	2.38	1.58
	9	1.30	0.865	1.80	1.20	1.46	0.973	2.04	1.36	1.70	1.13	2.39	1.59
	10	1.34	0.893	1.83	1.22	1.51	1.01	2.08	1.38	1.76	1.17	2.44	1.62
	11	1.39	0.925	1.86	1.24	1.57	1.04	2.12	1.41	1.82	1.21	2.49	1.65
	12	1.45	0.962	1.89	1.26	1.63	1.08	2.16	1.44	1.89	1.26	2.54	1.69
	13	1.51	1.00	1.93	1.28	1.70	1.13	2.20	1.46	1.98	1.32	2.59	1.72
	14	1.58	1.05	1.96	1.30	1.78	1.18	2.24	1.49	2.07	1.38	2.65	1.76
	15	1.65	1.10	1.99	1.33	1.87	1.24	2.29	1.52	2.18	1.45	2.71	1.80
	16	1.74	1.16	2.03	1.35	1.97	1.31	2.34	1.55	2.30	1.53	2.77	1.84
	17	1.84	1.23	2.07	1.38	2.08	1.39	2.38	1.59	2.43	1.62	2.83	1.89
	18	1.95	1.30	2.11	1.40	2.21	1.47	2.43	1.62	2.59	1.72	2.90	1.93
	19	2.08	1.38	2.15	1.43	2.35	1.57	2.49	1.65	2.76	1.83	2.97	1.98
	20	2.22	1.47	2.19	1.46	2.51	1.67	2.54	1.69	2.95	1.96	3.05	2.03
	22	2.55	1.70	2.28	1.51	2.90	1.93	2.66	1.77	3.41	2.27	3.21	2.14
	24	2.98	1.98	2.37	1.58	3.40	2.26	2.79	1.86	4.00	2.66	3.39	2.26
	26	3.50	2.33	2.48	1.65	3.99	2.65	2.93	1.95	4.70	3.13	3.59	2.39
	28	4.06	2.70	2.59	1.72	4.62	3.08	3.09	2.06	5.45	3.62	3.83	2.55
	30	4.66	3.10	2.72	1.81	5.31	3.53	3.27	2.17	6.25	4.16	4.20	2.80
	32	5.30	3.52	2.85	1.90	6.04	4.02	3.54	2.36	7.12	4.73	4.57	3.04
	34	5.98	3.98	3.04	2.03	6.82	4.54	3.82	2.54	8.03	5.34	4.94	3.29
	36	6.70	4.46	3.26	2.17	7.64	5.09	4.09	2.72	9.01	5.99	5.31	3.53
	38	7.47	4.97	3.47	2.31	8.52	5.67	4.36	2.90	10.0	6.68	5.68	3.78
	40	8.28	5.51	3.68	2.45	9.44	6.28	4.63	3.08	11.1	7.40	6.04	4.02

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	6.49	4.32	7.41	4.93	8.67	5.77
$t_y \times 10^3$, (kips)$^{-1}$	1.14	0.756	1.27	0.848	1.48	0.983
$t_r \times 10^3$, (kips)$^{-1}$	1.40	0.930	1.57	1.04	1.82	1.21
r_x/r_y	2.83		2.83		2.83	
r_y, in.	2.51		2.49		2.47	

W16

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W16×											
		67[c]				57				50[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.70	1.13	2.74	1.82	1.99	1.32	3.39	2.26	2.30	1.53	3.87	2.58
	6	1.81	1.21	2.74	1.82	2.31	1.53	3.43	2.28	2.64	1.76	3.92	2.61
	7	1.86	1.23	2.74	1.82	2.43	1.62	3.54	2.35	2.79	1.85	4.06	2.70
	8	1.90	1.27	2.74	1.82	2.59	1.72	3.65	2.43	2.97	1.97	4.21	2.80
	9	1.96	1.31	2.76	1.84	2.77	1.85	3.78	2.51	3.18	2.12	4.36	2.90
	10	2.03	1.35	2.82	1.88	3.00	2.00	3.91	2.60	3.45	2.29	4.53	3.02
	11	2.10	1.40	2.88	1.92	3.27	2.18	4.05	2.70	3.76	2.50	4.72	3.14
	12	2.19	1.46	2.95	1.96	3.59	2.39	4.20	2.80	4.14	2.75	4.91	3.27
	13	2.29	1.52	3.02	2.01	3.98	2.65	4.37	2.91	4.59	3.06	5.13	3.41
	14	2.40	1.59	3.09	2.06	4.45	2.96	4.55	3.03	5.14	3.42	5.37	3.57
	15	2.52	1.68	3.17	2.11	5.02	3.34	4.74	3.15	5.80	3.86	5.63	3.74
	16	2.66	1.77	3.25	2.16	5.70	3.79	4.95	3.29	6.60	4.39	5.91	3.93
	17	2.82	1.87	3.33	2.22	6.44	4.28	5.18	3.45	7.45	4.96	6.23	4.14
	18	2.99	1.99	3.42	2.27	7.22	4.80	5.43	3.61	8.35	5.56	6.74	4.48
	19	3.19	2.12	3.51	2.34	8.04	5.35	5.81	3.86	9.31	6.19	7.28	4.85
	20	3.42	2.27	3.61	2.40	8.91	5.93	6.23	4.14	10.3	6.86	7.83	5.21
	22	3.96	2.63	3.83	2.55	10.8	7.17	7.07	4.70	12.5	8.30	8.93	5.94
	24	4.65	3.10	4.07	2.71	12.8	8.54	7.90	5.26	14.8	9.88	10.0	6.67
	26	5.46	3.63	4.34	2.89	15.1	10.0	8.74	5.82	17.4	11.6	11.1	7.40
	28	6.33	4.21	4.82	3.21								
	30	7.27	4.84	5.31	3.53								
	32	8.27	5.50	5.80	3.86								
	34	9.34	6.21	6.29	4.18								
	36	10.5	6.96	6.77	4.51								
	38	11.7	7.76	7.26	4.83								
	40	12.9	8.60	7.75	5.15								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		10.0		6.68		18.9		12.5		21.9		14.5	
$t_y \times 10^3$, (kips)$^{-1}$		1.70		1.13		1.99		1.32		2.27		1.51	
$t_r \times 10^3$, (kips)$^{-1}$		2.09		1.40		2.44		1.63		2.79		1.86	
r_x/r_y		2.83				4.20				4.20			
r_y, in.		2.46				1.60				1.59			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W16

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W16×											
		45[c]				40[c]				36[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.60	1.73	4.33	2.88	3.02	2.01	4.88	3.25	3.41	2.27	5.57	3.70
	6	2.97	1.98	4.40	2.93	3.46	2.30	4.96	3.30	3.93	2.62	5.71	3.80
	7	3.12	2.08	4.56	3.03	3.63	2.42	5.16	3.43	4.14	2.76	5.94	3.95
	8	3.30	2.20	4.74	3.15	3.84	2.55	5.36	3.57	4.39	2.92	6.20	4.12
	9	3.55	2.36	4.92	3.28	4.09	2.72	5.59	3.72	4.70	3.12	6.48	4.31
	10	3.85	2.56	5.13	3.41	4.39	2.92	5.83	3.88	5.06	3.37	6.78	4.51
	11	4.21	2.80	5.35	3.56	4.75	3.16	6.10	4.06	5.50	3.66	7.12	4.74
	12	4.65	3.09	5.59	3.72	5.24	3.48	6.39	4.25	6.07	4.04	7.49	4.98
	13	5.17	3.44	5.86	3.90	5.83	3.88	6.72	4.47	6.81	4.53	7.90	5.26
	14	5.80	3.86	6.15	4.09	6.54	4.35	7.07	4.71	7.70	5.12	8.36	5.56
	15	6.58	4.37	6.47	4.30	7.41	4.93	7.47	4.97	8.80	5.86	8.88	5.91
	16	7.48	4.98	6.82	4.54	8.43	5.61	7.96	5.30	10.0	6.66	9.79	6.51
	17	8.45	5.62	7.36	4.90	9.52	6.33	8.76	5.83	11.3	7.52	10.8	7.19
	18	9.47	6.30	8.03	5.34	10.7	7.10	9.58	6.38	12.7	8.43	11.9	7.89
	19	10.5	7.02	8.70	5.79	11.9	7.91	10.4	6.93	14.1	9.40	12.9	8.59
	20	11.7	7.78	9.37	6.23	13.2	8.77	11.2	7.48	15.6	10.4	14.0	9.31
	21	12.9	8.57	10.0	6.68	14.5	9.66	12.1	8.04	17.3	11.5	15.1	10.0
	22	14.1	9.41	10.7	7.14	15.9	10.6	12.9	8.61	18.9	12.6	16.2	10.8
	23	15.5	10.3	11.4	7.59	17.4	11.6	13.8	9.17	20.7	13.8	17.3	11.5
	24	16.8	11.2	12.1	8.04	19.0	12.6	14.6	9.74	22.5	15.0	18.4	12.2
	25	18.3	12.2	12.8	8.50	20.6	13.7	15.5	10.3	24.4	16.3	19.5	13.0
	26	19.8	13.1	13.5	8.95	22.3	14.8	16.4	10.9				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	24.6	16.3	28.1	18.7	33.0	21.9
$t_y \times 10^3$, (kips)$^{-1}$	2.51	1.67	2.83	1.88	3.15	2.10
$t_r \times 10^3$, (kips)$^{-1}$	3.08	2.06	3.48	2.32	3.87	2.58
r_x/r_y	4.24		4.22		4.28	
r_y, in.	1.57		1.57		1.52	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W16

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W16×							
		31[c]				26[c], [v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.08	2.71	6.60	4.39	5.04	3.35	8.06	5.36
	6	5.16	3.43	7.28	4.85	6.50	4.32	9.07	6.03
	7	5.62	3.74	7.71	5.13	7.12	4.74	9.66	6.43
	8	6.20	4.12	8.19	5.45	7.92	5.27	10.3	6.87
	9	6.93	4.61	8.74	5.82	8.92	5.93	11.1	7.39
	10	7.89	5.25	9.37	6.23	10.2	6.78	12.0	7.99
	11	9.28	6.17	10.1	6.71	12.0	8.01	13.1	8.69
	12	11.0	7.34	11.1	7.35	14.3	9.53	15.0	10.0
	13	13.0	8.62	12.6	8.39	16.8	11.2	17.2	11.5
	14	15.0	10.0	14.2	9.45	19.5	13.0	19.5	13.0
	15	17.2	11.5	15.8	10.5	22.4	14.9	21.9	14.6
	16	19.6	13.1	17.5	11.6	25.5	16.9	24.3	16.2
	17	22.2	14.7	19.2	12.8	28.7	19.1	26.7	17.8
	18	24.8	16.5	20.9	13.9	32.2	21.4	29.2	19.4
	19	27.7	18.4	22.6	15.0				

Other Constants and Properties				
$b_y \times 10^3$, (kip-ft)$^{-1}$	50.7	33.7	65.0	43.3
$t_y \times 10^3$, (kips)$^{-1}$	3.66	2.43	4.35	2.89
$t_r \times 10^3$, (kips)$^{-1}$	4.49	3.00	5.34	3.56
r_x/r_y	5.48		5.59	
r_y, in.	1.17		1.12	

[c] Shape is slender for compression for F_y = 50 ksi.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		873[h]				808[h]				730[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.130	0.0865	0.176	0.117	0.140	0.0934	0.195	0.130	0.155	0.103	0.215	0.143
	11	0.137	0.0912	0.176	0.117	0.148	0.0986	0.195	0.130	0.165	0.110	0.215	0.143
	12	0.138	0.0921	0.176	0.117	0.150	0.0996	0.195	0.130	0.166	0.111	0.215	0.143
	13	0.140	0.0931	0.176	0.117	0.151	0.101	0.195	0.130	0.168	0.112	0.215	0.143
	14	0.142	0.0942	0.176	0.117	0.153	0.102	0.195	0.130	0.171	0.114	0.215	0.143
	15	0.143	0.0954	0.176	0.117	0.155	0.103	0.195	0.130	0.173	0.115	0.215	0.143
	16	0.145	0.0967	0.176	0.117	0.158	0.105	0.195	0.130	0.176	0.117	0.215	0.143
	17	0.148	0.0982	0.176	0.117	0.160	0.106	0.195	0.130	0.178	0.119	0.215	0.143
	18	0.150	0.0997	0.176	0.117	0.162	0.108	0.195	0.130	0.181	0.121	0.215	0.143
	19	0.152	0.101	0.176	0.117	0.165	0.110	0.195	0.130	0.185	0.123	0.216	0.143
	20	0.155	0.103	0.176	0.117	0.168	0.112	0.196	0.130	0.188	0.125	0.216	0.144
	22	0.161	0.107	0.177	0.118	0.175	0.116	0.196	0.131	0.196	0.130	0.217	0.144
	24	0.167	0.111	0.177	0.118	0.182	0.121	0.197	0.131	0.205	0.136	0.217	0.145
	26	0.175	0.116	0.178	0.118	0.190	0.127	0.198	0.131	0.215	0.143	0.218	0.145
	28	0.183	0.122	0.178	0.119	0.200	0.133	0.198	0.132	0.226	0.150	0.219	0.146
	30	0.193	0.128	0.179	0.119	0.211	0.140	0.199	0.132	0.239	0.159	0.220	0.146
	32	0.204	0.135	0.179	0.119	0.223	0.148	0.199	0.133	0.254	0.169	0.221	0.147
	34	0.216	0.144	0.180	0.120	0.236	0.157	0.200	0.133	0.270	0.180	0.221	0.147
	36	0.229	0.153	0.181	0.120	0.252	0.168	0.201	0.134	0.289	0.192	0.222	0.148
	38	0.245	0.163	0.181	0.121	0.269	0.179	0.201	0.134	0.310	0.206	0.223	0.148
	40	0.262	0.174	0.182	0.121	0.289	0.192	0.202	0.134	0.334	0.222	0.224	0.149
	42	0.282	0.187	0.182	0.121	0.311	0.207	0.203	0.135	0.361	0.240	0.225	0.150
	44	0.304	0.202	0.183	0.122	0.336	0.224	0.203	0.135	0.392	0.261	0.226	0.150
	46	0.329	0.219	0.183	0.122	0.365	0.243	0.204	0.136	0.429	0.285	0.226	0.151
	48	0.358	0.238	0.184	0.122	0.398	0.265	0.205	0.136	0.467	0.311	0.227	0.151
	50	0.388	0.258	0.185	0.123	0.431	0.287	0.206	0.137	0.506	0.337	0.228	0.152

