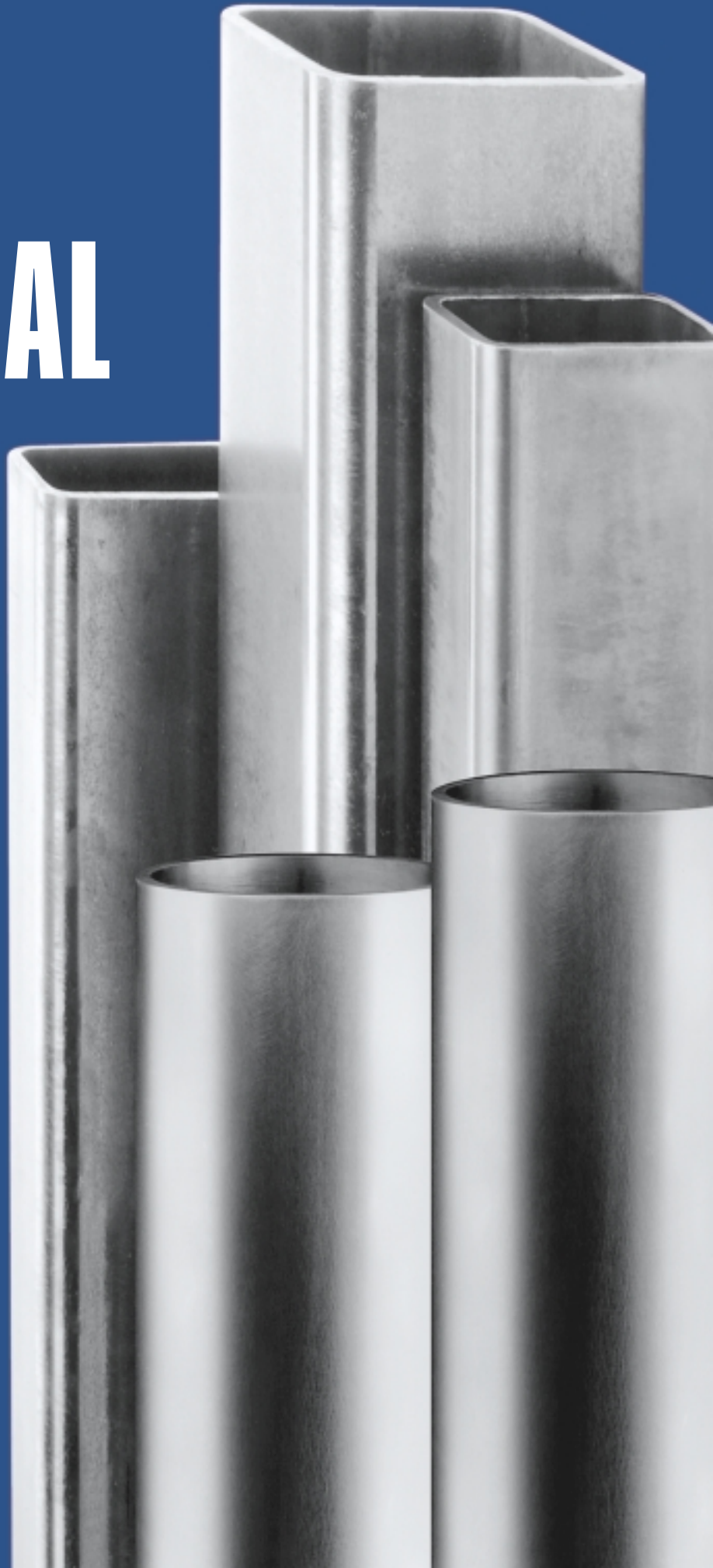


HOLLOW STRUCTURAL SECTIONS

Column Load Tables



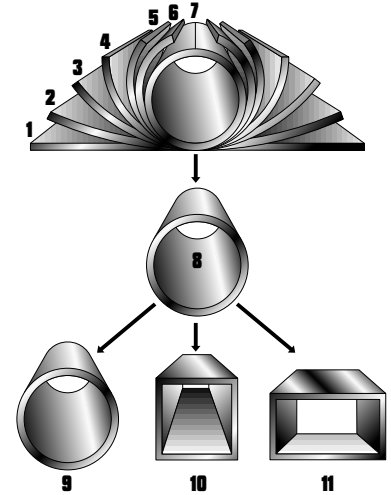
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HSS Manufacturing Methods

