Design Tables for Top- and Seat-Angle with Double Web-Angle Connections

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ABSTRACT

This paper provides a set of design tables, based on the AISC/LRFD Specification (1994), for the selection of top- and seat-angle with double web-angle connections given beam sections and applied loads. These tables enable the engineer to rapidly select proper angle sizes and configurations as well as determine the moment-rotation curve (M-θ_r) for the connection. Design procedures and a comprehensive case study are also presented.

1. INTRODUCTION

The aim of the work described in this paper is to provide design tables for top- and seat-angle with double web-angle connections (Figure 1) which can be used in semi-rigid frame design. To this end, a set of tables has been developed for the rapid selection of angle sizes and configurations as well as the values of the three parameters of a power model describing the M-θ_r curve of the connection (Figure 2).

The three-parameter power model was proposed by Richard (1961). They are: the initial connection stiffness R_{ki}, the ultimate moment capacity M_u, and the shape parameter n. The values R_{ki} and M_u can be determined in a simple procedure using an assumed failure mechanism (Kishi et al, 1993). The shape parameter n is determined as a linear function of $\log_{10}\theta_o$ (Figure 3) (Kishi and Hasan et al., 1994a & 1994b) based on experimental data installed in the Program SCDB (Chen and Kishi, 1986), where $\theta_o = M_u/R_{ki}$.

Since hand calculations for these three parameters are cumbersome, simple design tables are provided for eight general cases and two simple design examples are presented to illustrate the use of these tables in the following discussion.

2. GENERAL DESIGN PROCEDURES

The design of beam-columns is an iterative procedure. The general procedure for the design of PR frames (Y. Kim and Chen, 1996) is outlined below:

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1. Preliminary member sizing.
2. Select beam-to-column connections using design tables that are provided in this paper [Appendix A].
3. Load application: one of six factored load combinations.
4. Get modified connection stiffness using three parameters [Y. Kim and Chen, 1996].
5. Carry out the first-order elastic analysis, considering the connection behavior as a spring element.
6. Check the stability of frames by the LRFD (H1-1a, b) and the strength limit states [Y. Kim and Chen, 1996].
7. Check for serviceability limit states to ensure adequate stiffness for functionality at service loads.
8. Return to Step 4 until the six factored combinations become satisfactory. If member sizing is required, then return to Step 1.

3. STUDY OF CONNECTION PARAMETERS

Nine connection parameters for the top- and seat-angle with double web-angle (Figure 1) are summarized in Table 1.

BOLT

Two diameters of A325 bolts are included in the design tables: ¾-in. and ⅞-in. Note that connections with ¾-in. bolts have a higher M-θ_r curve than connections with ⅞-in. bolts. This is because the failure mechanism is related to the width of the nut.

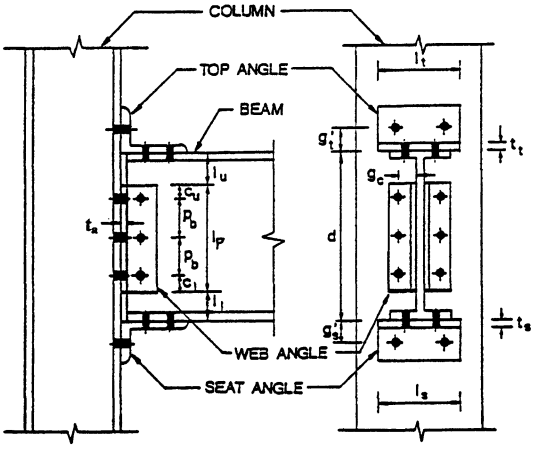

Fig. 1. Top- and seat-angle with double web-angle.

Table 1. Major Connection Parameters		
	Description	**Symbol**
BOLT	Nut's width across flat of bolt	w
BEAM	Nominal depth of beam	d
MATERIAL	Yield strength of beam	F_y
TOP- AND	Thickness Length	$t_t (= t_s)$ $l_t (= l_s)$
SEAT-ANGLE	Distance from heel to center of fastener hole on vertical leg	g_t'
WEB-ANGLE	Thickness Length Distance from heel to center of fastener hole	t_a l_p g_c

BEAM

From a preliminary moment design, the beam depth (d) is selected by estimating the required plastic section modulus.

Required plastic section modulus:

$$Z_x = \frac{M_{maximum}}{F_y} = \frac{\left(\frac{WL^2}{8}\right)}{F_y} = \frac{WL^2}{8F_y} \quad (1)$$

where

W = uniformly distributed load
L = length of the beam
F_y = yield strength of materials

Increasing the depth of beam increases the moment capacity of the connection. The use of 50 ksi steel gives a higher M-θ_r curve than 36 ksi steel.

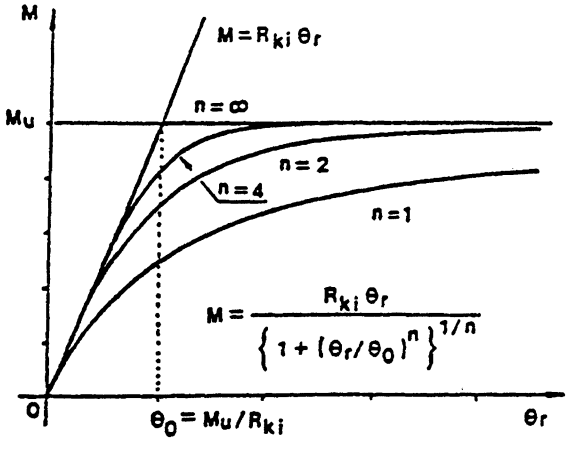

Fig. 2. General shape of the three-parameter power model.

TOP- AND SEAT-ANGLE

Symmetry allows the seat-angle to be treated the same way as the top-angle. Six L6×4 angles for top- and seat-angles, with a decreasing distance from heel to center of fastener hole on vertical leg g_t' (Table 2), are used.

$$g_t' = (H1 + C1) + t_t \quad (2)$$

where g_t' should be increased to ¼-in. unit. $H1$ and $C1$ are given in "Entering and Tightening Clearances" in Table 8-4 of AISC/LRFD Manual Vol. II (1994). For example, for a ¾-in. dia. bolt and CASE 1 in Table 2,

$$g_t' = (H1 + C1) + t_t = (15/32\text{-in.} + 1\tfrac{1}{4}\text{-in.}) + \tfrac{3}{4}\text{-in.} = 2.47 \text{ in.}$$

So, the final g_t' is 2½-in. Engineers can vary the length of top- and seat-angles by using "Staggered Bolts". Only 6-in. and 8-in. angles are used in these design tables. An increase in thickness and length of the angles results in a higher M-θ_r curve.

WEB-ANGLE

From a preliminary shear design ($WL/2$) using Table 9-2 of AISC/LRFD "All-Bolted Double-Angle Connections", engineers can select the thickness of the web-angles (t_a) and the number of bolts (N). For a given number of bolts, the length of web-angle (l_p) can be calculated by

$$l_p = (N - 1) \times \text{Bolt spacing (3-in.)}$$
$$+ \text{ Both edge distances (2.5-in. or 3-in.)} \quad (3)$$

Both edge distances are used: 2.5-in. for ¾-in. dia. bolts and 3-in. for ⅞-in. dia. bolts. Four 2 L4×3.5 angles are used for web-angles in these tables. Distance from heel to center of

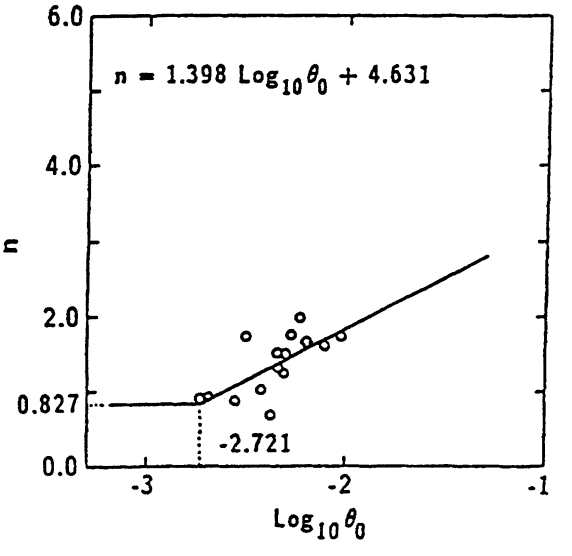

Fig. 3. Distribution of n (Kishi et al. 1994).

fastener hole g_c is tabulated in Table 3. Considering beam section and its possible number of bolts in the web-angle, the length of web-angle l_p is tabulated in Table 4.

$$g_c = (H1+C1) + t_a \quad (4)$$

where g_c should be increased to the nearest ¼-in.

3.1 Design Table

The design tables include 8 basic connection combinations. These combinations are summarized in Table 5.

4. MOMENT-ROTATION MODELING OF CONNECTIONS

The connection behavior is represented by its moment-rotation relationship. Extensive experimental work on connections has been performed, and a large body of moment-rotation data collected (Goverdhan 1983, Nethercot 1985, Kishi and Chen 1986 and Chen and Kishi 1989). Using this data base, researchers have developed several connection models including linear; polynomial; B-spline; power; and exponential models. A three-parameter power model proposed by Richard (1961) is used for the design tables and may be written as

$$\overline{m} = \frac{\overline{\theta}}{(1+\overline{\theta}^n)^{1/n}} \quad (5)$$

where

$\overline{m}$ = nondimensional connection moment = M/M_u
$\overline{\theta}$ = nondimensional relative rotation = θ/θ_o
n = shape parameter
θ_o = reference plastic rotation = M_u/R_{ki}

A practical procedure (Kishi et al 1993) for determining the three connection parameters is summarized here.

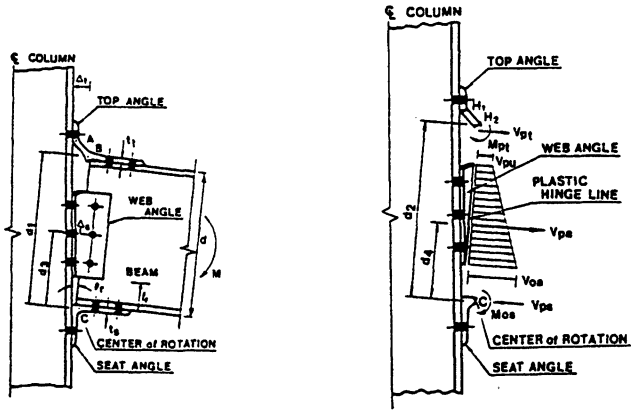

Fig. 4. Top- and seat-angle with web-angle connection (Kishi et al. 1993).

Table 2.
Distance from Heel to Center of Fastener Hole on Vertical Leg [g_t']

Top- and Seat-Angle	L6×4×t_t×k_t	Bolt Diameter	
		¾-in.	⅞-in.
CASE 1	L6×4×¾×1¼	2½-in.	2¾-in.
CASE 2	L6×4×⅝×1⅛	2½-in.	2¾-in.
CASE 3	L6×4×⅝×1 1/16	2¼-in.	2¾-in.
CASE 4	L6×4×½×1	2¼-in.	2½-in.
CASE 5	L6×4×7/16×15/16	2¼-in.	2½-in.
CASE 6	L6×4×⅜×⅞	2¼-in.	2½-in.

4.1 Determination of the initial connection stiffness, R_{ki}

The following assumptions are made for the initial stiffness.

1. Connection rotates about the center (C) located on the seat-angle as shown, in Figure 4.
2. The leg of the angle connected to the column behaves linearly elastically and the leg of the angle connected to the beam behaves as a rigid body.
3. The top-angle acts as a cantilever beam in which the fixed support is assumed to be at the fastener-hold edge near the beam flange in the leg adjacent to the column face as shown in Figure 5.
4. The deformed pattern of the web-angle is similar to that of the top-angle (Figure 6).
5. The bearing pressure is uniformly distributed over the outstanding leg of the seat-angle (Figure 7).

Based on these assumptions and considering shear deformation, the initial stiffness can be formulated from simple elastic beam theory.

Initial stiffness contributed by the top-angle:

$$K_{it} = \frac{3EI_t(d_1)^2}{g_1(g_1^2 + 0.78t_t^2)}$$

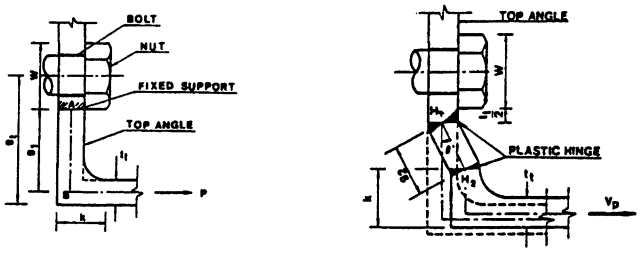

Fig. 5. Top-angle connection (Kishi et al. 1993).

Table 3. Distance from Heel to Center of Fastener Hole [g_c]			
Web-angle	2L4×3½×t_a×k_a	Bolt Diameter	
		¾-in.	⅞-in.
CASE 1	2L4×3½×½×15/16	2¼-in.	2½-in.
CASE 2	2L4×3½×⅜×13/16	2¼-in.	2½-in.
CASE 3	2L4×3½×5/16×¾	2-in.	2½-in.
CASE 4	2L4×3½×¼×1 1/16	2-in.	2¼-in.

Initial stiffness contributed by the seat-angle:

$$K_{is} = \frac{4EI_s}{I_{so}}$$

Initial stiffness contributed by the web-angles:

$$K_{ia} = \frac{6EI_a(d_3)^2}{g_3(g_3^2 + 0.78t_a^2)}$$

where

Bending rigidity of the top-angle:

$$EI_t = 29{,}000 * l_t(t_t)^3 / 12$$

Bending rigidity of the seat-angles:

$$EI_s = 29{,}000 * l_s(t_s)^3 / 12$$

Bending rigidity of the web-angle:

$$EI_a = 29{,}000 * l_p(t_a)^3 / 12$$

The initial stiffness of the top- and seat-angle with double web-angles is

$$R_{ki} = K_{it} + K_{is} + K_{ia} \qquad (6)$$

where

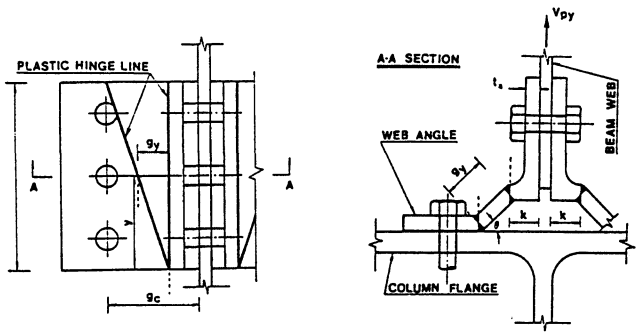

Fig. 6. Mechanism of web-angle connection of ultimate condition (Kishi et al. 1993).

g_1 = length of the vertical leg of the top-angle that acted as a cantilever beam
$= g_t' - w/2 - t_t/2$
g_3 = length of the leg of the web-angle that acted as a cantilever beam
$= g_c - w/2 - t_a/2$
d_1 = distance from the center of rotation to the line of the pull force acted upon a top-angle
$= d + t_s/2 + t_t/2$
l_{so} = distance from the critical section to the toe of the outstanding leg of the seat-angle
$d_3 = d/2 + t_s/2$

4.2 Determination of the ultimate moment capacity, M_u

The mechanism moment capacity of a connection is reached when an idealized elastic-plastic collapse mechanism is developed. On the basis of experimental studies, the collapse mechanism of a connection may be modeled from the individual angles. The mechanism moment of a connection may be obtained by summation of the plastic moment capacities contributed by each angle. Herein, plastic beam theory considering the bending moment-shear interaction is used to derive the expression for the mechanism moment. The ultimate moment of the top- and seat-angle with double web-angles is

$$M_u = M_{os} + M_{pt} + V_{pt}\,d_2 + 2V_{pa}d_4 \qquad (7)$$

where

$M_{pt} = V_{pt}g_2/2$ plastic moment in the top-angle ($\sigma_y = F_y$)
$M_{os} = \sigma_y l_s(t_s)^2/4$ plastic moment in the seat-angle
V_{pt} = plastic shear force in vertical leg of the top-angle

V_{pt} is determined by solving the following equation

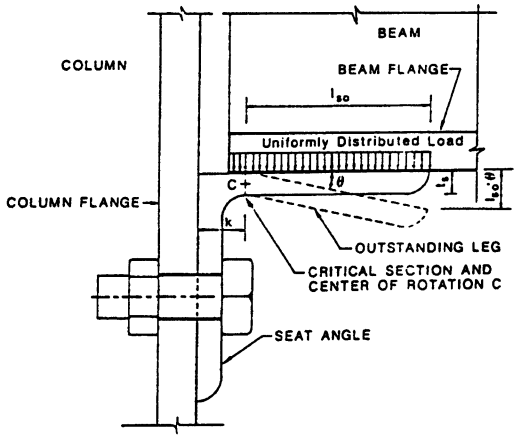

Fig. 7. Seat-angle connection (Kishi et al. 1993).

Table 4.
Length of Web-angle [l_p]

Beam	2 row	3 row	4 row	5 row	6 row	7 row	8 row	9 row
W8	**5½-in.** or 6-in.							
W10		**8½-in.** or 9-in.						
W12								
W14								
W16			**11½-in.** or 12-in.					
W18				**14½-in.** or 15-in.				
W21								
W24					**17½-in.** or 18-in.	**20½-in.** or 21-in.	**23½-in.** or 24-in.	**26½-in.** or 27-in.
W27								
W30								
W33								
W36								
W40								
W44								

Bold numbers are for ¾-in. dia. bolts and others are for ⅞-in. dia. bolts.

$$\left(\frac{V_{pt}}{V_{ot}}\right)^4 + \frac{g_2}{t_t}\left(\frac{V_{pt}}{V_{ot}}\right) - 1 = 0 \qquad (8)$$

where

$V_{ot} = \sigma_y l_s t_s / 2$
$g_2 = g_t' - k_t - w/2 - t_t/2$
d_2 = distance from the center of rotation to the line of the force V_{pt} acted upon
$= d + t_s/2 + k_t$
V_{pa} = the resultant of plastic shear force in a single web-angle
$= (V_{pu} + V_{oa}) l_p / 2$

V_{pu} is determined by solving the following equation

$$\left(\frac{V_{pu}}{V_{oa}}\right)^4 + \frac{g_y}{t_a}\left(\frac{V_{pu}}{V_{oa}}\right) - 1 = 0 \qquad (9)$$

where

$V_{oa} = \sigma_y t_a / 2$
$g_y = g_c - k_a$
d_4 = distance from the center of rotation to the line of the force V_{pa} acted upon
$= l_p(2V_{pu} + V_{oa}) / \{3(V_{pu} + V_{oa})\} + l_l + t_s/2$

4.3 Determination of the shape parameter, *n*

The following steps determine the shape parameter n:

1. The value of n is determined from experimental tests by applying least mean square technique using Equation 5.
2. Numerical values of n are then plotted against $\log_{10}\theta_o$.

The shape parameter n is assumed to be a linear function of $\log_{10}\theta_o$ (Figure 3), and is obtained by linear regression analysis from the n-$\log_{10}\theta_o$ curve. To avoid negative values of n, a horizontal segment is added to the inclined line as

$$n = 1.398\log_{10}\theta_o + 4.631 \quad \log_{10}\theta_o > -2.721 \qquad (10a)$$

$$n = 0.827 \quad \log_{10}\theta_o \le -2.721 \qquad (10b)$$

5. CASE STUDY-DESIGN EXAMPLE

A one-bay two-story frame (Y. Kim and Chen, 1996) is considered. The geometry, dimensions and applied loads of the frame are shown in Figure 8. All members are made of ASTM A36 steel. The angles are bolted to the structural members using high-strength bolts. All connections satisfy the design requirements in Sections J3.3, J3.4, J4, and J5.2 of the AISC/LRFD Specification (1994). All girders are adequately braced in the out-of-plane direction by the floor slabs. Member lengths are defined by centerline dimensions.

Table 5. Summary of Table			
	$l_t = l_s$	F_y	Bolt Dia.
CASE 1	6-in.	36 ksi	¾-in.
CASE 2			⅞-in.
CASE 3		50 ksi	¾-in.
CASE 4			⅞-in.
CASE 5	8-in.	36 ksi	¾-in.
CASE 6			⅞-in.
CASE 7		50 ksi	¾-in.
CASE 8			⅞-in.

Roof Beam

Uniformly Distributed Load:

$W = 0.0708$ kip-in

Maximum Moment:

$M_u = WL^2/8 = (0.0708)(300)^2/8 = 796.5$ kip-in

Required Section Modulus:

$Z_x = M_u/F_y = 796.5/36 = 22.13$ in.^{3}

Try W12×19 ($Z_x = 24.7$ in.^{3}).

Maximum Shear:

$V_u = WL/2 = (0.0708)(300)/2 = 10.62$ kips

The required ultimate moment capacity of a semi-rigid connection is calculated using Equation 11. The required M_u for the roof connection is

$$M_{u\,required} = M_p/2 = (Z_x \times F_y)/2 \qquad (11)$$

$$= 444.6 \text{ kip-in}$$

For the shear design, Table 9-2 (AISC/LRFD 1994) for the selection of double web-angle connections can be used. For a given W12 beam section, 2 rows of ¾-in. dia. bolts of A325-N and ¼-in. thickness of web-angle, Table 9-2 gives 48.9 kips which is greater than 10.62 kips. Since the AISC/LRFD does not provide PR (partially restrained) moment connection tables, we shall use the design table developed in this paper (Figure 9), and find L6×4×⅜×6 of the top- and seat-angle with 2L4×3.5×¼×5.5 web-angle connections. The three parameters are 588 kip-in for the ultimate moment, 219×10^3 kip-in/radian for the initial connection stiffness, and 0.87 for the shape parameter. The configuration of the final connection and its M-θ_r curve together with EC3 classification boundaries (ECCS, 1991) are shown in Figures 10 and 11.

Floor Beam

Uniformly Distributed Load:

$W = 0.2117$ kip-in

Maximum Moment:

$M_u = WL^2/8 = (0.2117)(300)^2/8 = 2{,}381.63$ kip-in

Required Section Modulus:

$Z_x = M_u/F_y = 2{,}381.63/36 = 66.16$ in.^{3}

Try W16×40 ($Z_x = 72.9$ in.^{3})

Maximum Shear:

$V_u = WL/2 = (0.2117)(300)/2 = 31.76$ kips

For the shear design with given W16 beam section, 3 Rows of ¾-in. dia. bolts of A325-N and ¼-in. thickness of web-angle (LRFD Table 9-7, p 9-40) gives 76.7 kips which is greater than 31.76 kips. Using Equation 11, the required M_u for the floor connections is 1,312.2 kip-in. Either L6×4×⅜×6 of the top- and seat-angle with 2L4×3.5×½×8.5 web-angles connection, or L6×4×⅝×6 of the top- and seat-angle with 2L4×3.5×¼×8.5 web-angles connection can be used in Figure 9. For floor connections, the final configuration and its M-θ_r curve with EC3 classification boundaries are shown in Figures 12 and 13.

6. SUMMARY

Design tables have been developed for rapid selection of top- and seat-angle with double web-angle connections when beam sections and applied loads are known. These tables enable the engineer to determine angle sizes, configurations and the M-θ_r curve directly. A step-by-step design procedure

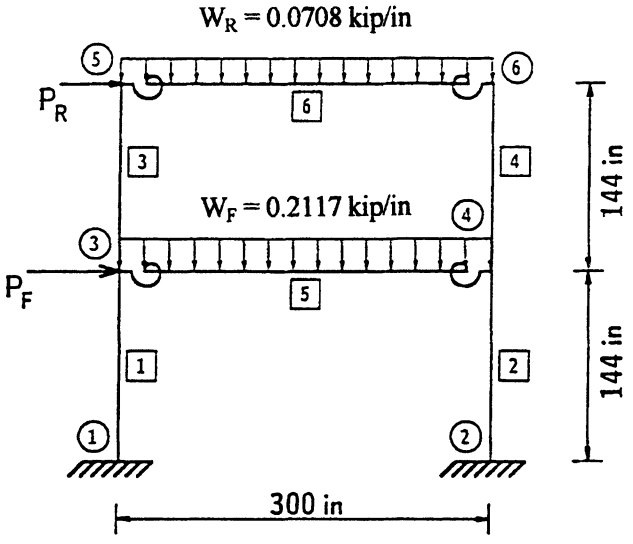

Fig. 8. One-bay two-story frame.

using these tables for the design of semi-rigid connections with LRFD has been presented. A one-bay two-story frame was also used to illustrate this procedure.

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Top- and Seat angle
Length of angle is 6 inch.
Use L6x4 angle

Double Web-angle
Use L4x3 ½ angle

T & S l_g=6" L6x4xt_t	Web 2L4x3.5 t_a	A36 3/4D	BEAM W8 2 row	W10 2 row	W10 3 row	W12 2 row	W12 3 row	W14 3 row	W16 3 row	W16 4 row	W18 3 row	W18 4 row	W18 5 row
3/4	1/2	Mu	1042	1258	1418	1494	1671	1924	2177	2431	2430	2721	2996
		Rki	421	632	687	887	964	1288	1659	1792	2078	2244	2411
		n	0.99	0.86	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	3/8	Mu	953	1147	1249	1342	1470	1690	1910	2074	2130	2320	2494
		Rki	380	570	592	800	830	1109	1428	1479	1788	1852	1917
		n	1	0.87	0.9	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	Mu	921	1108	1191	1294	1399	1607	1814	1949	2022	2177	2320
		Rki	379	568	589	797	826	1103	1421	1470	1779	1840	1902
		n	0.98	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	1/4	Mu	884	1061	1122	1239	1315	1509	1702	1801	1896	2010	2113
		Rki	366	549	559	770	784	1048	1349	1373	1689	1719	1749
		n	0.98	0.84	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
5/8	1/2	Mu	824	1001	1159	1179	1374	1588	1803	2055	2017	2306	2578
		Rki	252	381	434	536	612	820	1059	1190	1328	1492	1657
		n	1.16	1.03	1.04	0.92	0.93	0.84	0.83	0.83	0.83	0.83	0.83
	3/8	Mu	736	892	993	1048	1174	1356	1538	1700	1719	1907	2080
		Rki	213	321	341	451	481	644	831	882	1042	1106	1169
		n	1.2	1.06	1.09	0.95	0.98	0.89	0.83	0.84	0.83	0.83	0.83
	5/16	Mu	705	853	935	1001	1104	1273	1443	1576	1612	1766	1907
		Rki	211	319	339	449	477	638	824	872	1033	1094	1154
		n	1.17	1.04	1.06	0.93	0.95	0.86	0.83	0.83	0.83	0.83	0.83
	1/4	Mu	668	807	867	946	1022	1177	1332	1429	1487	1600	1702
		Rki	199	300	310	423	436	584	754	777	945	974	1003
		n	1.18	1.04	1.07	0.93	0.96	0.87	0.83	0.83	0.83	0.83	0.83
9/16	1/2	Mu	790	963	1120	1137	1330	1540	1751	2002	1961	2249	2520
		Rki	272	413	466	583	658	883	1141	1271	1433	1596	1759
		n	1.09	0.96	0.98	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83
	3/8	Mu	702	854	954	1006	1132	1309	1487	1648	1665	1851	2023
		Rki	233	353	374	499	528	708	915	965	1149	1212	1275
		n	1.11	0.98	1.01	0.87	0.91	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	Mu	671	815	897	959	1062	1227	1392	1525	1557	1711	1852
		Rki	232	351	371	496	524	703	908	956	1140	1200	1260
		n	1.09	0.95	0.98	0.84	0.87	0.83	0.83	0.83	0.83	0.83	0.83
	1/4	Mu	635	770	829	905	980	1131	1282	1378	1433	1545	1647
		Rki	220	333	342	470	483	649	838	861	1052	1081	1110
		n	1.09	0.95	0.98	0.84	0.87	0.83	0.83	0.83	0.83	0.83	0.83
7/16	1/2	Mu	584	719	873	853	1044	1216	1388	1636	1559	1845	2113
		Rki	150	229	280	324	398	535	693	821	872	1033	1194
		n	1.27	1.14	1.13	1.03	1.03	0.94	0.86	0.86	0.83	0.83	0.83
	3/8	Mu	498	611	709	724	848	987	1126	1285	1265	1450	1620
		Rki	112	171	191	242	270	364	471	520	592	654	717
		n	1.35	1.22	1.24	1.11	1.14	1.05	0.97	0.99	0.9	0.93	0.94
	5/16	Mu	467	573	653	678	779	906	1032	1163	1158	1310	1450
		Rki	111	169	188	239	266	358	464	511	583	643	702
		n	1.32	1.18	1.2	1.07	1.09	1.01	0.93	0.94	0.86	0.87	0.88
	1/4	Mu	432	528	586	624	698	810	922	1018	1034	1146	1247
		Rki	99	151	160	214	227	305	395	418	497	525	554
		n	1.34	1.2	1.23	1.09	1.13	1.04	0.96	0.98	0.89	0.92	0.93
3/8	1/2	Mu	556	686	839	817	1007	1174	1342	1589	1510	1794	2061
		Rki	151	231	282	329	401	541	702	829	884	1044	1204
		n	1.23	1.1	1.1	0.99	1	0.91	0.84	0.84	0.83	0.83	0.83
	3/8	Mu	470	579	677	689	811	946	1081	1240	1216	1400	1570
		Rki	114	174	194	247	275	371	481	530	606	668	729
		n	1.3	1.17	1.2	1.06	1.1	1.01	0.93	0.96	0.87	0.89	0.91
	5/16	Mu	440	541	621	642	743	865	988	1118	1110	1261	1400
		Rki	113	172	191	245	271	366	474	521	597	656	715
		n	1.27	1.14	1.16	1.03	1.05	0.97	0.89	0.91	0.83	0.84	0.85
	1/4	Mu	404	496	554	588	662	770	878	974	987	1098	1198
		Rki	901	155	164	219	232	313	406	429	511	539	568
		n	1.29	1.15	1.18	1.04	1.08	0.99	0.91	0.94	0.84	0.87	0.9

L6x4x3/8x6
2L4x3.5x1/4x5.5

Ultimate Moment Capacity (Kips)
Initial Connection Stiffness (10^3 Kip-in/radian)
Shape Parameter

Fig. 9. Design table of semi-rigid connections.