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	0.349	0.232	0.383	0.255	0.437	0.290
$t_y \times 10^3$, (kips)$^{-1}$	0.130	0.0865	0.140	0.0934	0.155	0.103
$t_r \times 10^3$, (kips)$^{-1}$	0.160	0.106	0.172	0.115	0.191	0.127
r_x/r_y	1.71		1.69		1.74	
r_y, in.	4.90		4.83		4.69	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		665[h]				605[h]				550[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.170	0.113	0.241	0.160	0.188	0.125	0.270	0.180	0.206	0.137	0.302	0.201
	11	0.181	0.120	0.241	0.160	0.200	0.133	0.270	0.180	0.220	0.146	0.302	0.201
	12	0.183	0.122	0.241	0.160	0.202	0.134	0.270	0.180	0.222	0.148	0.302	0.201
	13	0.185	0.123	0.241	0.160	0.204	0.136	0.270	0.180	0.225	0.150	0.302	0.201
	14	0.188	0.125	0.241	0.160	0.207	0.138	0.270	0.180	0.228	0.152	0.302	0.201
	15	0.190	0.127	0.241	0.160	0.210	0.140	0.270	0.180	0.232	0.154	0.302	0.201
	16	0.193	0.129	0.241	0.160	0.214	0.142	0.270	0.180	0.236	0.157	0.302	0.201
	17	0.197	0.131	0.241	0.160	0.217	0.145	0.270	0.180	0.240	0.160	0.303	0.201
	18	0.200	0.133	0.242	0.161	0.221	0.147	0.271	0.180	0.244	0.162	0.303	0.202
	19	0.204	0.135	0.242	0.161	0.225	0.150	0.272	0.181	0.249	0.166	0.304	0.202
	20	0.208	0.138	0.242	0.161	0.230	0.153	0.272	0.181	0.254	0.169	0.305	0.203
	22	0.216	0.144	0.243	0.162	0.240	0.160	0.273	0.182	0.265	0.177	0.306	0.204
	24	0.226	0.151	0.244	0.163	0.252	0.167	0.274	0.183	0.279	0.185	0.308	0.205
	26	0.238	0.158	0.245	0.163	0.265	0.176	0.276	0.183	0.293	0.195	0.309	0.206
	28	0.251	0.167	0.246	0.164	0.280	0.186	0.277	0.184	0.310	0.207	0.310	0.207
	30	0.266	0.177	0.247	0.164	0.297	0.197	0.278	0.185	0.330	0.219	0.312	0.208
	32	0.282	0.188	0.248	0.165	0.316	0.210	0.279	0.186	0.352	0.234	0.313	0.209
	34	0.301	0.201	0.249	0.166	0.338	0.225	0.280	0.187	0.377	0.251	0.315	0.209
	36	0.323	0.215	0.250	0.166	0.363	0.241	0.282	0.187	0.406	0.270	0.316	0.210
	38	0.347	0.231	0.251	0.167	0.391	0.260	0.283	0.188	0.438	0.292	0.318	0.211
	40	0.375	0.250	0.252	0.168	0.423	0.282	0.284	0.189	0.475	0.316	0.319	0.213
	42	0.407	0.271	0.253	0.168	0.460	0.306	0.285	0.190	0.518	0.345	0.321	0.214
	44	0.443	0.295	0.254	0.169	0.503	0.335	0.287	0.191	0.568	0.378	0.322	0.215
	46	0.485	0.322	0.255	0.170	0.550	0.366	0.288	0.191	0.621	0.413	0.324	0.216
	48	0.528	0.351	0.256	0.171	0.599	0.399	0.289	0.192	0.676	0.450	0.326	0.217
	50	0.573	0.381	0.257	0.171	0.650	0.432	0.290	0.193	0.733	0.488	0.327	0.218
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.488		0.325		0.546		0.364		0.611		0.407	
$t_y \times 10^3$, (kips)$^{-1}$		0.170		0.113		0.188		0.125		0.206		0.137	
$t_r \times 10^3$, (kips)$^{-1}$		0.209		0.140		0.230		0.154		0.253		0.169	
r_x/r_y		1.73				1.71				1.70			
r_y, in.		4.62				4.55				4.49			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		500[h]				455[h]				426[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.227	0.151	0.339	0.226	0.249	0.166	0.381	0.253	0.267	0.178	0.410	0.273
	11	0.242	0.161	0.339	0.226	0.266	0.177	0.381	0.253	0.286	0.190	0.410	0.273
	12	0.245	0.163	0.339	0.226	0.270	0.179	0.381	0.253	0.290	0.193	0.410	0.273
	13	0.249	0.166	0.339	0.226	0.273	0.182	0.381	0.253	0.294	0.195	0.410	0.273
	14	0.252	0.168	0.339	0.226	0.278	0.185	0.381	0.253	0.298	0.198	0.410	0.273
	15	0.256	0.171	0.339	0.226	0.282	0.188	0.381	0.253	0.303	0.202	0.410	0.273
	16	0.261	0.173	0.340	0.226	0.287	0.191	0.381	0.254	0.308	0.205	0.411	0.273
	17	0.265	0.177	0.340	0.227	0.292	0.194	0.382	0.254	0.314	0.209	0.412	0.274
	18	0.270	0.180	0.341	0.227	0.298	0.198	0.383	0.255	0.320	0.213	0.413	0.275
	19	0.276	0.183	0.342	0.228	0.304	0.202	0.384	0.256	0.327	0.218	0.414	0.276
	20	0.282	0.187	0.343	0.228	0.310	0.207	0.385	0.256	0.334	0.222	0.415	0.276
	22	0.295	0.196	0.345	0.229	0.325	0.216	0.387	0.258	0.350	0.233	0.418	0.278
	24	0.309	0.206	0.346	0.230	0.342	0.227	0.389	0.259	0.369	0.245	0.420	0.280
	26	0.327	0.217	0.348	0.232	0.361	0.240	0.392	0.261	0.390	0.259	0.423	0.281
	28	0.346	0.230	0.350	0.233	0.383	0.255	0.394	0.262	0.414	0.276	0.425	0.283
	30	0.368	0.245	0.352	0.234	0.408	0.272	0.396	0.263	0.442	0.294	0.428	0.285
	32	0.394	0.262	0.353	0.235	0.437	0.291	0.398	0.265	0.474	0.315	0.430	0.286
	34	0.422	0.281	0.355	0.236	0.470	0.313	0.400	0.266	0.510	0.339	0.433	0.288
	36	0.455	0.303	0.357	0.238	0.508	0.338	0.403	0.268	0.551	0.367	0.435	0.290
	38	0.493	0.328	0.359	0.239	0.551	0.366	0.405	0.269	0.599	0.399	0.438	0.291
	40	0.536	0.357	0.361	0.240	0.600	0.399	0.407	0.271	0.654	0.435	0.441	0.293
	42	0.586	0.390	0.363	0.241	0.657	0.437	0.409	0.272	0.718	0.478	0.443	0.295
	44	0.643	0.428	0.365	0.243	0.721	0.480	0.412	0.274	0.788	0.524	0.446	0.297
	46	0.703	0.468	0.367	0.244	0.789	0.525	0.414	0.276	0.861	0.573	0.449	0.299
	48	0.765	0.509	0.369	0.245	0.859	0.571	0.417	0.277	0.938	0.624	0.452	0.300
	50	0.830	0.552	0.371	0.247	0.932	0.620	0.419	0.279	1.02	0.677	0.454	0.302
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.683		0.454		0.761		0.506		0.821		0.546	
$t_y \times 10^3$, (kips)$^{-1}$		0.227		0.151		0.249		0.166		0.267		0.178	
$t_r \times 10^3$, (kips)$^{-1}$		0.279		0.186		0.306		0.204		0.328		0.219	
r_x/r_y		1.69				1.67				1.67			
r_y, in.		4.43				4.38				4.34			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		398[h]				370[h]				342[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.285	0.190	0.445	0.296	0.306	0.204	0.484	0.322	0.331	0.220	0.530	0.353
	11	0.306	0.203	0.445	0.296	0.329	0.219	0.484	0.322	0.355	0.236	0.530	0.353
	12	0.310	0.206	0.445	0.296	0.333	0.222	0.484	0.322	0.360	0.239	0.530	0.353
	13	0.314	0.209	0.445	0.296	0.338	0.225	0.484	0.322	0.365	0.243	0.530	0.353
	14	0.319	0.212	0.445	0.296	0.343	0.228	0.484	0.322	0.371	0.247	0.530	0.353
	15	0.324	0.216	0.445	0.296	0.349	0.232	0.484	0.322	0.377	0.251	0.530	0.353
	16	0.330	0.220	0.446	0.297	0.355	0.236	0.485	0.323	0.384	0.256	0.532	0.354
	17	0.336	0.224	0.447	0.298	0.362	0.241	0.487	0.324	0.392	0.261	0.534	0.355
	18	0.343	0.228	0.449	0.298	0.369	0.246	0.489	0.325	0.400	0.266	0.536	0.356
	19	0.350	0.233	0.450	0.299	0.377	0.251	0.490	0.326	0.409	0.272	0.538	0.358
	20	0.358	0.238	0.451	0.300	0.386	0.257	0.492	0.327	0.418	0.278	0.539	0.359
	22	0.376	0.250	0.454	0.302	0.405	0.270	0.495	0.329	0.439	0.292	0.543	0.361
	24	0.396	0.263	0.457	0.304	0.427	0.284	0.498	0.331	0.463	0.308	0.547	0.364
	26	0.419	0.279	0.460	0.306	0.453	0.301	0.501	0.334	0.491	0.327	0.551	0.367
	28	0.445	0.296	0.462	0.308	0.482	0.321	0.505	0.336	0.523	0.348	0.555	0.369
	30	0.475	0.316	0.465	0.310	0.515	0.343	0.508	0.338	0.560	0.373	0.559	0.372
	32	0.510	0.339	0.468	0.312	0.554	0.368	0.512	0.340	0.602	0.401	0.563	0.374
	34	0.550	0.366	0.471	0.314	0.597	0.397	0.515	0.343	0.651	0.433	0.567	0.377
	36	0.595	0.396	0.474	0.316	0.648	0.431	0.519	0.345	0.706	0.470	0.571	0.380
	38	0.647	0.431	0.477	0.318	0.705	0.469	0.522	0.347	0.770	0.513	0.575	0.383
	40	0.707	0.470	0.480	0.320	0.772	0.514	0.526	0.350	0.844	0.562	0.580	0.386
	42	0.778	0.517	0.484	0.322	0.850	0.566	0.529	0.352	0.931	0.619	0.584	0.389
	44	0.853	0.568	0.487	0.324	0.933	0.621	0.533	0.355	1.02	0.680	0.588	0.391
	46	0.933	0.621	0.490	0.326	1.02	0.679	0.537	0.357	1.12	0.743	0.593	0.394
	48	1.02	0.676	0.493	0.328	1.11	0.739	0.541	0.360	1.22	0.809	0.597	0.397
	50	1.10	0.733	0.496	0.330	1.21	0.802	0.545	0.362	1.32	0.878	0.602	0.401
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.886		0.590		0.963		0.641		1.05		0.701	
$t_y \times 10^3$, (kips)$^{-1}$		0.285		0.190		0.306		0.204		0.331		0.220	
$t_r \times 10^3$, (kips)$^{-1}$		0.351		0.234		0.376		0.251		0.406		0.271	
r_x/r_y		1.66				1.66				1.65			
r_y, in.		4.31				4.27				4.24			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		311[h]				283[h]				257			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.365	0.243	0.591	0.393	0.401	0.267	0.657	0.437	0.442	0.294	0.732	0.487
	11	0.393	0.261	0.591	0.393	0.431	0.287	0.657	0.437	0.476	0.317	0.732	0.487
	12	0.398	0.265	0.591	0.393	0.437	0.291	0.657	0.437	0.483	0.321	0.732	0.487
	13	0.404	0.269	0.591	0.393	0.444	0.296	0.657	0.437	0.490	0.326	0.732	0.487
	14	0.411	0.273	0.591	0.393	0.451	0.300	0.657	0.437	0.499	0.332	0.732	0.487
	15	0.418	0.278	0.591	0.393	0.459	0.306	0.658	0.438	0.508	0.338	0.733	0.488
	16	0.426	0.283	0.593	0.395	0.468	0.312	0.661	0.440	0.517	0.344	0.736	0.490
	17	0.434	0.289	0.596	0.396	0.478	0.318	0.663	0.441	0.528	0.351	0.740	0.492
	18	0.443	0.295	0.598	0.398	0.488	0.325	0.666	0.443	0.540	0.359	0.743	0.494
	19	0.453	0.302	0.600	0.399	0.499	0.332	0.669	0.445	0.552	0.367	0.746	0.497
	20	0.464	0.309	0.602	0.401	0.511	0.340	0.672	0.447	0.566	0.376	0.750	0.499
	22	0.488	0.325	0.607	0.404	0.537	0.358	0.677	0.451	0.596	0.396	0.757	0.503
	24	0.515	0.343	0.612	0.407	0.568	0.378	0.683	0.455	0.630	0.419	0.764	0.508
	26	0.547	0.364	0.617	0.410	0.604	0.402	0.689	0.458	0.671	0.446	0.771	0.513
	28	0.583	0.388	0.621	0.413	0.645	0.429	0.695	0.462	0.717	0.477	0.778	0.518
	30	0.625	0.416	0.626	0.417	0.691	0.460	0.701	0.466	0.770	0.512	0.786	0.523
	32	0.673	0.448	0.631	0.420	0.745	0.496	0.707	0.471	0.831	0.553	0.794	0.528
	34	0.729	0.485	0.636	0.423	0.807	0.537	0.713	0.475	0.902	0.600	0.801	0.533
	36	0.792	0.527	0.641	0.427	0.879	0.585	0.720	0.479	0.983	0.654	0.809	0.539
	38	0.865	0.576	0.647	0.430	0.961	0.640	0.726	0.483	1.08	0.717	0.818	0.544
	40	0.951	0.633	0.652	0.434	1.06	0.704	0.733	0.488	1.19	0.791	0.826	0.549
	42	1.05	0.697	0.657	0.437	1.17	0.776	0.740	0.492	1.31	0.872	0.834	0.555
	44	1.15	0.765	0.663	0.441	1.28	0.852	0.747	0.497	1.44	0.957	0.843	0.561
	46	1.26	0.837	0.669	0.445	1.40	0.931	0.754	0.501	1.57	1.05	0.852	0.567
	48	1.37	0.911	0.674	0.449	1.52	1.01	0.761	0.506	1.71	1.14	0.861	0.573
	50	1.49	0.988	0.680	0.452	1.65	1.10	0.768	0.511	1.86	1.24	0.870	0.579

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.17	0.780	1.30	0.865	1.45	0.964
$t_y \times 10^3$, (kips)$^{-1}$	0.365	0.243	0.401	0.267	0.442	0.294
$t_r \times 10^3$, (kips)$^{-1}$	0.449	0.299	0.493	0.328	0.543	0.362
r_x/r_y	1.64		1.63		1.62	
r_y, in.	4.20		4.17		4.13	

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		233				211				193			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.488	0.324	0.817	0.544	0.539	0.358	0.914	0.608	0.588	0.391	1.00	0.668
	11	0.526	0.350	0.817	0.544	0.582	0.387	0.914	0.608	0.636	0.423	1.00	0.668
	12	0.534	0.355	0.817	0.544	0.590	0.393	0.914	0.608	0.645	0.429	1.00	0.668
	13	0.542	0.361	0.817	0.544	0.600	0.399	0.914	0.608	0.655	0.436	1.00	0.668
	14	0.551	0.367	0.817	0.544	0.610	0.406	0.914	0.608	0.667	0.444	1.00	0.668
	15	0.561	0.374	0.819	0.545	0.622	0.414	0.917	0.610	0.679	0.452	1.01	0.670
	16	0.572	0.381	0.823	0.548	0.634	0.422	0.922	0.613	0.693	0.461	1.01	0.675
	17	0.584	0.389	0.827	0.551	0.647	0.431	0.927	0.617	0.708	0.471	1.02	0.679
	18	0.597	0.397	0.832	0.553	0.662	0.440	0.932	0.620	0.724	0.482	1.03	0.683
	19	0.611	0.407	0.836	0.556	0.678	0.451	0.937	0.623	0.741	0.493	1.03	0.687
	20	0.626	0.417	0.840	0.559	0.695	0.462	0.942	0.627	0.760	0.506	1.04	0.691
	22	0.660	0.439	0.849	0.565	0.733	0.488	0.953	0.634	0.802	0.534	1.05	0.700
	24	0.699	0.465	0.857	0.571	0.777	0.517	0.964	0.641	0.851	0.566	1.07	0.709
	26	0.745	0.495	0.866	0.576	0.828	0.551	0.975	0.649	0.908	0.604	1.08	0.718
	28	0.797	0.530	0.876	0.583	0.887	0.590	0.987	0.656	0.973	0.647	1.09	0.727
	30	0.857	0.570	0.885	0.589	0.955	0.635	1.00	0.664	1.05	0.697	1.11	0.737
	32	0.926	0.616	0.895	0.595	1.03	0.687	1.01	0.672	1.13	0.755	1.12	0.747
	34	1.01	0.669	0.904	0.602	1.12	0.747	1.02	0.680	1.23	0.822	1.14	0.757
	36	1.10	0.731	0.914	0.608	1.23	0.817	1.04	0.689	1.35	0.899	1.15	0.767
	38	1.20	0.801	0.925	0.615	1.35	0.897	1.05	0.697	1.49	0.989	1.17	0.778
	40	1.33	0.886	0.935	0.622	1.49	0.993	1.06	0.706	1.65	1.09	1.19	0.789
	42	1.47	0.976	0.946	0.629	1.65	1.09	1.08	0.715	1.81	1.21	1.20	0.800
	44	1.61	1.07	0.957	0.637	1.81	1.20	1.09	0.725	1.99	1.32	1.22	0.812
	46	1.76	1.17	0.968	0.644	1.97	1.31	1.10	0.734	2.18	1.45	1.24	0.824
	48	1.92	1.28	0.979	0.652	2.15	1.43	1.12	0.744	2.37	1.58	1.26	0.836
	50	2.08	1.38	0.991	0.659	2.33	1.55	1.13	0.754	2.57	1.71	1.28	0.848

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	1.61	1.07	1.80	1.20	1.98	1.32
$t_y \times 10^3$, (kips)$^{-1}$	0.488	0.324	0.539	0.358	0.588	0.391
$t_r \times 10^3$, (kips)$^{-1}$	0.599	0.399	0.662	0.441	0.722	0.482
r_x/r_y	1.62		1.61		1.60	
r_y, in.	4.10		4.07		4.05	