The transformation of steel strip into hollow structural sections (HSS) is the result of operations including forming, welding and sizing. Currently three methods are being used in North America for the manufacture of HSS. These methods, including two ERW methods and an SAW method, are described below. Both ERW methods meet ASTM A 500 and CSA G-40.21 requirements for the manufacture of HSS, and the ERW sizes included in this publication may be produced to either standard. The SAW method is not included as a manufacturing process in the ASTM or CSA specification. SAW sizes listed in this publication can be specified to meet desired physical and dimensional criteria of ASTM A500 and CSA G-40.21

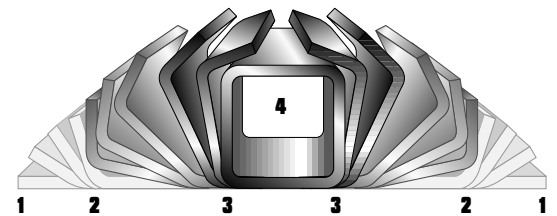
Electric Resistance Welding (ERW) Process

In the tube mill, flat steel strip (1) is formed continuously around its longitudinal axis to produce a round tube. This is done by moving the strip through a progressive set of rolls (2-6). The strip edges (7) are heated by either high frequency induction or contact welding and then forged together by weld rolls to create a continuous longitudinal weld without the addition of filler metal. The weld seam (8) is then cooled and processed through a set of sizing/shaping rolls which cold-form it into a round (9), square (10) or rectangular (11) section.



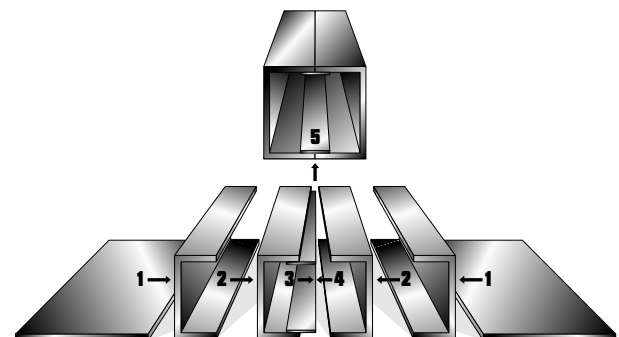
Form-Square Weld-Square (ERW) Process

In the weld mill, driven forming dies progressively shape the flat strip (1) by forming the top two corners (2) of the square or rectangular tube in the initial forming station. Subsequent stations form the bottom two corners (3) of the shape. No cold working of the sides of the shape is performed, and the shape's seam is welded by high-frequency contacts when the tube is near its final shape and size. The welded tube (4) is cooled and then driven through a series of sizing stations which qualifies the tube's final dimensions.



Submerged Arc Weld (SAW) Process

Two identical pieces of flat strip (1) are placed in a press brake and formed into two identical halves (2) of a finished tube size. A backup bar is tack welded to each leg of one of the half-sections (3). The two half-sections are fitted together toe-to-toe (4) and welded by the submerged arc process to complete the square or rectangular section (5).



STI/HSS Member Companies

Bull Moose Tube Company

1819 Clarkson Road, Suite 100
Chesterfield, MO 63017
Telephone: (636) 537-2600
(800) 325-4467
Fax: (636) 537-5848

Columbia Structural Tubing

8735 N Harborgate ST
Portland, OR 97203
Telephone: (503) 737-1200
(877) 737-1202
Fax: (503) 737-1202

IPSCO Tubulars Inc.

P.O. Box 18, 2011 7th Avenue
Camanche, IA 52730
Telephone: (563) 242-0000
(800) 945-8936
Fax: (563) 242-9137

Maruichi American Corp.

P.O. Box 3187
11529 Greenstone Ave.
Santa Fe Springs, CA 90670
Telephone: (562) 903-8600
(800) 654-5495
Fax: (562) 903-8601

Prolamsa

(Mexico Headquarters)
Carretera a Colombia Km. 5.75
Escobedo, N.L.,
Mexico C.P. 45560
Tel +52 (81) 8154-0200
Fax +52 (81) 8901-1709

Prolamsa USA, Inc.

(U.S. Headquarters)
770 South Post Oak Lane
Suite 200, Houston, TX 77056
Tel (281) 494-0900
Fax (281) 494-0990

Southland Tube Inc.