Column Connections," *Structural Engineering Report No. CE-STR-96-11*, School of Civil Engineering, Purdue University, West Lafayette, IN, 653 pp., 1986.
7. Kishi, N. and Chen, W. F., "Moment-Rotation Relations of Semi-Rigid Connections With Angles," *Journal of Structural Engineering*, ASCE, 116(7), pp. 1813–1834, 1990.
8. Kishi, N., Chen, W. F., Hasan, R., and Matsuoka, K. G., "Design Aid of Semi-Rigid Connections for Frame Analysis," *Engineering Journal*, AISC, 3rd Qtr., pp. 90–107, 1993.
9. Kishi, N., Hasan, R., Chen, W. F., and Goto, Y., "Power Model for Semi-Rigid Connections," *Journal of Singapore Structural Steel Society*, Vol. 5, No. 1, pp. 37–48, 1994a.
10. Kishi, N., Goto, Y., Hasan, R., and Matsuoka, K. G., "Effect of Shape Parameter in Three-Parameter Power Model on Behavior of Flexibly Jointed Frame," *Journal of Structural Engineering*, JSCE, Vol. 40A, pp. 1275–1285, 1994b.
11. Nethercot, D. A., "Steel Beam-to-Column Connections—A Review of Test Data and its Applicability to the Evaluation of Joint Behavior in the Performance of Steel Frames," *CIRIA Project Record*, RP 338, 1985a.
12. Nethercot, D. A., "Utilization of Experimentally Obtained Connection Data in Assessing the Performance of Steel Frames, *Connection Flexibility and Steel Frames*, W. F. Chen, Ed., Proceedings of a Session Sponsored by the Structural Division, ASCE, Detroit, MI, pp. 13–37, 1985b.
13. Richard, R. M., "A Study of Structural System Having Nonlinear Elements," *Doctoral Dissertation*, Purdue University, West Lafayette, IN, 1961.

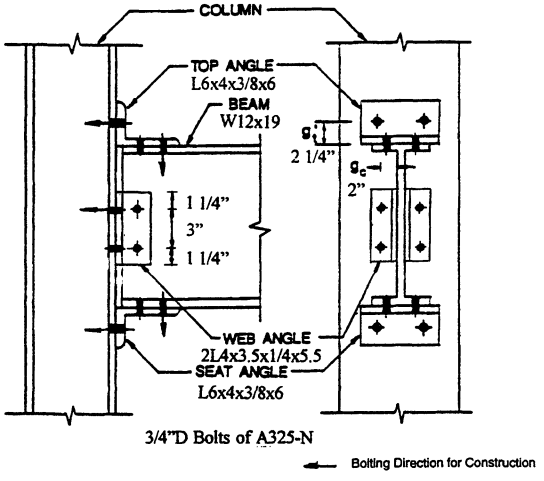

Fig. 10. Configuration of roof connections.

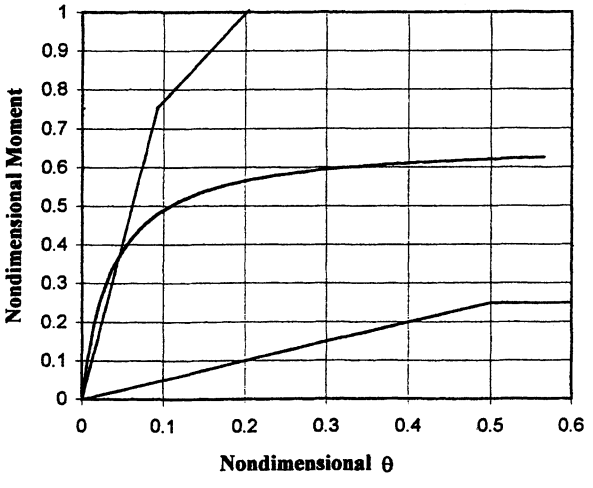

Fig. 11. Moment-rotation curve of roof connections.

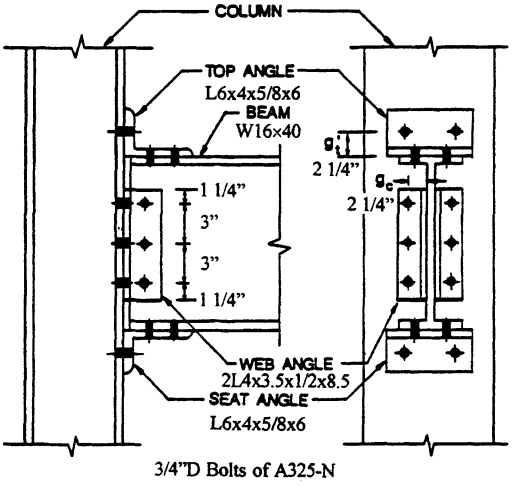

Fig. 12. Configuration of floor connections.

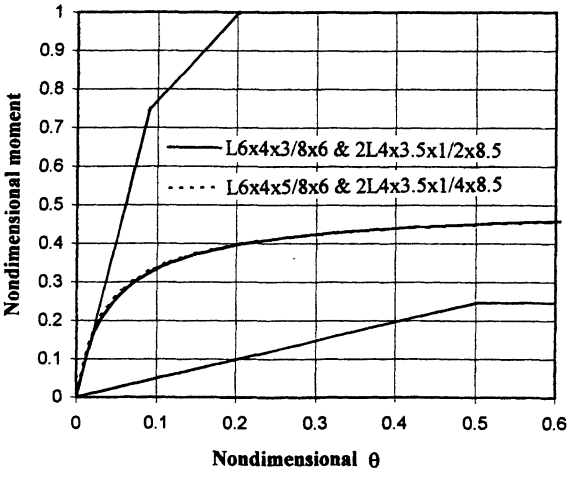

Fig. 13. Moment-Rotation curve of floor connections.

APPENDIX 1. SOURCE FILE

```
//*************************************
// Table.c: Table for three-parameter power
// model for Top- and Seat-angle with
// Double Web-angle
// Programmer: Yosuk Kim
// (yosuk@ce.ecn.purdue.edu)
// Last Modified: 10-26-97 (Sun)
//*************************************

#include <fstream.h>
#include <math.h>
#include <iomanip.h>
#include "section.h"

float g2, tt, gy, ta;
float Vot, Voa, Vpa, MU[24][43],
  RKI[24][43], NN[24][43];

float func1(float Vpt) {
float x=pow(Vpt/Vot,4)+(g2/tt)*(Vpt/Vot)-1;
return x;
}

float func2(float Vpy) {
float x=pow(Vpy/Voa,4)+(gy/ta)*(Vpy/Voa)-1;
return x;
}

float rtbis(int i, float x1, float x2){
int j=1, jmax=10000;
float dx, rt;
float fmid=(i==3)? func1(x2): func2(x2);
float f=(i==3)? func1(x1): func2(x1);
if(f<0.0) { rt=x1; dx=x2-x1; }
else { rt=x2; dx=x1-x2; }
do {
dx=0.5*dx;
float xmid=rt+dx;
fmid=(i==3)? func1(xmid): func2(xmid);
if(fmid<=0.0) rt=xmid;
if(fabs(dx)<0.00001 || fmid==0.0) return
  xmid; } while(j<=jmax);
}
int main() {      // Main program
int a,i,j,k,l,m,o,r,p,page,count;
float lso, ls, lt, d, lp, Sy, w, ka, gc,
  kt, ts, ks, gtt, moment[51];
float EIt, EIs, d1, g1, Mos, Vptmin,
  Vptmax, Vpt, Mpt, d2, l1, EIa, d3, g3;
float Rki, Vpymin, Vpymax, Vpu, d4, Mu,
  Theta_o, n;

// Top- and Seat-Angle used L6x4
lso=6.0; count=0;
cout<<"Type \"ls\" (6\" or 8\"): ";
cin>>ls;
cout<<"Type \"Fy\" (36 or 50 ksi): ";
cin>>Sy;
cout<<"Type \"0\" (3/4\"D) or \" 1\"
  (7/8\"D): ";
cin>>l;

lt=ls; w=W[l];
for(i=0; i<=13; i++) {
d=BLp[i][0];
for(j=1; j<=rows[i]; j++) {
lp=(w==1.25)? BLp[i][j]:BLp[i][j]+0.5;
for(o=0; o<6; o++) {
tt=TS[o][0];
kt=TS[o][1];
ts=tt;
ks=kt;
gtt=TS[o][2+l];
for(m=0; m<4; m++) {
ta=web[m][0];
ka=web[m][1];
gc=web[m][2+l];

// Calculation for Mu and Rki
EIt=29000.0*lt*pow(tt,3)/12.0;
EIs=EIt;
d1 =d+ts/2.0+tt/2.0;
g1=gtt-w/2.0-tt/2.0;
Mos=Sy*ls*ts*ts/4.0;
Vot=Sy*lt*tt/2.0;
g2=gtt-kt-w/2.0-tt/2.0;
Vptmin=0.0;
Vptmax=Sy*lt*tt;
Vpt=rtbis(3, Vptmin, Vptmax);
Mpt=Sy*lt*tt*tt/4.0;
d2=d+ts/2.0+kt;
l1=(d-lp)/2.0;
EIa=29000.0*lp*pow(ta,3)/12.0;
d3=d/2.0+ts/2.0;
g3=gc-w/2.0-ta/2.0;
Rki=4*EIs/(lso-ks)+3.0*EIt*d1*d1/
  (g1*(g1*g1+0.78*tt*tt))+6.0*EIa*d3*d3/
  (g3*(g3*g3+0.78*ta*ta));
RKI[4*o+m][count]=ceil(Rki/1000);

Voa=Sy*ta/2.0;
gy=gc-ka;
Vpymin=0.0;
Vpymax=Sy*lp*ta;
Vpu=rtbis(4, Vpymin, Vpymax);
Vpa=0.5*(Vpu+Voa)*lp;
d4=lp/3.0*(2*Vpu+Voa)/(Vpu+Voa)+l1+ts/2.0;
Mu=Mos+Mpt+Vpt*d2+2*Vpa*d4;
MU[4*o+m][count]=ceil(Mu);

// Calculation for Shape parameter(n) =>
  Kishi's shape parameter
Theta_o=Mu/Rki;
if(log10(Theta_o)>-2.721)
  n=1.398*log10(Theta_o)+4.631;
else n=0.827;
NN[4*o+m][count]=ceil(n*100)/100; } }
count=count+1; } }

// Print Table of summary
ofstream ofile;
ofile.open("table", ios::trunc);
for(page=0; page<4; page++) {
if(page!=3) {
ofile<<"_____"
<<"______"<<page+1<<" page\n"<<setw(7)<<
  Set[page][0]<<setw(7)
```

```
<<Set[page][1]<<setw(7)<<Set[page][2]
  <<setw(7)<<Set[page][3]<<setw(7)
<<Set[page][4]<<setw(7)<<Set[page][5]
  <<setw(7)<<Set[page][6]<<setw(7)
<<Set[page][7]<<setw(7)<<Set[page][8]
  <<setw(7)<<Set[page][9]<<setw(7)
<<Set[page][10]<<"\n"<<"_____"
<<"_____\n";
for(r=0; r<24; r++) {
m=(r+1)%4;
p=11*page;
ofile<<setw(7)<<MU[r][p]<<setw(7)<<MU[r][p+1]
  <<setw(7)<<MU[r][p+2]
<<setw(7)<<MU[r][p+3]<<setw(7)<<MU[r][p+4]
  <<setw(7)<<MU[r][p+5]
<<setw(7)<<MU[r][p+6]<<setw(7)<<MU[r][p+7]
  <<setw(7)<<MU[r][p+8]
<<setw(7)<<MU[r][p+9]<<setw(7)<<MU[r][p+10]
  <<"\n"<<setw(7)<<RKI[r][p]
<<setw(7)<<RKI[r][p+1]<<setw(7)<<RKI[r][p+2]
  <<setw(7)<<RKI[r][p+3]
<<setw(7)<<RKI[r][p+4]<<setw(7)<<RKI[r][p+5]
  <<setw(7)<<RKI[r][p+6]
<<setw(7)<<RKI[r][p+7]<<setw(7)<<RKI[r][p+8]
  <<setw(7)<<RKI[r][p+9]
<<setw(7)<<RKI[r][p+10]<<"\n"<<setw(7)
  <<NN[r][p]<<setw(7)<<NN[r][p+1]
<<setw(7)<<NN[r][p+2]<<setw(7)<<NN[r][p+3]
  <<setw(7)<<NN[r][p+4]
<<setw(7)<<NN[r][p+5]<<setw(7)<<NN[r][p+6]
  <<setw(7)<<NN[r][p+7]
<<setw(7)<<NN[r][p+8]<<setw(7)<<NN[r][p+9]
  <<setw(7)<<NN[r][p+10]
<<"\n"; } }

else {
ofile<<"_____"
<<"_____"<<page+1<<" page\n"<<setw(7)
  <<Set[page][0]<<setw(7)
<<Set[page][1]<<setw(7)<<Set[page][2]
  <<setw(7)<<Set[page][3]<<setw(7)
<<Set[page][4]<<setw(7)<<Set[page][5]
  <<setw(7)<<Set[page][6]<<setw(7)
<<Set[page][7]<<setw(7)<<Set[page][8]
  <<setw(7)<<Set[page][9]<<"\n"
<<"_____"
<<"_____\n";
for(r=0; r<24; r++) {
m=(r+1)%4;
p=11*page;
ofile<<setw(7)<<MU[r][p]<<setw(7)
  <<MU[r][p+1]<<setw(7)<<MU[r][p+2]
<<setw(7)<<MU[r][p+3]<<setw(7)<<MU[r][p+4]
  <<setw(7)<<MU[r][p+5]
<<setw(7)<<MU[r][p+6]<<setw(7)<<MU[r][p+7]
  <<setw(7)<<MU[r][p+8]
<<setw(7)<<MU[r][p+9]<<"\n"<<setw(7)
  <<RKI[r][p]<<setw(7)<<RKI[r][p+1]
<<setw(7)<<RKI[r][p+2]<<setw(7)<<RKI[r][p+3]
  <<setw(7)<<RKI[r][p+4]
<<setw(7)<<RKI[r][p+5]<<setw(7)<<RKI[r][p+6]
  <<setw(7)<<RKI[r][p+7]
<<setw(7)<<RKI[r][p+8]<<setw(7)<<RKI[r][p+9]
  <<"\n"<<setw(7)<<NN[r][p]
<<setw(7)<<NN[r][p+1]<<setw(7)<<NN[r][p+2]
  <<setw(7)<<NN[r][p+3]
<<setw(7)<<NN[r][p+4]<<setw(7)<<NN[r][p+5]
  <<setw(7)<<NN[r][p+6]
<<setw(7)<<NN[r][p+7]<<setw(7)<<NN[r][p+8]
  <<setw(7)<<NN[r][p+9]
<<"\n"; } } }
ofile.close();
return 0;
}

//****************************************
// section.h: Beam and Angle information
// programmer: Yosuk Kim
// Last Modified: 2-19-97
//****************************************

// Bolt Diameter 3/4D or 7/8D
float W[2]={1.25,1.4375};

// Web-Angle L 4 x 3.5 x ta x ka gc(3/4D
  and 7/8D)
float web[4][4]={{0.5,0.9375,2.25,2.75},
{0.375,0.8125,2.25,2.5},
{0.3125,0.75,2.0,2.5},
{0.25,0.6875,2.0,2.25} };

// Top- and Seat-Angle L 6 x 4 x tt x kt
  gtt(3/4D and 7/8D)
float TS[6][4]={{0.75,1.25,2.5,2.75},
{0.625,1.125,2.5,2.75},
{0.5625,1.0625,2.25,2.75},
{0.5,1.0,2.25,2.5},
{0.4375,0.9375,2.25,2.5},
{0.375,0.875,2.0,2.5} };

// Beam depth and length of web-angle(lp)
float BLp[14][6]={{8.0,5.5},
{10.0,5.5,8.5},
{12.0,5.5,8.5},
{14.0,8.5},
{16.0,8.5,11.5},
{18.0,8.5,11.5,14.5},
{21.0,11.5,14.5,17.5},
{24.0,11.5,14.5,17.5,20.5},
{27.0,14.5,17.5,20.5,23.5},
{30.0,14.5,17.5,20.5,23.5,26.5},
{33.0,17.5,20.5,23.5,26.5},
{36.0,17.5,20.5,23.5,26.5},
{40.0,17.5,20.5,23.5,26.5},
{44.0,17.5,20.5,23.5,26.5} };

// Rows of web-angle
int rows[14]={1,2,2,1,2,3,3,4,4,5,4,4,4,4};

// Table setup
int Set[4][11]={{2,2,3,2,3,3,3,4,3,4,5},
{3,4,5,4,5,6,7,5,6,7,8},
{9,6,7,8,9,6,7,8,9,6,7},
{8,9,6,7,8,9,6,7,8,9} };
```

APPENDIX II. DESIGN TABLE (8 CASES)

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16		W18		
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	1042	1258	1418	1474	1671	1924	2177	2431	2430	2721	2996
		R_{ki}	421	632	687	887	964	1288	1659	1792	2078	2244	2411
		n	0.99	0.86	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	953	1147	1249	1342	1470	1690	1910	2074	2130	2320	2494
		R_{ki}	380	570	592	800	830	1109	1428	1479	1788	1852	1917
		n	1	0.87	0.9	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	921	1108	1191	1294	1399	1607	1814	1949	2022	2177	2320
		R_{ki}	379	568	589	797	826	1103	1421	1470	1779	1840	1902
		n	0.98	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	884	1061	1122	1239	1315	1509	1702	1801	1896	2010	2113
		R_{ki}	366	549	559	770	784	1048	1349	1373	1689	1719	1749
		n	0.98	0.84	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	824	1001	1159	1179	1374	1588	1803	2055	2017	2306	2578
		R_{ki}	252	381	434	536	612	820	1059	1190	1328	1492	1657
		n	1.16	1.03	1.04	0.92	0.93	0.84	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	736	892	993	1048	1174	1356	1538	1700	1719	1907	2080
		R_{ki}	213	321	341	451	481	644	831	882	1042	1106	1169
		n	1.2	1.06	1.09	0.95	0.98	0.89	0.83	0.84	0.83	0.83	0.83
	5/16	M_u	705	853	935	1001	1104	1273	1443	1576	1612	1766	1907
		R_{ki}	211	319	339	449	477	638	824	872	1033	1094	1154
		n	1.17	1.04	1.06	0.93	0.95	0.86	0.83	0.83	0.83	0.83	0.83
	¼	M_u	668	807	867	946	1022	1177	1332	1429	1487	1600	1702
		R_{ki}	199	300	310	423	436	584	754	777	945	974	1003
		n	1.18	1.04	1.07	0.93	0.96	0.87	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	790	963	1120	1137	1330	1540	1751	2002	1961	2249	2520
		R_{ki}	272	413	466	583	658	883	1141	1271	1433	1596	1759
		n	1.09	0.96	0.98	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	702	854	954	1006	1132	1309	1487	1648	1665	1851	2023
		R_{ki}	233	353	374	499	528	708	915	965	1149	1212	1275
		n	1.11	0.98	1.01	0.87	0.91	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	671	815	897	959	1062	1227	1392	1525	1557	1711	1852
		R_{ki}	232	351	371	496	524	703	908	956	1140	1200	1260
		n	1.09	0.95	0.98	0.84	0.87	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	635	770	829	905	980	1131	1282	1378	1433	1545	1647
		R_{ki}	220	333	342	470	483	649	838	861	1052	1081	1110
		n	1.09	0.95	0.98	0.84	0.87	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	686	840	995	994	1186	1377	1568	1818	1760	2046	2316
		R_{ki}	202	307	359	434	508	683	884	1013	1111	1273	1435
		n	1.19	1.05	1.06	0.95	0.96	0.87	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	599	732	831	865	989	1147	1306	1466	1464	1650	1821
		R_{ki}	163	248	268	351	379	510	660	709	829	891	954
		n	1.23	1.1	1.13	0.99	1.02	0.93	0.86	0.88	0.83	0.83	0.83
	5/16	M_u	568	693	774	818	920	1066	1211	1343	1357	1510	1650
		R_{ki}	162	246	265	348	375	504	653	700	820	880	939
		n	1.21	1.07	1.09	0.96	0.99	0.9	0.83	0.84	0.83	0.83	0.83
	¼	M_u	532	648	707	763	838	970	1101	1197	1233	1345	1446
		R_{ki}	150	228	237	322	336	451	583	606	733	762	790
		n	1.21	1.08	1.11	0.97	1	0.91	0.83	0.86	0.83	0.83	0.83
7/16	½	M_u	584	719	873	853	1044	1216	1388	1636	1559	1845	2113
		R_{ki}	150	229	280	324	398	535	693	821	872	1033	1194
		n	1.27	1.14	1.13	1.03	1.03	0.94	0.86	0.86	0.83	0.83	0.83
	⅜	M_u	498	611	709	724	848	987	1126	1285	1265	1450	1620
		R_{ki}	112	171	191	242	270	364	471	520	592	654	717
		n	1.35	1.22	1.24	1.11	1.14	1.05	0.97	0.99	0.9	0.93	0.94
	5/16	M_u	467	573	653	678	779	906	1032	1163	1158	1310	1450
		R_{ki}	111	169	188	239	266	358	464	511	583	643	702
		n	1.32	1.18	1.2	1.07	1.09	1.01	0.93	0.94	0.86	0.87	0.88
	¼	M_u	432	528	586	624	698	810	922	1018	1034	1146	1247
		R_{ki}	99	151	160	214	227	305	395	418	497	525	554
		n	1.34	1.2	1.23	1.09	1.13	1.04	0.96	0.98	0.89	0.92	0.93
⅜	½	M_u	556	686	839	817	1007	1174	1342	1589	1510	1794	2061
		R_{ki}	151	231	282	329	401	541	702	829	884	1044	1204
		n	1.23	1.1	1.1	0.99	1	0.91	0.84	0.84	0.83	0.83	0.83
	⅜	M_u	470	579	677	689	811	946	1081	1240	1216	1400	1570
		R_{ki}	114	174	194	247	275	371	481	530	606	668	729
		n	1.3	1.17	1.2	1.06	1.1	1.01	0.93	0.96	0.87	0.89	0.91
	5/16	M_u	440	541	621	642	743	865	988	1118	1110	1261	1400
		R_{ki}	113	172	191	245	271	366	474	521	597	656	715
		n	1.27	1.14	1.16	1.03	1.05	0.97	0.89	0.91	0.83	0.84	0.85
	¼	M_u	404	496	554	588	662	770	878	974	987	1098	1198
		R_{ki}	101	155	164	219	232	313	406	429	511	539	568
		n	1.29	1.15	1.18	1.04	1.08	0.99	0.91	0.94	0.84	0.87	0.9