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		176				159				145			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.645	0.429	1.11	0.741	0.715	0.476	1.24	0.826	0.782	0.520	1.37	0.912
	11	0.698	0.464	1.11	0.741	0.774	0.515	1.24	0.826	0.848	0.564	1.37	0.912
	12	0.708	0.471	1.11	0.741	0.786	0.523	1.24	0.826	0.861	0.573	1.37	0.912
	13	0.720	0.479	1.11	0.741	0.799	0.532	1.24	0.826	0.875	0.582	1.37	0.912
	14	0.733	0.487	1.11	0.741	0.814	0.541	1.24	0.826	0.891	0.593	1.37	0.912
	15	0.747	0.497	1.12	0.745	0.829	0.552	1.25	0.831	0.908	0.604	1.38	0.919
	16	0.762	0.507	1.13	0.750	0.846	0.563	1.26	0.837	0.927	0.617	1.39	0.926
	17	0.778	0.518	1.13	0.755	0.865	0.576	1.27	0.843	0.948	0.631	1.40	0.933
	18	0.796	0.530	1.14	0.760	0.885	0.589	1.28	0.850	0.970	0.645	1.41	0.941
	19	0.816	0.543	1.15	0.765	0.907	0.603	1.29	0.856	0.994	0.662	1.43	0.949
	20	0.837	0.557	1.16	0.770	0.931	0.619	1.30	0.863	1.02	0.679	1.44	0.956
	22	0.884	0.588	1.17	0.781	0.983	0.654	1.32	0.876	1.08	0.718	1.46	0.973
	24	0.938	0.624	1.19	0.791	1.04	0.695	1.34	0.889	1.15	0.763	1.49	0.989
	26	1.00	0.666	1.21	0.803	1.12	0.742	1.36	0.904	1.23	0.816	1.51	1.01
	28	1.07	0.715	1.22	0.814	1.20	0.797	1.38	0.918	1.32	0.876	1.54	1.02
	30	1.16	0.771	1.24	0.826	1.29	0.860	1.40	0.933	1.42	0.947	1.57	1.04
	32	1.26	0.836	1.26	0.838	1.40	0.934	1.43	0.949	1.54	1.03	1.60	1.06
	34	1.37	0.911	1.28	0.851	1.53	1.02	1.45	0.965	1.69	1.12	1.63	1.08
	36	1.50	0.998	1.30	0.864	1.68	1.12	1.47	0.981	1.85	1.23	1.66	1.10
	38	1.65	1.10	1.32	0.877	1.85	1.23	1.50	0.998	2.05	1.36	1.69	1.12
	40	1.83	1.22	1.34	0.891	2.05	1.36	1.53	1.02	2.27	1.51	1.72	1.15
	42	2.02	1.34	1.36	0.905	2.26	1.50	1.56	1.03	2.50	1.66	1.76	1.17
	44	2.22	1.47	1.38	0.920	2.48	1.65	1.58	1.05	2.74	1.82	1.79	1.19
	46	2.42	1.61	1.41	0.935	2.71	1.81	1.61	1.07	3.00	1.99	1.83	1.22
	48	2.64	1.75	1.43	0.951	2.95	1.97	1.64	1.09	3.26	2.17	1.87	1.24
	50	2.86	1.90	1.45	0.967	3.21	2.13	1.68	1.12	3.54	2.36	1.91	1.27

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.19	1.45	2.44	1.62	2.68	1.78
$t_y \times 10^3$, (kips)$^{-1}$	0.645	0.429	0.715	0.476	0.782	0.520
$t_r \times 10^3$, (kips)$^{-1}$	0.792	0.528	0.878	0.586	0.961	0.641
r_x/r_y	1.60		1.60		1.59	
r_y, in.	4.02		4.00		3.98	

W14

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W14×											
		132				120				109			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.861	0.573	1.52	1.01	0.946	0.630	1.68	1.12	1.04	0.694	1.86	1.23
	11	0.942	0.627	1.52	1.01	1.04	0.690	1.68	1.12	1.14	0.761	1.86	1.23
	12	0.958	0.638	1.52	1.01	1.05	0.702	1.68	1.12	1.16	0.774	1.86	1.23
	13	0.976	0.650	1.52	1.01	1.07	0.715	1.68	1.12	1.19	0.789	1.86	1.23
	14	0.996	0.663	1.53	1.02	1.10	0.730	1.69	1.13	1.21	0.805	1.87	1.25
	15	1.02	0.677	1.55	1.03	1.12	0.746	1.71	1.14	1.24	0.823	1.89	1.26
	16	1.04	0.693	1.56	1.04	1.15	0.763	1.73	1.15	1.27	0.843	1.91	1.27
	17	1.07	0.710	1.57	1.05	1.18	0.783	1.74	1.16	1.30	0.864	1.93	1.29
	18	1.10	0.729	1.59	1.06	1.21	0.803	1.76	1.17	1.33	0.887	1.95	1.30
	19	1.13	0.749	1.60	1.07	1.24	0.826	1.78	1.18	1.37	0.913	1.98	1.31
	20	1.16	0.771	1.62	1.08	1.28	0.851	1.80	1.20	1.41	0.940	2.00	1.33
	22	1.23	0.821	1.65	1.10	1.36	0.906	1.84	1.22	1.51	1.00	2.04	1.36
	24	1.32	0.880	1.68	1.12	1.46	0.971	1.88	1.25	1.61	1.07	2.09	1.39
	26	1.42	0.948	1.71	1.14	1.57	1.05	1.92	1.28	1.74	1.16	2.14	1.43
	28	1.54	1.03	1.75	1.16	1.71	1.14	1.96	1.30	1.89	1.26	2.20	1.46
	30	1.68	1.12	1.79	1.19	1.86	1.24	2.00	1.33	2.06	1.37	2.25	1.50
	32	1.85	1.23	1.82	1.21	2.05	1.36	2.05	1.37	2.27	1.51	2.31	1.54
	34	2.04	1.35	1.86	1.24	2.26	1.50	2.10	1.40	2.50	1.67	2.37	1.58
	36	2.26	1.51	1.90	1.27	2.51	1.67	2.15	1.43	2.79	1.86	2.44	1.62
	38	2.52	1.68	1.95	1.29	2.80	1.86	2.21	1.47	3.11	2.07	2.51	1.67
	40	2.79	1.86	1.99	1.32	3.10	2.07	2.27	1.51	3.44	2.29	2.58	1.72
	42	3.08	2.05	2.04	1.36	3.42	2.28	2.33	1.55	3.80	2.53	2.66	1.77
	44	3.38	2.25	2.09	1.39	3.76	2.50	2.39	1.59	4.17	2.77	2.74	1.82
	46	3.70	2.46	2.14	1.42	4.11	2.73	2.46	1.63	4.55	3.03	2.82	1.88
	48	4.02	2.68	2.19	1.46	4.47	2.97	2.53	1.68	4.96	3.30	2.92	1.94
	50	4.37	2.91	2.25	1.50	4.85	3.23	2.60	1.73	5.38	3.58	3.05	2.03

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	3.15	2.10	3.49	2.32	3.84	2.56
$t_y \times 10^3$, (kips)$^{-1}$	0.861	0.573	0.946	0.630	1.04	0.694
$t_r \times 10^3$, (kips)$^{-1}$	1.06	0.705	1.16	0.775	1.28	0.855
r_x/r_y	1.67		1.67		1.67	
r_y, in.	3.76		3.74		3.73	

W14

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W14× 99[f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.15	0.764	2.07	1.38
	11	1.26	0.838	2.07	1.38
	12	1.28	0.853	2.07	1.38
	13	1.31	0.869	2.07	1.38
	14	1.33	0.887	2.08	1.38
	15	1.36	0.907	2.10	1.40
	16	1.40	0.929	2.13	1.42
	17	1.43	0.953	2.15	1.43
	18	1.47	0.978	2.18	1.45
	19	1.51	1.01	2.21	1.47
	20	1.56	1.04	2.23	1.49
	22	1.66	1.11	2.29	1.52
	24	1.78	1.19	2.35	1.56
	26	1.92	1.28	2.41	1.60
	28	2.09	1.39	2.48	1.65
	30	2.28	1.52	2.55	1.69
	32	2.51	1.67	2.62	1.74
	34	2.78	1.85	2.70	1.80
	36	3.10	2.06	2.78	1.85
	38	3.45	2.30	2.87	1.91
	40	3.83	2.55	2.96	1.97
	42	4.22	2.81	3.06	2.04
	44	4.63	3.08	3.17	2.11
	46	5.06	3.37	3.31	2.20
	48	5.51	3.67	3.48	2.32
	50	5.98	3.98	3.66	2.43

Other Constants and Properties		
$b_y \times 10^3$, (kip-ft)$^{-1}$	4.29	2.85
$t_y \times 10^3$, (kips)$^{-1}$	1.15	0.764
$t_r \times 10^3$, (kips)$^{-1}$	1.41	0.940
r_x/r_y	1.66	
r_y, in.	3.71	

[f] Shape does not meet compact limit for flexure for F_y = 50 ksi.

W14

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W14×											
		90[f]				82				74			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.26	0.839	2.33	1.55	1.39	0.926	2.56	1.71	1.53	1.02	2.83	1.88
	6	1.30	0.862	2.33	1.55	1.48	0.985	2.56	1.71	1.63	1.08	2.83	1.88
	7	1.31	0.871	2.33	1.55	1.51	1.01	2.56	1.71	1.67	1.11	2.83	1.88
	8	1.32	0.881	2.33	1.55	1.55	1.03	2.56	1.71	1.71	1.14	2.83	1.88
	9	1.34	0.892	2.33	1.55	1.60	1.06	2.57	1.71	1.76	1.17	2.84	1.89
	10	1.36	0.906	2.33	1.55	1.65	1.10	2.61	1.74	1.82	1.21	2.89	1.92
	11	1.38	0.920	2.33	1.55	1.71	1.14	2.66	1.77	1.88	1.25	2.94	1.96
	12	1.41	0.937	2.33	1.55	1.78	1.18	2.70	1.80	1.96	1.30	2.99	1.99
	13	1.44	0.955	2.33	1.55	1.86	1.24	2.74	1.83	2.05	1.36	3.05	2.03
	14	1.47	0.975	2.33	1.55	1.95	1.30	2.79	1.86	2.14	1.43	3.10	2.06
	15	1.50	0.997	2.33	1.55	2.05	1.36	2.84	1.89	2.25	1.50	3.16	2.10
	16	1.53	1.02	2.35	1.57	2.16	1.44	2.89	1.92	2.37	1.58	3.22	2.14
	17	1.57	1.05	2.38	1.59	2.28	1.52	2.94	1.96	2.51	1.67	3.29	2.19
	18	1.62	1.08	2.42	1.61	2.42	1.61	2.99	1.99	2.67	1.78	3.35	2.23
	19	1.66	1.11	2.45	1.63	2.58	1.72	3.05	2.03	2.84	1.89	3.42	2.28
	20	1.71	1.14	2.48	1.65	2.76	1.84	3.11	2.07	3.04	2.02	3.49	2.32
	22	1.83	1.22	2.55	1.70	3.19	2.12	3.23	2.15	3.51	2.33	3.65	2.43
	24	1.96	1.31	2.62	1.74	3.74	2.49	3.36	2.24	4.12	2.74	3.81	2.54
	26	2.12	1.41	2.70	1.80	4.39	2.92	3.51	2.33	4.83	3.21	3.99	2.66
	28	2.30	1.53	2.78	1.85	5.09	3.39	3.66	2.44	5.60	3.73	4.20	2.79
	30	2.52	1.68	2.87	1.91	5.84	3.89	3.83	2.55	6.43	4.28	4.42	2.94
	32	2.77	1.84	2.96	1.97	6.65	4.42	4.02	2.67	7.32	4.87	4.72	3.14
	34	3.07	2.04	3.06	2.03	7.50	4.99	4.26	2.84	8.26	5.50	5.07	3.38
	36	3.42	2.28	3.16	2.10	8.41	5.60	4.56	3.03	9.26	6.16	5.43	3.61
	38	3.81	2.54	3.27	2.18	9.37	6.24	4.85	3.22	10.3	6.86	5.78	3.85
	40	4.23	2.81	3.39	2.26	10.4	6.91	5.14	3.42	11.4	7.61	6.14	4.08

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	4.90	3.26	7.95	5.29	8.80	5.85
$t_y \times 10^3$, (kips)$^{-1}$	1.26	0.839	1.39	0.926	1.53	1.02
$t_r \times 10^3$, (kips)$^{-1}$	1.55	1.03	1.71	1.14	1.88	1.25
r_x/r_y	1.66		2.44		2.44	
r_y, in.	3.70		2.48		2.48	

[f] Shape does not meet compact limit for flexure for F_y = 50 ksi.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		68				61				53			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.67	1.11	3.10	2.06	1.87	1.24	3.49	2.32	2.14	1.42	4.09	2.72
	6	1.78	1.18	3.10	2.06	1.99	1.32	3.49	2.32	2.37	1.58	4.09	2.72
	7	1.82	1.21	3.10	2.06	2.03	1.35	3.49	2.32	2.46	1.64	4.11	2.74
	8	1.87	1.24	3.10	2.06	2.09	1.39	3.49	2.32	2.57	1.71	4.21	2.80
	9	1.92	1.28	3.12	2.07	2.15	1.43	3.52	2.34	2.70	1.80	4.32	2.88
	10	1.99	1.32	3.17	2.11	2.22	1.48	3.59	2.39	2.85	1.90	4.44	2.95
	11	2.06	1.37	3.23	2.15	2.31	1.54	3.66	2.44	3.02	2.01	4.56	3.03
	12	2.15	1.43	3.30	2.19	2.40	1.60	3.74	2.49	3.23	2.15	4.68	3.11
	13	2.24	1.49	3.36	2.24	2.51	1.67	3.82	2.54	3.47	2.31	4.81	3.20
	14	2.35	1.56	3.43	2.28	2.63	1.75	3.90	2.59	3.75	2.49	4.96	3.30
	15	2.47	1.64	3.50	2.33	2.77	1.84	3.99	2.65	4.07	2.71	5.11	3.40
	16	2.61	1.73	3.57	2.38	2.92	1.95	4.08	2.71	4.45	2.96	5.26	3.50
	17	2.76	1.84	3.65	2.43	3.10	2.06	4.17	2.78	4.89	3.25	5.43	3.62
	18	2.93	1.95	3.73	2.48	3.29	2.19	4.27	2.84	5.40	3.59	5.61	3.74
	19	3.13	2.08	3.81	2.53	3.51	2.34	4.38	2.91	6.01	4.00	5.81	3.86
	20	3.35	2.23	3.90	2.59	3.76	2.50	4.49	2.98	6.66	4.43	6.01	4.00
	22	3.88	2.58	4.08	2.72	4.36	2.90	4.72	3.14	8.06	5.36	6.47	4.31
	24	4.56	3.03	4.29	2.85	5.14	3.42	4.99	3.32	9.60	6.38	7.22	4.80
	26	5.35	3.56	4.51	3.00	6.03	4.01	5.28	3.51	11.3	7.49	7.99	5.32
	28	6.21	4.13	4.77	3.17	6.99	4.65	5.66	3.77	13.1	8.69	8.76	5.83
	30	7.12	4.74	5.10	3.39	8.02	5.34	6.20	4.13	15.0	9.98	9.53	6.34
	32	8.11	5.39	5.53	3.68	9.13	6.07	6.74	4.48	17.1	11.3	10.3	6.85
	34	9.15	6.09	5.96	3.96	10.3	6.86	7.27	4.84				
	36	10.3	6.83	6.38	4.25	11.6	7.69	7.81	5.20				
	38	11.4	7.60	6.81	4.53	12.9	8.57	8.34	5.55				
	40	12.7	8.43	7.23	4.81	14.3	9.49	8.87	5.90				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	9.65	6.42	10.9	7.23	16.2	10.8
$t_y \times 10^3$, (kips)$^{-1}$	1.67	1.11	1.87	1.24	2.14	1.42
$t_r \times 10^3$, (kips)$^{-1}$	2.05	1.37	2.29	1.53	2.63	1.75
r_x/r_y	2.44		2.44		3.07	
r_y, in.	2.46		2.45		1.92	