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W21			W24				W27			
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row
¾	½	M_u	3157	3487	3800	3592	3977	4346	4698	4468	4893	5300	5691
		R_{ki}	3018	3242	3466	3906	4196	4487	4777	5274	5639	6004	6369
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2688	2901	3098	3057	3307	3543	3764	3714	3988	4247	4491
		R_{ki}	2491	2577	2664	3223	3336	3448	3560	4192	4333	4474	4615
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2520	2695	2856	2864	3069	3263	3443	3444	3669	3881	4081
		R_{ki}	2474	2557	2639	3202	3309	3416	3523	4159	4293	4427	4562
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2324	2452	2568	2639	2790	2931	3060	3129	3293	3447	3590
		R_{ki}	2311	2351	2391	2991	3043	3094	3146	3824	3889	3954	4019
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	2684	3011	3322	3061	3444	3811	4160	3877	4300	4705	5093
		R_{ki}	2011	2232	2454	2606	2894	3181	3468	3641	4002	4364	4726
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2218	2429	2625	2529	2778	3012	3231	3127	3399	3657	3899
		R_{ki}	1490	1575	1661	1930	2042	2153	2264	2568	2708	2848	2988
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2051	2224	2385	2337	2541	2733	2913	2858	3082	3293	3491
		R_{ki}	1473	1555	1637	1910	2015	2121	2227	2535	2669	2802	2935
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1856	1983	2098	2113	2264	2403	2532	2544	2708	2861	3002
		R_{ki}	1312	1352	1391	1700	1752	1803	1854	2203	2268	2332	2397
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	2621	2947	3257	2992	3374	3739	4088	3801	4222	4626	5013
		R_{ki}	2153	2373	2593	2792	3078	3364	3650	3876	4236	4596	4956
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2156	2366	2561	2461	2709	2943	3161	3052	3324	3581	3822
		R_{ki}	1634	1720	1805	2120	2231	2341	2452	2808	2948	3087	3226
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1990	2162	2322	2269	2473	2665	2843	2784	3007	3217	3415
		R_{ki}	1619	1700	1781	2099	2205	2310	2415	2775	2908	3040	3173
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1796	1922	2037	2046	2196	2335	2463	2471	2634	2786	2928
		R_{ki}	1458	1497	1537	1891	1942	1993	2044	2445	2509	2573	2637
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	2389	2714	3022	2731	3112	3476	3823	3510	3929	4332	4718
		R_{ki}	1718	1937	2157	2231	2515	2800	3084	3169	3527	3885	4244
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1926	2135	2329	2201	2449	2681	2899	2763	3034	3289	3530
		R_{ki}	1203	1288	1373	1562	1672	1782	1892	2106	2245	2383	2522
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1760	1932	2091	2010	2214	2404	2582	2495	2718	2927	3124
		R_{ki}	1187	1268	1349	1541	1646	1751	1855	2073	2205	2337	2469
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1566	1692	1806	1788	1937	2076	2203	2183	2345	2497	2638
		R_{ki}	1028	1067	1106	1334	1385	1435	1486	1744	1808	1872	1936
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	2158	2482	2789	2471	2851	3214	3560	3219	3638	4039	4424
		R_{ki}	1396	1614	1832	1814	2097	2380	2663	2643	3000	3357	3714
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1696	1905	2098	1943	2189	2421	2638	2474	2744	2999	3239
		R_{ki}	884	968	1053	1148	1258	1367	1477	1585	1723	1861	1999
		n	0.84	0.85	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1531	1702	1860	1752	1955	2145	2322	2207	2429	2638	2834
		R_{ki}	868	949	1029	1128	1232	1336	1440	1553	1684	1815	1947
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1338	1463	1577	1530	1679	1817	1944	1896	2058	2209	2349
		R_{ki}	710	749	787	922	972	1023	1073	1225	1289	1352	1416
		n	0.83	0.85	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	2101	2424	2730	2408	2787	3149	3493	3150	3567	3967	4351
		R_{ki}	1412	1629	1845	1836	2118	2399	2681	2671	3026	3381	3736
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1641	1849	2041	1881	2127	2358	2574	2406	2675	2930	3169
		R_{ki}	903	987	1070	1174	1283	1392	1501	1618	1755	1892	2030
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1476	1647	1804	1691	1893	2083	2259	2140	2361	2569	2765
		R_{ki}	887	967	1047	1153	1257	1361	1464	1585	1716	1847	1977
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1284	1408	1522	1470	1619	1756	1883	1829	1991	2141	2281
		R_{ki}	730	768	807	948	999	1049	1099	1259	1322	1386	1449
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	4959	5439	5902	6348	6777	5985	6504	7006	7491	6532	7106
		R_{ki}	6475	6923	7371	7819	8267	8338	8878	9418	9958	9885	10526
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4121	4433	4731	5013	5280	4878	5214	5535	5840	5324	5697
		R_{ki}	5146	5319	5493	5666	5839	6407	6616	6824	7033	7595	7843
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3819	4075	4319	4550	4769	4482	4757	5020	5270	4888	5195
		R_{ki}	5105	5270	5435	5600	5765	6347	6546	6745	6943	7525	7760
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3467	3656	3834	4000	4156	4018	4220	4411	4591	4381	4607
		R_{ki}	4694	4774	4853	4933	5013	5749	5845	5941	6038	6816	6930
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	4311	4788	5249	5693	6120	5277	5793	6293	6775	5766	6338
		R_{ki}	4474	4918	5363	5807	6252	5928	6464	7000	7536	7033	7668
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3476	3787	4083	4363	4629	4174	4508	4827	5131	4562	4934
		R_{ki}	3156	3328	3500	3672	3844	4011	4218	4426	4633	4758	5004
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3175	3431	3673	3903	4120	3779	4053	4315	4563	4128	4434
		R_{ki}	3115	3279	3442	3606	3770	3952	4149	4346	4544	4688	4922
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2825	3013	3189	3355	3510	3317	3518	3708	3887	3622	3847
		R_{ki}	2707	2786	2865	2945	3024	3358	3454	3549	3644	3984	4097
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	4228	4704	5164	5607	6033	5187	5702	6201	6682	5670	6241
		R_{ki}	4765	5207	5650	6093	6536	6279	6813	7347	7881	7452	8085
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3395	3705	4000	4280	4545	4087	4420	4738	5041	4468	4839
		R_{ki}	3452	3624	3795	3966	4137	4369	4576	4782	4989	5185	5430
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3095	3350	3592	3821	4037	3692	3966	4226	4475	4035	4340
		R_{ki}	3412	3575	3738	3901	4064	4311	4507	4703	4900	5115	5348
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2746	2933	3109	3274	3429	3231	3432	3621	3800	3530	3755
		R_{ki}	3006	3084	3163	3242	3321	3719	3814	3909	4004	4413	4526
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	3908	4383	4841	5283	5708	4837	5351	5848	6328	5290	5860
		R_{ki}	3897	4338	4779	5220	5661	5233	5765	6297	6829	6212	6843
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3077	3386	3680	3959	4223	3738	4070	4388	4690	4090	4461
		R_{ki}	2590	2761	2931	3102	3272	3330	3536	3742	3947	3953	4197
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2777	3031	3272	3501	3717	3345	3617	3877	4125	3658	3962
		R_{ki}	2550	2712	2874	3037	3199	3271	3467	3663	3859	3883	4116
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2428	2615	2791	2956	3110	2885	3085	3274	3452	3154	3378
		R_{ki}	2145	2224	2302	2381	2459	2682	2777	2872	2966	3184	3296
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	3588	4062	4519	4960	5383	4486	4999	5495	5974	4911	5479
		R_{ki}	3252	3692	4131	4570	5009	4455	4985	5515	6045	5290	5919
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2759	3067	3360	3639	3902	3390	3722	4038	4340	3713	4083
		R_{ki}	1951	2121	2290	2460	2630	2559	2764	2969	3174	3038	3282
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2460	2713	2954	3182	3397	2997	3270	3529	3776	3282	3585
		R_{ki}	1911	2072	2234	2395	2557	2501	2696	2891	3085	2969	3201
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2112	2298	2473	2638	2791	2538	2738	2926	3104	2779	3002
		R_{ki}	1508	1586	1664	1742	1820	1913	2008	2102	2196	2272	2384
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	3512	3985	4441	4881	5303	4404	4915	5410	5888	4822	5389
		R_{ki}	3288	3725	4162	4600	5037	4497	5025	5553	6081	5341	5969
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2685	2992	3285	3562	3825	3309	3640	3956	4257	3627	3996
		R_{ki}	1991	2160	2330	2499	2668	2608	2812	3017	3221	3098	3340
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2387	2639	2879	3106	3321	2918	3189	3448	3694	3196	3499
		R_{ki}	1951	2112	2273	2434	2595	2550	2744	2938	3133	3029	3260
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2039	2225	2400	2564	2717	2460	2658	2846	3023	2694	2917
		R_{ki}	1550	1628	1706	1784	1861	1965	2059	2153	2247	2334	2446
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam									
			W36		W40				W44			
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row
¾	½	M_u	7664	8204	7260	7909	8540	9155	7989	8712	9417	10106
		R_{ki}	11166	11806	12153	12940	13728	14515	14655	15604	16554	17503
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6056	6400	5917	6342	6752	7147	6511	6986	7447	7893
		R_{ki}	8091	8338	9337	9642	9946	10251	11259	11626	11994	12361
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5490	5771	5430	5779	6116	6439	5972	6363	6742	7108
		R_{ki}	7996	8231	9251	9540	9830	10120	11155	11504	11853	12203
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4822	5026	4864	5122	5370	5606	5347	5638	5917	6186
		R_{ki}	7044	7157	8379	8519	8659	8799	10103	10272	10441	10610
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	6893	7431	6417	7063	7693	8305	7069	7789	8493	9179
		R_{ki}	8304	8940	8652	9434	10217	10999	10439	11383	12327	13271
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5291	5633	5078	5501	5910	6303	5595	6069	6528	6972
		R_{ki}	5250	5496	5853	6156	6458	6761	7062	7427	7792	8157
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4727	5007	4593	4941	5276	5598	5057	5448	5825	6190
		R_{ki}	5156	5390	5767	6055	6343	6631	6958	7305	7653	8000
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4061	4265	4029	4286	4532	4767	4435	4724	5003	5270
		R_{ki}	4210	4323	4901	5040	5179	5318	5912	6080	6248	6416
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	6794	7331	6313	6958	7586	8197	6957	7676	8378	9063
		R_{ki}	8719	9353	9171	9951	10731	11511	11068	12009	12951	13892
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5196	5537	4976	5399	5806	6198	5485	5958	6416	6860
		R_{ki}	5675	5920	6381	6682	6984	7286	7701	8065	8429	8793
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4632	4912	4491	4839	5173	5495	4948	5338	5714	6078
		R_{ki}	5581	5814	6295	6582	6869	7156	7597	7943	8290	8636
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3968	4171	3928	4185	4431	4666	4327	4615	4893	5160
		R_{ki}	4639	4751	5431	5570	5709	5847	6554	6722	6889	7057
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	6412	6948	5895	6539	7166	7776	6499	7218	7919	8603
		R_{ki}	7475	8106	7648	8425	9203	9980	9232	10171	11110	12048
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4816	5157	4560	4982	5388	5780	5030	5502	5960	6403
		R_{ki}	4441	4686	4866	5167	5468	5768	5874	6237	6601	6964
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4254	4533	4076	4423	4756	5078	4494	4883	5259	5622
		R_{ki}	4348	4580	4781	5067	5353	5639	5771	6116	6462	6807
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3591	3794	3514	3770	4015	4249	3873	4162	4439	4705
		R_{ki}	3408	3521	3919	4058	4196	4334	4731	4898	5065	5232
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	6031	6566	5476	6119	6745	7354	6042	6759	7459	8142
		R_{ki}	6548	7178	6515	7290	8065	8840	7867	8803	9739	10675
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4438	4777	4144	4565	4970	5361	4574	5046	5503	5945
		R_{ki}	3525	3769	3742	4042	4341	4641	4518	4880	5242	5604
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3876	4155	3661	4006	4340	4660	4040	4428	4803	5166
		R_{ki}	3432	3664	3656	3942	4227	4512	4415	4760	5104	5448
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3215	3417	3099	3355	3600	3833	3420	3708	3985	4250
		R_{ki}	2496	2608	2798	2936	3074	3212	3378	3545	3712	3878
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	5940	6473	5380	6021	6646	7254	5938	6653	7352	8034
		R_{ki}	6596	7223	6581	7353	8126	8899	7949	8882	9816	10749
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4350	4689	4049	4469	4874	5264	4472	4943	5399	5840
		R_{ki}	3583	3826	3816	4115	4414	4713	4610	4971	5332	5693
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3789	4067	3567	3912	4245	4565	3938	4325	4700	5062
		R_{ki}	3490	3721	3731	4016	4300	4584	4507	4850	5194	5537
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3129	3330	3007	3262	3506	3739	3319	3607	3883	4148
		R_{ki}	2557	2669	2875	3013	3150	3288	3473	3639	3805	3971
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16		W18		
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	990	1198	1334	1405	1576	1817	2059	2279	2301	2555	2790
		R_{ki}	307	460	487	645	682	911	1173	1237	1469	1549	1628
		n	1.15	1.02	1.05	0.91	0.95	0.86	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	913	1102	1195	1290	1408	1621	1834	1986	2047	2223	2384
		R_{ki}	293	439	455	616	638	852	1097	1135	1373	1421	1469
		n	1.13	1	1.03	0.89	0.92	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	875	1053	1125	1232	1324	1522	1720	1838	1919	2056	2180
		R_{ki}	284	425	434	596	608	812	1046	1067	1309	1336	1362
		n	1.13	0.99	1.02	0.88	0.91	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	843	1013	1069	1183	1254	1440	1625	1717	1811	1918	2014
		R_{ki}	281	422	429	591	601	802	1033	1050	1293	1314	1335
		n	1.11	0.97	1	0.86	0.89	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	771	940	1073	1108	1276	1479	1682	1900	1885	2137	2369
		R_{ki}	178	269	294	378	414	554	715	778	897	976	1054
		n	1.33	1.2	1.23	1.1	1.13	1.04	0.96	0.98	0.89	0.92	0.93
	⅜	M_u	695	844	936	994	1110	1284	1458	1609	1632	1808	1967
		R_{ki}	165	248	263	349	371	496	640	678	802	850	897
		n	1.32	1.19	1.21	1.08	1.11	1.02	0.94	0.97	0.87	0.9	0.92
	5/16	M_u	657	797	868	936	1027	1186	1346	1463	1505	1642	1765
		R_{ki}	156	234	243	330	342	457	590	611	739	765	792
		n	1.32	1.19	1.22	1.08	1.11	1.02	0.94	0.97	0.87	0.91	0.93
	¼	M_u	626	757	812	888	958	1105	1252	1342	1399	1505	1599
		R_{ki}	153	231	238	325	334	447	577	593	723	744	765
		n	1.3	1.16	1.19	1.05	1.08	0.99	0.91	0.94	0.84	0.87	0.89
9/16	½	M_u	666	815	947	964	1131	1315	1498	1715	1682	1933	2164
		R_{ki}	134	202	228	285	321	430	556	618	697	776	854
		n	1.42	1.29	1.31	1.18	1.21	1.12	1.04	1.06	0.98	1	1.01
	⅜	M_u	590	720	812	850	966	1121	1275	1425	1430	1604	1763
		R_{ki}	121	182	197	256	278	372	481	518	604	650	697
		n	1.41	1.28	1.3	1.17	1.2	1.11	1.03	1.06	0.97	0.99	1.01
	5/16	M_u	553	673	743	793	883	1023	1163	1279	1303	1439	1562
		R_{ki}	112	169	177	237	249	334	431	452	541	567	593
		n	1.42	1.28	1.31	1.18	1.21	1.12	1.05	1.07	0.98	1.01	1.03
	¼	M_u	522	633	688	745	815	942	1070	1160	1197	1303	1397
		R_{ki}	109	165	172	232	242	324	418	435	525	545	566
		n	1.39	1.26	1.29	1.15	1.18	1.09	1.01	1.04	0.94	0.97	0.99
½	½	M_u	634	779	910	924	1090	1270	1449	1664	1629	1878	2108
		R_{ki}	136	206	231	291	327	439	568	629	713	791	868
		n	1.38	1.25	1.28	1.14	1.17	1.09	1.01	1.03	0.94	0.97	0.98
	⅜	M_u	559	685	775	811	926	1077	1227	1376	1378	1551	1709
		R_{ki}	123	186	201	263	284	382	494	530	620	666	713
		n	1.37	1.23	1.26	1.13	1.16	1.07	1	1.02	0.93	0.96	0.97
	5/16	M_u	522	638	708	754	844	979	1115	1231	1251	1387	1508
		R_{ki}	114	173	181	244	256	343	444	464	558	583	609
		n	1.37	1.24	1.27	1.13	1.17	1.08	1	1.03	0.93	0.97	0.99
	¼	M_u	491	598	652	706	776	899	1022	1112	1145	1251	1344
		R_{ki}	112	169	176	239	248	334	431	448	542	562	583
		n	1.34	1.21	1.24	1.1	1.13	1.04	0.97	0.99	0.9	0.93	0.95
7/16	½	M_u	534	660	791	786	951	1112	1272	1487	1433	1681	1910
		R_{ki}	98	149	174	211	246	331	428	490	538	615	693
		n	1.48	1.35	1.36	1.24	1.26	1.18	1.1	1.12	1.04	1.05	1.06
	⅜	M_u	460	567	657	674	788	920	1051	1199	1183	1356	1513
		R_{ki}	85	129	144	183	204	274	355	391	446	492	538
		n	1.47	1.34	1.37	1.24	1.26	1.18	1.1	1.12	1.03	1.06	1.07
	5/16	M_u	423	520	589	617	706	823	940	1055	1057	1192	1313
		R_{ki}	76	116	124	164	176	236	306	326	384	410	435
		n	1.49	1.36	1.39	1.25	1.29	1.2	1.13	1.16	1.06	1.09	1.11
	¼	M_u	393	481	535	570	639	743	847	936	951	1056	1149
		R_{ki}	74	112	119	159	168	226	293	309	368	388	409
		n	1.46	1.33	1.36	1.22	1.25	1.16	1.09	1.12	1.02	1.05	1.07
⅜	½	M_u	445	554	683	662	826	969	1112	1325	1255	1503	1731
		R_{ki}	71	108	133	154	188	254	329	390	414	491	567
		n	1.56	1.43	1.44	1.33	1.34	1.26	1.18	1.19	1.12	1.12	1.12
	⅜	M_u	372	461	550	550	664	778	892	1039	1006	1178	1334
		R_{ki}	58	89	103	126	147	198	256	292	322	368	414
		n	1.57	1.44	1.46	1.34	1.36	1.28	1.2	1.21	1.13	1.15	1.15
	5/16	M_u	335	414	483	494	582	682	781	896	881	1015	1135
		R_{ki}	50	76	84	107	119	160	207	227	261	286	311
		n	1.6	1.48	1.51	1.37	1.41	1.32	1.25	1.28	1.18	1.21	1.23
	¼	M_u	304	376	428	447	515	602	689	777	776	880	973
		R_{ki}	48	72	79	103	112	150	195	211	245	265	285
		n	1.57	1.44	1.47	1.34	1.37	1.29	1.21	1.24	1.14	1.17	1.19

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W21			W24				W27			
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row
¾	½	M_u	2970	3256	3522	3384	3722	4040	4338	4188	4557	4907	5238
		R_{ki}	2082	2189	2296	2694	2833	2972	3110	3560	3734	3909	4083
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2580	2778	2960	2936	3171	3391	3594	3565	3821	4062	4287
		R_{ki}	1910	1974	2038	2471	2555	2638	2721	3210	3315	3419	3524
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2384	2538	2678	2711	2895	3065	3220	3252	3451	3637	3809
		R_{ki}	1795	1831	1866	2323	2369	2415	2461	2977	3035	3092	3150
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2220	2339	2447	2522	2665	2796	2916	2990	3145	3289	3421
		R_{ki}	1766	1794	1822	2285	2321	2358	2394	2917	2963	3009	3055
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	2493	2777	3041	2849	3185	3500	3797	3592	3960	4308	4636
		R_{ki}	1314	1420	1526	1703	1840	1978	2115	2315	2488	2661	2834
		n	0.83	0.85	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2106	2302	2483	2404	2637	2855	3057	2973	3228	3467	3690
		R_{ki}	1144	1208	1271	1483	1565	1647	1730	1969	2072	2176	2279
		n	0.83	0.83	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1911	2063	2202	2180	2362	2531	2686	2661	2859	3044	3215
		R_{ki}	1031	1066	1101	1336	1381	1427	1472	1737	1795	1852	1909
		n	0.83	0.84	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1748	1867	1973	1992	2134	2264	2383	2401	2555	2697	2828
		R_{ki}	1002	1030	1057	1298	1334	1370	1406	1678	1723	1769	1814
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	2260	2542	2806	2587	2921	3236	3531	3300	3666	4013	4340
		R_{ki}	1046	1151	1256	1356	1493	1629	1766	1879	2051	2223	2395
		n	0.91	0.92	0.93	0.83	0.85	0.86	0.86	0.83	0.83	0.83	0.83
	⅜	M_u	1873	2069	2249	2142	2375	2592	2794	2681	2936	3174	3397
		R_{ki}	877	940	1003	1137	1219	1301	1383	1534	1637	1740	1844
		n	0.9	0.92	0.93	0.83	0.85	0.86	0.87	0.83	0.83	0.83	0.83
	5/16	M_u	1679	1831	1969	1919	2101	2269	2423	2371	2568	2752	2922
		R_{ki}	764	799	834	991	1036	1081	1127	1304	1361	1418	1475
		n	0.92	0.95	0.96	0.84	0.87	0.89	0.91	0.83	0.83	0.84	0.86
	¼	M_u	1517	1635	1741	1732	1873	2003	2121	2111	2264	2406	2537
		R_{ki}	735	763	791	953	989	1025	1061	1245	1290	1335	1381
		n	0.88	0.91	0.92	0.83	0.83	0.85	0.86	0.83	0.83	0.83	0.83
½	½	M_u	2199	2481	2743	2520	2853	3167	3461	3226	3591	3937	4263
		R_{ki}	1067	1172	1277	1385	1521	1657	1793	1916	2088	2259	2430
		n	0.88	0.9	0.91	0.83	0.83	0.84	0.84	0.83	0.83	0.83	0.83
	⅜	M_u	1814	2009	2188	2077	2309	2526	2726	2609	2863	3100	3322
		R_{ki}	899	962	1025	1167	1249	1330	1412	1573	1676	1778	1881
		n	0.87	0.89	0.9	0.83	0.83	0.83	0.84	0.83	0.83	0.83	0.83
	5/16	M_u	1621	1772	1909	1854	2036	2203	2356	2299	2496	2680	2849
		R_{ki}	787	822	857	1022	1067	1112	1157	1344	1400	1457	1514
		n	0.88	0.91	0.93	0.83	0.83	0.86	0.87	0.83	0.83	0.83	0.83
	¼	M_u	1459	1576	1682	1667	1808	1938	2056	2040	2193	2335	2465
		R_{ki}	759	786	814	984	1020	1056	1092	1285	1330	1375	1420
		n	0.84	0.86	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	1974	2254	2515	2266	2598	2911	3204	2942	3306	3651	3976
		R_{ki}	832	936	1040	1080	1215	1351	1486	1532	1702	1873	2044
		n	0.97	0.98	0.98	0.89	0.9	0.91	0.91	0.84	0.85	0.85	0.85
	⅜	M_u	1590	1784	1963	1824	2056	2271	2471	2327	2580	2817	3038
		R_{ki}	665	727	789	863	944	1025	1107	1190	1292	1395	1497
		n	0.97	0.99	1	0.9	0.91	0.92	0.93	0.85	0.86	0.87	0.87
	5/16	M_u	1397	1548	1685	1602	1783	1949	2102	2018	2214	2397	2566
		R_{ki}	553	588	622	718	763	808	853	962	1018	1075	1132
		n	1	1.03	1.05	0.93	0.96	0.98	0.99	0.89	0.91	0.93	0.94
	¼	M_u	1236	1353	1458	1416	1556	1685	1803	1759	1912	2053	2183
		R_{ki}	525	552	579	681	717	753	788	903	948	993	1038
		n	0.96	0.99	1	0.89	0.91	0.93	0.94	0.85	0.87	0.88	0.89
⅜	½	M_u	1769	2048	2308	2035	2366	2678	2970	2684	3047	3391	3715
		R_{ki}	663	767	870	862	997	1132	1266	1257	1427	1597	1767
		n	1.04	1.04	1.03	0.96	0.97	0.97	0.96	0.9	0.9	0.9	0.89
	⅜	M_u	1386	1580	1757	1594	1825	2040	2239	2070	2322	2558	2779
		R_{ki}	497	560	622	647	727	808	889	917	1019	1121	1222
		n	1.06	1.07	1.07	0.99	1	1	1	0.94	0.94	0.94	0.94
	5/16	M_u	1194	1344	1480	1373	1553	1719	1871	1762	1958	2140	2308
		R_{ki}	387	421	455	502	547	592	636	690	746	803	859
		n	1.13	1.15	1.16	1.05	1.08	1.09	1.1	1.01	1.03	1.04	1.04
	¼	M_u	1033	1150	1255	1187	1327	1455	1572	1504	1656	1797	1926
		R_{ki}	358	386	413	466	501	536	572	632	676	721	766
		n	1.09	1.11	1.12	1.01	1.03	1.05	1.06	0.97	0.99	1	1

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	4654	5075	5476	5858	6221	5592	6046	6479	6893	6110	6615
		R_{ki}	4370	4584	4798	5012	5227	5521	5779	6037	6295	6545	6851
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3958	4252	4530	4792	5038	4683	4998	5297	5580	5113	5465
		R_{ki}	3940	4069	4197	4326	4454	4900	5055	5210	5364	5809	5992
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3609	3838	4054	4256	4444	4225	4471	4702	4920	4612	4888
		R_{ki}	3654	3725	3796	3867	3938	4486	4572	4657	4743	5318	5419
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3316	3494	3661	3817	3961	3843	4033	4212	4380	4192	4406
		R_{ki}	3580	3637	3693	3749	3806	4380	4448	4516	4583	5192	5272
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	4000	4419	4818	5198	5559	4878	5329	5761	6173	5338	5840
		R_{ki}	2844	3057	3269	3482	3694	3684	3941	4197	4453	4371	4675
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3308	3600	3876	4137	4382	3972	4286	4583	4865	4344	4695
		R_{ki}	2419	2546	2673	2801	2928	3068	3222	3376	3529	3640	3822
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2960	3188	3402	3603	3790	3517	3761	3991	4208	3845	4119
		R_{ki}	2134	2205	2275	2346	2416	2657	2742	2827	2912	3152	3253
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2668	2845	3011	3166	3309	3136	3325	3503	3670	3426	3639
		R_{ki}	2061	2117	2173	2229	2285	2552	2619	2687	2754	3027	3107
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	3678	4096	4495	4873	5233	4526	4976	5407	5818	4957	5458
		R_{ki}	2310	2521	2733	2945	3156	3040	3295	3550	3806	3607	3910
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2987	3279	3554	3814	4058	3622	3935	4232	4513	3965	4315
		R_{ki}	1886	2012	2139	2266	2393	2426	2579	2732	2885	2879	3060
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2640	2868	3082	3282	3468	3167	3411	3641	3857	3467	3740
		R_{ki}	1602	1673	1743	1813	1883	2017	2101	2186	2271	2393	2493
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2349	2526	2691	2846	2988	2787	2976	3154	3320	3049	3261
		R_{ki}	1530	1586	1641	1697	1753	1912	1979	2046	2113	2268	2348
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	3598	4015	4413	4790	5149	4439	4888	5318	5727	4864	5364
		R_{ki}	2357	2567	2778	2989	3200	3097	3351	3605	3860	3676	3978
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2909	3200	3475	3734	3977	3537	3849	4145	4425	3874	4223
		R_{ki}	1934	2061	2187	2313	2440	2485	2638	2790	2943	2950	3131
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2563	2790	3003	3202	3388	3083	3326	3555	3771	3377	3649
		R_{ki}	1652	1722	1792	1862	1932	2077	2162	2246	2330	2466	2566
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2272	2448	2614	2767	2910	2704	2892	3070	3236	2959	3171
		R_{ki}	1580	1635	1691	1746	1802	1973	2040	2106	2173	2341	2421
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	3286	3702	4098	4475	4832	4097	4545	4974	5382	4493	4992
		R_{ki}	1885	2095	2305	2515	2725	2528	2781	3034	3288	3001	3302
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2598	2888	3162	3421	3663	3197	3508	3803	4083	3505	3854
		R_{ki}	1464	1590	1716	1842	1967	1919	2070	2222	2374	2278	2458
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2253	2479	2692	2890	3075	2744	2986	3215	3429	3009	3281
		R_{ki}	1183	1253	1323	1392	1462	1512	1596	1680	1764	1795	1895
		n	0.83	0.86	0.87	0.89	0.89	0.83	0.83	0.84	0.85	0.83	0.83
	¼	M_u	1963	2139	2303	2456	2598	2365	2553	2730	2896	2592	2804
		R_{ki}	1111	1167	1222	1277	1332	1408	1474	1541	1608	1671	1750
		n	0.83	0.83	0.83	0.84	0.85	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	3002	3416	3812	4187	4543	3786	4233	4660	5067	4155	4653
		R_{ki}	1548	1757	1966	2175	2384	2121	2373	2625	2878	2519	2819
		n	0.84	0.85	0.84	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2315	2604	2878	3135	3377	2887	3197	3492	3771	3169	3517
		R_{ki}	1129	1254	1379	1505	1630	1514	1665	1816	1968	1798	1978
		n	0.88	0.89	0.89	0.89	0.88	0.83	0.84	0.84	0.84	0.83	0.83
	5/16	M_u	1971	2196	2408	2606	2790	2435	2677	2905	3119	2674	2945
		R_{ki}	849	918	988	1057	1127	1109	1192	1276	1360	1317	1416
		n	0.95	0.97	0.98	0.99	0.99	0.92	0.93	0.94	0.95	0.87	0.89
	¼	M_u	1681	1857	2021	2173	2315	2057	2245	2421	2586	2258	2469
		R_{ki}	777	832	887	942	997	1005	1071	1138	1204	1193	1272
		n	0.91	0.93	0.94	0.95	0.95	0.88	0.89	0.9	0.91	0.83	0.84

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam									
			W36		W40				W44			
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row
¾	½	M_u	7100	7566	6800	7374	7928	8462	7490	8133	8756	9359
		R_{ki}	7157	7463	8046	8422	8798	9175	9702	10156	10609	11063
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5802	6122	5687	6089	6475	6845	6262	6713	7148	7568
		R_{ki}	6176	6359	7141	7367	7592	7818	8611	8883	9155	9427
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5149	5396	5128	5443	5744	6032	5644	5999	6340	6667
		R_{ki}	5521	5622	6537	6662	6787	6912	7882	8033	8183	8334
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4608	4800	4657	4902	5136	5359	5122	5399	5664	5918
		R_{ki}	5353	5433	6382	6481	6580	6679	7696	7815	7934	8054
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	6323	6787	5950	6521	7073	7606	6562	7203	7823	8424
		R_{ki}	4978	5282	5377	5751	6125	6499	6487	6938	7389	7841
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5030	5349	4841	5241	5625	5994	5337	5787	6220	6638
		R_{ki}	4004	4186	4477	4702	4926	5150	5402	5672	5943	6213
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4379	4626	4283	4597	4897	5183	4721	5075	5415	5741
		R_{ki}	3354	3454	3877	4001	4125	4249	4677	4827	4977	5127
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3841	4031	3814	4058	4291	4513	4201	4477	4741	4994
		R_{ki}	3187	3267	3723	3822	3920	4018	4492	4611	4729	4848
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	5940	6403	5530	6101	6652	7183	6104	6743	7363	7963
		R_{ki}	4213	4516	4439	4812	5185	5558	5357	5807	6257	6707
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4649	4967	4423	4822	5206	5573	4881	5329	5762	6180
		R_{ki}	3242	3424	3543	3766	3990	4213	4275	4545	4815	5084
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4000	4246	3866	4180	4479	4764	4266	4619	4958	5283
		R_{ki}	2594	2694	2944	3068	3192	3315	3553	3702	3852	4001
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3463	3652	3397	3641	3874	4095	3746	4021	4285	4538
		R_{ki}	2427	2507	2791	2889	2987	3085	3368	3486	3605	3723
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	5845	6306	5429	5998	6548	7078	5995	6633	7251	7850
		R_{ki}	4280	4582	4525	4897	5269	5640	5463	5912	6361	6809
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4556	4874	4324	4722	5105	5472	4773	5221	5653	6070
		R_{ki}	3312	3493	3632	3855	4077	4300	4384	4653	4922	5191
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3908	4153	3768	4080	4379	4664	4159	4511	4850	5175
		R_{ki}	2666	2766	3035	3158	3282	3405	3664	3813	3962	4110
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3372	3561	3300	3543	3775	3996	3640	3915	4178	4430
		R_{ki}	2500	2580	2882	2980	3078	3176	3479	3597	3715	3834
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	5472	5933	5020	5589	6137	6666	5548	6185	6802	7400
		R_{ki}	3603	3904	3696	4067	4437	4808	4463	4911	5358	5806
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4186	4503	3917	4314	4696	5063	4328	4775	5207	5622
		R_{ki}	2639	2819	2805	3027	3249	3471	3387	3656	3924	4192
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3539	3784	3362	3674	3972	4256	3715	4067	4405	4729
		R_{ki}	1995	2094	2210	2333	2456	2579	2669	2818	2966	3114
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3004	3193	2895	3137	3369	3589	3197	3471	3734	3986
		R_{ki}	1830	1909	2058	2156	2253	2351	2485	2603	2721	2838
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	5132	5591	4648	5215	5762	6290	5140	5776	6392	6989
		R_{ki}	3118	3418	3103	3472	3842	4211	3748	4194	4640	5087
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3848	4164	3546	3943	4324	4689	3922	4369	4799	5214
		R_{ki}	2157	2337	2215	2436	2658	2879	2675	2943	3210	3477
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3203	3447	2992	3303	3601	3884	3310	3661	3998	4322
		R_{ki}	1516	1615	1622	1744	1867	1989	1959	2107	2255	2403
		n	0.9	0.9	0.83	0.83	0.84	0.85	0.83	0.83	0.83	0.83
	¼	M_u	2669	2857	2525	2768	2999	3218	2793	3066	3329	3580
		R_{ki}	1351	1430	1470	1567	1664	1761	1775	1893	2010	2128
		n	0.86	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16		W18		
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	1447	1747	1969	2047	2321	2672	3024	3377	3375	3780	4161
		R_{ki}	421	632	687	887	964	1288	1659	1792	2078	2244	2411
		n	1.19	1.06	1.08	0.95	0.98	0.89	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1323	1593	1735	1864	2041	2347	2653	2880	2959	3221	3463
		R_{ki}	380	570	592	800	830	1109	1428	1479	1788	1852	1917
		n	1.2	1.07	1.1	0.96	0.99	0.9	0.83	0.85	0.83	0.83	0.83
	5/16	M_u	1279	1538	1654	1797	1943	2231	2520	2706	2808	3024	3222
		R_{ki}	379	568	589	797	826	1103	1421	1470	1779	1840	1902
		n	1.18	1.05	1.07	0.94	0.96	0.87	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1227	1474	1558	1720	1827	2096	2364	2501	2633	2792	2935
		R_{ki}	366	549	559	770	784	1048	1349	1373	1689	1719	1749
		n	1.18	1.04	1.06	0.93	0.96	0.86	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	1144	1391	1610	1637	1908	2206	2504	2853	2802	3203	3581
		R_{ki}	252	381	434	536	612	820	1059	1190	1328	1492	1657
		n	1.36	1.23	1.24	1.12	1.13	1.04	0.96	0.97	0.9	0.91	0.91
	⅜	M_u	1022	1239	1378	1456	1631	1883	2136	2361	2388	2649	2888
		R_{ki}	213	321	341	451	481	644	831	882	1042	1106	1169
		n	1.4	1.26	1.29	1.15	1.18	1.09	1.02	1.04	0.95	0.97	0.99
	5/16	M_u	978	1184	1299	1390	1534	1769	2004	2188	2239	2452	2649
		R_{ki}	211	319	339	449	477	638	824	872	1033	1094	1154
		n	1.37	1.24	1.26	1.13	1.15	1.06	0.98	1	0.91	0.93	0.95
	¼	M_u	927	1120	1204	1313	1419	1634	1849	1984	2065	2222	2364
		R_{ki}	199	300	310	423	436	584	754	777	945	974	1003
		n	1.38	1.24	1.27	1.13	1.16	1.07	0.99	1.01	0.92	0.94	0.96
9/16	½	M_u	1097	1337	1555	1578	1847	2139	2432	2780	2724	3124	3500
		R_{ki}	272	413	466	583	658	883	1141	1271	1433	1596	1759
		n	1.29	1.16	1.17	1.05	1.07	0.98	0.9	0.92	0.83	0.85	0.86
	⅜	M_u	975	1186	1325	1398	1572	1818	2065	2289	2312	2571	2810
		R_{ki}	233	353	374	499	528	708	915	965	1149	1212	1275
		n	1.31	1.18	1.21	1.07	1.11	1.01	0.94	0.97	0.87	0.9	0.92
	5/16	M_u	932	1132	1246	1332	1475	1704	1934	2117	2163	2376	2571
		R_{ki}	232	351	371	496	524	703	908	956	1140	1200	1260
		n	1.29	1.15	1.18	1.04	1.07	0.98	0.9	0.92	0.83	0.86	0.88
	¼	M_u	882	1069	1151	1256	1361	1570	1780	1914	1990	2146	2288
		R_{ki}	220	333	342	470	483	649	838	861	1052	1081	1110
		n	1.29	1.15	1.18	1.04	1.07	0.98	0.9	0.93	0.83	0.86	0.88
½	½	M_u	952	1166	1382	1380	1647	1913	2178	2525	2444	2842	3216
		R_{ki}	202	307	359	434	508	683	884	1013	1111	1273	1435
		n	1.39	1.25	1.26	1.14	1.16	1.07	0.99	1	0.92	0.93	0.93
	⅜	M_u	832	1016	1154	1201	1373	1593	1813	2036	2033	2291	2529
		R_{ki}	163	248	268	351	379	510	660	709	829	891	954
		n	1.43	1.3	1.33	1.19	1.22	1.13	1.06	1.08	0.99	1.02	1.03
	5/16	M_u	789	962	1075	1135	1277	1480	1682	1865	1885	2097	2291
		R_{ki}	162	246	265	348	375	504	653	700	820	880	939
		n	1.4	1.27	1.29	1.16	1.19	1.1	1.02	1.04	0.95	0.97	0.98
	¼	M_u	739	899	981	1060	1164	1347	1529	1663	1712	1868	2008
		R_{ki}	150	228	237	322	336	451	583	606	733	762	790
		n	1.41	1.28	1.3	1.17	1.2	1.11	1.03	1.05	0.96	0.99	1.01
7/16	½	M_u	811	998	1212	1185	1450	1689	1927	2272	2165	2562	2935
		R_{ki}	150	229	280	324	398	535	693	821	872	1033	1194
		n	1.47	1.34	1.33	1.23	1.23	1.14	1.06	1.06	0.99	0.99	0.99
	⅜	M_u	691	849	985	1006	1178	1371	1563	1785	1756	2013	2250
		R_{ki}	112	171	191	242	270	364	471	520	592	654	717
		n	1.55	1.42	1.44	1.31	1.34	1.25	1.17	1.19	1.1	1.12	1.14
	5/16	M_u	649	795	907	941	1082	1258	1433	1615	1608	1819	2013
		R_{ki}	111	169	188	239	266	358	464	511	583	643	702
		n	1.52	1.38	1.4	1.27	1.29	1.2	1.13	1.14	1.06	1.07	1.08
	¼	M_u	599	733	814	866	969	1125	1281	1413	1436	1591	1731
		R_{ki}	99	151	160	214	227	305	395	418	497	525	554
		n	1.54	1.4	1.43	1.29	1.32	1.23	1.16	1.18	1.09	1.12	1.13
⅜	½	M_u	771	953	1165	1134	1398	1631	1864	2207	2096	2491	2863
		R_{ki}	151	231	282	329	401	541	702	829	884	1044	1204
		n	1.43	1.3	1.3	1.19	1.2	1.11	1.04	1.04	0.97	0.97	0.97
	⅜	M_u	652	804	939	956	1127	1314	1501	1722	1689	1945	2180
		R_{ki}	114	174	194	247	275	371	481	530	606	668	729
		n	1.5	1.37	1.4	1.26	1.3	1.21	1.13	1.16	1.06	1.09	1.11
	5/16	M_u	611	751	862	892	1032	1202	1372	1553	1541	1752	1944
		R_{ki}	113	172	191	245	271	366	474	521	597	656	715
		n	1.47	1.34	1.36	1.23	1.25	1.16	1.09	1.11	1.02	1.04	1.05
	¼	M_u	561	689	769	817	920	1070	1220	1352	1370	1524	1664
		R_{ki}	101	155	164	219	232	313	406	429	511	539	568
		n	1.49	1.35	1.38	1.24	1.28	1.19	1.11	1.14	1.04	1.07	1.09

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W21			W24				W27			
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row
¾	½	M_u	4384	4842	5277	4988	5524	6036	6525	6206	6795	7361	7903
		R_{ki}	3018	3242	3466	3906	4196	4487	4777	5274	5639	6004	6369
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3733	4028	4303	4245	4593	4921	5227	5159	5539	5899	6238
		R_{ki}	2491	2577	2664	3223	3336	3448	3560	4192	4333	4474	4615
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3500	3743	3967	3977	4263	4531	4782	4783	5096	5390	5668
		R_{ki}	2474	2557	2639	3202	3309	3416	3523	4159	4293	4427	4562
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3228	3405	3567	3665	3875	4070	4250	4345	4574	4787	4986
		R_{ki}	2311	2351	2391	2991	3043	3094	3146	3824	3889	3954	4019
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	3727	4182	4614	4251	4784	5293	5778	5385	5971	6534	7073
		R_{ki}	2011	2232	2454	2606	2894	3181	3468	3641	4002	4364	4726
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3080	3373	3645	3512	3858	4183	4488	4343	4721	5079	5415
		R_{ki}	1490	1575	1661	1930	2042	2153	2264	2568	2708	2848	2988
		n	0.88	0.9	0.92	0.83	0.83	0.85	0.86	0.83	0.83	0.83	0.83
	5/16	M_u	2849	3089	3312	3245	3529	3796	4045	3970	4280	4573	4848
		R_{ki}	1473	1555	1637	1910	2015	2121	2227	2535	2669	2802	2935
		n	0.84	0.86	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2578	2754	2914	2935	3144	3337	3516	3533	3761	3973	4170
		R_{ki}	1312	1352	1391	1700	1752	1803	1854	2203	2268	2332	2397
		n	0.85	0.87	0.89	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	3639	4093	4523	4155	4686	5193	5677	5279	5864	6425	6962
		R_{ki}	2153	2373	2593	2792	3078	3364	3650	3876	4236	4596	4956
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2995	3286	3557	3418	3763	4087	4390	4239	4616	4973	5308
		R_{ki}	1634	1720	1805	2120	2231	2341	2452	2808	2948	3087	3226
		n	0.83	0.84	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2764	3003	3225	3152	3435	3701	3949	3867	4176	4468	4743
		R_{ki}	1619	1700	1781	2099	2205	2310	2415	2775	2908	3040	3173
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2494	2669	2829	2842	3050	3243	3421	3432	3658	3870	4066
		R_{ki}	1458	1497	1537	1891	1942	1993	2044	2445	2509	2573	2637
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	3317	3769	4198	3793	4322	4827	5310	4874	5457	6017	6553
		R_{ki}	1718	1937	2157	2231	2515	2800	3084	3169	3527	3885	4244
		n	0.84	0.85	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2674	2965	3235	3057	3401	3724	4026	3837	4213	4568	4903
		R_{ki}	1203	1288	1373	1562	1672	1782	1892	2106	2245	2383	2522
		n	0.93	0.95	0.96	0.85	0.87	0.89	0.9	0.83	0.83	0.84	0.85
	5/16	M_u	2444	2683	2904	2792	3074	3339	3586	3466	3774	4065	4339
		R_{ki}	1187	1268	1349	1541	1646	1751	1855	2073	2205	2337	2469
		n	0.88	0.9	0.91	0.83	0.83	0.83	0.84	0.83	0.83	0.83	0.83
	¼	M_u	2175	2349	2508	2483	2690	2883	3060	3031	3257	3468	3664
		R_{ki}	1028	1067	1106	1334	1385	1435	1486	1744	1808	1872	1936
		n	0.9	0.92	0.94	0.83	0.85	0.87	0.88	0.83	0.83	0.83	0.83
7/16	½	M_u	2997	3447	3874	3431	3959	4463	4944	4471	5052	5610	6145
		R_{ki}	1396	1614	1832	1814	2097	2380	2663	2643	3000	3357	3714
		n	0.91	0.9	0.9	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2356	2645	2914	2698	3041	3362	3663	3436	3811	4165	4499
		R_{ki}	884	968	1053	1148	1258	1367	1477	1585	1723	1861	1999
		n	1.04	1.05	1.06	0.96	0.98	0.99	0.99	0.91	0.92	0.93	0.93
	5/16	M_u	2126	2364	2584	2433	2715	2979	3225	3066	3373	3663	3936
		R_{ki}	868	949	1029	1128	1232	1336	1440	1553	1684	1815	1947
		n	0.99	1	1	0.91	0.92	0.93	0.93	0.86	0.86	0.87	0.87
	¼	M_u	1858	2032	2190	2125	2332	2524	2700	2633	2858	3068	3262
		R_{ki}	710	749	787	922	972	1023	1073	1225	1289	1352	1416
		n	1.03	1.05	1.06	0.95	0.97	0.99	1	0.91	0.93	0.94	0.95
⅜	½	M_u	2918	3367	3792	3344	3870	4373	4852	4374	4954	5510	6043
		R_{ki}	1412	1629	1845	1836	2118	2399	2681	2671	3026	3381	3736
		n	0.88	0.88	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2279	2567	2835	2613	2954	3275	3575	3342	3716	4069	4401
		R_{ki}	903	987	1070	1174	1283	1392	1501	1618	1755	1892	2030
		n	1	1.02	1.03	0.93	0.95	0.96	0.97	0.88	0.9	0.91	0.91
	5/16	M_u	2050	2287	2506	2349	2630	2892	3138	2972	3279	3568	3840
		R_{ki}	887	967	1047	1153	1257	1361	1464	1585	1716	1847	1977
		n	0.95	0.96	0.97	0.87	0.89	0.9	0.9	0.83	0.84	0.84	0.85
	¼	M_u	1783	1956	2113	2042	2248	2439	2615	2540	2765	2974	3168
		R_{ki}	730	768	807	948	999	1049	1099	1259	1322	1386	1449
		n	0.98	1.01	1.03	0.91	0.93	0.95	0.97	0.87	0.89	0.91	0.92

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	6887	7554	8197	8817	9413	8313	9033	9730	10404	9072	9869
		R_{ki}	6475	6923	7371	7819	8267	8338	8878	9418	9958	9885	10526
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5724	6157	6570	6962	7333	6775	7241	7687	8111	7394	7913
		R_{ki}	5146	5319	5493	5666	5839	6407	6616	6824	7033	7595	7843
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5304	5660	5999	6320	6623	6224	6607	6972	7319	6789	7215
		R_{ki}	5105	5270	5435	5600	5765	6347	6546	6745	6943	7525	7760
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4815	5077	5324	5556	5773	5581	5861	6126	6376	6084	6398
		R_{ki}	4694	4774	4853	4933	5013	5749	5845	5941	6038	6816	6930
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	5987	6650	7290	7906	8499	7329	8046	8740	9410	8008	8802
		R_{ki}	4474	4918	5363	5807	6252	5928	6464	7000	7536	7033	7668
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4828	5259	5670	6060	6429	5797	6261	6704	7126	6335	6852
		R_{ki}	3156	3328	3500	3672	3844	4011	4218	4426	4633	4758	5004
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4410	4764	5101	5420	5722	5249	5629	5992	6338	5733	6157
		R_{ki}	3115	3279	3442	3606	3770	3952	4149	4346	4544	4688	4922
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3923	4184	4430	4660	4875	4607	4886	5150	5399	5031	5343
		R_{ki}	2707	2786	2865	2945	3024	3358	3454	3549	3644	3984	4097
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	5872	6534	7172	7787	8378	7204	7920	8612	9280	7874	8667
		R_{ki}	4765	5207	5650	6093	6536	6279	6813	7347	7881	7452	8085
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4716	5146	5555	5944	6312	5676	6138	6580	7001	6205	6721
		R_{ki}	3452	3624	3795	3966	4137	4369	4576	4782	4989	5185	5430
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4299	4652	4988	5306	5607	5128	5508	5870	6214	5604	6027
		R_{ki}	3412	3575	3738	3901	4064	4311	4507	4703	4900	5115	5348
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3813	4073	4318	4548	4762	4488	4766	5029	5277	4903	5215
		R_{ki}	3006	3084	3163	3242	3321	3719	3814	3909	4004	4413	4526
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	5427	6087	6724	7337	7927	6717	7431	8122	8789	7347	8138
		R_{ki}	3897	4338	4779	5220	5661	5233	5765	6297	6829	6212	6843
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4273	4702	5111	5498	5865	5192	5653	6094	6514	5681	6195
		R_{ki}	2590	2761	2931	3102	3272	3330	3536	3742	3947	3953	4197
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3857	4210	4545	4862	5162	4645	5024	5385	5729	5080	5503
		R_{ki}	2550	2712	2874	3037	3199	3271	3467	3663	3859	3883	4116
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3373	3632	3876	4105	4319	4006	4284	4546	4794	4381	4692
		R_{ki}	2145	2224	2302	2381	2459	2682	2777	2872	2966	3184	3296
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	4983	5642	6277	6888	7476	6231	6943	7632	8298	6820	7610
		R_{ki}	3252	3692	4131	4570	5009	4455	4985	5515	6045	5290	5919
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3832	4260	4667	5053	5419	4708	5169	5608	6027	5157	5670
		R_{ki}	1951	2121	2290	2460	2630	2559	2764	2969	3174	3038	3282
		n	0.85	0.87	0.87	0.88	0.88	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3416	3768	4102	4419	4717	4163	4541	4901	5244	4558	4979
		R_{ki}	1911	2072	2234	2395	2557	2501	2696	2891	3085	2969	3201
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2933	3192	3435	3663	3876	3525	3802	4064	4311	3859	4170
		R_{ki}	1508	1586	1664	1742	1820	1913	2008	2102	2196	2272	2384
		n	0.85	0.87	0.88	0.89	0.9	0.83	0.83	0.84	0.85	0.83	0.83
⅜	½	M_u	4878	5535	6168	6778	7365	6116	6827	7514	8178	6697	7485
		R_{ki}	3288	3725	4162	4600	5037	4497	5025	5553	6081	5341	5969
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3729	4156	4562	4948	5312	4596	5056	5494	5912	5037	5549
		R_{ki}	1991	2160	2330	2499	2668	2608	2812	3017	3221	3098	3340
		n	0.83	0.84	0.85	0.86	0.86	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3315	3666	3999	4314	4612	4052	4429	4789	5130	4439	4860
		R_{ki}	1951	2112	2273	2434	2595	2550	2744	2938	3133	3029	3260
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2832	3090	3333	3561	3773	3416	3692	3953	4199	3742	4051
		R_{ki}	1550	1628	1706	1784	1861	1965	2059	2153	2247	2334	2446
		n	0.83	0.83	0.85	0.86	0.87	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam									
			W36		W40				W44			
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row
¾	½	M_u	10644	11394	10084	10984	11862	12715	11096	12099	13079	14036
		R_{ki}	11166	11806	12153	12940	13728	14515	14655	15604	16554	17503
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	8411	8889	8218	8808	9377	9926	9042	9703	10343	10962
		R_{ki}	8091	8338	9337	9642	9946	10251	11259	11626	11994	12361
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	7624	8015	7541	8026	8494	8944	8294	8837	9363	9872
		R_{ki}	7996	8231	9251	9540	9830	10120	11155	11504	11853	12203
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	6697	6980	6756	7114	7457	7786	7427	7830	8218	8591
		R_{ki}	7044	7157	8379	8519	8659	8799	10103	10272	10441	10610
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	9573	10321	8913	9810	10684	11535	9818	10818	11795	12749
		R_{ki}	8304	8940	8652	9434	10217	10999	10439	11383	12327	13271
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	7348	7824	7053	7641	8208	8754	7770	8429	9067	9684
		R_{ki}	5250	5496	5853	6156	6458	6761	7062	7427	7792	8157
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	6564	6954	6378	6862	7327	7775	7024	7566	8090	8596
		R_{ki}	5156	5390	5767	6055	6343	6631	6958	7305	7653	8000
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5641	5923	5595	5952	6294	6621	6160	6561	6948	7319
		R_{ki}	4210	4323	4901	5040	5179	5318	5912	6080	6248	6416
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	9437	10182	8768	9664	10536	11385	9662	10661	11636	12588
		R_{ki}	8719	9353	9171	9951	10731	11511	11068	12009	12951	13892
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	7216	7690	6911	7498	8064	8609	7617	8275	8912	9527
		R_{ki}	5675	5920	6381	6682	6984	7286	7701	8065	8429	8793
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	6433	6822	6238	6720	7185	7632	6872	7413	7936	8442
		R_{ki}	5581	5814	6295	6582	6869	7156	7597	7943	8290	8636
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5511	5793	5456	5812	6154	6480	6009	6410	6796	7167
		R_{ki}	4639	4751	5431	5570	5709	5847	6554	6722	6889	7057
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	8906	9650	8187	9081	9952	10799	9027	10024	10998	11948
		R_{ki}	7475	8106	7648	8425	9203	9980	9232	10171	11110	12048
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6689	7162	6333	6919	7483	8027	6985	7642	8277	8892
		R_{ki}	4441	4686	4866	5167	5468	5768	5874	6237	6601	6964
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5908	6296	5661	6142	6606	7052	6241	6781	7304	7808
		R_{ki}	4348	4580	4781	5067	5353	5639	5771	6116	6462	6807
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4988	5269	4880	5236	5576	5902	5380	5780	6165	6535
		R_{ki}	3408	3521	3919	4058	4196	4334	4731	4898	5065	5232
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	8376	9119	7606	8499	9368	10213	8392	9387	10360	11308
		R_{ki}	6548	7178	6515	7290	8065	8840	7867	8803	9739	10675
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6163	6635	5755	6339	6903	7446	6353	7008	7643	8257
		R_{ki}	3525	3769	3742	4042	4341	4641	4518	4880	5242	5604
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5384	5770	5084	5564	6027	6472	5610	6149	6671	7174
		R_{ki}	3432	3664	3656	3942	4227	4512	4415	4760	5104	5448
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4465	4745	4304	4660	4999	5324	4750	5149	5534	5903
		R_{ki}	2496	2608	2798	2936	3074	3212	3378	3545	3712	3878
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	8250	8991	7472	8363	9230	10074	8247	9241	10211	11158
		R_{ki}	6596	7223	6581	7353	8126	8899	7949	8882	9816	10749
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6041	6512	5624	6207	6770	7311	6211	6865	7499	8111
		R_{ki}	3583	3826	3816	4115	4414	4713	4610	4971	5332	5693
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5263	5649	4954	5433	5895	6340	5469	6007	6528	7031
		R_{ki}	3490	3721	3731	4016	4300	4584	4507	4850	5194	5537
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4346	4625	4176	4530	4869	5193	4610	5009	5393	5761
		R_{ki}	2557	2669	2875	3013	3150	3288	3473	3639	3805	3971
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16			W18	
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	1375	1663	1852	1952	2188	2524	2860	3165	3196	3549	3874
		R_{ki}	307	460	487	645	682	911	1173	1237	1469	1549	1628
		n	1.35	1.22	1.25	1.11	1.15	1.06	0.98	1.01	0.91	0.95	0.97
	⅜	M_u	1268	1530	1660	1791	1955	2251	2547	2758	2842	3088	3311
		R_{ki}	293	439	455	616	638	852	1097	1135	1373	1421	1469
		n	1.33	1.2	1.23	1.09	1.12	1.03	0.95	0.98	0.88	0.91	0.94
	5/16	M_u	1215	1463	1563	1710	1838	2114	2389	2553	2664	2856	3028
		R_{ki}	284	425	434	596	608	812	1046	1067	1309	1336	1362
		n	1.33	1.19	1.22	1.08	1.11	1.02	0.94	0.97	0.87	0.9	0.93
	¼	M_u	1170	1406	1484	1642	1742	2000	2257	2384	2515	2664	2797
		R_{ki}	281	422	429	591	601	802	1033	1050	1293	1314	1335
		n	1.31	1.17	1.2	1.06	1.09	1	0.92	0.94	0.85	0.87	0.89
⅝	½	M_u	1071	1305	1491	1539	1772	2054	2336	2638	2618	2968	3290
		R_{ki}	178	269	294	378	414	554	715	778	897	976	1054
		n	1.53	1.4	1.43	1.3	1.33	1.24	1.16	1.18	1.09	1.12	1.13
	⅜	M_u	965	1173	1300	1380	1542	1784	2025	2234	2267	2510	2732
		R_{ki}	165	248	263	349	371	496	640	678	802	850	897
		n	1.52	1.39	1.41	1.28	1.31	1.22	1.14	1.17	1.07	1.1	1.12
	5/16	M_u	913	1106	1205	1300	1426	1648	1869	2031	2090	2280	2451
		R_{ki}	156	234	243	330	342	457	590	611	739	765	792
		n	1.52	1.39	1.42	1.28	1.31	1.22	1.14	1.17	1.07	1.11	1.13
	¼	M_u	869	1051	1127	1233	1331	1535	1738	1864	1942	2090	2221
		R_{ki}	153	231	238	325	334	447	577	593	723	744	765
		n	1.5	1.36	1.39	1.25	1.28	1.19	1.11	1.14	1.04	1.07	1.09
9/16	½	M_u	924	1131	1316	1339	1571	1826	2081	2381	2336	2684	3005
		R_{ki}	134	202	228	285	321	430	556	618	697	776	854
		n	1.62	1.49	1.51	1.38	1.41	1.32	1.24	1.26	1.18	1.2	1.21
	⅜	M_u	820	1000	1127	1181	1342	1556	1771	1979	1986	2228	2449
		R_{ki}	121	182	197	256	278	372	481	518	604	650	697
		n	1.61	1.48	1.5	1.37	1.4	1.31	1.23	1.26	1.17	1.19	1.2
	5/16	M_u	767	934	1032	1101	1227	1421	1615	1777	1810	1999	2169
		R_{ki}	112	169	177	237	249	334	431	452	541	567	593
		n	1.61	1.48	1.51	1.37	1.41	1.32	1.24	1.27	1.18	1.21	1.23
	¼	M_u	724	879	955	1034	1132	1309	1485	1610	1662	1809	1940
		R_{ki}	109	165	172	232	242	324	418	435	525	545	566
		n	1.59	1.46	1.49	1.35	1.38	1.29	1.21	1.24	1.14	1.17	1.19
½	½	M_u	880	1082	1264	1283	1514	1763	2012	2311	2262	2609	2928
		R_{ki}	136	206	231	291	327	439	568	629	713	791	868
		n	1.58	1.45	1.48	1.34	1.37	1.29	1.21	1.23	1.14	1.17	1.18
	⅜	M_u	776	951	1077	1126	1286	1495	1704	1911	1913	2154	2374
		R_{ki}	123	186	201	263	284	382	494	530	620	666	713
		n	1.56	1.43	1.46	1.33	1.36	1.27	1.19	1.22	1.13	1.15	1.17
	5/16	M_u	724	886	983	1047	1171	1360	1549	1709	1738	1926	2095
		R_{ki}	114	173	181	244	256	343	444	464	558	583	609
		n	1.57	1.44	1.47	1.33	1.37	1.28	1.2	1.23	1.13	1.17	1.19
	¼	M_u	682	831	906	981	1077	1248	1420	1544	1591	1737	1867
		R_{ki}	112	169	176	239	248	334	431	448	542	562	583
		n	1.54	1.41	1.44	1.3	1.33	1.24	1.17	1.19	1.1	1.13	1.15
7/16	½	M_u	742	917	1098	1092	1321	1544	1767	2064	1990	2335	2653
		R_{ki}	98	149	174	211	246	331	428	490	538	615	693
		n	1.68	1.55	1.56	1.44	1.46	1.38	1.3	1.32	1.24	1.25	1.26
	⅜	M_u	639	788	912	936	1095	1277	1460	1666	1642	1883	2101
		R_{ki}	85	129	144	183	204	274	355	391	446	492	538
		n	1.67	1.54	1.57	1.44	1.46	1.38	1.3	1.32	1.23	1.26	1.27
	5/16	M_u	588	722	818	857	981	1143	1306	1465	1468	1655	1823
		R_{ki}	76	116	124	164	176	236	306	326	384	410	435
		n	1.69	1.56	1.59	1.45	1.49	1.4	1.32	1.36	1.26	1.29	1.31
	¼	M_u	545	668	742	791	887	1032	1177	1300	1321	1467	1596
		R_{ki}	74	112	119	159	168	226	293	309	368	388	409
		n	1.66	1.53	1.56	1.42	1.45	1.36	1.29	1.32	1.22	1.25	1.27
⅜	½	M_u	618	769	949	920	1147	1346	1544	1840	1743	2087	2403
		R_{ki}	71	108	133	154	188	254	329	390	414	491	567
		n	1.76	1.63	1.64	1.53	1.54	1.46	1.38	1.38	1.32	1.32	1.32
	⅜	M_u	516	640	764	764	922	1080	1239	1443	1397	1636	1853
		R_{ki}	58	89	103	126	147	198	256	292	322	368	414
		n	1.77	1.64	1.66	1.54	1.56	1.47	1.4	1.41	1.33	1.35	1.35
	5/16	M_u	465	575	670	686	809	947	1085	1244	1223	1409	1576
		R_{ki}	50	76	84	107	119	160	207	227	261	286	311
		n	1.8	1.68	1.71	1.57	1.61	1.52	1.45	1.47	1.38	1.41	1.43
	¼	M_u	423	521	595	620	715	836	956	1079	1077	1222	1351
		R_{ki}	48	72	79	103	112	150	195	211	245	265	285
		n	1.77	1.64	1.67	1.54	1.57	1.49	1.41	1.44	1.34	1.37	1.39