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		48				43[c]				38[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.37	1.58	4.54	3.02	2.67	1.78	5.12	3.41	3.05	2.03	5.79	3.85
	6	2.63	1.75	4.54	3.02	2.95	1.96	5.12	3.41	3.51	2.33	5.90	3.93
	7	2.73	1.82	4.57	3.04	3.06	2.04	5.17	3.44	3.70	2.46	6.12	4.07
	8	2.85	1.90	4.70	3.13	3.20	2.13	5.31	3.54	3.95	2.63	6.36	4.23
	9	2.99	1.99	4.83	3.21	3.37	2.24	5.47	3.64	4.25	2.83	6.61	4.40
	10	3.16	2.10	4.96	3.30	3.56	2.37	5.64	3.75	4.62	3.08	6.89	4.58
	11	3.36	2.23	5.11	3.40	3.79	2.52	5.82	3.87	5.07	3.37	7.19	4.78
	12	3.59	2.39	5.26	3.50	4.05	2.70	6.01	4.00	5.61	3.73	7.52	5.00
	13	3.86	2.57	5.43	3.61	4.36	2.90	6.21	4.13	6.25	4.16	7.88	5.24
	14	4.17	2.77	5.60	3.73	4.72	3.14	6.42	4.27	7.04	4.68	8.27	5.50
	15	4.53	3.02	5.79	3.85	5.15	3.42	6.66	4.43	8.01	5.33	8.71	5.80
	16	4.96	3.30	5.98	3.98	5.64	3.75	6.90	4.59	9.11	6.06	9.20	6.12
	17	5.45	3.63	6.20	4.12	6.21	4.13	7.17	4.77	10.3	6.85	9.99	6.65
	18	6.03	4.01	6.42	4.27	6.90	4.59	7.46	4.97	11.5	7.68	10.9	7.23
	19	6.72	4.47	6.67	4.44	7.68	5.11	7.78	5.17	12.9	8.55	11.8	7.82
	20	7.45	4.96	6.94	4.61	8.51	5.66	8.12	5.40	14.2	9.48	12.6	8.41
	21	8.21	5.46	7.22	4.80	9.39	6.25	8.71	5.80	15.7	10.4	13.5	9.00
	22	9.01	6.00	7.69	5.12	10.3	6.85	9.31	6.19	17.2	11.5	14.4	9.60
	23	9.85	6.56	8.16	5.43	11.3	7.49	9.90	6.59	18.8	12.5	15.3	10.2
	24	10.7	7.14	8.64	5.75	12.3	8.16	10.5	6.99	20.5	13.6	16.2	10.8
	25	11.6	7.74	9.12	6.07	13.3	8.85	11.1	7.39	22.3	14.8	17.1	11.4
	26	12.6	8.38	9.59	6.38	14.4	9.57	11.7	7.78				
	27	13.6	9.03	10.1	6.70	15.5	10.3	12.3	8.18				
	28	14.6	9.72	10.5	7.01	16.7	11.1	12.9	8.58				
	29	15.7	10.4	11.0	7.33	17.9	11.9	13.5	8.98				
	30	16.8	11.2	11.5	7.65	19.2	12.7	14.1	9.37				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		18.2		12.1		20.6		13.7		29.4		19.6	
$t_y \times 10^3$, (kips)$^{-1}$		2.37		1.58		2.65		1.76		2.98		1.98	
$t_r \times 10^3$, (kips)$^{-1}$		2.91		1.94		3.26		2.17		3.66		2.44	
r_x/r_y		3.06				3.08				3.79			
r_y, in.		1.91				1.89				1.55			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W14

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		34[c]				30[c]				26[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	3.49	2.32	6.53	4.34	4.01	2.67	7.53	5.01	4.72	3.14	8.86	5.90
	6	4.03	2.68	6.67	4.44	4.65	3.10	7.76	5.16	6.24	4.15	10.0	6.67
	7	4.24	2.82	6.94	4.61	4.91	3.27	8.09	5.38	6.90	4.59	10.7	7.10
	8	4.50	2.99	7.22	4.80	5.22	3.48	8.44	5.62	7.75	5.16	11.4	7.59
	9	4.81	3.20	7.53	5.01	5.60	3.73	8.83	5.88	9.02	6.00	12.3	8.15
	10	5.24	3.48	7.87	5.23	6.06	4.03	9.26	6.16	10.7	7.13	13.2	8.80
	11	5.76	3.83	8.24	5.48	6.70	4.46	9.74	6.48	12.9	8.60	14.4	9.56
	12	6.38	4.25	8.64	5.75	7.47	4.97	10.3	6.83	15.4	10.2	16.5	11.0
	13	7.14	4.75	9.09	6.05	8.41	5.60	10.8	7.21	18.1	12.0	18.7	12.4
	14	8.07	5.37	9.58	6.37	9.56	6.36	11.5	7.65	20.9	13.9	20.9	13.9
	15	9.21	6.13	10.1	6.74	11.0	7.30	12.3	8.20	24.0	16.0	23.2	15.4
	16	10.5	6.97	11.0	7.29	12.5	8.31	13.7	9.12	27.3	18.2	25.5	17.0
	17	11.8	7.87	12.0	8.01	14.1	9.38	15.1	10.0	30.9	20.5	27.8	18.5
	18	13.3	8.82	13.1	8.73	15.8	10.5	16.5	11.0	34.6	23.0	30.1	20.0
	19	14.8	9.83	14.2	9.47	17.6	11.7	18.0	12.0				
	20	16.4	10.9	15.3	10.2	19.5	13.0	19.4	12.9				
	21	18.0	12.0	16.5	11.0	21.5	14.3	20.9	13.9				
	22	19.8	13.2	17.6	11.7	23.6	15.7	22.4	14.9				
	23	21.6	14.4	18.7	12.4	25.8	17.2	23.9	15.9				
	24	23.6	15.7	19.8	13.2	28.1	18.7	25.4	16.9				
	25	25.6	17.0	21.0	13.9								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		33.6		22.4		39.6		26.4		64.3		42.8	
$t_y \times 10^3$, (kips)$^{-1}$		3.34		2.22		3.77		2.51		4.34		2.89	
$t_r \times 10^3$, (kips)$^{-1}$		4.10		2.74		4.64		3.09		5.33		3.56	
r_x/r_y		3.81				3.85				5.23			
r_y, in.		1.53				1.49				1.08			

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W14

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W14× 22[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	5.80	3.86	10.7	7.14
	6	7.81	5.20	12.4	8.24
	7	8.70	5.79	13.3	8.83
	8	9.84	6.55	14.3	9.51
	9	11.3	7.54	15.5	10.3
	10	13.6	9.08	16.9	11.2
	11	16.5	11.0	19.2	12.8
	12	19.7	13.1	22.3	14.8
	13	23.1	15.3	25.4	16.9
	14	26.8	17.8	28.5	19.0
	15	30.7	20.4	31.8	21.2
	16	34.9	23.2	35.1	23.3
	17	39.4	26.2	38.4	25.6

Other Constants and Properties		
$b_y \times 10^3$, (kip-ft)$^{-1}$	81.2	54.0
$t_y \times 10^3$, (kips)$^{-1}$	5.15	3.42
$t_r \times 10^3$, (kips)$^{-1}$	6.32	4.21
r_x/r_y	5.33	
r_y, in.	1.04	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		336[h]				305[h]				279[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.338	0.225	0.591	0.393	0.373	0.248	0.663	0.441	0.408	0.271	0.741	0.493
	6	0.349	0.232	0.591	0.393	0.385	0.256	0.663	0.441	0.422	0.280	0.741	0.493
	7	0.352	0.235	0.591	0.393	0.390	0.259	0.663	0.441	0.427	0.284	0.741	0.493
	8	0.357	0.238	0.591	0.393	0.395	0.263	0.663	0.441	0.433	0.288	0.741	0.493
	9	0.363	0.241	0.591	0.393	0.401	0.267	0.663	0.441	0.439	0.292	0.741	0.493
	10	0.369	0.245	0.591	0.393	0.408	0.272	0.663	0.441	0.447	0.298	0.741	0.493
	11	0.375	0.250	0.591	0.393	0.416	0.277	0.663	0.441	0.456	0.303	0.741	0.493
	12	0.383	0.255	0.591	0.393	0.425	0.283	0.663	0.441	0.466	0.310	0.741	0.493
	13	0.391	0.260	0.592	0.394	0.435	0.289	0.666	0.443	0.477	0.317	0.744	0.495
	14	0.401	0.267	0.594	0.395	0.445	0.296	0.668	0.444	0.489	0.325	0.746	0.497
	15	0.411	0.274	0.596	0.397	0.457	0.304	0.670	0.446	0.502	0.334	0.749	0.499
	16	0.422	0.281	0.598	0.398	0.470	0.313	0.673	0.448	0.516	0.344	0.752	0.500
	17	0.435	0.289	0.600	0.399	0.484	0.322	0.675	0.449	0.532	0.354	0.755	0.502
	18	0.448	0.298	0.602	0.400	0.500	0.332	0.677	0.451	0.550	0.366	0.758	0.504
	19	0.463	0.308	0.604	0.402	0.516	0.344	0.680	0.452	0.569	0.378	0.761	0.506
	20	0.479	0.319	0.606	0.403	0.535	0.356	0.682	0.454	0.590	0.392	0.764	0.508
	22	0.516	0.343	0.610	0.406	0.577	0.384	0.687	0.457	0.637	0.424	0.770	0.512
	24	0.559	0.372	0.614	0.408	0.627	0.417	0.692	0.461	0.693	0.461	0.776	0.516
	26	0.610	0.406	0.618	0.411	0.686	0.456	0.697	0.464	0.760	0.506	0.782	0.520
	28	0.670	0.446	0.622	0.414	0.756	0.503	0.702	0.467	0.840	0.559	0.788	0.524
	30	0.742	0.494	0.626	0.417	0.839	0.558	0.708	0.471	0.935	0.622	0.795	0.529
	32	0.827	0.550	0.630	0.419	0.938	0.624	0.713	0.474	1.05	0.698	0.801	0.533
	34	0.930	0.619	0.635	0.422	1.06	0.704	0.718	0.478	1.18	0.788	0.808	0.537
	36	1.04	0.694	0.639	0.425	1.19	0.789	0.724	0.481	1.33	0.883	0.814	0.542
	38	1.16	0.773	0.644	0.428	1.32	0.879	0.729	0.485	1.48	0.984	0.821	0.546
	40	1.29	0.856	0.648	0.431	1.46	0.974	0.735	0.489	1.64	1.09	0.828	0.551
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.30		0.865		1.46		0.971		1.62		1.08	
$t_y \times 10^3$, (kips)$^{-1}$		0.338		0.225		0.373		0.248		0.408		0.271	
$t_r \times 10^3$, (kips)$^{-1}$		0.415		0.277		0.458		0.306		0.501		0.334	
r_x/r_y		1.85				1.84				1.82			
r_y, in.		3.47				3.42				3.38			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		252[h]				230[h]				210			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.451	0.300	0.832	0.554	0.493	0.328	0.923	0.614	0.540	0.360	1.02	0.681
	6	0.466	0.310	0.832	0.554	0.511	0.340	0.923	0.614	0.560	0.372	1.02	0.681
	7	0.472	0.314	0.832	0.554	0.517	0.344	0.923	0.614	0.567	0.377	1.02	0.681
	8	0.479	0.319	0.832	0.554	0.525	0.349	0.923	0.614	0.575	0.383	1.02	0.681
	9	0.487	0.324	0.832	0.554	0.533	0.355	0.923	0.614	0.585	0.389	1.02	0.681
	10	0.495	0.330	0.832	0.554	0.543	0.361	0.923	0.614	0.596	0.397	1.02	0.681
	11	0.505	0.336	0.832	0.554	0.554	0.369	0.923	0.614	0.608	0.405	1.02	0.681
	12	0.516	0.344	0.833	0.554	0.567	0.377	0.924	0.615	0.622	0.414	1.03	0.683
	13	0.529	0.352	0.837	0.557	0.580	0.386	0.928	0.618	0.638	0.424	1.03	0.686
	14	0.542	0.361	0.840	0.559	0.596	0.396	0.933	0.621	0.655	0.436	1.04	0.689
	15	0.557	0.371	0.844	0.561	0.612	0.407	0.937	0.623	0.674	0.448	1.04	0.693
	16	0.574	0.382	0.847	0.564	0.631	0.420	0.941	0.626	0.694	0.462	1.05	0.696
	17	0.592	0.394	0.851	0.566	0.651	0.433	0.946	0.629	0.717	0.477	1.05	0.700
	18	0.612	0.407	0.854	0.568	0.674	0.448	0.950	0.632	0.742	0.494	1.06	0.703
	19	0.634	0.422	0.858	0.571	0.698	0.464	0.954	0.635	0.769	0.512	1.06	0.707
	20	0.657	0.437	0.862	0.573	0.725	0.482	0.959	0.638	0.799	0.532	1.07	0.710
	22	0.712	0.474	0.869	0.578	0.786	0.523	0.968	0.644	0.868	0.577	1.08	0.718
	24	0.776	0.516	0.877	0.583	0.858	0.571	0.977	0.650	0.950	0.632	1.09	0.725
	26	0.853	0.568	0.884	0.588	0.945	0.629	0.986	0.656	1.05	0.697	1.10	0.733
	28	0.945	0.629	0.892	0.594	1.05	0.697	0.996	0.663	1.16	0.775	1.11	0.741
	30	1.05	0.701	0.900	0.599	1.17	0.780	1.01	0.669	1.30	0.868	1.13	0.749
	32	1.19	0.790	0.908	0.604	1.32	0.880	1.02	0.676	1.48	0.982	1.14	0.757
	34	1.34	0.891	0.916	0.610	1.49	0.993	1.03	0.682	1.67	1.11	1.15	0.765
	36	1.50	0.999	0.925	0.615	1.67	1.11	1.04	0.689	1.87	1.24	1.16	0.774
	38	1.67	1.11	0.933	0.621	1.87	1.24	1.05	0.696	2.08	1.38	1.18	0.782
	40	1.85	1.23	0.942	0.627	2.07	1.37	1.06	0.704	2.31	1.53	1.19	0.791
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.82		1.21		2.01		1.34		2.24		1.49	
$t_y \times 10^3$, (kips)$^{-1}$		0.451		0.300		0.493		0.328		0.540		0.360	
$t_r \times 10^3$, (kips)$^{-1}$		0.554		0.369		0.606		0.404		0.664		0.443	
r_x/r_y		1.81				1.80				1.80			
r_y, in.		3.34				3.31				3.28			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1d.

W12

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W12×											
		190				170				152			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.596	0.397	1.15	0.762	0.668	0.444	1.30	0.862	0.747	0.497	1.47	0.975
	6	0.618	0.411	1.15	0.762	0.693	0.461	1.30	0.862	0.776	0.516	1.47	0.975
	7	0.626	0.417	1.15	0.762	0.702	0.467	1.30	0.862	0.786	0.523	1.47	0.975
	8	0.636	0.423	1.15	0.762	0.713	0.474	1.30	0.862	0.798	0.531	1.47	0.975
	9	0.647	0.430	1.15	0.762	0.725	0.483	1.30	0.862	0.813	0.541	1.47	0.975
	10	0.659	0.438	1.15	0.762	0.739	0.492	1.30	0.862	0.829	0.551	1.47	0.975
	11	0.673	0.448	1.15	0.762	0.755	0.503	1.30	0.862	0.847	0.563	1.47	0.975
	12	0.688	0.458	1.15	0.764	0.773	0.514	1.30	0.865	0.867	0.577	1.47	0.980
	13	0.706	0.470	1.16	0.768	0.793	0.528	1.31	0.870	0.890	0.592	1.48	0.987
	14	0.725	0.482	1.16	0.773	0.815	0.542	1.32	0.876	0.915	0.609	1.49	0.994
	15	0.746	0.497	1.17	0.777	0.839	0.559	1.32	0.881	0.943	0.627	1.50	1.00
	16	0.770	0.512	1.17	0.781	0.866	0.576	1.33	0.887	0.974	0.648	1.51	1.01
	17	0.796	0.529	1.18	0.786	0.896	0.596	1.34	0.892	1.01	0.670	1.52	1.01
	18	0.824	0.548	1.19	0.790	0.928	0.618	1.35	0.898	1.04	0.695	1.54	1.02
	19	0.855	0.569	1.19	0.794	0.964	0.641	1.36	0.903	1.09	0.722	1.55	1.03
	20	0.889	0.591	1.20	0.799	1.00	0.667	1.37	0.909	1.13	0.752	1.56	1.04
	22	0.966	0.643	1.21	0.808	1.09	0.727	1.38	0.921	1.23	0.820	1.58	1.05
	24	1.06	0.705	1.23	0.817	1.20	0.798	1.40	0.932	1.36	0.902	1.60	1.07
	26	1.17	0.778	1.24	0.827	1.33	0.883	1.42	0.945	1.50	1.00	1.63	1.08
	28	1.30	0.867	1.26	0.837	1.48	0.985	1.44	0.957	1.68	1.12	1.65	1.10
	30	1.46	0.973	1.27	0.847	1.67	1.11	1.46	0.970	1.90	1.26	1.68	1.12
	32	1.66	1.10	1.29	0.857	1.89	1.26	1.48	0.983	2.16	1.43	1.70	1.13
	34	1.87	1.25	1.30	0.867	2.14	1.42	1.50	0.997	2.43	1.62	1.73	1.15
	36	2.10	1.40	1.32	0.878	2.39	1.59	1.52	1.01	2.73	1.82	1.76	1.17
	38	2.34	1.56	1.34	0.889	2.67	1.78	1.54	1.03	3.04	2.02	1.79	1.19
	40	2.59	1.72	1.35	0.900	2.96	1.97	1.56	1.04	3.37	2.24	1.82	1.21

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	2.49	1.66	2.83	1.88	3.21	2.14
$t_y \times 10^3$, (kips)$^{-1}$	0.596	0.397	0.668	0.444	0.747	0.497
$t_r \times 10^3$, (kips)$^{-1}$	0.733	0.488	0.821	0.547	0.918	0.612
r_x/r_y	1.79		1.78		1.77	
r_y, in.	3.25		3.22		3.19	

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		136				120				106			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.837	0.557	1.66	1.11	0.949	0.631	1.92	1.27	1.07	0.712	2.17	1.45
	6	0.869	0.578	1.66	1.11	0.986	0.656	1.92	1.27	1.11	0.741	2.17	1.45
	7	0.881	0.586	1.66	1.11	1.00	0.665	1.92	1.27	1.13	0.751	2.17	1.45
	8	0.896	0.596	1.66	1.11	1.02	0.676	1.92	1.27	1.15	0.764	2.17	1.45
	9	0.912	0.607	1.66	1.11	1.04	0.689	1.92	1.27	1.17	0.778	2.17	1.45
	10	0.930	0.619	1.66	1.11	1.06	0.703	1.92	1.27	1.19	0.794	2.17	1.45
	11	0.951	0.633	1.66	1.11	1.08	0.719	1.92	1.27	1.22	0.813	2.17	1.45
	12	0.974	0.648	1.68	1.11	1.11	0.737	1.93	1.28	1.25	0.833	2.19	1.46
	13	1.00	0.666	1.69	1.12	1.14	0.757	1.95	1.30	1.29	0.856	2.22	1.47
	14	1.03	0.685	1.70	1.13	1.17	0.779	1.96	1.31	1.33	0.882	2.24	1.49
	15	1.06	0.706	1.71	1.14	1.21	0.804	1.98	1.32	1.37	0.910	2.26	1.50
	16	1.10	0.730	1.73	1.15	1.25	0.831	2.00	1.33	1.41	0.941	2.28	1.52
	17	1.14	0.755	1.74	1.16	1.29	0.861	2.02	1.34	1.47	0.976	2.31	1.53
	18	1.18	0.784	1.76	1.17	1.34	0.894	2.04	1.35	1.52	1.01	2.33	1.55
	19	1.22	0.815	1.77	1.18	1.40	0.931	2.05	1.37	1.59	1.06	2.35	1.57
	20	1.28	0.849	1.78	1.19	1.46	0.970	2.07	1.38	1.65	1.10	2.38	1.58
	22	1.39	0.928	1.81	1.21	1.60	1.06	2.11	1.41	1.81	1.21	2.43	1.62
	24	1.54	1.02	1.84	1.23	1.76	1.17	2.15	1.43	2.00	1.33	2.48	1.65
	26	1.71	1.14	1.87	1.25	1.96	1.31	2.19	1.46	2.23	1.49	2.54	1.69
	28	1.91	1.27	1.91	1.27	2.20	1.47	2.24	1.49	2.51	1.67	2.60	1.73
	30	2.16	1.44	1.94	1.29	2.50	1.66	2.28	1.52	2.86	1.90	2.66	1.77
	32	2.46	1.64	1.97	1.31	2.84	1.89	2.33	1.55	3.25	2.16	2.72	1.81
	34	2.78	1.85	2.01	1.34	3.21	2.14	2.38	1.58	3.67	2.44	2.79	1.86
	36	3.12	2.07	2.05	1.36	3.60	2.40	2.43	1.62	4.11	2.74	2.86	1.90
	38	3.47	2.31	2.09	1.39	4.01	2.67	2.48	1.65	4.58	3.05	2.93	1.95
	40	3.85	2.56	2.13	1.41	4.44	2.96	2.54	1.69	5.08	3.38	3.01	2.00

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	3.64	2.42	4.17	2.78	4.74	3.16
$t_y \times 10^3$, (kips)$^{-1}$	0.837	0.557	0.949	0.631	1.07	0.712
$t_r \times 10^3$, (kips)$^{-1}$	1.03	0.685	1.17	0.777	1.31	0.877
r_x/r_y	1.77		1.76		1.76	
r_y, in.	3.16		3.13		3.11	

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		96				87				79			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.18	0.788	2.42	1.61	1.30	0.868	2.70	1.80	1.44	0.958	2.99	1.99
	6	1.23	0.820	2.42	1.61	1.36	0.904	2.70	1.80	1.50	0.998	2.99	1.99
	7	1.25	0.832	2.42	1.61	1.38	0.917	2.70	1.80	1.52	1.01	2.99	1.99
	8	1.27	0.846	2.42	1.61	1.40	0.932	2.70	1.80	1.55	1.03	2.99	1.99
	9	1.30	0.862	2.42	1.61	1.43	0.950	2.70	1.80	1.58	1.05	2.99	1.99
	10	1.32	0.880	2.42	1.61	1.46	0.971	2.70	1.80	1.61	1.07	2.99	1.99
	11	1.35	0.901	2.43	1.61	1.49	0.994	2.70	1.80	1.65	1.10	3.00	2.00
	12	1.39	0.924	2.45	1.63	1.53	1.02	2.74	1.82	1.69	1.13	3.04	2.02
	13	1.43	0.949	2.48	1.65	1.58	1.05	2.77	1.84	1.74	1.16	3.08	2.05
	14	1.47	0.978	2.50	1.67	1.62	1.08	2.80	1.86	1.80	1.20	3.12	2.08
	15	1.52	1.01	2.53	1.68	1.68	1.12	2.84	1.89	1.86	1.24	3.16	2.11
	16	1.57	1.05	2.56	1.70	1.74	1.16	2.87	1.91	1.92	1.28	3.21	2.13
	17	1.63	1.08	2.59	1.72	1.80	1.20	2.91	1.93	2.00	1.33	3.25	2.16
	18	1.69	1.13	2.62	1.74	1.87	1.25	2.94	1.96	2.08	1.38	3.30	2.19
	19	1.76	1.17	2.65	1.76	1.95	1.30	2.98	1.98	2.17	1.44	3.34	2.22
	20	1.84	1.22	2.68	1.78	2.04	1.36	3.02	2.01	2.26	1.51	3.39	2.26
	22	2.02	1.34	2.74	1.83	2.24	1.49	3.10	2.06	2.49	1.66	3.49	2.32
	24	2.24	1.49	2.81	1.87	2.48	1.65	3.19	2.12	2.76	1.84	3.60	2.40
	26	2.50	1.66	2.88	1.92	2.78	1.85	3.28	2.18	3.09	2.06	3.71	2.47
	28	2.81	1.87	2.95	1.97	3.13	2.08	3.37	2.24	3.50	2.33	3.84	2.55
	30	3.20	2.13	3.03	2.02	3.57	2.38	3.47	2.31	4.00	2.66	3.96	2.64
	32	3.64	2.42	3.11	2.07	4.07	2.71	3.58	2.38	4.55	3.02	4.10	2.73
	34	4.11	2.74	3.20	2.13	4.59	3.05	3.69	2.46	5.13	3.41	4.25	2.83
	36	4.61	3.07	3.29	2.19	5.15	3.42	3.81	2.54	5.75	3.83	4.41	2.93
	38	5.14	3.42	3.39	2.26	5.73	3.81	3.94	2.62	6.41	4.26	4.58	3.05
	40	5.69	3.79	3.49	2.32	6.35	4.23	4.08	2.72	7.10	4.73	4.78	3.18

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	5.28	3.51	5.90	3.92	6.56	4.37
$t_y \times 10^3$, (kips)$^{-1}$	1.18	0.788	1.30	0.868	1.44	0.958
$t_r \times 10^3$, (kips)$^{-1}$	1.45	0.970	1.60	1.07	1.77	1.18
r_x/r_y	1.76		1.75		1.75	
r_y, in.	3.09		3.07		3.05	

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		72				65[f]				58			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.58	1.05	3.30	2.19	1.75	1.16	3.75	2.50	1.96	1.31	4.12	2.74
	6	1.65	1.10	3.30	2.19	1.82	1.21	3.75	2.50	2.09	1.39	4.12	2.74
	7	1.67	1.11	3.30	2.19	1.85	1.23	3.75	2.50	2.13	1.42	4.12	2.74
	8	1.70	1.13	3.30	2.19	1.88	1.25	3.75	2.50	2.19	1.45	4.12	2.74
	9	1.74	1.16	3.30	2.19	1.92	1.28	3.75	2.50	2.25	1.50	4.13	2.75
	10	1.77	1.18	3.30	2.19	1.96	1.31	3.75	2.50	2.32	1.54	4.21	2.80
	11	1.82	1.21	3.31	2.20	2.01	1.34	3.75	2.50	2.41	1.60	4.28	2.85
	12	1.87	1.24	3.36	2.23	2.06	1.37	3.75	2.50	2.50	1.66	4.36	2.90
	13	1.92	1.28	3.40	2.27	2.13	1.41	3.81	2.54	2.61	1.73	4.45	2.96
	14	1.98	1.32	3.45	2.30	2.19	1.46	3.87	2.58	2.73	1.81	4.53	3.02
	15	2.05	1.36	3.50	2.33	2.27	1.51	3.93	2.62	2.86	1.90	4.62	3.07
	16	2.12	1.41	3.56	2.37	2.35	1.56	4.00	2.66	3.01	2.01	4.71	3.14
	17	2.20	1.46	3.61	2.40	2.44	1.62	4.06	2.70	3.18	2.12	4.81	3.20
	18	2.29	1.52	3.67	2.44	2.54	1.69	4.13	2.75	3.38	2.25	4.91	3.27
	19	2.39	1.59	3.72	2.48	2.65	1.77	4.20	2.80	3.59	2.39	5.01	3.34
	20	2.50	1.66	3.78	2.52	2.77	1.85	4.27	2.84	3.83	2.55	5.12	3.41
	22	2.75	1.83	3.91	2.60	3.06	2.03	4.43	2.95	4.41	2.94	5.36	3.56
	24	3.05	2.03	4.04	2.69	3.40	2.26	4.59	3.06	5.15	3.43	5.61	3.74
	26	3.42	2.28	4.18	2.78	3.82	2.54	4.77	3.17	6.05	4.02	5.90	3.92
	28	3.87	2.57	4.33	2.88	4.32	2.88	4.96	3.30	7.01	4.67	6.21	4.13
	30	4.42	2.94	4.49	2.99	4.95	3.29	5.17	3.44	8.05	5.36	6.57	4.37
	32	5.03	3.35	4.67	3.10	5.63	3.75	5.39	3.59	9.16	6.09	7.12	4.74
	34	5.68	3.78	4.86	3.23	6.36	4.23	5.64	3.75	10.3	6.88	7.66	5.10
	36	6.37	4.24	5.06	3.37	7.13	4.74	5.97	3.98	11.6	7.71	8.21	5.46
	38	7.09	4.72	5.32	3.54	7.94	5.28	6.39	4.25	12.9	8.59	8.75	5.82
	40	7.86	5.23	5.66	3.76	8.80	5.85	6.81	4.53	14.3	9.52	9.29	6.18

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	7.24	4.82	8.31	5.53	11.0	7.29
$t_y \times 10^3$, (kips)$^{-1}$	1.58	1.05	1.75	1.16	1.96	1.31
$t_r \times 10^3$, (kips)$^{-1}$	1.94	1.30	2.15	1.43	2.41	1.61
r_x/r_y	1.75		1.75		2.10	
r_y, in.	3.04		3.02		2.51	

[f] Shape does not meet compact limit for flexure for F_y = 50 ksi.

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		53				50				45			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.14	1.42	4.57	3.04	2.29	1.52	4.96	3.30	2.55	1.70	5.55	3.69
	6	2.28	1.52	4.57	3.04	2.52	1.68	4.96	3.30	2.82	1.87	5.55	3.69
	7	2.33	1.55	4.57	3.04	2.62	1.74	4.96	3.30	2.92	1.94	5.56	3.70
	8	2.39	1.59	4.57	3.04	2.73	1.81	5.08	3.38	3.04	2.03	5.70	3.79
	9	2.46	1.64	4.59	3.06	2.86	1.90	5.19	3.46	3.19	2.12	5.84	3.89
	10	2.54	1.69	4.68	3.12	3.01	2.00	5.32	3.54	3.36	2.24	6.00	3.99
	11	2.63	1.75	4.77	3.18	3.19	2.12	5.45	3.62	3.56	2.37	6.15	4.09
	12	2.74	1.82	4.87	3.24	3.39	2.26	5.58	3.72	3.80	2.53	6.32	4.21
	13	2.86	1.90	4.97	3.31	3.64	2.42	5.73	3.81	4.07	2.71	6.50	4.32
	14	2.99	1.99	5.07	3.38	3.91	2.60	5.88	3.91	4.39	2.92	6.69	4.45
	15	3.15	2.09	5.18	3.45	4.24	2.82	6.04	4.02	4.75	3.16	6.88	4.58
	16	3.32	2.21	5.29	3.52	4.61	3.07	6.20	4.13	5.18	3.45	7.09	4.72
	17	3.51	2.34	5.41	3.60	5.05	3.36	6.38	4.25	5.68	3.78	7.32	4.87
	18	3.73	2.48	5.53	3.68	5.56	3.70	6.57	4.37	6.25	4.16	7.56	5.03
	19	3.97	2.64	5.66	3.77	6.17	4.10	6.77	4.50	6.94	4.62	7.81	5.20
	20	4.25	2.83	5.80	3.86	6.83	4.55	6.98	4.64	7.69	5.12	8.08	5.38
	22	4.90	3.26	6.09	4.05	8.27	5.50	7.45	4.95	9.31	6.19	8.69	5.78
	24	5.75	3.83	6.41	4.26	9.84	6.55	8.01	5.33	11.1	7.37	9.66	6.43
	26	6.75	4.49	6.77	4.50	11.5	7.68	8.84	5.88	13.0	8.65	10.7	7.11
	28	7.83	5.21	7.16	4.77	13.4	8.91	9.67	6.44	15.1	10.0	11.7	7.80
	30	8.99	5.98	7.81	5.20	15.4	10.2	10.5	6.99	17.3	11.5	12.8	8.48
	32	10.2	6.80	8.48	5.64	17.5	11.6	11.3	7.53	19.7	13.1	13.8	9.16
	34	11.5	7.68	9.15	6.09								
	36	12.9	8.61	9.81	6.53								
	38	14.4	9.59	10.5	6.97								
	40	16.0	10.6	11.1	7.41								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		12.2		8.15		16.7		11.1		18.8		12.5	
$t_y \times 10^3$, (kips)$^{-1}$		2.14		1.42		2.29		1.52		2.55		1.70	
$t_r \times 10^3$, (kips)$^{-1}$		2.63		1.75		2.81		1.87		3.13		2.09	
r_x/r_y		2.11				2.64				2.64			
r_y, in.		2.48				1.96				1.95			