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W21			W24				W27			
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row
¾	½	M_u	4124	4521	4891	4700	5169	5610	6025	5816	6329	6815	7274
		R_{ki}	2082	2189	2296	2694	2833	2972	3110	3560	3734	3909	4083
		n	0.86	0.88	0.9	0.83	0.83	0.83	0.84	0.83	0.83	0.83	0.83
	⅜	M_u	3583	3858	4111	4078	4404	4709	4992	4951	5307	5642	5954
		R_{ki}	1910	1974	2038	2471	2555	2638	2721	3210	3315	3419	3524
		n	0.83	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3311	3524	3719	3765	4020	4256	4473	4516	4793	5052	5290
		R_{ki}	1795	1831	1866	2323	2369	2415	2461	2977	3035	3092	3150
		n	0.83	0.84	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3083	3249	3399	3503	3701	3883	4050	4153	4368	4567	4751
		R_{ki}	1766	1794	1822	2285	2321	2358	2394	2917	2963	3009	3055
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	3462	3857	4224	3957	4423	4862	5273	4989	5499	5983	6439
		R_{ki}	1314	1420	1526	1703	1840	1978	2115	2315	2488	2661	2834
		n	1.03	1.05	1.06	0.95	0.97	0.99	1	0.91	0.92	0.93	0.94
	⅜	M_u	2924	3197	3448	3338	3663	3965	4246	4128	4483	4815	5125
		R_{ki}	1144	1208	1271	1483	1565	1647	1730	1969	2072	2176	2279
		n	1.01	1.03	1.05	0.93	0.96	0.98	0.99	0.89	0.91	0.92	0.93
	5/16	M_u	2654	2866	3058	3027	3281	3515	3730	3696	3971	4228	4465
		R_{ki}	1031	1066	1101	1336	1381	1427	1472	1737	1795	1852	1909
		n	1.02	1.04	1.06	0.94	0.97	0.99	1.01	0.9	0.92	0.94	0.96
	¼	M_u	2428	2592	2741	2766	2963	3144	3310	3334	3548	3746	3928
		R_{ki}	1002	1030	1057	1298	1334	1370	1406	1678	1723	1769	1814
		n	0.98	1	1.02	0.9	0.93	0.95	0.96	0.86	0.88	0.9	0.91
9/16	½	M_u	3138	3531	3896	3592	4057	4494	4904	4583	5091	5573	6028
		R_{ki}	1046	1151	1256	1356	1493	1629	1766	1879	2051	2223	2395
		n	1.11	1.12	1.13	1.03	1.05	1.06	1.06	0.98	0.99	1	1
	⅜	M_u	2602	2874	3124	2975	3299	3600	3880	3724	4077	4408	4718
		R_{ki}	877	940	1003	1137	1219	1301	1383	1534	1637	1740	1844
		n	1.1	1.12	1.13	1.03	1.05	1.06	1.07	0.98	1	1.01	1.01
	5/16	M_u	2332	2543	2735	2665	2918	3151	3365	3292	3567	3823	4059
		R_{ki}	764	799	834	991	1036	1081	1127	1304	1361	1418	1475
		n	1.12	1.15	1.16	1.04	1.07	1.09	1.11	1	1.03	1.04	1.06
	¼	M_u	2107	2271	2418	2405	2601	2782	2946	2932	3145	3342	3524
		R_{ki}	735	763	791	953	989	1025	1061	1245	1290	1335	1381
		n	1.08	1.1	1.12	1	1.03	1.05	1.06	0.96	0.98	1	1.01
½	½	M_u	3054	3445	3809	3500	3963	4399	4807	4480	4988	5468	5921
		R_{ki}	1067	1172	1277	1385	1521	1657	1793	1916	2088	2259	2430
		n	1.08	1.1	1.11	1	1.02	1.03	1.04	0.96	0.97	0.98	0.98
	⅜	M_u	2519	2790	3039	2885	3207	3508	3786	3624	3976	4306	4614
		R_{ki}	899	962	1025	1167	1249	1330	1412	1573	1676	1778	1881
		n	1.07	1.09	1.1	0.99	1.01	1.03	1.04	0.95	0.97	0.98	0.99
	5/16	M_u	2251	2461	2652	2575	2827	3059	3273	3193	3467	3722	3957
		R_{ki}	787	822	857	1022	1067	1112	1157	1344	1400	1457	1514
		n	1.08	1.11	1.13	1	1.03	1.06	1.07	0.97	0.99	1.01	1.03
	¼	M_u	2026	2189	2336	2316	2511	2691	2855	2833	3046	3242	3423
		R_{ki}	759	786	814	984	1020	1056	1092	1285	1330	1375	1420
		n	1.04	1.06	1.08	0.96	0.99	1.01	1.03	0.92	0.95	0.96	0.98
7/16	½	M_u	2741	3131	3493	3147	3609	4043	4450	4086	4592	5071	5522
		R_{ki}	832	936	1040	1080	1215	1351	1486	1532	1702	1873	2044
		n	1.17	1.18	1.18	1.09	1.1	1.11	1.11	1.04	1.04	1.05	1.05
	⅜	M_u	2208	2478	2726	2533	2855	3154	3432	3232	3583	3912	4219
		R_{ki}	665	727	789	863	944	1025	1107	1190	1292	1395	1497
		n	1.17	1.19	1.19	1.1	1.11	1.12	1.13	1.05	1.06	1.07	1.07
	5/16	M_u	1940	2149	2340	2225	2476	2707	2920	2802	3075	3329	3563
		R_{ki}	553	588	622	718	763	808	853	962	1018	1075	1132
		n	1.2	1.23	1.25	1.13	1.16	1.18	1.19	1.09	1.11	1.13	1.14
	¼	M_u	1716	1879	2025	1966	2161	2340	2503	2443	2655	2851	3031
		R_{ki}	525	552	579	681	717	753	788	903	948	993	1038
		n	1.16	1.19	1.2	1.09	1.11	1.13	1.14	1.05	1.07	1.08	1.09
⅜	½	M_u	2456	2845	3206	2826	3286	3719	4124	3727	4232	4709	5159
		R_{ki}	663	767	870	862	997	1132	1266	1257	1427	1597	1767
		n	1.24	1.24	1.23	1.16	1.17	1.16	1.16	1.1	1.1	1.1	1.09
	⅜	M_u	1925	2194	2441	2214	2534	2833	3109	2875	3225	3553	3859
		R_{ki}	497	560	622	647	727	808	889	917	1019	1121	1222
		n	1.26	1.27	1.27	1.19	1.2	1.2	1.2	1.14	1.14	1.14	1.14
	5/16	M_u	1658	1867	2056	1907	2157	2387	2599	2447	2719	2972	3205
		R_{ki}	387	421	455	502	547	592	636	690	746	803	859
		n	1.33	1.35	1.36	1.25	1.28	1.29	1.3	1.21	1.23	1.24	1.24
	¼	M_u	1435	1597	1742	1648	1843	2021	2184	2089	2300	2495	2675
		R_{ki}	358	386	413	466	501	536	572	632	676	721	766
		n	1.29	1.31	1.32	1.21	1.23	1.25	1.26	1.17	1.19	1.2	1.2

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	6463	7048	7606	8137	8640	7767	8397	8999	9574	8486	9187
		R_{ki}	4370	4584	4798	5012	5227	5521	5779	6037	6295	6545	6851
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5497	5905	6291	6655	6998	6503	6941	7357	7750	7102	7591
		R_{ki}	3940	4069	4197	4326	4454	4900	5055	5210	5364	5809	5992
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5012	5331	5630	5911	6172	5868	6209	6531	6833	6406	6788
		R_{ki}	3654	3725	3796	3867	3938	4486	4572	4657	4743	5318	5419
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4605	4852	5084	5301	5501	5337	5602	5850	6084	5822	6119
		R_{ki}	3580	3637	3693	3749	3806	4380	4448	4516	4583	5192	5272
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	5555	6137	6692	7220	7720	6775	7402	8001	8573	7413	8111
		R_{ki}	2844	3057	3269	3482	3694	3684	3941	4197	4453	4371	4675
		n	0.85	0.87	0.88	0.88	0.89	0.83	0.83	0.83	0.84	0.83	0.83
	⅜	M_u	4594	5000	5383	5745	6085	5517	5952	6366	6757	6034	6521
		R_{ki}	2419	2546	2673	2801	2928	3068	3222	3376	3529	3640	3822
		n	0.83	0.85	0.87	0.88	0.89	0.83	0.83	0.83	0.84	0.83	0.83
	5/16	M_u	4111	4428	4725	5004	5263	4884	5223	5543	5844	5340	5721
		R_{ki}	2134	2205	2275	2346	2416	2657	2742	2827	2912	3152	3253
		n	0.84	0.87	0.89	0.9	0.91	0.83	0.83	0.85	0.86	0.83	0.83
	¼	M_u	3705	3951	4182	4397	4596	4355	4618	4866	5097	4758	5054
		R_{ki}	2061	2117	2173	2229	2285	2552	2619	2687	2754	3027	3107
		n	0.83	0.83	0.84	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	5108	5689	6242	6768	7267	6286	6912	7509	8080	6884	7581
		R_{ki}	2310	2521	2733	2945	3156	3040	3295	3550	3806	3607	3910
		n	0.92	0.94	0.94	0.95	0.95	0.88	0.89	0.9	0.9	0.83	0.84
	⅜	M_u	4149	4554	4937	5297	5636	5030	5465	5877	6268	5507	5993
		R_{ki}	1886	2012	2139	2266	2393	2426	2579	2732	2885	2879	3060
		n	0.92	0.94	0.95	0.96	0.96	0.88	0.9	0.91	0.91	0.84	0.85
	5/16	M_u	3667	3983	4280	4558	4816	4399	4737	5056	5356	4815	5195
		R_{ki}	1602	1673	1743	1813	1883	2017	2101	2186	2271	2393	2493
		n	0.94	0.97	0.99	1	1.01	0.92	0.94	0.95	0.96	0.87	0.89
	¼	M_u	3262	3508	3738	3952	4150	3871	4134	4380	4612	4234	4529
		R_{ki}	1530	1586	1641	1697	1753	1912	1979	2046	2113	2268	2348
		n	0.9	0.92	0.94	0.96	0.97	0.87	0.89	0.9	0.92	0.83	0.84
½	½	M_u	4998	5577	6128	6653	7151	6166	6789	7386	7955	6755	7450
		R_{ki}	2357	2567	2778	2989	3200	3097	3351	3605	3860	3676	3978
		n	0.9	0.91	0.92	0.93	0.93	0.86	0.87	0.88	0.88	0.83	0.83
	⅜	M_u	4040	4444	4826	5185	5523	4912	5345	5757	6146	5380	5865
		R_{ki}	1934	2061	2187	2313	2440	2485	2638	2790	2943	2950	3131
		n	0.89	0.91	0.92	0.93	0.94	0.86	0.87	0.88	0.89	0.83	0.83
	5/16	M_u	3559	3875	4171	4447	4705	4282	4620	4938	5237	4690	5068
		R_{ki}	1652	1722	1792	1862	1932	2077	2162	2246	2330	2466	2566
		n	0.91	0.93	0.95	0.97	0.98	0.88	0.9	0.92	0.93	0.83	0.86
	¼	M_u	3155	3400	3630	3843	4041	3755	4017	4263	4494	4110	4404
		R_{ki}	1580	1635	1691	1746	1802	1973	2040	2106	2173	2341	2421
		n	0.86	0.89	0.91	0.92	0.93	0.83	0.85	0.87	0.88	0.83	0.83
7/16	½	M_u	4564	5141	5692	6215	6711	5691	6313	6908	7475	6240	6934
		R_{ki}	1885	2095	2305	2515	2725	2528	2781	3034	3288	3001	3302
		n	0.98	0.99	0.99	0.99	0.99	0.93	0.94	0.94	0.94	0.89	0.89
	⅜	M_u	3609	4011	4392	4751	5087	4440	4872	5282	5671	4868	5352
		R_{ki}	1464	1590	1716	1842	1967	1919	2070	2222	2374	2278	2458
		n	0.99	1	1.01	1.02	1.02	0.95	0.96	0.97	0.97	0.9	0.91
	5/16	M_u	3129	3443	3738	4014	4271	3811	4147	4465	4763	4179	4557
		R_{ki}	1183	1253	1323	1392	1462	1512	1596	1680	1764	1795	1895
		n	1.03	1.06	1.07	1.09	1.09	1	1.02	1.04	1.05	0.96	0.97
	¼	M_u	2726	2970	3199	3412	3609	3285	3546	3792	4021	3600	3894
		R_{ki}	1111	1167	1222	1277	1332	1408	1474	1541	1608	1671	1750
		n	0.99	1.01	1.03	1.04	1.05	0.96	0.98	0.99	1	0.91	0.93
⅜	½	M_u	4169	4745	5294	5815	6310	5258	5878	6472	7038	5771	6463
		R_{ki}	1548	1757	1966	2175	2384	2121	2373	2625	2878	2519	2819
		n	1.04	1.05	1.04	1.04	1.03	0.99	0.99	0.99	0.98	0.95	0.95
	⅜	M_u	3216	3617	3997	4354	4690	4009	4440	4850	5237	4401	4884
		R_{ki}	1129	1254	1379	1505	1630	1514	1665	1816	1968	1798	1978
		n	1.08	1.09	1.09	1.09	1.08	1.03	1.04	1.04	1.04	0.99	0.99
	5/16	M_u	2737	3050	3344	3620	3875	3382	3717	4034	4331	3713	4090
		R_{ki}	849	918	988	1057	1127	1109	1192	1276	1360	1317	1416
		n	1.15	1.17	1.18	1.19	1.19	1.12	1.13	1.14	1.15	1.07	1.09
	¼	M_u	2335	2578	2806	3018	3215	2857	3118	3362	3591	3136	3429
		R_{ki}	777	832	887	942	997	1005	1071	1138	1204	1193	1272
		n	1.11	1.13	1.14	1.15	1.15	1.08	1.09	1.1	1.11	1.03	1.04

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W36		W40				W44				
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	
¾	½	M_u	9861	10508	9445	10241	11011	11753	10403	11295	12161	12998	
		R_{ki}	7157	7463	8046	8422	8798	9175	9702	10156	10609	11063	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	8058	8503	7899	8457	8993	9507	8696	9323	9928	10510	
		R_{ki}	6176	6359	7141	7367	7592	7818	8611	8883	9155	9427	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	7151	7495	7122	7560	7978	8377	7839	8332	8805	9259	
		R_{ki}	5521	5622	6537	6662	6787	6912	7882	8033	8183	8334	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	6400	6666	6468	6808	7133	7443	7114	7498	7866	8219	
		R_{ki}	5353	5433	6382	6481	6580	6679	7696	7815	7934	8054	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
⅝	½	M_u	8782	9426	8264	9057	9824	10563	9114	10003	10866	11700	
		R_{ki}	4978	5282	5377	5751	6125	6499	6487	6938	7389	7841	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	6986	7429	6723	7279	7812	8324	7412	8037	8639	9220	
		R_{ki}	4004	4186	4477	4702	4926	5150	5402	5672	5943	6213	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	6082	6424	5949	6385	6801	7199	6557	7048	7520	7973	
		R_{ki}	3354	3454	3877	4001	4125	4249	4677	4827	4977	5127	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	5334	5599	5296	5636	5959	6267	5835	6217	6585	6936	
		R_{ki}	3187	3267	3723	3822	3920	4018	4492	4611	4729	4848	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
9/16	½	M_u	8250	8892	7681	8473	9238	9976	8477	9365	10226	11059	
		R_{ki}	4213	4516	4439	4812	5185	5558	5357	5807	6257	6707	
		n	0.85	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	6457	6899	6143	6697	7230	7741	6778	7402	8003	8582	
		R_{ki}	3242	3424	3543	3766	3990	4213	4275	4545	4815	5084	
		n	0.86	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	5555	5897	5370	5805	6220	6617	5924	6415	6886	7337	
		R_{ki}	2594	2694	2944	3068	3192	3315	3553	3702	3852	4001	
		n	0.9	0.92	0.83	0.83	0.85	0.86	0.83	0.83	0.83	0.83	
	¼	M_u	4809	5073	4718	5057	5380	5687	5203	5585	5951	6302	
		R_{ki}	2427	2507	2791	2889	2987	3085	3368	3486	3605	3723	
		n	0.86	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
½	½	M_u	8118	8759	7540	8331	9095	9831	8326	9212	10071	10903	
		R_{ki}	4280	4582	4525	4897	5269	5640	5463	5912	6361	6809	
		n	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	6328	6769	6005	6558	7090	7600	6629	7251	7852	8430	
		R_{ki}	3312	3493	3632	3855	4077	4300	4384	4653	4922	5191	
		n	0.84	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	5428	5768	5233	5667	6082	6478	5776	6266	6736	7187	
		R_{ki}	2666	2766	3035	3158	3282	3405	3664	3813	3962	4110	
		n	0.87	0.89	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	4683	4946	4583	4921	5243	5550	5056	5437	5803	6153	
		R_{ki}	2500	2580	2882	2980	3078	3176	3479	3597	3715	3834	
		n	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
7/16	½	M_u	7600	8240	6972	7762	8524	9259	7705	8590	9447	10278	
		R_{ki}	3603	3904	3696	4067	4437	4808	4463	4911	5358	5806	
		n	0.9	0.9	0.83	0.83	0.84	0.84	0.83	0.83	0.83	0.83	
	⅜	M_u	5814	6254	5440	5992	6523	7031	6011	6632	7231	7809	
		R_{ki}	2639	2819	2805	3027	3249	3471	3387	3656	3924	4192	
		n	0.92	0.93	0.84	0.86	0.87	0.87	0.83	0.83	0.83	0.83	
	5/16	M_u	4915	5255	4669	5102	5516	5911	5160	5648	6117	6567	
		R_{ki}	1995	2094	2210	2333	2456	2579	2669	2818	2966	3114	
		n	0.99	1	0.9	0.92	0.93	0.95	0.84	0.86	0.88	0.9	
	¼	M_u	4172	4434	4020	4357	4679	4985	4440	4821	5186	5535	
		R_{ki}	1830	1909	2058	2156	2253	2351	2485	2603	2721	2838	
		n	0.94	0.95	0.85	0.87	0.89	0.9	0.83	0.83	0.83	0.85	
⅜	½	M_u	7128	7766	6455	7243	8003	8736	7139	8022	8878	9707	
		R_{ki}	3118	3418	3103	3472	3842	4211	3748	4194	4640	5087	
		n	0.94	0.94	0.89	0.89	0.89	0.89	0.83	0.84	0.84	0.83	
	⅜	M_u	5345	5784	4924	5476	6005	6513	5447	6067	6665	7242	
		R_{ki}	2157	2337	2215	2436	2658	2879	2675	2943	3210	3477	
		n	0.99	0.99	0.93	0.93	0.94	0.94	0.87	0.88	0.89	0.89	
	5/16	M_u	4448	4787	4155	4588	5001	5395	4597	5085	5553	6002	
		R_{ki}	1516	1615	1622	1744	1867	1989	1959	2107	2255	2403	
		n	1.1	1.1	1.01	1.03	1.04	1.05	0.96	0.98	0.99	1	
	¼	M_u	3706	3968	3507	3844	4165	4470	3879	4259	4623	4972	
		R_{ki}	1351	1430	1470	1567	1664	1761	1775	1893	2010	2128	
		n	1.05	1.06	0.97	0.99	1	1.01	0.92	0.93	0.95	0.96	

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16		W18		
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	1300	1565	1725	1830	2027	2330	2632	2886	2934	3226	3500
		R_{ki}	538	809	864	1135	1212	1620	2086	2219	2612	2779	2946
		n	0.98	0.84	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1210	1454	1556	1698	1826	2095	2365	2529	2635	2824	2998
		R_{ki}	498	747	769	1048	1078	1440	1855	1907	2323	2387	2452
		n	0.98	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1179	1414	1498	1650	1755	2012	2269	2403	2526	2681	2824
		R_{ki}	496	745	766	1046	1074	1435	1848	1897	2314	2375	2437
		n	0.97	0.83	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1141	1368	1429	1595	1672	1914	2157	2255	2400	2514	2618
		R_{ki}	484	726	736	1019	1032	1379	1777	1800	2224	2254	2284
		n	0.96	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	1010	1224	1382	1438	1633	1884	2135	2387	2386	2675	2947
		R_{ki}	315	475	529	669	744	998	1288	1419	1615	1779	1944
		n	1.15	1.02	1.03	0.91	0.92	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	922	1115	1215	1307	1433	1652	1870	2032	2088	2276	2448
		R_{ki}	275	415	436	584	613	821	1060	1111	1329	1393	1457
		n	1.18	1.04	1.07	0.93	0.96	0.87	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	891	1075	1158	1260	1364	1569	1775	1908	1981	2135	2276
		R_{ki}	274	413	433	581	609	816	1053	1101	1321	1381	1442
		n	1.16	1.02	1.04	0.91	0.93	0.84	0.83	0.83	0.83	0.83	0.83
	¼	M_u	854	1030	1089	1205	1281	1472	1664	1761	1855	1969	2071
		R_{ki}	261	394	404	555	568	761	983	1006	1232	1261	1291
		n	1.16	1.03	1.04	0.91	0.94	0.84	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	965	1174	1330	1382	1576	1821	2067	2318	2313	2600	2871
		R_{ki}	341	518	571	731	806	1082	1398	1528	1756	1919	2082
		n	1.07	0.94	0.96	0.83	0.85	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	878	1065	1165	1252	1377	1590	1803	1964	2016	2203	2374
		R_{ki}	302	458	479	647	676	907	1173	1223	1472	1535	1598
		n	1.09	0.95	0.98	0.84	0.87	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	847	1026	1108	1205	1308	1508	1708	1841	1909	2062	2203
		R_{ki}	301	457	476	644	672	902	1166	1213	1463	1523	1583
		n	1.07	0.93	0.96	0.83	0.85	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	810	980	1040	1150	1226	1412	1598	1694	1784	1897	1998
		R_{ki}	289	438	448	618	632	848	1096	1119	1375	1404	1433
		n	1.07	0.93	0.95	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	828	1010	1165	1193	1385	1605	1825	2074	2045	2331	2601
		R_{ki}	248	377	429	533	607	816	1056	1185	1327	1490	1652
		n	1.17	1.04	1.05	0.93	0.94	0.85	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	741	902	1001	1064	1188	1375	1562	1722	1749	1935	2106
		R_{ki}	209	318	338	450	479	643	832	882	1045	1108	1171
		n	1.21	1.08	1.1	0.96	0.99	0.9	0.83	0.85	0.83	0.83	0.83
	5/16	M_u	710	863	944	1017	1119	1293	1468	1599	1642	1795	1935
		R_{ki}	208	316	336	447	475	638	825	873	1037	1096	1156
		n	1.19	1.05	1.07	0.94	0.96	0.87	0.83	0.83	0.83	0.83	0.83
	¼	M_u	674	818	877	962	1037	1197	1358	1454	1518	1630	1731
		R_{ki}	196	298	308	422	435	584	756	779	949	978	1007
		n	1.19	1.06	1.08	0.94	0.97	0.88	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	693	849	1003	1006	1197	1391	1585	1833	1778	2064	2333
		R_{ki}	179	273	325	387	461	620	803	932	1010	1172	1333
		n	1.26	1.13	1.13	1.02	1.02	0.93	0.85	0.85	0.83	0.83	0.83
	⅜	M_u	606	742	840	877	1001	1162	1323	1483	1484	1669	1839
		R_{ki}	141	215	235	305	333	449	581	630	730	793	855
		n	1.33	1.19	1.22	1.08	1.11	1.02	0.94	0.96	0.87	0.89	0.91
	5/16	M_u	576	703	784	831	932	1081	1229	1360	1377	1529	1669
		R_{ki}	140	214	233	302	329	443	574	621	722	781	840
		n	1.3	1.17	1.18	1.06	1.07	0.98	0.9	0.92	0.83	0.85	0.86
	¼	M_u	540	658	717	776	851	985	1119	1215	1254	1365	1466
		R_{ki}	128	196	205	277	290	390	505	528	635	664	692
		n	1.32	1.18	1.2	1.07	1.1	1	0.93	0.95	0.86	0.88	0.9
⅜	½	M_u	655	807	959	958	1148	1336	1525	1772	1713	1998	2265
		R_{ki}	181	277	328	394	466	629	816	943	1027	1187	1347
		n	1.22	1.09	1.09	0.98	0.99	0.9	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	569	700	797	830	953	1108	1264	1423	1420	1604	1774
		R_{ki}	144	220	240	312	340	459	595	644	749	811	873
		n	1.28	1.15	1.17	1.04	1.07	0.98	0.9	0.92	0.83	0.86	0.87
	5/16	M_u	539	661	741	783	884	1027	1171	1301	1314	1465	1604
		R_{ki}	143	218	237	310	336	454	588	635	740	799	858
		n	1.25	1.12	1.14	1.01	1.03	0.94	0.86	0.88	0.83	0.83	0.83
	¼	M_u	504	617	675	730	804	932	1061	1157	1190	1302	1402
		R_{ki}	131	200	209	285	297	401	520	542	654	683	711
		n	1.26	1.13	1.15	1.01	1.05	0.95	0.88	0.9	0.83	0.83	0.85

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W21			W24				W27			
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row
¾	½	M_u	3735	4065	4378	4244	4630	4998	5350	5194	5619	6026	6417
		R_{ki}	3737	3961	4185	4837	5127	5418	5708	6444	6809	7174	7539
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3266	3479	3676	3709	3960	4195	4416	4440	4714	4973	5217
		R_{ki}	3210	3297	3383	4154	4267	4379	4491	5362	5503	5644	5785
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3099	3273	3435	3516	3722	3915	4095	4170	4395	4607	4807
		R_{ki}	3194	3276	3359	4133	4240	4347	4454	5328	5463	5597	5731
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2903	3030	3146	3291	3442	3583	3712	3855	4019	4173	4316
		R_{ki}	3030	3070	3110	3922	3974	4025	4077	4993	5058	5123	5188
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	3107	3435	3746	3539	3923	4289	4638	4410	4832	5238	5626
		R_{ki}	2397	2619	2841	3107	3395	3682	3970	4271	4633	4995	5357
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2641	2852	3048	3007	3256	3490	3709	3660	3932	4190	4432
		R_{ki}	1876	1962	2048	2432	2543	2654	2765	3199	3339	3479	3619
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2475	2648	2808	2815	3020	3211	3391	3391	3615	3826	4024
		R_{ki}	1860	1942	2023	2411	2517	2622	2728	3166	3299	3432	3565
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2280	2406	2522	2591	2742	2881	3010	3077	3241	3393	3535
		R_{ki}	1699	1738	1778	2202	2253	2304	2355	2834	2898	2963	3027
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	3024	3351	3661	3448	3831	4196	4544	4310	4731	5135	5522
		R_{ki}	2588	2809	3029	3358	3644	3930	4216	4587	4947	5307	5668
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2560	2770	2965	2918	3166	3399	3618	3562	3833	4090	4331
		R_{ki}	2070	2155	2241	2685	2796	2907	3017	3520	3659	3798	3938
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2394	2566	2726	2726	2930	3121	3300	3294	3516	3727	3924
		R_{ki}	2054	2135	2216	2665	2770	2875	2980	3487	3620	3752	3884
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2200	2326	2441	2503	2653	2792	2920	2980	3143	3296	3437
		R_{ki}	1894	1933	1972	2457	2507	2558	2609	3156	3221	3285	3349
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	2717	3042	3350	3102	3483	3847	4194	3924	4343	4746	5132
		R_{ki}	2011	2230	2449	2611	2895	3180	3464	3647	4005	4364	4722
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2254	2463	2657	2572	2820	3052	3270	3177	3448	3703	3944
		R_{ki}	1496	1581	1665	1942	2052	2162	2272	2584	2723	2862	3000
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2088	2260	2419	2381	2585	2775	2953	2909	3132	3341	3538
		R_{ki}	1480	1561	1641	1921	2026	2131	2235	2552	2684	2816	2947
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1894	2020	2134	2159	2308	2447	2574	2597	2759	2911	3052
		R_{ki}	1321	1360	1399	1714	1765	1815	1866	2223	2287	2350	2414
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	2410	2735	3042	2757	3136	3499	3845	3538	3957	4359	4743
		R_{ki}	1583	1801	2019	2057	2340	2623	2906	2949	3306	3663	4020
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1949	2157	2351	2228	2475	2707	2924	2793	3063	3318	3558
		R_{ki}	1071	1155	1240	1391	1501	1610	1720	1891	2029	2167	2305
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1784	1955	2113	2038	2241	2431	2608	2526	2748	2957	3153
		R_{ki}	1055	1135	1216	1371	1475	1579	1683	1859	1990	2121	2253
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1591	1716	1829	1816	1965	2103	2230	2215	2377	2528	2668
		R_{ki}	897	935	974	1165	1215	1265	1316	1531	1595	1658	1722
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	2336	2659	2965	2675	3053	3415	3760	3447	3865	4265	4649
		R_{ki}	1606	1822	2039	2088	2369	2651	2933	2988	3343	3699	4054
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1876	2084	2276	2148	2394	2625	2841	2704	2973	3227	3467
		R_{ki}	1097	1180	1264	1426	1535	1644	1752	1935	2073	2210	2347
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1712	1882	2040	1958	2160	2349	2526	2438	2659	2867	3063
		R_{ki}	1081	1161	1240	1405	1509	1613	1716	1903	2034	2164	2295
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1519	1643	1757	1737	1885	2023	2149	2127	2288	2439	2579
		R_{ki}	923	962	1000	1200	1250	1301	1351	1577	1640	1703	1767
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	5759	6239	6702	7148	7577	6859	7378	7880	8365	7480	8054
		R_{ki}	7910	8359	8807	9255	9703	10068	10608	11148	11687	11936	12576
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4921	5233	5531	5813	6080	5753	6088	6409	6714	6272	6645
		R_{ki}	6582	6755	6929	7102	7275	8136	8345	8554	8763	9645	9893
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4619	4875	5119	5350	5569	5356	5631	5894	6144	5836	6143
		R_{ki}	6541	6706	6871	7036	7201	8077	8275	8474	8673	9575	9811
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4267	4456	4634	4800	4956	4892	5094	5285	5465	5329	5555
		R_{ki}	6130	6209	6289	6369	6449	7479	7575	7671	7767	8866	8980
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	4898	5376	5837	6280	6707	5919	6436	6935	7418	6463	7035
		R_{ki}	5248	5693	6138	6582	7027	6862	7398	7934	8470	8140	8776
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4064	4375	4670	4951	5217	4817	5151	5470	5773	5259	5631
		R_{ki}	3931	4103	4275	4446	4618	4945	5152	5359	5567	5866	6112
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3763	4018	4261	4490	4708	4422	4696	4957	5206	4825	5131
		R_{ki}	3890	4054	4217	4381	4544	4886	5083	5280	5477	5796	6030
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3413	3600	3777	3943	4098	3960	4161	4351	4530	4319	4544
		R_{ki}	3482	3561	3640	3719	3799	4292	4387	4483	4578	5091	5204
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	4790	5266	5726	6169	6594	5802	6317	6815	7297	6337	6908
		R_{ki}	5639	6082	6525	6968	7410	7334	7868	8402	8936	8703	9337
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3957	4267	4562	4842	5107	4701	5034	5352	5656	5135	5507
		R_{ki}	4327	4498	4670	4841	5012	5424	5631	5837	6044	6436	6682
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3657	3912	4154	4383	4599	4307	4580	4841	5089	4702	5007
		R_{ki}	4287	4450	4612	4775	4938	5365	5562	5758	5955	6367	6600
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3308	3495	3671	3836	3991	3846	4047	4236	4415	4198	4422
		R_{ki}	3880	3959	4038	4117	4195	4774	4869	4964	5059	5665	5777
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	4365	4840	5298	5740	6165	5337	5851	6348	6828	5833	6403
		R_{ki}	4486	4926	5367	5808	6249	5943	6475	7007	7539	7054	7686
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3534	3843	4137	4416	4680	4238	4570	4888	5190	4633	5004
		R_{ki}	3179	3349	3520	3690	3861	4040	4246	4451	4657	4795	5040
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3234	3488	3729	3958	4174	3845	4117	4378	4625	4201	4506
		R_{ki}	3138	3301	3463	3625	3787	3981	4177	4373	4568	4726	4958
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2885	3072	3248	3413	3567	3385	3585	3774	3952	3697	3921
		R_{ki}	2734	2812	2891	2969	3047	3392	3487	3581	3676	4026	4139
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	3940	4414	4872	5312	5736	4872	5385	5881	6360	5330	5898
		R_{ki}	3629	4068	4507	4946	5385	4909	5439	5969	6499	5829	6458
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3111	3419	3713	3991	4254	3776	4107	4424	4725	4132	4502
		R_{ki}	2327	2497	2667	2837	3007	3013	3218	3423	3628	3578	3821
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2812	3066	3306	3534	3749	3383	3655	3915	4161	3701	4004
		R_{ki}	2287	2449	2610	2772	2933	2955	3150	3345	3540	3508	3740
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2464	2650	2826	2990	3144	2924	3123	3312	3489	3198	3421
		R_{ki}	1884	1962	2040	2119	2197	2368	2462	2556	2651	2811	2923
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	3841	4314	4770	5210	5632	4764	5276	5771	6248	5214	5781
		R_{ki}	3679	4116	4553	4991	5428	4969	5497	6025	6553	5902	6529
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3014	3321	3614	3891	4154	3670	4001	4316	4617	4018	4387
		R_{ki}	2382	2552	2721	2890	3059	3080	3284	3489	3693	3659	3901
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2716	2968	3208	3435	3650	3278	3549	3808	4054	3587	3891
		R_{ki}	2343	2503	2664	2825	2986	3022	3216	3411	3605	3590	3820
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2368	2554	2729	2893	3046	2820	3019	3207	3384	3086	3309
		R_{ki}	1941	2019	2097	2175	2252	2437	2531	2625	2719	2895	3006
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam									
			W36		W40				W44			
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row
¾	½	M_u	8612	9152	8307	8955	9587	10202	9134	9857	10563	11251
		R_{ki}	13216	13856	14674	15461	16248	17035	17694	18643	19593	20542
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	7004	7348	6964	7389	7798	8193	7656	8132	8592	9038
		R_{ki}	10141	10388	11858	12162	12467	12771	14298	14666	15033	15400
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	6438	6719	6477	6826	7162	7486	7117	7508	7887	8253
		R_{ki}	10046	10282	11771	12061	12350	12640	14194	14543	14892	15242
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5770	5974	5911	6169	6416	6652	6493	6783	7062	7331
		R_{ki}	9094	9208	10899	11039	11179	11319	13142	13311	13480	13649
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	7590	8128	7187	7834	8463	9075	7912	8632	9336	10022
		R_{ki}	9412	10048	10014	10797	11579	12361	12083	13027	13971	14915
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5988	6330	5848	6272	6680	7073	6438	6912	7371	7816
		R_{ki}	6358	6603	7216	7518	7821	8124	8706	9071	9436	9801
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5424	5704	5363	5711	6046	6368	5901	6291	6668	7033
		R_{ki}	6264	6497	7130	7418	7705	7993	8602	8949	9297	9644
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4758	4962	4799	5056	5302	5537	5278	5567	5846	6113
		R_{ki}	5318	5431	6263	6402	6542	6681	7556	7724	7892	8060
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	7462	7999	7051	7696	8324	8935	7765	8484	9186	9871
		R_{ki}	9971	10604	10711	11491	12271	13051	12927	13868	14810	15751
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5863	6204	5714	6136	6544	6936	6293	6766	7224	7668
		R_{ki}	6927	7172	7921	8223	8524	8826	9560	9924	10288	10652
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5300	5579	5229	5576	5911	6233	5756	6145	6522	6886
		R_{ki}	6833	7066	7835	8122	8409	8696	9456	9802	10149	10495
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4636	4838	4666	4923	5168	5403	5135	5423	5701	5968
		R_{ki}	5890	6003	6971	7110	7249	7388	8413	8581	8748	8916
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	6956	7491	6495	7139	7766	8376	7157	7875	8576	9261
		R_{ki}	8317	8949	8685	9462	10240	11017	10484	11423	12362	13300
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5360	5700	5160	5582	5989	6380	5687	6160	6618	7060
		R_{ki}	5284	5528	5903	6204	6505	6805	7127	7490	7853	8216
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4797	5076	4676	5023	5357	5678	5152	5540	5917	6280
		R_{ki}	5190	5423	5818	6104	6390	6676	7023	7369	7714	8059
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4135	4337	4114	4370	4616	4850	4531	4819	5097	5363
		R_{ki}	4251	4363	4956	5095	5233	5372	5983	6150	6317	6485
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	6450	6984	5940	6582	7208	7817	6550	7267	7967	8650
		R_{ki}	7088	7717	7179	7954	8729	9504	8669	9605	10541	11477
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4857	5196	4607	5028	5434	5824	5082	5554	6011	6453
		R_{ki}	4065	4308	4406	4706	5006	5305	5320	5682	6044	6406
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4295	4574	4124	4470	4803	5124	4547	4935	5311	5673
		R_{ki}	3972	4203	4321	4606	4891	5176	5217	5562	5906	6250
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3634	3835	3563	3818	4063	4297	3928	4215	4492	4758
		R_{ki}	3035	3147	3462	3600	3738	3876	4180	4347	4514	4680
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	6331	6865	5813	6455	7079	7687	6413	7128	7827	8509
		R_{ki}	7157	7784	7271	8044	8817	9590	8783	9717	10650	11584
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4741	5080	4483	4903	5308	5698	4947	5418	5874	6315
		R_{ki}	4144	4386	4507	4806	5105	5404	5444	5805	6166	6527
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4181	4459	4000	4346	4678	4998	4413	4800	5175	5537
		R_{ki}	4051	4282	4422	4706	4991	5275	5342	5685	6028	6372
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3521	3722	3440	3695	3939	4173	3794	4082	4358	4623
		R_{ki}	3118	3230	3566	3704	3841	3979	4307	4474	4640	4806
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16		W18		
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	1233	1487	1623	1740	1911	2199	2487	2706	2775	3029	3263
		R_{ki}	398	596	622	836	873	1165	1501	1564	1879	1958	2038
		n	1.13	1	1.02	0.89	0.92	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1156	1390	1484	1625	1743	2002	2261	2413	2520	2697	2858
		R_{ki}	384	575	591	806	828	1106	1424	1462	1783	1831	1878
		n	1.11	0.98	1	0.87	0.89	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1117	1342	1414	1567	1659	1903	2148	2266	2392	2530	2654
		R_{ki}	374	561	570	787	799	1067	1373	1394	1719	1745	1772
		n	1.11	0.97	0.99	0.86	0.89	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1085	1302	1357	1518	1589	1821	2053	2144	2285	2392	2488
		R_{ki}	372	558	565	782	791	1056	1360	1377	1703	1724	1744
		n	1.09	0.96	0.97	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	942	1144	1278	1346	1514	1750	1986	2204	2222	2474	2706
		R_{ki}	226	341	367	480	516	691	891	954	1117	1196	1274
		n	1.31	1.18	1.2	1.07	1.1	1.01	0.93	0.95	0.86	0.88	0.9
	⅜	M_u	866	1049	1141	1231	1348	1555	1762	1913	1970	2145	2304
		R_{ki}	213	320	336	451	472	632	816	853	1023	1070	1117
		n	1.3	1.16	1.19	1.05	1.08	0.99	0.91	0.93	0.84	0.86	0.88
	5/16	M_u	828	1001	1072	1174	1265	1457	1650	1767	1842	1979	2102
		R_{ki}	204	307	315	431	443	593	765	786	960	986	1012
		n	1.29	1.16	1.19	1.05	1.08	0.99	0.91	0.93	0.84	0.87	0.89
	¼	M_u	797	961	1016	1125	1196	1376	1556	1646	1736	1842	1937
		R_{ki}	201	303	310	426	436	583	753	769	943	964	985
		n	1.28	1.14	1.16	1.03	1.06	0.96	0.88	0.9	0.83	0.84	0.85
9/16	½	M_u	802	978	1111	1154	1321	1532	1742	1958	1952	2203	2434
		R_{ki}	167	253	278	356	392	525	679	741	852	930	1008
		n	1.4	1.26	1.28	1.16	1.18	1.09	1.01	1.03	0.95	0.97	0.98
	⅜	M_u	727	884	975	1040	1156	1338	1519	1669	1700	1875	2034
		R_{ki}	154	232	248	327	349	468	604	641	758	805	851
		n	1.39	1.25	1.28	1.14	1.17	1.08	1	1.02	0.93	0.96	0.97
	5/16	M_u	689	836	907	983	1073	1240	1407	1523	1574	1710	1832
		R_{ki}	145	219	227	308	320	429	554	575	695	721	747
		n	1.39	1.26	1.28	1.15	1.18	1.09	1.01	1.03	0.94	0.97	0.99
	¼	M_u	658	797	851	935	1005	1159	1313	1403	1468	1573	1667
		R_{ki}	143	215	222	303	313	419	541	558	679	700	720
		n	1.37	1.24	1.26	1.13	1.15	1.06	0.98	1	0.91	0.93	0.95
½	½	M_u	760	931	1063	1101	1268	1472	1677	1893	1882	2132	2362
		R_{ki}	170	258	283	365	400	537	695	757	873	951	1028
		n	1.35	1.22	1.25	1.11	1.14	1.05	0.98	1	0.91	0.93	0.95
	⅜	M_u	686	837	928	988	1104	1279	1455	1604	1631	1805	1963
		R_{ki}	157	238	253	336	357	480	621	658	780	826	873
		n	1.34	1.21	1.23	1.1	1.13	1.04	0.96	0.98	0.89	0.92	0.93
	5/16	M_u	648	790	860	931	1021	1182	1344	1459	1505	1641	1762
		R_{ki}	148	225	233	317	329	442	571	592	718	743	769
		n	1.34	1.21	1.24	1.1	1.13	1.04	0.96	0.99	0.89	0.92	0.95
	¼	M_u	617	751	804	884	953	1102	1251	1340	1399	1504	1598
		R_{ki}	146	221	228	312	322	432	559	575	702	722	743
		n	1.32	1.18	1.21	1.07	1.1	1.01	0.93	0.96	0.86	0.89	0.91
7/16	½	M_u	629	774	904	919	1084	1263	1443	1657	1622	1871	2100
		R_{ki}	119	182	207	257	293	394	510	571	641	718	795
		n	1.45	1.32	1.34	1.22	1.24	1.15	1.07	1.09	1.01	1.02	1.03
	⅜	M_u	555	681	770	806	921	1071	1222	1370	1372	1545	1702
		R_{ki}	107	162	177	229	250	337	436	473	548	594	640
		n	1.45	1.31	1.34	1.21	1.23	1.15	1.07	1.09	1	1.02	1.04
	5/16	M_u	518	634	703	750	839	975	1111	1226	1247	1381	1502
		R_{ki}	98	149	157	211	222	299	387	407	486	512	537
		n	1.46	1.32	1.35	1.21	1.25	1.16	1.08	1.11	1.01	1.05	1.07
	¼	M_u	487	595	648	702	771	895	1018	1107	1141	1246	1339
		R_{ki}	96	145	152	206	215	289	374	390	470	491	511
		n	1.43	1.3	1.32	1.19	1.22	1.13	1.05	1.08	0.98	1.01	1.03
⅜	½	M_u	510	632	762	754	918	1074	1230	1444	1387	1634	1862
		R_{ki}	84	128	152	182	216	291	378	439	475	552	628
		n	1.54	1.41	1.42	1.31	1.32	1.23	1.16	1.17	1.09	1.1	1.1
	⅜	M_u	437	539	628	642	756	883	1010	1158	1137	1310	1466
		R_{ki}	71	108	123	154	175	235	305	341	383	429	475
		n	1.55	1.42	1.43	1.31	1.33	1.25	1.17	1.18	1.1	1.12	1.13
	5/16	M_u	400	493	561	586	674	787	899	1014	1012	1146	1267
		R_{ki}	63	95	104	135	147	198	256	276	322	347	373
		n	1.57	1.44	1.47	1.33	1.37	1.28	1.21	1.23	1.14	1.17	1.19
	¼	M_u	370	454	507	538	607	707	807	896	907	1011	1104
		R_{ki}	60	92	99	130	140	188	243	259	306	326	347
		n	1.55	1.41	1.44	1.3	1.34	1.25	1.17	1.19	1.1	1.13	1.15

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W21			W24				W27			
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row
¾	½	M_u	3513	3799	4065	3996	4334	4652	4950	4869	5239	5589	5919
		R_{ki}	2633	2740	2847	3407	3546	3684	3823	4455	4630	4804	4979
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3123	3321	3503	3548	3784	4003	4207	4247	4503	4744	4969
		R_{ki}	2461	2525	2589	3184	3267	3351	3434	4106	4210	4315	4419
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2927	3081	3221	3323	3507	3677	3833	3933	4133	4319	4491
		R_{ki}	2346	2382	2417	3036	3082	3128	3174	3872	3930	3988	4046
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2763	2882	2990	3134	3277	3408	3529	3672	3827	3970	4102
		R_{ki}	2317	2345	2373	2998	3034	3071	3107	3812	3858	3904	3950
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	2880	3164	3428	3286	3622	3937	4234	4079	4447	4794	5123
		R_{ki}	1610	1716	1822	2087	2224	2362	2499	2798	2971	3144	3317
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2493	2689	2870	2841	3074	3292	3494	3459	3714	3954	4177
		R_{ki}	1441	1504	1568	1867	1949	2031	2114	2452	2556	2659	2763
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2298	2451	2589	2617	2799	2968	3123	3148	3346	3531	3701
		R_{ki}	1327	1362	1398	1720	1765	1811	1857	2221	2278	2335	2393
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2135	2254	2361	2429	2571	2701	2820	2887	3041	3184	3315
		R_{ki}	1298	1326	1354	1682	1718	1754	1791	2161	2207	2252	2298
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	2570	2853	3116	2937	3272	3587	3882	3691	4057	4404	4731
		R_{ki}	1253	1359	1464	1626	1762	1899	2036	2218	2390	2562	2735
		n	0.88	0.89	0.9	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2184	2380	2560	2493	2726	2943	3145	3072	3327	3565	3788
		R_{ki}	1085	1148	1211	1406	1488	1570	1652	1873	1976	2080	2183
		n	0.87	0.88	0.9	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1990	2142	2280	2270	2452	2620	2774	2762	2959	3143	3313
		R_{ki}	972	1007	1042	1260	1305	1351	1396	1643	1700	1757	1814
		n	0.88	0.9	0.92	0.83	0.83	0.84	0.86	0.83	0.83	0.83	0.83
	¼	M_u	1828	1946	2052	2083	2224	2354	2472	2502	2655	2797	2928
		R_{ki}	943	971	998	1223	1259	1295	1331	1584	1629	1675	1720
		n	0.84	0.86	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	2491	2773	3035	2850	3184	3497	3791	3594	3960	4305	4631
		R_{ki}	1283	1388	1493	1666	1802	1938	2074	2269	2440	2612	2783
		n	0.84	0.86	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2106	2301	2480	2407	2639	2856	3056	2977	3231	3469	3691
		R_{ki}	1115	1178	1241	1448	1529	1611	1692	1926	2028	2131	2234
		n	0.83	0.85	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1913	2064	2201	2185	2366	2533	2687	2667	2865	3048	3217
		R_{ki}	1003	1038	1073	1302	1347	1392	1437	1697	1753	1810	1867
		n	0.83	0.86	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1751	1868	1974	1998	2138	2268	2386	2408	2561	2703	2833
		R_{ki}	974	1002	1030	1265	1300	1336	1372	1638	1683	1728	1773
		n	0.83	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	2192	2473	2734	2513	2845	3158	3451	3218	3582	3927	4252
		R_{ki}	970	1074	1178	1260	1395	1530	1666	1758	1929	2099	2270
		n	0.94	0.95	0.95	0.86	0.87	0.88	0.88	0.83	0.83	0.83	0.83
	⅜	M_u	1808	2002	2181	2071	2302	2518	2718	2603	2855	3092	3313
		R_{ki}	803	865	928	1043	1124	1205	1286	1416	1518	1621	1723
		n	0.94	0.95	0.96	0.86	0.88	0.89	0.9	0.83	0.83	0.83	0.84
	5/16	M_u	1615	1766	1903	1849	2030	2196	2349	2293	2490	2673	2841
		R_{ki}	691	726	760	898	943	988	1033	1188	1245	1301	1358
		n	0.96	0.98	1	0.88	0.91	0.93	0.94	0.84	0.86	0.88	0.89
	¼	M_u	1454	1571	1676	1663	1803	1932	2050	2035	2187	2328	2458
		R_{ki}	663	690	718	861	896	932	968	1130	1174	1219	1264
		n	0.92	0.94	0.96	0.84	0.87	0.88	0.9	0.83	0.83	0.83	0.85
⅜	½	M_u	1920	2200	2460	2206	2537	2849	3141	2875	3238	3582	3906
		R_{ki}	746	850	953	970	1105	1239	1374	1393	1563	1733	1903
		n	1.02	1.02	1.02	0.94	0.95	0.95	0.94	0.88	0.88	0.88	0.88
	⅜	M_u	1538	1731	1909	1766	1996	2211	2410	2261	2513	2749	2970
		R_{ki}	580	642	704	754	835	916	996	1053	1155	1256	1358
		n	1.03	1.04	1.05	0.96	0.97	0.98	0.98	0.91	0.91	0.92	0.92
	5/16	M_u	1345	1495	1632	1544	1724	1890	2042	1953	2149	2331	2499
		R_{ki}	470	504	538	610	655	700	744	826	882	938	995
		n	1.08	1.1	1.12	1.01	1.03	1.05	1.06	0.96	0.98	0.99	1
	¼	M_u	1185	1301	1406	1358	1498	1627	1744	1695	1847	1988	2117
		R_{ki}	441	468	496	573	609	644	680	767	812	857	902
		n	1.04	1.06	1.08	0.97	0.99	1	1.01	0.92	0.94	0.95	0.96