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		40				35[c]				30[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.85	1.90	6.25	4.16	3.25	2.16	6.96	4.63	3.93	2.62	8.27	5.50
	6	3.16	2.10	6.25	4.16	3.80	2.53	7.09	4.72	4.55	3.03	8.46	5.63
	7	3.27	2.18	6.27	4.17	4.03	2.68	7.34	4.89	4.79	3.19	8.79	5.85
	8	3.41	2.27	6.44	4.29	4.31	2.87	7.61	5.07	5.09	3.39	9.14	6.08
	9	3.58	2.38	6.62	4.40	4.65	3.09	7.90	5.26	5.50	3.66	9.53	6.34
	10	3.78	2.51	6.80	4.53	5.05	3.36	8.22	5.47	5.99	3.99	9.94	6.62
	11	4.00	2.66	7.00	4.66	5.55	3.69	8.56	5.69	6.60	4.39	10.4	6.92
	12	4.27	2.84	7.21	4.79	6.15	4.09	8.93	5.94	7.32	4.87	10.9	7.25
	13	4.58	3.05	7.43	4.94	6.87	4.57	9.33	6.21	8.21	5.46	11.5	7.62
	14	4.94	3.29	7.66	5.10	7.74	5.15	9.77	6.50	9.28	6.18	12.1	8.02
	15	5.36	3.56	7.91	5.26	8.82	5.87	10.3	6.82	10.6	7.06	12.7	8.48
	16	5.84	3.89	8.18	5.44	10.0	6.68	10.8	7.18	12.1	8.04	13.7	9.13
	17	6.41	4.26	8.46	5.63	11.3	7.54	11.5	7.66	13.6	9.07	15.0	10.0
	18	7.07	4.70	8.77	5.83	12.7	8.45	12.5	8.30	15.3	10.2	16.4	10.9
	19	7.85	5.23	9.10	6.05	14.2	9.42	13.4	8.94	17.0	11.3	17.7	11.8
	20	8.70	5.79	9.45	6.29	15.7	10.4	14.4	9.59	18.9	12.6	19.0	12.7
	22	10.5	7.01	10.5	6.96	19.0	12.6	16.3	10.9	22.8	15.2	21.7	14.5
	24	12.5	8.34	11.8	7.83	22.6	15.0	18.3	12.2	27.2	18.1	24.4	16.3
	26	14.7	9.79	13.1	8.69								
	28	17.1	11.3	14.4	9.56								
	30	19.6	13.0	15.7	10.4								
	32	22.3	14.8	16.9	11.3								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	21.2	14.1	31.0	20.6	37.3	24.8
$t_y \times 10^3$, (kips)$^{-1}$	2.85	1.90	3.24	2.16	3.80	2.53
$t_r \times 10^3$, (kips)$^{-1}$	3.51	2.34	3.98	2.66	4.67	3.11
r_x/r_y	2.64		3.41		3.43	
r_y, in.	1.94		1.54		1.52	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		26[c]				22[c]				19[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.64	3.09	9.58	6.37	5.40	3.59	12.2	8.09	6.50	4.33	14.4	9.60
	1	4.66	3.10	9.58	6.37	5.47	3.64	12.2	8.09	6.59	4.38	14.4	9.60
	2	4.72	3.14	9.58	6.37	5.67	3.78	12.2	8.09	6.85	4.56	14.4	9.60
	3	4.82	3.21	9.58	6.37	6.04	4.02	12.2	8.09	7.31	4.87	14.5	9.66
	4	4.96	3.30	9.58	6.37	6.59	4.38	13.0	8.65	8.02	5.33	15.6	10.4
	5	5.15	3.42	9.58	6.37	7.43	4.95	14.0	9.28	9.02	6.00	16.9	11.2
	6	5.38	3.58	9.83	6.54	8.73	5.81	15.1	10.0	10.5	6.99	18.4	12.2
	7	5.68	3.78	10.2	6.81	10.6	7.03	16.4	10.9	12.9	8.56	20.2	13.4
	8	6.04	4.02	10.7	7.11	13.2	8.75	17.9	11.9	16.3	10.8	22.3	14.9
	9	6.47	4.31	11.2	7.43	16.7	11.1	19.8	13.1	20.6	13.7	25.7	17.1
	10	7.00	4.66	11.7	7.79	20.6	13.7	23.0	15.3	25.5	16.9	30.4	20.2
	11	7.63	5.08	12.3	8.17	24.9	16.6	26.5	17.6	30.8	20.5	35.2	23.4
	12	8.49	5.65	12.9	8.60	29.6	19.7	30.0	20.0	36.7	24.4	40.1	26.7
	13	9.53	6.34	13.6	9.08	34.7	23.1	33.5	22.3	43.0	28.6	45.1	30.0
	14	10.8	7.18	14.4	9.61	40.3	26.8	37.1	24.7				
	15	12.4	8.22	15.4	10.3								
	16	14.1	9.36	17.1	11.4								
	17	15.9	10.6	18.8	12.5								
	18	17.8	11.8	20.6	13.7								
	19	19.8	13.2	22.3	14.9								
	20	22.0	14.6	24.1	16.0								
	21	24.2	16.1	25.9	17.2								
	22	26.6	17.7	27.7	18.4								
	23	29.1	19.3	29.5	19.6								
	24	31.6	21.0	31.3	20.8								
	25	34.3	22.8	33.1	22.0								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	43.6	29.0	97.3	64.8	120	79.5
$t_y \times 10^3$, (kips)$^{-1}$	4.37	2.90	5.15	3.43	6.00	3.99
$t_r \times 10^3$, (kips)$^{-1}$	5.36	3.58	6.33	4.22	7.37	4.91
r_x/r_y	3.42		5.79		5.86	
r_y, in.	1.51		0.848		0.822	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W12

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×							
		16[c]				14[c], [v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	7.95	5.29	17.7	11.8	9.35	6.22	20.5	13.6
	1	8.06	5.37	17.7	11.8	9.49	6.31	20.5	13.6
	2	8.42	5.60	17.7	11.8	9.93	6.61	20.5	13.6
	3	9.05	6.02	18.1	12.0	10.7	7.13	21.0	14.0
	4	10.0	6.67	19.6	13.1	11.9	7.93	22.9	15.2
	5	11.4	7.59	21.4	14.3	13.7	9.08	25.1	16.7
	6	13.4	8.91	23.6	15.7	16.1	10.7	27.8	18.5
	7	16.8	11.2	26.3	17.5	19.9	13.3	31.2	20.7
	8	21.8	14.5	29.6	19.7	26.0	17.3	36.4	24.2
	9	27.6	18.3	36.1	24.0	32.9	21.9	44.6	29.7
	10	34.0	22.6	42.9	28.5	40.6	27.0	53.3	35.5
	11	41.2	27.4	50.0	33.3	49.1	32.7	62.4	41.5
	12	49.0	32.6	57.2	38.1	58.5	38.9	71.8	47.8

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	158	105	188	125
$t_y \times 10^3$, (kips)$^{-1}$	7.09	4.72	8.03	5.34
$t_r \times 10^3$, (kips)$^{-1}$	8.71	5.81	9.86	6.57
r_x/r_y	6.04		6.14	
r_y, in.	0.773		0.753	

[c] Shape is slender for compression for F_y = 50 ksi.

[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W10

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		112				100				88			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.02	0.675	2.42	1.61	1.14	0.758	2.74	1.82	1.28	0.855	3.15	2.10
	6	1.07	0.712	2.42	1.61	1.20	0.800	2.74	1.82	1.36	0.903	3.15	2.10
	7	1.09	0.726	2.42	1.61	1.23	0.816	2.74	1.82	1.38	0.921	3.15	2.10
	8	1.12	0.742	2.42	1.61	1.25	0.835	2.74	1.82	1.42	0.942	3.15	2.10
	9	1.14	0.761	2.42	1.61	1.29	0.856	2.74	1.82	1.45	0.967	3.15	2.10
	10	1.18	0.782	2.43	1.62	1.32	0.881	2.75	1.83	1.50	0.995	3.17	2.11
	11	1.21	0.807	2.45	1.63	1.37	0.909	2.78	1.85	1.54	1.03	3.20	2.13
	12	1.25	0.834	2.47	1.64	1.41	0.941	2.80	1.86	1.60	1.06	3.23	2.15
	13	1.30	0.865	2.49	1.66	1.47	0.977	2.82	1.88	1.66	1.11	3.27	2.17
	14	1.35	0.900	2.51	1.67	1.53	1.02	2.85	1.90	1.73	1.15	3.30	2.19
	15	1.41	0.939	2.53	1.68	1.60	1.06	2.87	1.91	1.81	1.20	3.33	2.22
	16	1.48	0.983	2.55	1.69	1.67	1.11	2.90	1.93	1.90	1.26	3.36	2.24
	17	1.55	1.03	2.56	1.71	1.76	1.17	2.92	1.94	1.99	1.33	3.40	2.26
	18	1.63	1.09	2.59	1.72	1.85	1.23	2.95	1.96	2.10	1.40	3.43	2.28
	19	1.72	1.15	2.61	1.73	1.96	1.30	2.98	1.98	2.23	1.48	3.47	2.31
	20	1.82	1.21	2.63	1.75	2.08	1.38	3.00	2.00	2.36	1.57	3.50	2.33
	22	2.06	1.37	2.67	1.78	2.36	1.57	3.06	2.03	2.68	1.79	3.58	2.38
	24	2.36	1.57	2.71	1.80	2.70	1.80	3.11	2.07	3.09	2.05	3.65	2.43
	26	2.74	1.82	2.76	1.83	3.15	2.09	3.17	2.11	3.60	2.40	3.73	2.48
	28	3.18	2.11	2.80	1.87	3.65	2.43	3.23	2.15	4.18	2.78	3.82	2.54
	30	3.65	2.43	2.85	1.90	4.19	2.79	3.30	2.19	4.79	3.19	3.90	2.60
	32	4.15	2.76	2.90	1.93	4.77	3.17	3.36	2.24	5.46	3.63	4.00	2.66
	34	4.69	3.12	2.95	1.97	5.38	3.58	3.43	2.28	6.16	4.10	4.09	2.72
	36	5.25	3.50	3.01	2.00	6.03	4.01	3.50	2.33	6.90	4.59	4.19	2.79
	38	5.85	3.90	3.06	2.04	6.72	4.47	3.58	2.38	7.69	5.12	4.30	2.86
	40	6.49	4.32	3.12	2.08	7.45	4.96	3.66	2.43	8.52	5.67	4.41	2.94

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	5.15	3.43	5.84	3.89	6.71	4.46
$t_y \times 10^3$, (kips)$^{-1}$	1.02	0.675	1.14	0.758	1.28	0.855
$t_r \times 10^3$, (kips)$^{-1}$	1.25	0.831	1.40	0.933	1.58	1.05
r_x/r_y	1.74		1.74		1.73	
r_y, in.	2.68		2.65		2.63	

W10

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W10×											
		77				68				60			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.47	0.979	3.65	2.43	1.68	1.12	4.18	2.78	1.89	1.26	4.78	3.18
	6	1.56	1.04	3.65	2.43	1.78	1.18	4.18	2.78	2.00	1.33	4.78	3.18
	7	1.59	1.06	3.65	2.43	1.81	1.21	4.18	2.78	2.04	1.36	4.78	3.18
	8	1.63	1.08	3.65	2.43	1.86	1.23	4.18	2.78	2.09	1.39	4.78	3.18
	9	1.67	1.11	3.65	2.43	1.91	1.27	4.18	2.78	2.15	1.43	4.78	3.18
	10	1.72	1.14	3.68	2.45	1.96	1.31	4.22	2.81	2.21	1.47	4.84	3.22
	11	1.78	1.18	3.72	2.48	2.03	1.35	4.27	2.84	2.29	1.52	4.90	3.26
	12	1.84	1.23	3.76	2.50	2.10	1.40	4.32	2.88	2.37	1.58	4.97	3.31
	13	1.91	1.27	3.80	2.53	2.19	1.46	4.38	2.91	2.47	1.64	5.04	3.36
	14	2.00	1.33	3.85	2.56	2.28	1.52	4.44	2.95	2.58	1.72	5.12	3.41
	15	2.09	1.39	3.89	2.59	2.39	1.59	4.49	2.99	2.70	1.80	5.19	3.46
	16	2.19	1.46	3.94	2.62	2.51	1.67	4.55	3.03	2.84	1.89	5.27	3.51
	17	2.31	1.54	3.98	2.65	2.64	1.76	4.61	3.07	2.99	1.99	5.35	3.56
	18	2.44	1.62	4.03	2.68	2.79	1.86	4.67	3.11	3.16	2.10	5.43	3.62
	19	2.58	1.72	4.08	2.71	2.96	1.97	4.74	3.15	3.36	2.23	5.52	3.67
	20	2.74	1.83	4.13	2.74	3.14	2.09	4.80	3.20	3.57	2.38	5.61	3.73
	22	3.13	2.08	4.23	2.81	3.59	2.39	4.94	3.29	4.08	2.72	5.79	3.85
	24	3.61	2.40	4.33	2.88	4.15	2.76	5.08	3.38	4.73	3.14	5.99	3.99
	26	4.22	2.81	4.45	2.96	4.85	3.23	5.24	3.49	5.54	3.69	6.20	4.13
	28	4.89	3.26	4.56	3.04	5.63	3.74	5.40	3.59	6.42	4.27	6.43	4.28
	30	5.62	3.74	4.69	3.12	6.46	4.30	5.57	3.71	7.38	4.91	6.67	4.44
	32	6.39	4.25	4.82	3.21	7.35	4.89	5.76	3.83	8.39	5.58	6.94	4.61
	34	7.22	4.80	4.96	3.30	8.30	5.52	5.96	3.96	9.47	6.30	7.22	4.80
	36	8.09	5.38	5.11	3.40	9.30	6.19	6.17	4.10	10.6	7.07	7.53	5.01
	38	9.02	6.00	5.26	3.50	10.4	6.90	6.40	4.26	11.8	7.87	7.96	5.30
	40	9.99	6.65	5.43	3.61	11.5	7.64	6.64	4.42	13.1	8.72	8.43	5.61

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	7.76	5.16	8.88	5.91	10.2	6.77
$t_y \times 10^3$, (kips)$^{-1}$	1.47	0.979	1.68	1.12	1.89	1.26
$t_r \times 10^3$, (kips)$^{-1}$	1.81	1.20	2.06	1.37	2.32	1.55
r_x/r_y	1.73		1.71		1.71	
r_y, in.	2.60		2.59		2.57	

W10

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		54				49				45			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.11	1.41	5.35	3.56	2.32	1.54	5.90	3.92	2.51	1.67	6.49	4.32
	6	2.24	1.49	5.35	3.56	2.46	1.64	5.90	3.92	2.76	1.84	6.49	4.32
	7	2.29	1.52	5.35	3.56	2.51	1.67	5.90	3.92	2.85	1.90	6.49	4.32
	8	2.34	1.56	5.35	3.56	2.57	1.71	5.90	3.92	2.97	1.97	6.60	4.39
	9	2.41	1.60	5.35	3.56	2.65	1.76	5.90	3.93	3.10	2.06	6.73	4.48
	10	2.48	1.65	5.43	3.61	2.73	1.82	6.00	3.99	3.26	2.17	6.87	4.57
	11	2.57	1.71	5.51	3.67	2.83	1.88	6.10	4.06	3.44	2.29	7.00	4.66
	12	2.66	1.77	5.60	3.72	2.93	1.95	6.20	4.13	3.65	2.43	7.15	4.76
	13	2.77	1.85	5.69	3.78	3.06	2.03	6.31	4.20	3.90	2.60	7.30	4.86
	14	2.90	1.93	5.78	3.85	3.19	2.12	6.42	4.27	4.19	2.78	7.46	4.96
	15	3.03	2.02	5.88	3.91	3.35	2.23	6.54	4.35	4.51	3.00	7.63	5.07
	16	3.19	2.12	5.97	3.97	3.52	2.34	6.66	4.43	4.89	3.26	7.80	5.19
	17	3.36	2.24	6.08	4.04	3.72	2.47	6.78	4.51	5.33	3.55	7.98	5.31
	18	3.56	2.37	6.18	4.11	3.94	2.62	6.91	4.60	5.84	3.89	8.17	5.44
	19	3.78	2.51	6.29	4.19	4.18	2.78	7.04	4.69	6.44	4.28	8.37	5.57
	20	4.02	2.67	6.40	4.26	4.46	2.96	7.18	4.78	7.13	4.75	8.58	5.71
	22	4.60	3.06	6.64	4.42	5.11	3.40	7.48	4.98	8.63	5.74	9.03	6.01
	24	5.33	3.55	6.90	4.59	5.94	3.95	7.80	5.19	10.3	6.83	9.53	6.34
	26	6.25	4.16	7.18	4.78	6.97	4.64	8.15	5.42	12.1	8.02	10.1	6.71
	28	7.25	4.83	7.48	4.98	8.08	5.38	8.53	5.68	14.0	9.30	10.9	7.22
	30	8.33	5.54	7.81	5.20	9.28	6.17	8.95	5.96	16.0	10.7	11.7	7.82
	32	9.47	6.30	8.17	5.43	10.6	7.03	9.47	6.30	18.3	12.1	12.6	8.41
	34	10.7	7.12	8.60	5.72	11.9	7.93	10.2	6.77				
	36	12.0	7.98	9.19	6.11	13.4	8.89	10.9	7.24				
	38	13.4	8.89	9.77	6.50	14.9	9.91	11.6	7.71				
	40	14.8	9.85	10.4	6.89	16.5	11.0	12.3	8.18				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		11.4		7.57		12.6		8.38		17.6		11.7	
$t_y \times 10^3$, (kips)$^{-1}$		2.11		1.41		2.32		1.54		2.51		1.67	
$t_r \times 10^3$, (kips)$^{-1}$		2.60		1.73		2.85		1.90		3.08		2.06	
r_x/r_y		1.71				1.71				2.15			
r_y, in.		2.56				2.54				2.01			