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	5405	5826	6227	6609	6972	6413	6866	7300	7714	7000	7505
		R_{ki}	5469	5683	5897	6112	6326	6845	7103	7361	7619	8114	8420
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4709	5003	5281	5543	5789	5503	5818	6117	6401	6003	6355
		R_{ki}	5040	5168	5296	5425	5553	6224	6379	6534	6688	7378	7562
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4360	4589	4805	5007	5195	5046	5291	5523	5740	5502	5777
		R_{ki}	4753	4824	4895	4966	5037	5810	5895	5981	6067	6887	6989
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4067	4245	4412	4568	4712	4663	4854	5033	5201	5081	5295
		R_{ki}	4680	4736	4792	4849	4905	5704	5771	5839	5907	6761	6842
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	4537	4956	5355	5735	6095	5465	5916	6347	6759	5974	6477
		R_{ki}	3438	3651	3863	4076	4288	4400	4656	4912	5169	5219	5523
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3844	4137	4413	4674	4918	4559	4872	5170	5452	4981	5331
		R_{ki}	3012	3140	3267	3394	3522	3784	3938	4091	4245	4489	4671
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3496	3725	3939	4140	4326	4103	4347	4578	4794	4482	4756
		R_{ki}	2728	2799	2869	2940	3010	3373	3458	3543	3628	4001	4101
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3204	3382	3548	3703	3846	3722	3912	4090	4257	4063	4276
		R_{ki}	2655	2711	2767	2823	2879	3267	3335	3402	3470	3876	3956
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	4109	4527	4926	5305	5664	4998	5448	5878	6289	5468	5970
		R_{ki}	2727	2938	3150	3362	3573	3543	3798	4053	4308	4204	4507
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3419	3710	3986	4246	4490	4094	4406	4703	4984	4477	4827
		R_{ki}	2302	2429	2556	2683	2810	2929	3082	3235	3388	3475	3657
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3072	3299	3513	3713	3899	3639	3882	4112	4328	3979	4252
		R_{ki}	2019	2090	2160	2230	2300	2519	2604	2689	2773	2989	3090
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2780	2957	3123	3277	3420	3259	3448	3626	3792	3560	3773
		R_{ki}	1947	2002	2058	2114	2170	2414	2481	2549	2616	2864	2944
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	4005	4422	4819	5197	5555	4884	5333	5762	6172	5346	5847
		R_{ki}	2791	3001	3212	3423	3634	3620	3875	4129	4383	4297	4599
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	3316	3606	3881	4140	4383	3982	4293	4590	4870	4357	4706
		R_{ki}	2368	2495	2621	2747	2874	3009	3161	3314	3466	3572	3753
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2969	3196	3409	3609	3794	3528	3771	4000	4215	3859	4132
		R_{ki}	2086	2156	2226	2296	2366	2601	2685	2770	2854	3087	3187
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2679	2855	3020	3174	3316	3148	3337	3514	3680	3442	3654
		R_{ki}	2014	2069	2125	2180	2236	2496	2563	2630	2697	2963	3042
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	3590	4006	4402	4779	5136	4430	4878	5306	5715	4854	5354
		R_{ki}	2163	2373	2583	2793	3003	2863	3117	3370	3623	3400	3701
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2903	3192	3466	3725	3967	3529	3841	4136	4416	3867	4215
		R_{ki}	1742	1868	1994	2120	2246	2254	2406	2558	2710	2677	2857
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2557	2783	2996	3194	3379	3077	3319	3548	3762	3370	3642
		R_{ki}	1462	1531	1601	1671	1740	1848	1932	2016	2100	2194	2293
		n	0.83	0.83	0.83	0.84	0.85	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2267	2443	2607	2761	2902	2698	2886	3063	3228	2954	3165
		R_{ki}	1390	1445	1500	1555	1611	1743	1810	1877	1943	2070	2149
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	3213	3627	4023	4398	4754	4017	4464	4891	5298	4406	4904
		R_{ki}	1715	1924	2133	2342	2551	2323	2575	2827	3080	2759	3058
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	2527	2816	3089	3346	3588	3118	3428	3723	4002	3420	3768
		R_{ki}	1296	1421	1547	1672	1797	1716	1867	2018	2169	2038	2217
		n	0.85	0.86	0.86	0.86	0.86	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	2182	2407	2619	2817	3001	2666	2908	3136	3350	2925	3196
		R_{ki}	1016	1086	1155	1224	1294	1310	1394	1478	1562	1556	1656
		n	0.91	0.93	0.94	0.95	0.95	0.87	0.89	0.9	0.91	0.83	0.84
	¼	M_u	1892	2068	2232	2384	2526	2288	2476	2652	2817	2509	2720
		R_{ki}	945	1000	1055	1110	1165	1207	1273	1339	1406	1433	1512
		n	0.86	0.88	0.9	0.91	0.91	0.83	0.85	0.86	0.86	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam									
			W36		W40				W44			
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row
¾	½	M_u	7990	8455	7782	8356	8910	9444	8565	9207	9830	10434
		R_{ki}	8726	9032	9975	10351	10728	11104	12028	12482	12935	13389
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6691	7012	6669	7071	7457	7827	7336	7787	8222	8642
		R_{ki}	7745	7929	9070	9296	9521	9747	10937	11209	11481	11753
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	6039	6286	6110	6425	6726	7014	6719	7073	7414	7741
		R_{ki}	7090	7192	8466	8591	8716	8841	10208	10359	10510	10660
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5498	5689	5639	5884	6118	6341	6197	6473	6738	6992
		R_{ki}	6922	7003	8311	8411	8510	8609	10022	10141	10261	10380
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	6960	7423	6653	7224	7776	8309	7332	7972	8593	9194
		R_{ki}	5827	6131	6421	6795	7169	7543	7746	8198	8649	9100
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5666	5985	5544	5944	6328	6697	6107	6556	6990	7408
		R_{ki}	4853	5035	5522	5746	5970	6194	6661	6932	7202	7473
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5016	5262	4986	5300	5600	5886	5491	5844	6184	6510
		R_{ki}	4202	4303	4921	5045	5169	5293	5937	6087	6236	6386
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4477	4668	4517	4761	4994	5216	4970	5246	5510	5763
		R_{ki}	4036	4115	4767	4866	4964	5063	5751	5870	5989	6108
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	6452	6914	6095	6666	7217	7748	6723	7362	7982	8582
		R_{ki}	4810	5112	5173	5546	5919	6291	6243	6693	7143	7593
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5161	5479	4988	5387	5771	6139	5499	5948	6381	6798
		R_{ki}	3838	4020	4277	4500	4723	4947	5161	5431	5700	5970
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4512	4757	4432	4745	5044	5330	4885	5237	5577	5902
		R_{ki}	3190	3291	3678	3802	3925	4049	4439	4588	4737	4886
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3974	4164	3963	4207	4439	4660	4365	4640	4904	5156
		R_{ki}	3024	3104	3525	3623	3721	3819	4253	4372	4490	4609
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	6328	6789	5963	6532	7082	7612	6579	7217	7836	8435
		R_{ki}	4901	5203	5290	5662	6034	6405	6386	6835	7284	7733
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5039	5357	4857	5256	5638	6005	5358	5806	6238	6654
		R_{ki}	3933	4114	4397	4620	4842	5065	5308	5577	5845	6114
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4391	4636	4302	4614	4913	5198	4744	5096	5434	5759
		R_{ki}	3287	3387	3800	3923	4047	4170	4587	4736	4885	5034
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3855	4044	3833	4077	4309	4529	4225	4500	4763	5015
		R_{ki}	3122	3201	3647	3745	3843	3941	4403	4521	4639	4757
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	5834	6294	5420	5988	6537	7066	5985	6623	7240	7838
		R_{ki}	4002	4303	4187	4558	4928	5299	5056	5503	5951	6398
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4547	4864	4316	4714	5096	5462	4766	5213	5644	6060
		R_{ki}	3037	3218	3296	3518	3740	3962	3980	4248	4516	4785
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3901	4145	3761	4073	4371	4656	4153	4504	4842	5166
		R_{ki}	2393	2493	2701	2824	2947	3070	3262	3410	3559	3707
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3365	3554	3294	3537	3769	3989	3635	3909	4172	4423
		R_{ki}	2228	2307	2549	2646	2744	2841	3078	3195	3313	3431
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	5383	5842	4925	5492	6040	6568	5444	6080	6696	7293
		R_{ki}	3358	3658	3398	3768	4137	4506	4105	4551	4997	5443
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4099	4415	3823	4220	4601	4967	4226	4672	5103	5518
		R_{ki}	2397	2577	2510	2732	2953	3174	3032	3299	3567	3834
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3454	3698	3269	3581	3878	4162	3614	3965	4302	4626
		R_{ki}	1755	1855	1917	2040	2162	2285	2316	2464	2612	2760
		n	0.85	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	2919	3108	2803	3045	3276	3496	3097	3370	3633	3884
		R_{ki}	1591	1670	1765	1862	1960	2057	2132	2249	2367	2484
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16		W18		
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	1805	2174	2396	2542	2816	3235	3655	4008	4075	4480	4861
		R_{ki}	538	809	864	1135	1212	1620	2086	2219	2612	2779	2946
		n	1.18	1.04	1.06	0.93	0.95	0.86	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	1681	2020	2161	2359	2536	2910	3285	3512	3659	3922	4164
		R_{ki}	498	747	769	1048	1078	1440	1855	1907	2323	2387	2452
		n	1.18	1.05	1.07	0.93	0.96	0.87	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	1637	1964	2081	2292	2438	2794	3151	3338	3508	3724	3922
		R_{ki}	496	745	766	1046	1074	1435	1848	1897	2314	2375	2437
		n	1.17	1.03	1.05	0.92	0.94	0.85	0.83	0.83	0.83	0.83	0.83
	¼	M_u	1585	1900	1984	2215	2322	2659	2996	3132	3333	3492	3635
		R_{ki}	484	726	736	1019	1032	1379	1777	1800	2224	2254	2284
		n	1.16	1.03	1.04	0.91	0.93	0.84	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	1403	1700	1919	1997	2268	2616	2965	3315	3314	3715	4093
		R_{ki}	315	475	529	669	744	998	1288	1419	1615	1779	1944
		n	1.35	1.22	1.23	1.11	1.12	1.03	0.95	0.96	0.88	0.89	0.89
	⅜	M_u	1280	1548	1688	1816	1991	2294	2597	2822	2900	3161	3400
		R_{ki}	275	415	436	584	613	821	1060	1111	1329	1393	1457
		n	1.38	1.24	1.26	1.13	1.16	1.07	0.99	1.01	0.92	0.94	0.96
	5/16	M_u	1237	1493	1608	1750	1894	2179	2465	2650	2751	2965	3161
		R_{ki}	274	413	433	581	609	816	1053	1101	1321	1381	1442
		n	1.36	1.22	1.24	1.11	1.13	1.04	0.96	0.98	0.89	0.91	0.92
	¼	M_u	1186	1430	1513	1673	1779	2045	2311	2446	2577	2734	2876
		R_{ki}	261	394	404	555	568	761	983	1006	1232	1261	1291
		n	1.36	1.22	1.24	1.11	1.13	1.04	0.96	0.98	0.89	0.91	0.93
9/16	½	M_u	1340	1630	1847	1920	2188	2530	2871	3219	3212	3611	3988
		R_{ki}	341	518	571	731	806	1082	1398	1528	1756	1919	2082
		n	1.27	1.14	1.16	1.03	1.05	0.96	0.88	0.89	0.83	0.83	0.84
	⅜	M_u	1219	1479	1617	1739	1913	2209	2504	2728	2800	3059	3298
		R_{ki}	302	458	479	647	676	907	1173	1223	1472	1535	1598
		n	1.29	1.15	1.18	1.04	1.07	0.98	0.9	0.93	0.83	0.86	0.88
	5/16	M_u	1176	1425	1538	1674	1816	2094	2373	2556	2651	2864	3059
		R_{ki}	301	457	476	644	672	902	1166	1213	1463	1523	1583
		n	1.27	1.13	1.15	1.02	1.05	0.95	0.87	0.89	0.83	0.83	0.84
	¼	M_u	1125	1361	1444	1597	1702	1961	2219	2353	2477	2634	2775
		R_{ki}	289	438	448	618	632	848	1096	1119	1375	1404	1433
		n	1.27	1.13	1.15	1.02	1.04	0.95	0.87	0.89	0.83	0.83	0.84
½	½	M_u	1149	1403	1619	1657	1924	2229	2534	2881	2839	3238	3612
		R_{ki}	248	377	429	533	607	816	1056	1185	1327	1490	1652
		n	1.37	1.24	1.25	1.13	1.14	1.05	0.97	0.98	0.9	0.91	0.92
	⅜	M_u	1028	1253	1390	1477	1650	1909	2169	2392	2429	2687	2925
		R_{ki}	209	318	338	450	479	643	832	882	1045	1108	1171
		n	1.41	1.27	1.3	1.16	1.19	1.1	1.02	1.05	0.95	0.98	1
	5/16	M_u	986	1199	1311	1412	1554	1796	2038	2221	2280	2493	2687
		R_{ki}	208	316	336	447	475	638	825	873	1037	1096	1156
		n	1.39	1.25	1.27	1.14	1.16	1.07	0.99	1.01	0.92	0.94	0.95
	¼	M_u	936	1136	1218	1336	1440	1663	1885	2019	2108	2264	2404
		R_{ki}	196	298	308	422	435	584	756	779	949	978	1007
		n	1.39	1.25	1.28	1.14	1.17	1.08	1	1.02	0.93	0.95	0.97
7/16	½	M_u	962	1179	1393	1397	1662	1932	2201	2546	2470	2866	3239
		R_{ki}	179	273	325	387	461	620	803	932	1010	1172	1333
		n	1.46	1.33	1.33	1.22	1.22	1.13	1.05	1.05	0.98	0.99	0.98
	⅜	M_u	842	1030	1166	1218	1390	1613	1837	2059	2061	2318	2554
		R_{ki}	141	215	235	305	333	449	581	630	730	793	855
		n	1.53	1.39	1.41	1.28	1.31	1.22	1.14	1.16	1.07	1.09	1.11
	5/16	M_u	800	977	1088	1153	1294	1501	1707	1889	1913	2124	2318
		R_{ki}	140	214	233	302	329	443	574	621	722	781	840
		n	1.5	1.37	1.38	1.26	1.27	1.18	1.1	1.12	1.03	1.05	1.06
	¼	M_u	750	914	995	1078	1182	1368	1554	1687	1741	1896	2036
		R_{ki}	128	196	205	277	290	390	505	528	635	664	692
		n	1.52	1.38	1.4	1.27	1.3	1.2	1.12	1.15	1.05	1.08	1.1
⅜	½	M_u	910	1120	1332	1330	1594	1856	2118	2461	2380	2775	3146
		R_{ki}	181	277	328	394	466	629	816	943	1027	1187	1347
		n	1.42	1.29	1.29	1.18	1.19	1.1	1.02	1.02	0.95	0.96	0.96
	⅜	M_u	791	972	1107	1152	1323	1539	1756	1976	1972	2228	2463
		R_{ki}	144	220	240	312	340	459	595	644	749	811	873
		n	1.48	1.35	1.37	1.24	1.27	1.18	1.1	1.12	1.03	1.06	1.07
	5/16	M_u	749	918	1029	1088	1228	1427	1626	1807	1825	2035	2228
		R_{ki}	143	218	237	310	336	454	588	635	740	799	858
		n	1.45	1.32	1.33	1.21	1.23	1.14	1.06	1.08	0.99	1.01	1.02
	¼	M_u	700	856	937	1013	1116	1295	1474	1606	1653	1808	1947
		R_{ki}	131	200	209	285	297	401	520	542	654	683	711
		n	1.46	1.33	1.35	1.21	1.25	1.15	1.08	1.1	1.01	1.03	1.05

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam											
			W21			W24				W27				
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row	
¾	½	M_u	5187	5645	6080	5894	6430	6942	7430	7214	7803	8369	8912	
		R_{ki}	3737	3961	4185	4837	5127	5418	5708	6444	6809	7174	7539	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	4536	4831	5106	5151	5499	5827	6133	6167	6547	6907	7246	
		R_{ki}	3210	3297	3383	4154	4267	4379	4491	5362	5503	5644	5785	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	4303	4545	4770	4883	5169	5437	5688	5792	6104	6399	6676	
		R_{ki}	3194	3276	3359	4133	4240	4347	4454	5328	5463	5597	5731	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	4031	4208	4370	4570	4781	4976	5156	5354	5582	5796	5994	
		R_{ki}	3030	3070	3110	3922	3974	4025	4077	4993	5058	5123	5188	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
⅝	½	M_u	4315	4770	5202	4915	5448	5957	6442	6125	6712	7274	7813	
		R_{ki}	2397	2619	2841	3107	3395	3682	3970	4271	4633	4995	5357	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	3668	3961	4233	4176	4522	4847	5152	5083	5461	5819	6156	
		R_{ki}	1876	1962	2048	2432	2543	2654	2765	3199	3339	3479	3619	
		n	0.85	0.87	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	3437	3677	3900	3909	4194	4460	4709	4710	5020	5313	5589	
		R_{ki}	1860	1942	2023	2411	2517	2622	2728	3166	3299	3432	3565	
		n	0.83	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	3166	3342	3502	3599	3808	4002	4180	4274	4501	4713	4910	
		R_{ki}	1699	1738	1778	2202	2253	2304	2355	2834	2898	2963	3027	
		n	0.83	0.84	0.85	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
9/16	½	M_u	4200	4654	5084	4789	5320	5827	6311	5986	6571	7132	7670	
		R_{ki}	2588	2809	3029	3358	3644	3930	4216	4587	4947	5307	5668	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	3556	3847	4118	4052	4397	4721	5024	4947	5324	5680	6016	
		R_{ki}	2070	2155	2241	2685	2796	2907	3017	3520	3659	3798	3938	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	3325	3564	3786	3786	4069	4335	4583	4574	4884	5176	5450	
		R_{ki}	2054	2135	2216	2665	2770	2875	2980	3487	3620	3752	3884	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	3055	3230	3390	3476	3684	3878	4055	4139	4366	4577	4773	
		R_{ki}	1894	1933	1972	2457	2507	2558	2609	3156	3221	3285	3349	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
½	½	M_u	3773	4225	4653	4308	4837	5343	5825	5449	6032	6592	7128	
		R_{ki}	2011	2230	2449	2611	2895	3180	3464	3647	4005	4364	4722	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	3130	3420	3690	3572	3916	4239	4541	4412	4788	5143	5478	
		R_{ki}	1496	1581	1665	1942	2052	2162	2272	2584	2723	2862	3000	
		n	0.89	0.91	0.93	0.83	0.83	0.85	0.86	0.83	0.83	0.83	0.83	
	5/16	M_u	2900	3138	3359	3307	3589	3854	4101	4041	4349	4640	4914	
		R_{ki}	1480	1561	1641	1921	2026	2131	2235	2552	2684	2816	2947	
		n	0.85	0.87	0.88	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	2631	2805	2964	2998	3206	3398	3575	3607	3832	4043	4239	
		R_{ki}	1321	1360	1399	1714	1765	1815	1866	2223	2287	2350	2414	
		n	0.86	0.88	0.9	0.83	0.83	0.83	0.84	0.83	0.83	0.83	0.83	
7/16	½	M_u	3347	3798	4225	3828	4356	4860	5341	4914	5496	6053	6588	
		R_{ki}	1583	1801	2019	2057	2340	2623	2906	2949	3306	3663	4020	
		n	0.9	0.9	0.89	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	2706	2996	3265	3095	3438	3759	4060	3879	4254	4608	4942	
		R_{ki}	1071	1155	1240	1391	1501	1610	1720	1891	2029	2167	2305	
		n	1	1.02	1.03	0.93	0.95	0.96	0.96	0.88	0.89	0.9	0.9	
	5/16	M_u	2477	2715	2935	2830	3112	3376	3622	3509	3817	4107	4379	
		R_{ki}	1055	1135	1216	1371	1475	1579	1683	1859	1990	2121	2253	
		n	0.96	0.97	0.98	0.88	0.9	0.9	0.91	0.83	0.84	0.84	0.85	
	¼	M_u	2209	2382	2541	2522	2729	2921	3097	3076	3301	3511	3706	
		R_{ki}	897	935	974	1165	1215	1265	1316	1531	1595	1658	1722	
		n	0.99	1.01	1.02	0.91	0.93	0.95	0.96	0.87	0.88	0.9	0.91	
⅜	½	M_u	3245	3693	4118	3715	4240	4743	5222	4788	5367	5924	6456	
		R_{ki}	1606	1822	2039	2088	2369	2651	2933	2988	3343	3699	4054	
		n	0.87	0.87	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	2605	2894	3161	2983	3325	3645	3945	3755	4129	4482	4814	
		R_{ki}	1097	1180	1264	1426	1535	1644	1752	1935	2073	2210	2347	
		n	0.97	0.99	1	0.89	0.91	0.93	0.93	0.84	0.86	0.87	0.88	
	5/16	M_u	2377	2614	2833	2719	3000	3263	3508	3386	3693	3982	4253	
		R_{ki}	1081	1161	1240	1405	1509	1613	1716	1903	2034	2164	2295	
		n	0.92	0.93	0.94	0.84	0.86	0.87	0.88	0.83	0.83	0.83	0.83	
	¼	M_u	2110	2282	2440	2412	2618	2809	2985	2954	3178	3387	3582	
		R_{ki}	923	962	1000	1200	1250	1301	1351	1577	1640	1703	1767	
		n	0.94	0.97	0.98	0.87	0.89	0.91	0.92	0.83	0.84	0.86	0.87	