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W10

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		39				33				30			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.90	1.93	7.61	5.06	3.44	2.29	9.18	6.11	3.78	2.51	9.73	6.48
	6	3.20	2.13	7.61	5.06	3.80	2.53	9.18	6.11	4.62	3.08	10.1	6.74
	7	3.31	2.20	7.61	5.07	3.95	2.62	9.22	6.13	4.97	3.31	10.5	6.99
	8	3.45	2.29	7.78	5.18	4.11	2.74	9.45	6.29	5.41	3.60	10.9	7.25
	9	3.61	2.40	7.96	5.29	4.31	2.87	9.70	6.45	5.95	3.96	11.3	7.53
	10	3.80	2.53	8.14	5.41	4.55	3.03	9.96	6.62	6.62	4.41	11.8	7.84
	11	4.02	2.67	8.33	5.54	4.83	3.21	10.2	6.81	7.45	4.96	12.3	8.17
	12	4.28	2.84	8.53	5.67	5.15	3.42	10.5	7.00	8.47	5.64	12.8	8.54
	13	4.57	3.04	8.74	5.81	5.52	3.67	10.8	7.20	9.76	6.49	13.4	8.93
	14	4.92	3.27	8.96	5.96	5.95	3.96	11.2	7.42	11.3	7.53	14.1	9.37
	15	5.31	3.54	9.19	6.12	6.45	4.29	11.5	7.65	13.0	8.64	14.8	9.85
	16	5.78	3.84	9.44	6.28	7.04	4.68	11.9	7.89	14.8	9.83	15.6	10.4
	17	6.31	4.20	9.70	6.45	7.72	5.14	12.3	8.15	16.7	11.1	16.8	11.2
	18	6.93	4.61	9.97	6.63	8.51	5.67	12.7	8.43	18.7	12.4	18.1	12.1
	19	7.67	5.10	10.3	6.82	9.46	6.30	13.1	8.73	20.8	13.9	19.4	12.9
	20	8.50	5.66	10.6	7.03	10.5	6.98	13.6	9.05	23.1	15.4	20.7	13.8
	22	10.3	6.84	11.2	7.47	12.7	8.44	14.8	9.82	27.9	18.6	23.2	15.4
	24	12.2	8.14	12.0	7.98	15.1	10.0	16.5	11.0				
	26	14.4	9.56	13.2	8.77	17.7	11.8	18.3	12.2				
	28	16.7	11.1	14.4	9.58	20.6	13.7	20.1	13.4				
	30	19.1	12.7	15.6	10.4	23.6	15.7	21.9	14.5				
	32	21.8	14.5	16.8	11.2	26.8	17.9	23.6	15.7				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	20.7	13.8	25.4	16.9	40.3	26.8
$t_y \times 10^3$, (kips)$^{-1}$	2.90	1.93	3.44	2.29	3.78	2.51
$t_r \times 10^3$, (kips)$^{-1}$	3.57	2.38	4.23	2.82	4.64	3.09
r_x/r_y	2.16		2.16		3.20	
r_y, in.	1.98		1.94		1.37	

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W10

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		26				22[c]				19			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.39	2.92	11.4	7.57	5.18	3.45	13.7	9.12	5.94	3.95	16.5	11.0
	1	4.41	2.94	11.4	7.57	5.21	3.46	13.7	9.12	6.03	4.01	16.5	11.0
	2	4.49	2.99	11.4	7.57	5.29	3.52	13.7	9.12	6.28	4.18	16.5	11.0
	3	4.62	3.07	11.4	7.57	5.43	3.61	13.7	9.12	6.73	4.48	16.5	11.0
	4	4.81	3.20	11.4	7.57	5.66	3.77	13.7	9.12	7.41	4.93	17.4	11.6
	5	5.06	3.37	11.5	7.63	5.97	3.97	13.9	9.23	8.39	5.58	18.6	12.4
	6	5.39	3.58	11.9	7.93	6.38	4.24	14.5	9.64	9.76	6.49	19.9	13.2
	7	5.80	3.86	12.4	8.25	6.89	4.58	15.1	10.1	11.7	7.77	21.4	14.3
	8	6.32	4.20	12.9	8.59	7.53	5.01	15.9	10.6	14.4	9.55	23.2	15.4
	9	6.96	4.63	13.5	8.97	8.33	5.55	16.7	11.1	18.1	12.0	25.3	16.8
	10	7.76	5.16	14.1	9.38	9.33	6.21	17.6	11.7	22.3	14.8	28.2	18.8
	11	8.74	5.81	14.8	9.84	10.6	7.04	18.5	12.3	27.0	18.0	32.3	21.5
	12	9.96	6.63	15.5	10.3	12.1	8.07	19.6	13.1	32.1	21.4	36.4	24.2
	13	11.5	7.65	16.4	10.9	14.1	9.38	20.9	13.9	37.7	25.1	40.5	26.9
	14	13.3	8.88	17.3	11.5	16.4	10.9	22.5	15.0	43.7	29.1	44.6	29.7
	15	15.3	10.2	18.4	12.2	18.8	12.5	25.0	16.6				
	16	17.4	11.6	20.1	13.4	21.4	14.2	27.4	18.2				
	17	19.7	13.1	21.8	14.5	24.1	16.0	29.9	19.9				
	18	22.1	14.7	23.6	15.7	27.0	18.0	32.4	21.6				
	19	24.6	16.3	25.3	16.8	30.1	20.0	34.9	23.2				
	20	27.2	18.1	27.0	18.0	33.4	22.2	37.4	24.9				
	21	30.0	20.0	28.7	19.1	36.8	24.5	39.9	26.5				
	22	32.9	21.9	30.5	20.3	40.4	26.9	42.4	28.2				

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	47.5	31.6	58.4	38.9	106	70.8
$t_y \times 10^3$, (kips)$^{-1}$	4.39	2.92	5.15	3.42	5.94	3.95
$t_r \times 10^3$, (kips)$^{-1}$	5.39	3.59	6.32	4.21	7.30	4.87
r_x/r_y	3.20		3.21		4.74	
r_y, in.	1.36		1.33		0.874	

[c] Shape is slender for compression for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W10

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		17[c]				15[c]				12[c], [f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	6.75	4.49	19.1	12.7	7.75	5.15	22.3	14.8	10.3	6.85	28.5	19.0
	1	6.83	4.55	19.1	12.7	7.85	5.22	22.3	14.8	10.4	6.95	28.5	19.0
	2	7.10	4.72	19.1	12.7	8.18	5.44	22.3	14.8	10.9	7.25	28.5	19.0
	3	7.64	5.09	19.1	12.7	8.75	5.82	22.5	15.0	11.7	7.78	28.8	19.1
	4	8.47	5.64	20.4	13.6	9.79	6.51	24.2	16.1	12.9	8.60	31.1	20.7
	5	9.68	6.44	21.9	14.5	11.3	7.53	26.1	17.4	14.7	9.78	33.9	22.6
	6	11.4	7.57	23.6	15.7	13.5	8.98	28.4	18.9	17.5	11.6	37.3	24.8
	7	13.8	9.17	25.6	17.0	16.6	11.1	31.2	20.7	21.8	14.5	41.3	27.5
	8	17.2	11.4	28.0	18.6	21.2	14.1	34.5	22.9	28.1	18.7	46.4	30.9
	9	21.8	14.5	30.9	20.6	26.8	17.8	39.6	26.4	35.6	23.7	56.5	37.6
	10	26.9	17.9	36.0	23.9	33.1	22.0	46.8	31.1	43.9	29.2	67.2	44.7
	11	32.5	21.6	41.4	27.5	40.1	26.7	54.0	35.9	53.1	35.4	78.3	52.1
	12	38.7	25.8	46.8	31.2	47.7	31.7	61.4	40.9	63.2	42.1	89.6	59.6
	13	45.4	30.2	52.3	34.8	56.0	37.2	68.8	45.8	74.2	49.4	101	67.3
	14	52.7	35.1	57.8	38.5								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	127	84.7	155	103	207	138
$t_y \times 10^3$, (kips)$^{-1}$	6.69	4.45	7.57	5.04	9.44	6.28
$t_r \times 10^3$, (kips)$^{-1}$	8.22	5.48	9.30	6.20	11.6	7.73
r_x/r_y	4.79		4.88		4.97	
r_y, in.	0.845		0.810		0.785	

[c] Shape is slender for compression for F_y = 50 ksi.

[f] Shape does not meet compact limit for flexure for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W8

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W8×											
		67				58				48			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.70	1.13	5.08	3.38	1.95	1.30	5.96	3.96	2.37	1.58	7.27	4.84
	6	1.84	1.23	5.08	3.38	2.13	1.42	5.96	3.96	2.59	1.72	7.27	4.84
	7	1.90	1.27	5.08	3.38	2.20	1.46	5.96	3.96	2.67	1.78	7.27	4.84
	8	1.97	1.31	5.11	3.40	2.28	1.51	6.00	3.99	2.77	1.84	7.34	4.88
	9	2.05	1.36	5.16	3.43	2.37	1.58	6.07	4.04	2.88	1.92	7.44	4.95
	10	2.14	1.43	5.21	3.47	2.48	1.65	6.14	4.08	3.02	2.01	7.55	5.02
	11	2.25	1.50	5.27	3.50	2.61	1.73	6.21	4.13	3.18	2.12	7.65	5.09
	12	2.38	1.58	5.32	3.54	2.75	1.83	6.29	4.18	3.36	2.24	7.77	5.17
	13	2.52	1.68	5.38	3.58	2.92	1.95	6.36	4.23	3.57	2.38	7.88	5.24
	14	2.68	1.79	5.43	3.61	3.12	2.08	6.44	4.29	3.82	2.54	8.00	5.32
	15	2.87	1.91	5.49	3.65	3.34	2.22	6.52	4.34	4.10	2.73	8.12	5.41
	16	3.09	2.05	5.55	3.69	3.60	2.39	6.61	4.40	4.42	2.94	8.25	5.49
	17	3.34	2.22	5.61	3.73	3.89	2.59	6.69	4.45	4.79	3.18	8.38	5.58
	18	3.62	2.41	5.67	3.77	4.23	2.82	6.78	4.51	5.21	3.47	8.52	5.67
	19	3.95	2.63	5.74	3.82	4.62	3.08	6.87	4.57	5.70	3.79	8.66	5.76
	20	4.33	2.88	5.80	3.86	5.08	3.38	6.96	4.63	6.28	4.18	8.80	5.85
	22	5.24	3.48	5.93	3.95	6.15	4.09	7.15	4.76	7.60	5.06	9.10	6.06
	24	6.23	4.15	6.07	4.04	7.32	4.87	7.35	4.89	9.05	6.02	9.43	6.27
	26	7.31	4.87	6.22	4.14	8.59	5.71	7.57	5.03	10.6	7.06	9.77	6.50
	28	8.48	5.64	6.38	4.24	9.96	6.63	7.79	5.19	12.3	8.19	10.1	6.75
	30	9.74	6.48	6.54	4.35	11.4	7.61	8.03	5.35	14.1	9.40	10.6	7.02
	32	11.1	7.37	6.71	4.46	13.0	8.66	8.29	5.52	16.1	10.7	11.0	7.31
	34	12.5	8.32	6.89	4.58	14.7	9.77	8.56	5.70	18.2	12.1	11.5	7.63

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	10.9	7.25	12.8	8.50	15.6	10.4
$t_y \times 10^3$, (kips)$^{-1}$	1.70	1.13	1.95	1.30	2.37	1.58
$t_r \times 10^3$, (kips)$^{-1}$	2.08	1.39	2.40	1.60	2.91	1.94
r_x/r_y	1.75		1.74		1.74	
r_y, in.	2.12		2.10		2.08	

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W8

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W8×											
		40				35				31[f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.85	1.90	8.95	5.96	3.24	2.16	10.3	6.83	3.66	2.43	11.7	7.80
	6	3.13	2.08	8.95	5.96	3.56	2.37	10.3	6.83	4.01	2.67	11.7	7.80
	7	3.23	2.15	8.95	5.96	3.68	2.45	10.3	6.83	4.15	2.76	11.7	7.80
	8	3.36	2.23	9.07	6.03	3.82	2.54	10.4	6.94	4.32	2.87	11.9	7.94
	9	3.50	2.33	9.22	6.14	3.99	2.65	10.6	7.07	4.51	3.00	12.2	8.11
	10	3.68	2.45	9.38	6.24	4.19	2.79	10.8	7.21	4.74	3.15	12.5	8.29
	11	3.88	2.58	9.55	6.35	4.42	2.94	11.1	7.36	5.00	3.33	12.7	8.48
	12	4.11	2.73	9.72	6.47	4.68	3.12	11.3	7.51	5.30	3.53	13.0	8.67
	13	4.38	2.91	9.90	6.59	4.99	3.32	11.5	7.67	5.66	3.76	13.3	8.88
	14	4.69	3.12	10.1	6.71	5.35	3.56	11.8	7.83	6.07	4.04	13.7	9.09
	15	5.04	3.36	10.3	6.84	5.76	3.83	12.0	8.00	6.54	4.35	14.0	9.32
	16	5.46	3.63	10.5	6.97	6.24	4.15	12.3	8.18	7.08	4.71	14.4	9.56
	17	5.93	3.95	10.7	7.11	6.79	4.51	12.6	8.37	7.71	5.13	14.7	9.81
	18	6.48	4.31	10.9	7.25	7.42	4.94	12.9	8.56	8.44	5.62	15.1	10.1
	19	7.12	4.73	11.1	7.40	8.16	5.43	13.2	8.77	9.29	6.18	15.6	10.3
	20	7.87	5.24	11.4	7.55	9.03	6.01	13.5	8.99	10.3	6.84	16.0	10.6
	22	9.52	6.34	11.8	7.88	10.9	7.27	14.2	9.45	12.4	8.28	17.0	11.3
	24	11.3	7.54	12.4	8.24	13.0	8.65	15.0	9.97	14.8	9.86	18.0	12.0
	26	13.3	8.85	13.0	8.64	15.3	10.2	15.8	10.5	17.4	11.6	19.6	13.1
	28	15.4	10.3	13.6	9.07	17.7	11.8	17.0	11.3	20.2	13.4	21.4	14.3
	30	17.7	11.8	14.4	9.57	20.3	13.5	18.4	12.3	23.1	15.4	23.3	15.5
	32	20.1	13.4	15.4	10.3	23.1	15.4	19.8	13.2	26.3	17.5	25.1	16.7
	34	22.7	15.1	16.5	11.0								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	19.3	12.8	22.1	14.7	25.3	16.8
$t_y \times 10^3$, (kips)$^{-1}$	2.85	1.90	3.24	2.16	3.66	2.43
$t_r \times 10^3$, (kips)$^{-1}$	3.51	2.34	3.98	2.66	4.49	3.00
r_x/r_y	1.73		1.73		1.72	
r_y, in.	2.04		2.03		2.02	

[f] Shape does not meet compact limit for flexure for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W8

Table 6-J (continued)

Combined Flexure and Axial Force

W-Shapes

F_y = 50 ksi

Shape		W8×			
		28			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.05	2.69	13.1	8.71
	6	4.68	3.11	13.2	8.77
	7	4.93	3.28	13.5	9.00
	8	5.23	3.48	13.9	9.23
	9	5.60	3.73	14.2	9.48
	10	6.05	4.02	14.6	9.74
	11	6.58	4.38	15.0	10.0
	12	7.21	4.80	15.5	10.3
	13	7.98	5.31	15.9	10.6
	14	8.89	5.91	16.4	10.9
	15	9.98	6.64	17.0	11.3
	16	11.3	7.54	17.5	11.7
	17	12.8	8.51	18.1	12.0
	18	14.3	9.54	18.7	12.5
	19	16.0	10.6	19.4	12.9
	20	17.7	11.8	20.2	13.4
	22	21.4	14.2	22.1	14.7
	24	25.5	17.0	24.5	16.3
	26	29.9	19.9	26.9	17.9
	28				
	30				
	32				
	34				
	36				
	38				
	40				

Other Constants and Properties		
$b_y \times 10^3$, (kip-ft)$^{-1}$	35.3	23.5
$t_y \times 10^3$, (kips)$^{-1}$	4.05	2.69
$t_r \times 10^3$, (kips)$^{-1}$	4.97	3.32
r_x/r_y	2.13	
r_y, in.	1.62	