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	7998	8665	9308	9928	10524	9527	10247	10944	11617	10388	11186
		R_{ki}	7910	8359	8807	9255	9703	10068	10608	11148	11687	11936	12576
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6835	7268	7681	8073	8445	7989	8455	8901	9325	8710	9230
		R_{ki}	6582	6755	6929	7102	7275	8136	8345	8554	8763	9645	9893
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	6415	6771	7110	7431	7734	7438	7821	8186	8533	8106	8532
		R_{ki}	6541	6706	6871	7036	7201	8077	8275	8474	8673	9575	9811
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5926	6188	6435	6667	6884	6795	7075	7340	7590	7401	7715
		R_{ki}	6130	6209	6289	6369	6449	7479	7575	7671	7767	8866	8980
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	6803	7466	8106	8723	9316	8221	8938	9632	10302	8976	9770
		R_{ki}	5248	5693	6138	6582	7027	6862	7398	7934	8470	8140	8776
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5644	6076	6486	6876	7245	6690	7153	7596	8018	7304	7821
		R_{ki}	3931	4103	4275	4446	4618	4945	5152	5359	5567	5866	6112
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5226	5581	5917	6237	6538	6141	6522	6885	7230	6701	7126
		R_{ki}	3890	4054	4217	4381	4544	4886	5083	5280	5477	5796	6030
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4740	5000	5246	5476	5691	5500	5779	6043	6291	5999	6311
		R_{ki}	3482	3561	3640	3719	3799	4292	4387	4483	4578	5091	5204
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	6653	7314	7953	8567	9159	8058	8773	9465	10134	8801	9594
		R_{ki}	5639	6082	6525	6968	7410	7334	7868	8402	8936	8703	9337
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5496	5927	6336	6725	7093	6529	6992	7434	7855	7132	7648
		R_{ki}	4327	4498	4670	4841	5012	5424	5631	5837	6044	6436	6682
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5079	5433	5769	6087	6388	5982	6361	6724	7068	6531	6954
		R_{ki}	4287	4450	4612	4775	4938	5365	5562	5758	5955	6367	6600
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4594	4854	5099	5328	5543	5342	5620	5883	6131	5830	6142
		R_{ki}	3880	3959	4038	4117	4195	4774	4869	4964	5059	5665	5777
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	6062	6722	7359	7972	8562	7412	8126	8816	9483	8101	8893
		R_{ki}	4486	4926	5367	5808	6249	5943	6475	7007	7539	7054	7686
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4908	5337	5746	6133	6500	5886	6348	6788	7208	6435	6950
		R_{ki}	3179	3349	3520	3690	3861	4040	4246	4451	4657	4795	5040
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4492	4844	5179	5497	5797	5340	5718	6080	6423	5835	6257
		R_{ki}	3138	3301	3463	3625	3787	3981	4177	4373	4568	4726	4958
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4007	4267	4511	4740	4954	4701	4979	5241	5488	5135	5446
		R_{ki}	2734	2812	2891	2969	3047	3392	3487	3581	3676	4026	4139
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	5472	6131	6766	7378	7966	6767	7479	8168	8833	7402	8192
		R_{ki}	3629	4068	4507	4946	5385	4909	5439	5969	6499	5829	6458
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4321	4749	5156	5543	5909	5244	5704	6144	6563	5739	6252
		R_{ki}	2327	2497	2667	2837	3007	3013	3218	3423	3628	3578	3821
		n	0.83	0.83	0.84	0.85	0.85	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3906	4257	4592	4908	5207	4698	5076	5437	5780	5139	5561
		R_{ki}	2287	2449	2610	2772	2933	2955	3150	3345	3540	3508	3740
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3422	3681	3924	4153	4366	4061	4338	4600	4846	4441	4752
		R_{ki}	1884	1962	2040	2119	2197	2368	2462	2556	2651	2811	2923
		n	0.83	0.83	0.84	0.85	0.86	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	5335	5992	6625	7235	7822	6616	7327	8014	8678	7241	8029
		R_{ki}	3679	4116	4553	4991	5428	4969	5497	6025	6553	5902	6529
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4186	4613	5019	5405	5769	5097	5556	5995	6412	5581	6093
		R_{ki}	2382	2552	2721	2890	3059	3080	3284	3489	3693	3659	3901
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	3772	4122	4456	4771	5069	4552	4930	5289	5631	4982	5403
		R_{ki}	2343	2503	2664	2825	2986	3022	3216	3411	3605	3590	3820
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3289	3547	3790	4018	4230	3916	4193	4454	4700	4285	4595
		R_{ki}	1941	2019	2097	2175	2252	2437	2531	2625	2719	2895	3006
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam									
			W36		W40				W44			
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row
¾	½	M_u	11960	12711	11537	12438	13315	14169	12686	13690	14670	15627
		R_{ki}	13216	13856	14674	15461	16248	17035	17694	18643	19593	20542
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	9728	10205	9672	10262	10831	11379	10633	11294	11934	12553
		R_{ki}	10141	10388	11858	12162	12467	12771	14298	14666	15033	15400
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	8941	9332	8995	9480	9947	10397	9884	10428	10954	11462
		R_{ki}	10046	10282	11771	12061	12350	12640	14194	14543	14892	15242
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	8014	8297	8209	8568	8911	9239	9018	9421	9809	10181
		R_{ki}	9094	9208	10899	11039	11179	11319	13142	13311	13480	13649
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	10541	11289	9982	10880	11754	12604	10989	11989	12966	13920
		R_{ki}	9412	10048	10014	10797	11579	12361	12083	13027	13971	14915
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	8317	8792	8122	8710	9277	9823	8941	9600	10238	10855
		R_{ki}	6358	6603	7216	7518	7821	8124	8706	9071	9436	9801
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	7533	7922	7448	7931	8397	8845	8195	8737	9261	9767
		R_{ki}	6264	6497	7130	7418	7705	7993	8602	8949	9297	9644
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	6609	6891	6665	7022	7364	7691	7331	7732	8119	8490
		R_{ki}	5318	5431	6263	6402	6542	6681	7556	7724	7892	8060
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	10363	11109	9793	10688	11561	12410	10784	11783	12758	13710
		R_{ki}	9971	10604	10711	11491	12271	13051	12927	13868	14810	15751
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	8143	8617	7936	8522	9088	9633	8739	9397	10034	10650
		R_{ki}	6927	7172	7921	8223	8524	8826	9560	9924	10288	10652
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	7360	7749	7262	7745	8209	8656	7994	8535	9058	9564
		R_{ki}	6833	7066	7835	8122	8409	8696	9456	9802	10149	10495
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	6438	6720	6480	6837	7178	7504	7131	7532	7918	8289
		R_{ki}	5890	6003	6971	7110	7249	7388	8413	8581	8748	8916
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
½	½	M_u	9660	10405	9021	9915	10786	11633	9940	10938	11911	12862
		R_{ki}	8317	8949	8685	9462	10240	11017	10484	11423	12362	13300
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	7444	7917	7167	7753	8317	8861	7899	8555	9191	9806
		R_{ki}	5284	5528	5903	6204	6505	6805	7127	7490	7853	8216
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	6663	7050	6495	6976	7440	7886	7155	7695	8217	8722
		R_{ki}	5190	5423	5818	6104	6390	6676	7023	7369	7714	8059
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5742	6023	5714	6070	6410	6736	6293	6693	7079	7449
		R_{ki}	4251	4363	4956	5095	5233	5372	5983	6150	6317	6485
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	8958	9700	8249	9142	10011	10857	9097	10092	11065	12013
		R_{ki}	7088	7717	7179	7954	8729	9504	8669	9605	10541	11477
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6745	7217	6398	6983	7546	8089	7058	7713	8348	8962
		R_{ki}	4065	4308	4406	4706	5006	5305	5320	5682	6044	6406
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5966	6352	5727	6208	6671	7116	6315	6854	7376	7879
		R_{ki}	3972	4203	4321	4606	4891	5176	5217	5562	5906	6250
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5047	5327	4948	5303	5643	5968	5455	5854	6239	6608
		R_{ki}	3035	3147	3462	3600	3738	3876	4180	4347	4514	4680
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅜	½	M_u	8794	9535	8074	8965	9832	10676	8906	9900	10871	11818
		R_{ki}	7157	7784	7271	8044	8817	9590	8783	9717	10650	11584
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6585	7056	6226	6809	7372	7913	6871	7525	8158	8771
		R_{ki}	4144	4386	4507	4806	5105	5404	5444	5805	6166	6527
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	5807	6193	5556	6035	6497	6941	6129	6667	7188	7690
		R_{ki}	4051	4282	4422	4706	4991	5275	5342	5685	6028	6372
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4890	5169	4778	5132	5471	5795	5270	5669	6052	6421
		R_{ki}	3118	3230	3566	3704	3841	3979	4307	4474	4640	4806
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W8	W10		W12		W14	W16		W18		
			2 row	2 row	3 row	2 row	3 row	3 row	3 row	4 row	3 row	4 row	5 row
¾	½	M_u	1712	2065	2253	2417	2654	3054	3454	3759	3854	4207	4532
		R_{ki}	398	596	622	836	873	1165	1501	1564	1879	1958	2038
		n	1.33	1.2	1.22	1.09	1.12	1.03	0.95	0.97	0.88	0.91	0.93
	⅜	M_u	1605	1931	2061	2256	2421	2781	3140	3351	3500	3746	3969
		R_{ki}	384	575	591	806	828	1106	1424	1462	1783	1831	1878
		n	1.31	1.18	1.2	1.07	1.09	1	0.92	0.95	0.85	0.88	0.9
	5/16	M_u	1552	1864	1964	2176	2304	2643	2983	3147	3322	3514	3686
		R_{ki}	374	561	570	787	799	1067	1373	1394	1719	1745	1772
		n	1.31	1.17	1.19	1.06	1.09	0.99	0.91	0.94	0.84	0.87	0.89
	¼	M_u	1507	1808	1885	2108	2207	2529	2851	2978	3173	3322	3455
		R_{ki}	372	558	565	782	791	1056	1360	1377	1703	1724	1744
		n	1.29	1.16	1.17	1.04	1.07	0.97	0.89	0.91	0.83	0.84	0.86
⅝	½	M_u	1308	1588	1774	1869	2102	2430	2758	3060	3086	3436	3759
		R_{ki}	226	341	367	480	516	691	891	954	1117	1196	1274
		n	1.51	1.38	1.4	1.27	1.3	1.21	1.13	1.15	1.06	1.08	1.1
	⅜	M_u	1203	1456	1584	1710	1872	2160	2448	2657	2735	2979	3200
		R_{ki}	213	320	336	451	472	632	816	853	1023	1070	1117
		n	1.5	1.36	1.38	1.25	1.28	1.19	1.11	1.13	1.04	1.06	1.08
	5/16	M_u	1150	1390	1489	1630	1756	2024	2291	2453	2559	2749	2919
		R_{ki}	204	307	315	431	443	593	765	786	960	986	1012
		n	1.49	1.36	1.39	1.25	1.28	1.19	1.11	1.13	1.04	1.06	1.09
	¼	M_u	1106	1335	1411	1563	1661	1911	2161	2286	2411	2558	2690
		R_{ki}	201	303	310	426	436	583	753	769	943	964	985
		n	1.48	1.34	1.36	1.23	1.25	1.16	1.08	1.1	1.01	1.03	1.05
9/16	½	M_u	1114	1358	1543	1603	1835	2127	2419	2720	2711	3060	3381
		R_{ki}	167	253	278	356	392	525	679	741	852	930	1008
		n	1.59	1.46	1.48	1.36	1.38	1.29	1.21	1.23	1.15	1.17	1.18
	⅜	M_u	1010	1227	1354	1445	1606	1858	2110	2318	2362	2604	2824
		R_{ki}	154	232	248	327	349	468	604	641	758	805	851
		n	1.59	1.45	1.47	1.34	1.37	1.28	1.2	1.22	1.13	1.16	1.17
	5/16	M_u	957	1161	1259	1365	1491	1722	1954	2115	2186	2375	2544
		R_{ki}	145	219	227	308	320	429	554	575	695	721	747
		n	1.59	1.46	1.48	1.35	1.38	1.29	1.21	1.23	1.14	1.17	1.19
	¼	M_u	914	1106	1182	1299	1396	1610	1824	1949	2038	2185	2316
		R_{ki}	143	215	222	303	313	419	541	558	679	700	720
		n	1.57	1.44	1.46	1.33	1.35	1.26	1.18	1.2	1.11	1.13	1.15
½	½	M_u	1056	1293	1476	1530	1760	2045	2330	2629	2614	2961	3281
		R_{ki}	170	258	283	365	400	537	695	757	873	951	1028
		n	1.55	1.42	1.45	1.31	1.34	1.25	1.18	1.2	1.11	1.13	1.15
	⅜	M_u	952	1162	1288	1372	1532	1777	2021	2228	2266	2507	2726
		R_{ki}	157	238	253	336	357	480	621	658	780	826	873
		n	1.54	1.41	1.43	1.3	1.33	1.24	1.16	1.18	1.09	1.12	1.13
	5/16	M_u	900	1097	1194	1293	1418	1642	1866	2027	2090	2279	2447
		R_{ki}	148	225	233	317	329	442	571	592	718	743	769
		n	1.54	1.41	1.44	1.3	1.33	1.24	1.16	1.19	1.09	1.12	1.15
	¼	M_u	857	1042	1117	1227	1324	1530	1737	1861	1943	2089	2220
		R_{ki}	146	221	228	312	322	432	559	575	702	722	743
		n	1.52	1.38	1.41	1.27	1.3	1.21	1.13	1.16	1.06	1.09	1.11
7/16	½	M_u	873	1074	1256	1276	1505	1755	2004	2301	2253	2599	2917
		R_{ki}	119	182	207	257	293	394	510	571	641	718	795
		n	1.65	1.52	1.54	1.41	1.44	1.35	1.27	1.29	1.21	1.22	1.23
	⅜	M_u	770	945	1070	1120	1279	1488	1697	1903	1906	2146	2364
		R_{ki}	107	162	177	229	250	337	436	473	548	594	640
		n	1.65	1.51	1.54	1.41	1.43	1.34	1.27	1.29	1.2	1.22	1.24
	5/16	M_u	719	880	976	1041	1165	1354	1542	1702	1731	1919	2086
		R_{ki}	98	149	157	211	222	299	387	407	486	512	537
		n	1.65	1.52	1.55	1.41	1.45	1.36	1.28	1.31	1.21	1.24	1.27
	¼	M_u	676	826	900	975	1071	1242	1413	1537	1585	1730	1860
		R_{ki}	96	145	152	206	215	289	374	390	470	491	511
		n	1.63	1.5	1.52	1.39	1.42	1.33	1.25	1.27	1.18	1.21	1.23
⅜	½	M_u	708	878	1057	1047	1275	1492	1709	2005	1926	2270	2586
		R_{ki}	84	128	152	182	216	291	378	439	475	552	628
		n	1.74	1.61	1.62	1.51	1.52	1.43	1.36	1.37	1.29	1.3	1.3
	⅜	M_u	607	749	872	891	1049	1226	1403	1608	1580	1819	2036
		R_{ki}	71	108	123	154	175	235	305	341	383	429	475
		n	1.75	1.62	1.63	1.51	1.53	1.45	1.37	1.38	1.3	1.32	1.33
	5/16	M_u	555	684	779	813	936	1093	1249	1408	1406	1592	1759
		R_{ki}	63	95	104	135	147	198	256	276	322	347	373
		n	1.77	1.64	1.67	1.53	1.57	1.48	1.41	1.43	1.34	1.37	1.38
	¼	M_u	513	630	704	748	843	982	1121	1244	1260	1404	1533
		R_{ki}	60	92	99	130	140	188	243	259	306	326	347
		n	1.74	1.61	1.64	1.5	1.54	1.45	1.37	1.39	1.3	1.33	1.35

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W21			W24				W27			
			3 row	4 row	5 row	4 row	5 row	6 row	7 row	5 row	6 row	7 row	8 row
¾	½	M_u	4878	5276	5646	5550	6019	6461	6875	6763	7276	7762	8221
		R_{ki}	2633	2740	2847	3407	3546	3684	3823	4455	4630	4804	4979
		n	0.83	0.84	0.86	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	4337	4612	4865	4928	5255	5560	5843	5898	6254	6589	6901
		R_{ki}	2461	2525	2589	3184	3267	3351	3434	4106	4210	4315	4419
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4065	4278	4473	4616	4871	5107	5323	5463	5740	5998	6237
		R_{ki}	2346	2382	2417	3036	3082	3128	3174	3872	3930	3988	4046
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	3837	4003	4153	4353	4551	4734	4901	5100	5315	5514	5698
		R_{ki}	2317	2345	2373	2998	3034	3071	3107	3812	3858	3904	3950
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	4000	4394	4761	4564	5030	5468	5880	5665	6176	6659	7115
		R_{ki}	1610	1716	1822	2087	2224	2362	2499	2798	2971	3144	3317
		n	0.99	1.01	1.03	0.92	0.94	0.95	0.96	0.87	0.89	0.9	0.91
	⅜	M_u	3462	3735	3986	3945	4270	4572	4853	4804	5159	5491	5801
		R_{ki}	1441	1504	1568	1867	1949	2031	2114	2452	2556	2659	2763
		n	0.97	0.99	1.01	0.9	0.92	0.93	0.95	0.85	0.87	0.88	0.89
	5/16	M_u	3191	3403	3596	3634	3888	4122	4337	4372	4647	4904	5141
		R_{ki}	1327	1362	1398	1720	1765	1811	1857	2221	2278	2335	2393
		n	0.97	1	1.02	0.9	0.92	0.94	0.96	0.85	0.87	0.89	0.91
	¼	M_u	2966	3130	3278	3373	3570	3751	3917	4010	4224	4422	4604
		R_{ki}	1298	1326	1354	1682	1718	1754	1791	2161	2207	2252	2298
		n	0.94	0.96	0.98	0.86	0.89	0.9	0.92	0.83	0.84	0.85	0.86
9/16	½	M_u	3570	3962	4328	4080	4544	4981	5391	5126	5635	6116	6571
		R_{ki}	1253	1359	1464	1626	1762	1899	2036	2218	2390	2562	2735
		n	1.08	1.09	1.1	1	1.02	1.03	1.03	0.95	0.96	0.97	0.97
	⅜	M_u	3033	3305	3555	3463	3786	4088	4367	4267	4620	4951	5261
		R_{ki}	1085	1148	1211	1406	1488	1570	1652	1873	1976	2080	2183
		n	1.07	1.08	1.1	0.99	1.01	1.02	1.03	0.94	0.96	0.97	0.98
	5/16	M_u	2764	2975	3167	3153	3405	3638	3852	3836	4110	4366	4602
		R_{ki}	972	1007	1042	1260	1305	1351	1396	1643	1700	1757	1814
		n	1.08	1.1	1.12	1	1.02	1.04	1.06	0.96	0.98	0.99	1.01
	¼	M_u	2538	2702	2850	2892	3088	3269	3434	3475	3688	3885	4067
		R_{ki}	943	971	998	1223	1259	1295	1331	1584	1629	1675	1720
		n	1.04	1.06	1.08	0.96	0.99	1	1.02	0.92	0.94	0.95	0.96
½	½	M_u	3460	3851	4215	3958	4421	4857	5266	4992	5499	5979	6432
		R_{ki}	1283	1388	1493	1666	1802	1938	2074	2269	2440	2612	2783
		n	1.04	1.06	1.07	0.97	0.99	1	1.01	0.92	0.94	0.94	0.95
	⅜	M_u	2925	3196	3445	3343	3666	3966	4245	4135	4487	4817	5126
		R_{ki}	1115	1178	1241	1448	1529	1611	1692	1926	2028	2131	2234
		n	1.03	1.05	1.06	0.95	0.97	0.99	1	0.91	0.92	0.94	0.95
	5/16	M_u	2656	2866	3057	3034	3286	3518	3731	3705	3979	4233	4468
		R_{ki}	1003	1038	1073	1302	1347	1392	1437	1697	1753	1810	1867
		n	1.03	1.06	1.08	0.96	0.98	1	1.02	0.92	0.94	0.96	0.97
	¼	M_u	2432	2595	2742	2774	2970	3150	3314	3345	3557	3754	3935
		R_{ki}	974	1002	1030	1265	1300	1336	1372	1638	1683	1728	1773
		n	1	1.02	1.04	0.92	0.94	0.96	0.98	0.88	0.9	0.91	0.93
7/16	½	M_u	3044	3434	3797	3490	3951	4386	4793	4469	4975	5453	5905
		R_{ki}	970	1074	1178	1260	1395	1530	1666	1758	1929	2099	2270
		n	1.14	1.15	1.15	1.06	1.07	1.08	1.08	1.01	1.02	1.02	1.02
	⅜	M_u	2511	2781	3029	2876	3198	3497	3775	3614	3965	4294	4602
		R_{ki}	803	865	928	1043	1124	1205	1286	1416	1518	1621	1723
		n	1.13	1.15	1.16	1.06	1.08	1.09	1.1	1.01	1.02	1.03	1.04
	5/16	M_u	2243	2453	2643	2568	2819	3050	3263	3185	3458	3712	3946
		R_{ki}	691	726	760	898	943	988	1033	1188	1245	1301	1358
		n	1.16	1.18	1.2	1.08	1.11	1.13	1.14	1.04	1.06	1.08	1.09
	¼	M_u	2020	2182	2328	2309	2504	2683	2846	2826	3038	3234	3414
		R_{ki}	663	690	718	861	896	932	968	1130	1174	1219	1264
		n	1.12	1.14	1.16	1.04	1.07	1.08	1.1	1	1.02	1.03	1.05
⅜	½	M_u	2667	3055	3416	3064	3524	3957	4362	3993	4497	4975	5424
		R_{ki}	746	850	953	970	1105	1239	1374	1393	1563	1733	1903
		n	1.22	1.22	1.22	1.14	1.15	1.15	1.14	1.08	1.08	1.08	1.08
	⅜	M_u	2135	2404	2651	2452	2772	3071	3347	3141	3491	3819	4125
		R_{ki}	580	642	704	754	835	916	996	1053	1155	1256	1358
		n	1.23	1.24	1.25	1.16	1.17	1.18	1.18	1.11	1.11	1.12	1.12
	5/16	M_u	1868	2077	2266	2145	2394	2625	2837	2712	2984	3237	3471
		R_{ki}	470	504	538	610	655	700	744	826	882	938	995
		n	1.28	1.3	1.32	1.21	1.23	1.25	1.25	1.16	1.18	1.19	1.2
	¼	M_u	1645	1807	1953	1886	2081	2259	2422	2354	2565	2761	2940
		R_{ki}	441	468	496	573	609	644	680	767	812	857	902
		n	1.24	1.26	1.27	1.17	1.19	1.2	1.21	1.12	1.14	1.15	1.16

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W27	W30				W33				W36	
			9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row
¾	½	M_u	7506	8091	8649	9180	9683	8906	9536	10138	10713	9722	10423
		R_{ki}	5469	5683	5897	6112	6326	6845	7103	7361	7619	8114	8420
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	6541	6948	7334	7699	8041	7643	8080	8496	8890	8337	8826
		R_{ki}	5040	5168	5296	5425	5553	6224	6379	6534	6688	7378	7562
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	6055	6374	6673	6954	7215	7008	7349	7670	7973	7641	8024
		R_{ki}	4753	4824	4895	4966	5037	5810	5895	5981	6067	6887	6989
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	5648	5895	6127	6344	6544	6476	6741	6990	7223	7057	7354
		R_{ki}	4680	4736	4792	4849	4905	5704	5771	5839	5907	6761	6842
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
⅝	½	M_u	6301	6883	7438	7965	8466	7590	8216	8816	9388	8297	8995
		R_{ki}	3438	3651	3863	4076	4288	4400	4656	4912	5169	5219	5523
		n	0.83	0.83	0.84	0.85	0.85	0.83	0.83	0.83	0.83	0.83	0.83
	⅜	M_u	5339	5745	6129	6491	6831	6331	6767	7180	7572	6918	7405
		R_{ki}	3012	3140	3267	3394	3522	3784	3938	4091	4245	4489	4671
		n	0.83	0.83	0.83	0.84	0.84	0.83	0.83	0.83	0.83	0.83	0.83
	5/16	M_u	4856	5173	5471	5749	6009	5699	6038	6358	6658	6224	6605
		R_{ki}	2728	2799	2869	2940	3010	3373	3458	3543	3628	4001	4101
		n	0.83	0.83	0.83	0.85	0.86	0.83	0.83	0.83	0.83	0.83	0.83
	¼	M_u	4450	4697	4927	5142	5341	5170	5433	5680	5912	5642	5938
		R_{ki}	2655	2711	2767	2823	2879	3267	3335	3402	3470	3876	3956
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
9/16	½	M_u	5707	6288	6841	7367	7866	6941	7566	8164	8735	7595	8291
		R_{ki}	2727	2938	3150	3362	3573	3543	3798	4053	4308	4204	4507
		n	0.89	0.9	0.91	0.92	0.92	0.85	0.86	0.87	0.87	0.83	0.83
	⅜	M_u	4748	5153	5536	5896	6235	5685	6120	6532	6923	6218	6704
		R_{ki}	2302	2429	2556	2683	2810	2929	3082	3235	3388	3475	3657
		n	0.88	0.9	0.91	0.92	0.93	0.84	0.86	0.87	0.88	0.83	0.83
	5/16	M_u	4266	4582	4879	5157	5415	5054	5392	5711	6011	5526	5905
		R_{ki}	2019	2090	2160	2230	2300	2519	2604	2689	2773	2989	3090
		n	0.9	0.92	0.94	0.95	0.96	0.86	0.88	0.9	0.91	0.83	0.84
	¼	M_u	3861	4107	4337	4551	4749	4526	4788	5035	5266	4945	5240
		R_{ki}	1947	2002	2058	2114	2170	2414	2481	2549	2616	2864	2944
		n	0.86	0.88	0.89	0.91	0.92	0.83	0.84	0.86	0.87	0.83	0.83
½	½	M_u	5562	6141	6693	7218	7715	6783	7407	8003	8572	7425	8120
		R_{ki}	2791	3001	3212	3423	3634	3620	3875	4129	4383	4297	4599
		n	0.86	0.88	0.89	0.89	0.9	0.83	0.84	0.84	0.85	0.83	0.83
	⅜	M_u	4605	5008	5390	5750	6088	5530	5963	6374	6764	6051	6536
		R_{ki}	2368	2495	2621	2747	2874	3009	3161	3314	3466	3572	3753
		n	0.85	0.87	0.88	0.89	0.9	0.83	0.83	0.84	0.85	0.83	0.83
	5/16	M_u	4124	4439	4735	5012	5269	4900	5237	5555	5854	5360	5739
		R_{ki}	2086	2156	2226	2296	2366	2601	2685	2770	2854	3087	3187
		n	0.86	0.88	0.9	0.92	0.93	0.83	0.85	0.86	0.88	0.83	0.83
	¼	M_u	3720	3965	4194	4408	4606	4373	4635	4881	5111	4780	5075
		R_{ki}	2014	2069	2125	2180	2236	2496	2563	2630	2697	2963	3042
		n	0.83	0.84	0.85	0.87	0.88	0.83	0.83	0.83	0.83	0.83	0.83
7/16	½	M_u	4986	5564	6114	6637	7133	6153	6775	7370	7937	6742	7436
		R_{ki}	2163	2373	2583	2793	3003	2863	3117	3370	3623	3400	3701
		n	0.95	0.96	0.97	0.97	0.97	0.91	0.91	0.92	0.92	0.86	0.87
	⅜	M_u	4031	4434	4814	5173	5510	4902	5334	5744	6133	5370	5854
		R_{ki}	1742	1868	1994	2120	2246	2254	2406	2558	2710	2677	2857
		n	0.95	0.97	0.98	0.98	0.99	0.91	0.93	0.93	0.94	0.86	0.88
	5/16	M_u	3551	3865	4161	4437	4693	4273	4610	4927	5225	4681	5059
		R_{ki}	1462	1531	1601	1671	1740	1848	1932	2016	2100	2194	2293
		n	0.98	1	1.02	1.04	1.04	0.95	0.97	0.98	1	0.9	0.92
	¼	M_u	3148	3392	3621	3834	4031	3747	4008	4254	4484	4102	4396
		R_{ki}	1390	1445	1500	1555	1611	1743	1810	1877	1943	2070	2149
		n	0.94	0.96	0.98	0.99	1	0.91	0.92	0.94	0.95	0.86	0.88
⅜	½	M_u	4462	5038	5587	6108	6603	5579	6199	6792	7359	6119	6811
		R_{ki}	1715	1924	2133	2342	2551	2323	2575	2827	3080	2759	3058
		n	1.02	1.03	1.03	1.02	1.02	0.97	0.98	0.97	0.97	0.93	0.93
	⅜	M_u	3509	3910	4290	4648	4983	4330	4761	5170	5558	4750	5233
		R_{ki}	1296	1421	1547	1672	1797	1716	1867	2018	2169	2038	2217
		n	1.05	1.06	1.06	1.06	1.06	1	1.01	1.01	1.01	0.96	0.96
	5/16	M_u	3030	3343	3638	3913	4169	3703	4038	4355	4652	4062	4439
		R_{ki}	1016	1086	1155	1224	1294	1310	1394	1478	1562	1556	1656
		n	1.11	1.13	1.14	1.15	1.15	1.07	1.09	1.1	1.1	1.02	1.04
	¼	M_u	2628	2872	3099	3312	3508	3178	3438	3683	3912	3484	3777
		R_{ki}	945	1000	1055	1110	1165	1207	1273	1339	1406	1433	1512
		n	1.06	1.08	1.1	1.11	1.11	1.03	1.05	1.06	1.06	0.98	1

T & S l_t = 6-in. L6×4×t_t	Web 2L4×3.5 t_a	A36 ¾-in. Dia.	Beam										
			W36		W40				W44				
			8 row	9 row	6 row	7 row	8 row	9 row	6 row	7 row	8 row	9 row	
¾	½	M_u	11097	11743	10809	11605	12375	13117	11895	12788	13653	14491	
		R_{ki}	8726	9032	9975	10351	10728	11104	12028	12482	12935	13389	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	9293	9739	9263	9821	10357	10871	10189	10815	11420	12003	
		R_{ki}	7745	7929	9070	9296	9521	9747	10937	11209	11481	11753	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	8387	8731	8486	8924	9342	9741	9331	9824	10297	10752	
		R_{ki}	7090	7192	8466	8591	8716	8841	10208	10359	10510	10660	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	7636	7902	7832	8172	8497	8807	8606	8990	9359	9712	
		R_{ki}	6922	7003	8311	8411	8510	8609	10022	10141	10261	10380	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
⅝	½	M_u	9666	10310	9240	10034	10800	11540	10183	11072	11934	12769	
		R_{ki}	5827	6131	6421	6795	7169	7543	7746	8198	8649	9100	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	7870	8313	7699	8255	8789	9301	8481	9106	9708	10289	
		R_{ki}	4853	5035	5522	5746	5970	6194	6661	6932	7202	7473	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	6966	7308	6925	7361	7778	8175	7626	8117	8589	9042	
		R_{ki}	4202	4303	4921	5045	5169	5293	5937	6087	6236	6386	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	6218	6483	6273	6612	6936	7244	6903	7286	7653	8005	
		R_{ki}	4036	4115	4767	4866	4964	5063	5751	5870	5989	6108	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
9/16	½	M_u	8961	9603	8466	9258	10023	10761	9337	10225	11085	11919	
		R_{ki}	4810	5112	5173	5546	5919	6291	6243	6693	7143	7593	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	7168	7610	6928	7482	8015	8526	7638	8261	8862	9442	
		R_{ki}	3838	4020	4277	4500	4723	4947	5161	5431	5700	5970	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	6266	6607	6155	6590	7005	7402	6784	7274	7745	8197	
		R_{ki}	3190	3291	3678	3802	3925	4049	4439	4588	4737	4886	
		n	0.85	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	5519	5783	5504	5842	6165	6472	6062	6444	6811	7161	
		R_{ki}	3024	3104	3525	3623	3721	3819	4253	4372	4490	4609	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
½	½	M_u	8788	9429	8281	9072	9836	10572	9137	10024	10883	11715	
		R_{ki}	4901	5203	5290	5662	6034	6405	6386	6835	7284	7733	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	6999	7440	6746	7299	7831	8341	7441	8063	8663	9242	
		R_{ki}	3933	4114	4397	4620	4842	5065	5308	5577	5845	6114	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	5/16	M_u	6099	6439	5974	6408	6823	7219	6588	7078	7548	7999	
		R_{ki}	3287	3387	3800	3923	4047	4170	4587	4736	4885	5034	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	¼	M_u	5354	5617	5324	5662	5984	6291	5868	6249	6615	6965	
		R_{ki}	3122	3201	3647	3745	3843	3941	4403	4521	4639	4757	
		n	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
7/16	½	M_u	8102	8741	7527	8317	9079	9814	8313	9198	10055	10886	
		R_{ki}	4002	4303	4187	4558	4928	5299	5056	5503	5951	6398	
		n	0.87	0.87	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
	⅜	M_u	6316	6756	5994	6547	7077	7586	6619	7240	7839	8417	
		R_{ki}	3037	3218	3296	3518	3740	3962	3980	4248	4516	4785	
		n	0.89	0.89	0.83	0.83	0.83	0.84	0.83	0.83	0.83	0.83	
	5/16	M_u	5417	5757	5224	5657	6071	6466	5767	6256	6725	7175	
		R_{ki}	2393	2493	2701	2824	2947	3070	3262	3410	3559	3707	
		n	0.94	0.95	0.84	0.86	0.88	0.89	0.83	0.83	0.83	0.84	
	¼	M_u	4674	4936	4575	4912	5234	5540	5048	5429	5794	6143	
		R_{ki}	2228	2307	2549	2646	2744	2841	3078	3195	3313	3431	
		n	0.89	0.9	0.83	0.83	0.83	0.85	0.83	0.83	0.83	0.83	
⅜	½	M_u	7476	8114	6840	7628	8388	9122	7561	8444	9300	10129	
		R_{ki}	3358	3658	3398	3768	4137	4506	4105	4551	4997	5443	
		n	0.93	0.93	0.87	0.87	0.87	0.87	0.83	0.83	0.83	0.83	
	⅜	M_u	5693	6132	5310	5861	6390	6898	5869	6489	7088	7664	
		R_{ki}	2397	2577	2510	2732	2953	3174	3032	3299	3567	3834	
		n	0.97	0.97	0.9	0.91	0.91	0.91	0.84	0.85	0.86	0.86	
	5/16	M_u	4797	5135	4540	4973	5386	5780	5019	5507	5975	6424	
		R_{ki}	1755	1855	1917	2040	2162	2285	2316	2464	2612	2760	
		n	1.05	1.06	0.97	0.98	1	1.01	0.91	0.93	0.94	0.96	
	¼	M_u	4055	4316	3892	4229	4550	4855	4301	4681	5045	5394	
		R_{ki}	1591	1670	1765	1862	1960	2057	2132	2249	2367	2484	
		n	1.01	1.02	0.92	0.94	0.95	0.96	0.87	0.89	0.9	0.91	