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W8

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W8×											
		24				21				18			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.72	3.14	15.4	10.3	5.42	3.61	17.5	11.6	6.35	4.22	21.0	13.9
	1	4.74	3.15	15.4	10.3	5.46	3.63	17.5	11.6	6.39	4.25	21.0	13.9
	2	4.79	3.19	15.4	10.3	5.57	3.70	17.5	11.6	6.53	4.34	21.0	13.9
	3	4.89	3.26	15.4	10.3	5.76	3.83	17.5	11.6	6.76	4.50	21.0	13.9
	4	5.03	3.35	15.4	10.3	6.03	4.01	17.5	11.6	7.10	4.72	21.0	13.9
	5	5.22	3.47	15.4	10.3	6.40	4.26	17.8	11.9	7.56	5.03	21.5	14.3
	6	5.46	3.63	15.6	10.4	6.88	4.58	18.5	12.3	8.16	5.43	22.5	15.0
	7	5.76	3.83	16.0	10.6	7.50	4.99	19.2	12.8	8.93	5.94	23.5	15.6
	8	6.12	4.07	16.5	11.0	8.29	5.51	20.0	13.3	9.91	6.60	24.6	16.4
	9	6.56	4.36	17.0	11.3	9.28	6.17	20.9	13.9	11.2	7.42	25.9	17.2
	10	7.08	4.71	17.5	11.7	10.5	7.00	21.9	14.5	12.7	8.47	27.3	18.1
	11	7.71	5.13	18.1	12.0	12.1	8.05	22.9	15.2	14.7	9.81	28.8	19.2
	12	8.47	5.63	18.7	12.4	14.1	9.39	24.1	16.0	17.3	11.5	30.5	20.3
	13	9.37	6.24	19.3	12.9	16.6	11.0	25.3	16.8	20.3	13.5	32.5	21.6
	14	10.5	6.96	20.0	13.3	19.2	12.8	26.7	17.8	23.6	15.7	35.3	23.5
	15	11.8	7.83	20.8	13.8	22.0	14.7	28.5	18.9	27.1	18.0	38.8	25.8
	16	13.4	8.89	21.6	14.4	25.1	16.7	30.9	20.6	30.8	20.5	42.4	28.2
	17	15.1	10.0	22.5	14.9	28.3	18.8	33.4	22.2	34.8	23.1	45.9	30.5
	18	16.9	11.3	23.4	15.6	31.7	21.1	35.9	23.9	39.0	26.0	49.4	32.9
	19	18.8	12.5	24.5	16.3	35.4	23.5	38.3	25.5	43.5	28.9	52.9	35.2
	20	20.9	13.9	26.1	17.4	39.2	26.1	40.7	27.1	48.2	32.0	56.4	37.5
	21	23.0	15.3	27.8	18.5	43.2	28.7	43.2	28.7				
	22	25.3	16.8	29.4	19.6								
	23	27.6	18.4	31.0	20.6								
	24	30.1	20.0	32.6	21.7								
	25	32.6	21.7	34.2	22.8								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		41.6		27.7		62.6		41.7		76.5		50.9	
$t_y \times 10^3$, (kips)$^{-1}$		4.72		3.14		5.42		3.61		6.35		4.22	
$t_r \times 10^3$, (kips)$^{-1}$		5.79		3.86		6.66		4.44		7.80		5.20	
r_x/r_y		2.12				2.77				2.79			
r_y, in.		1.61				1.26				1.23			

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

W8

Table 6-J (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W8×											
		15				13				10[c], [f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, L_c (ft), with respect to the least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	7.52	5.01	26.2	17.4	8.70	5.79	31.3	20.8	11.7	7.76	40.6	27.0
	1	7.63	5.07	26.2	17.4	8.83	5.87	31.3	20.8	11.8	7.86	40.6	27.0
	2	7.95	5.29	26.2	17.4	9.23	6.14	31.3	20.8	12.3	8.17	40.6	27.0
	3	8.51	5.66	26.2	17.4	9.94	6.61	31.3	20.8	13.1	8.71	40.6	27.0
	4	9.37	6.23	27.6	18.4	11.0	7.34	33.4	22.2	14.3	9.53	43.2	28.8
	5	10.6	7.05	29.4	19.5	12.6	8.38	35.7	23.8	16.4	10.9	46.7	31.1
	6	12.3	8.20	31.3	20.8	14.8	9.86	38.5	25.6	19.3	12.8	50.8	33.8
	7	14.7	9.80	33.6	22.4	18.0	12.0	41.7	27.7	23.4	15.6	55.7	37.0
	8	18.1	12.0	36.2	24.1	22.5	14.9	45.4	30.2	29.3	19.5	61.6	41.0
	9	22.8	15.2	39.3	26.1	28.4	18.9	50.0	33.2	37.1	24.7	71.3	47.4
	10	28.1	18.7	42.9	28.6	35.1	23.4	57.4	38.2	45.8	30.4	84.3	56.1
	11	34.0	22.6	48.9	32.5	42.5	28.3	65.8	43.8	55.4	36.8	97.6	64.9
	12	40.5	26.9	54.9	36.5	50.6	33.6	74.3	49.4	65.9	43.8	111	73.9
	13	47.5	31.6	60.9	40.5	59.3	39.5	82.7	55.0	77.3	51.5	125	83.0
	14	55.1	36.7	66.9	44.5	68.8	45.8	91.2	60.7	89.7	59.7	139	92.2

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	133	88.8	166	110	218	145
$t_y \times 10^3$, (kips)$^{-1}$	7.52	5.01	8.70	5.79	11.3	7.51
$t_r \times 10^3$, (kips)$^{-1}$	9.24	6.16	10.7	7.12	13.9	9.24
r_x/r_y	3.76		3.81		3.83	
r_y, in.	0.876		0.843		0.841	

[c] Shape is slender for compression for F_y = 50 ksi.

[f] Shape does not meet compact limit for flexure for F_y = 50 ksi.

Note: Heavy line indicates L_c/r_y equal to or greater than 200.

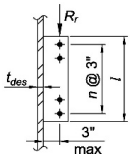

Table 10-A
Available Punching Shear Strength of Square or Rectangular HSS with Single-Plate Shear Connection, kips

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Number of Bolt Rows, *n*	*l*, in.	HSS Wall Thickness									
		t_{nom}, in.									
		1		⅞		¾		⅝		½	
		t_{des}, in.									
		0.930		0.814		0.698		0.581		0.465	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
12	36½	2560	3840	2240	3360	1920	2880	1600	2400	1280	1920
	36	2490	3740	2180	3270	1870	2800	1560	2330	1250	1870
	35½	2420	3630	2120	3180	1820	2730	1510	2270	1210	1820
11	33½	2160	3240	1890	2830	1620	2430	1350	2020	1080	1620
	33	2090	3140	1830	2750	1570	2360	1310	1960	1050	1570
	32½	2030	3050	1780	2670	1520	2290	1270	1900	1020	1520
10	30½	1790	2680	1560	2350	1340	2010	1120	1680	894	1340
	30	1730	2590	1510	2270	1300	1950	1080	1620	865	1300
	29½	1670	2510	1460	2200	1260	1880	1040	1570	836	1250
9	27½	1450	2180	1270	1910	1090	1640	908	1360	727	1090
	27	1400	2100	1230	1840	1050	1580	875	1310	701	1050
	26½	1350	2020	1180	1770	1010	1520	843	1260	675	1010
8	24½	1150	1730	1010	1510	866	1300	721	1080	577	865
	24	1110	1660	969	1450	831	1250	692	1040	554	830
	23½	1060	1590	929	1390	797	1190	663	995	531	796
7	21½	888	1330	778	1170	667	1000	555	833	444	666
	21	848	1270	742	1110	636	954	530	794	424	636
	20½	808	1210	707	1060	606	909	505	757	404	606
6	18½	658	987	576	864	494	741	411	616	329	493
	18	623	934	545	818	467	701	389	584	311	467
	17½	589	883	515	773	442	663	368	552	294	441
5	15½	462	693	404	606	347	520	288	433	231	346
	15	432	649	379	568	325	487	270	405	216	324
	14½	404	606	354	531	303	455	252	379	202	303
4	12½	300	450	263	394	225	338	188	281	150	225
	12	277	415	242	363	208	312	173	259	138	208
	11½	254	381	222	334	191	286	159	238	127	191
3	9½	173	260	152	228	130	195	108	163	86.7	130
	9	156	234	136	204	117	175	97.3	146	77.8	117
	8½	139	208	122	182	104	156	86.8	130	69.4	104
2	6½	81.2	122	71.1	107	60.9	91.4	50.7	76.1	40.6	60.9
	6	69.2	104	60.6	90.8	51.9	77.9	43.2	64.8	34.6	51.9
	5½	58.1	87.2	50.9	76.3	43.6	65.5	36.3	54.5	29.1	43.6

ASD	LRFD
$\Omega = 2.00$	$\phi = 0.75$

Notes:
1. Tabulated values do not consider the available strength of the supported member, single-plate connection, or support limit states other than punching shear. See AISC *Manual* Part 10 for guidance on other limit states.
2. Single-plate connection may not be used at HSS with walls classified as a slender element; where $b/t \geq 33.7$ for $F_y = 50$ ksi

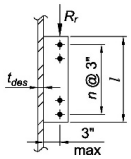

Table 10-A (continued)
Available Punching Shear Strength of Square or Rectangular HSS with Single-Plate Shear Connection, kips

ASTM A500/A500M
Grade C
F_y = 50 ksi
F_u = 62 ksi

Number of Bolt Rows, n	l, in.	HSS Wall Thickness							
		t_{nom}, in,							
		3/8		5/16		1/4		3/16	
		t_{des}, in.							
		0.349		0.291		0.233		0.174	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
12	36½	961	1440	801	1200	642	962	479	719
	36	935	1400	779	1170	624	936	466	699
	35½	909	1360	758	1140	607	910	453	680
11	33½	809	1210	675	1010	540	811	404	605
	33	785	1180	655	982	524	787	392	587
	32½	762	1140	635	953	509	763	380	570
10	30½	671	1010	559	839	448	672	335	502
	30	649	974	541	812	433	650	324	485
	29½	628	942	523	785	419	629	313	469
9	27½	545	818	455	682	364	546	272	408
	27	526	789	438	658	351	527	262	393
	26½	507	760	422	633	338	507	253	379
8	24½	433	649	361	541	289	434	216	324
	24	415	623	346	520	277	416	207	311
	23½	398	597	332	498	266	399	199	298
7	21½	333	500	278	417	223	334	166	249
	21	318	477	265	398	212	319	159	238
	20½	303	455	253	379	202	304	151	227
6	18½	247	370	206	309	165	247	123	185
	18	234	351	195	292	156	234	117	175
	17½	221	331	184	276	147	221	110	165
5	15½	173	260	144	217	116	174	86.4	130
	15	162	243	135	203	108	163	80.9	121
	14½	152	227	126	190	101	152	75.6	113
4	12½	113	169	94.0	141	75.2	113	56.2	84.3
	12	104	156	86.6	130	69.3	104	51.8	77.7
	11½	95.4	143	79.5	119	63.7	95.5	47.6	71.3
3	9½	65.1	97.6	54.3	81.4	43.5	65.2	32.5	48.7
	9	58.4	87.6	48.7	73.1	39.0	58.5	29.1	43.7
	8½	52.1	78.2	43.5	65.2	34.8	52.2	26.0	39.0
2	6½	30.5	45.7	25.4	38.1	20.3	30.5	15.2	22.8
	6	26.0	38.9	21.7	32.5	17.3	26.0	12.9	19.4
	5½	21.8	32.7	18.2	27.3	14.6	21.8	10.9	16.3

ASD	LRFD
$\Omega = 2.00$	$\phi = 0.75$

Notes:
1. Tabulated values do not consider the available strength of the supported member, single-plate connection, or support limit states other than punching shear. See AISC *Manual* Part 10 for guidance on other limit states.
2. Single-plate connection may not be used at HSS with walls classified as a slender element; where $b/t \geq 33.7$ for $F_y = 50$ ksi

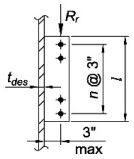

Table 10-B
Available Punching Shear Strength of Square or Rectangular HSS with Single-Plate Shear Connection, kips

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Number of Bolt Rows, n	l, in.	HSS Wall Thickness									
		t_{nom}, in.									
		1		⅞		¾		⅝		½	
		t_{des}, in.									
		1.00		0.875		0.750		0.625		0.500	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
12	36½	2890	4330	2530	3790	2160	3250	1800	2710	1440	2160
	36	2810	4210	2460	3690	2110	3160	1760	2630	1400	2110
	35½	2730	4100	2390	3580	2050	3070	1710	2560	1370	2050
11	33½	2430	3650	2130	3190	1820	2740	1520	2280	1220	1820
	33	2360	3540	2060	3100	1770	2650	1470	2210	1180	1770
	32½	2290	3430	2000	3000	1720	2570	1430	2150	1140	1720
10	30½	2020	3020	1760	2650	1510	2270	1260	1890	1010	1510
	30	1950	2930	1710	2560	1460	2190	1220	1830	975	1460
	29½	1890	2830	1650	2470	1410	2120	1180	1770	943	1410
9	27½	1640	2460	1430	2150	1230	1840	1020	1540	819	1230
	27	1580	2370	1380	2070	1180	1780	987	1480	790	1180
	26½	1520	2280	1330	2000	1140	1710	951	1430	761	1140
8	24½	1300	1950	1140	1710	975	1460	813	1220	650	975
	24	1250	1870	1090	1640	936	1400	780	1170	624	936
	23½	1200	1790	1050	1570	897	1350	748	1120	598	897
7	21½	1000	1500	876	1310	751	1130	626	939	501	751
	21	956	1430	836	1250	717	1070	597	896	478	717
	20½	911	1370	797	1200	683	1020	569	854	455	683
6	18½	742	1110	649	973	556	834	463	695	371	556
	18	702	1050	614	921	527	790	439	658	351	527
	17½	664	995	581	871	498	746	415	622	332	498
5	15½	521	781	455	683	390	586	325	488	260	390
	15	488	731	427	640	366	548	305	457	244	366
	14½	456	683	399	598	342	512	285	427	228	342
4	12½	339	508	296	444	254	381	212	317	169	254
	12	312	468	273	410	234	351	195	293	156	234
	11½	287	430	251	376	215	322	179	269	143	215
3	9½	196	293	171	257	147	220	122	183	97.8	147
	9	176	263	154	230	132	197	110	165	87.8	132
	8½	157	235	137	205	117	176	97.8	147	78.3	117
2	6½	91.5	137	80.1	120	68.7	103	57.2	85.8	45.8	68.7
	6	78.0	117	68.3	102	58.5	87.8	48.8	73.1	39.0	58.5
	5½	65.5	98.3	57.3	86.0	49.2	73.7	41.0	61.4	32.8	49.2

ASD	LRFD
$\Omega = 2.00$	$\phi = 0.75$

Notes:
1. Tabulated values do not consider the available strength of the supported member, single-plate connection, or support limit states other than punching shear. See AISC *Manual* Part 10 for guidance on other limit states.
2. Single-plate connection may not be used at HSS with walls classified as a slender element; where $b/t \geq 33.7$ for $F_y = 50$ ksi

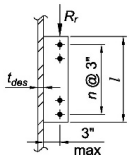

Table 10-B (continued)
Available Punching Shear Strength of Square or Rectangular HSS with Single-Plate Shear Connection, kips

ASTM A1085/A1085M
Grade A
F_y = 50 ksi
F_u = 65 ksi

Number of Bolt Rows, *n*	*l*, in.	HSS Wall Thickness							
		t_{nom}, in,							
		3/8		5/16		1/4		3/16	
		t_{des}, in.							
		0.375		0.313		0.250		0.188	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
12	36½	1080	1620	902	1350	722	1080	541	812
	36	1050	1580	878	1320	702	1050	527	790
	35½	1020	1540	853	1280	683	1020	512	768
11	33½	912	1370	760	1140	608	912	456	684
	33	885	1330	737	1110	590	885	442	664
	32½	858	1290	715	1070	572	858	429	644
10	30½	756	1130	630	945	504	756	378	567
	30	731	1100	609	914	488	731	366	548
	29½	707	1060	589	884	471	707	354	530
9	27½	614	922	512	768	410	614	307	461
	27	592	888	494	740	395	592	296	444
	26½	571	856	475	713	380	571	285	428
8	24½	488	732	406	610	325	488	244	366
	24	468	702	390	585	312	468	234	351
	23½	449	673	374	561	299	449	224	337
7	21½	376	563	313	469	250	376	188	282
	21	358	537	299	448	239	358	179	269
	20½	341	512	285	427	228	341	171	256
6	18½	278	417	232	348	185	278	139	209
	18	263	395	219	329	176	263	132	197
	17½	249	373	207	311	166	249	124	187
5	15½	195	293	163	244	130	195	97.6	146
	15	183	274	152	229	122	183	91.4	137
	14½	171	256	142	214	114	171	85.4	128
4	12½	127	190	106	159	84.6	127	63.5	95.2
	12	117	176	97.5	146	78.0	117	58.5	87.8
	11½	107	161	89.5	134	71.6	107	53.7	80.6
3	9½	73.3	110	61.1	91.7	48.9	73.3	36.7	55.0
	9	65.8	98.7	54.8	82.3	43.9	65.8	32.9	49.4
	8½	58.7	88.1	48.9	73.4	39.1	58.7	29.4	44.0
2	6½	34.3	51.5	28.6	42.9	22.9	34.3	17.2	25.7
	6	29.3	43.9	24.4	36.6	19.5	29.3	14.6	21.9
	5½	24.6	36.9	20.5	30.7	16.4	24.6	12.3	18.4

ASD	LRFD
$\Omega = 2.00$	$\phi = 0.75$

Notes:
1. Tabulated values do not consider the available strength of the supported member, single-plate connection, or support limit states other than punching shear. See AISC *Manual* Part 10 for guidance on other limit states.
2. Single-plate connection may not be used at HSS with walls classified as a slender element; where $b/t \geq 33.7$ for $F_y = 50$ ksi

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