P.O. Box 2425
Birmingham, AL 35201-2425
Telephone: (205) 251-1884
(800) 543-9024
FAX: (205) 251-1553

Valmont Industries

(Structural Tube Division)
HWY 275, P.O. Box 358
Valley, NB 68064
Telephone: (800) 345-6825
Fax: (402) 359-4481

Vest, Incorporated

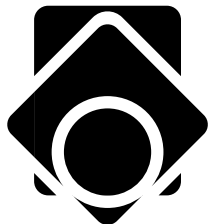
6023 Alcoa Avenue
Los Angeles, CA 90058
Telephone: (323) 581-8823
(800) 421-6370
Fax: (323) 581-3465

Welded Tube

111 Rayette Road
Concord, Ontario,
Canada L4K 2E9
Telephone: (905) 669-1111
(800) 565-8823
Fax: (905) 669-8570

Please Note:

*We've tried to make this brochure as comprehensive and factual as possible.
However, some information may have been updated since the time of printing.
Your HSS producer is your best source for up-to-date information.*



**Steel Tube
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OF NORTH AMERICA



Foreword

Tables of allowable axial compressive loads, in kips, are presented for square, rectangular and round hollow structural sections (HSS) manufactured by the electric resistance welding (ERW) method and for square and rectangular HSS manufactured by the submerged arc welding (SAW) method. Tables of allowable stresses for compression members of 42 ksi to 70 ksi specified minimum yield stress are also included.

The allowable axial compressive loads, in kips, and the allowable axial compressive stresses, in ksi, have been calculated in accordance with the 1989 “*Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design*” published by the American Institute of Steel Construction. The allowable loads are based upon section property data for HSS that were recalculated in 1996 to account for today’s more precise manufacturing methods. Recalculated section property data for HSS is published in “*Hollow Structural Sections - Dimensions and Section Properties*” available from the Steel Tube Institute of North America.

Tables for square and rectangular HSS are presented for $F_y = 46$ ksi and for $F_y = 50$ ksi. Separate tables are used for HSS sizes produced by the ERW and SAW manufacturing methods.

Tables for round HSS are presented for $F_y = 42$ ksi, $F_y = 46$ ksi, and $F_y = 50$ ksi. Only round sizes produced by the ERW manufacturing method are included.

The allowable axial loads have been calculated for effective lengths, KL , with respect to the least radius of gyration (r or r_y) varying from 0 to 40 feet. AISC “*Specification*” Appendix B5.2 is used to calculate the allowable loads for members with slender elements. These members are identified in the tables with an asterisk (*) immediately following the design wall thickness parameter.

The properties at the bottom of the tables are useful for determining column strength with respect to the major axis and for the design of columns subject to combined axial and bending loads.

Refer to part 3, Column Design, in the AISC 9th Edition “*Manual of Steel Construction*” for a discussion of effective length, strength about the major axis, and combined axial and bending loading (interaction). Symbols in these tables follow those used in the AISC “*Manual*”.

The tabulated values of allowable axial compressive stresses on pages 124 through 126, are calculated in accordance with the requirements of AISC “*Specification*” Chapter E, Formulae (E2-1) and (E2-2).

The information presented in this publication has been prepared in accordance with recognized engineering principles and is for general information only. While it is believed to be accurate, this information should not be used or relied upon for any specific application without competent professional examination and verification of its accuracy, suitability, and applicability by a licensed professional engineer, designer, or architect. The publication of the material contained herein is not intended as a representation or warranty on the part of The Steel Tube Institute of North America or of any other person named herein, that this information is suitable for any general or particular use or of freedom from infringement of any patent or patents. Anyone making use of this information assumes all liability arising from such use.

Caution must be exercised when relying upon other specifications and codes developed by other bodies and incorporated by reference herein since such material may be modified or amended from time to time subsequent to the printing of this edition. The Institute bears no responsibility for such material other than to refer to it and incorporate it by reference at the time of the initial publication of this edition.

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Column Load Tables:		Round HSS (ERW) $F_y = 46$ ksi	93
Square HSS (ERW) $F_y = 46$ ksi	6	Round HSS (ERW) $F_y = 50$ ksi	108
Rectangular HSS (ERW) $F_y = 46$ ksi	14	Allowable Stress Tables	
Square HSS (ERW) $F_y = 50$ ksi	36	$F_y=42$ ksi	124
Rectangular HSS (ERW) $F_y = 50$ ksi	44	$F_y=46$ ksi	124
Square HSS (SAW) $F_y = 46$ ksi	67	$F_y=50$ ksi	125
Rectangular HSS (SAW) $F_y = 46$ ksi	69	$F_y=60$ ksi	125
Square HSS (SAW) $F_y = 50$ ksi	72	$F_y=65$ ksi	126
Rectangular HSS (SAW) $F_y = 50$ ksi	74	$F_y=70$ ksi	126

“Designs for the 21st Century”



How To Use The Column Load Tables

Example I

Select the lightest 8-inch square ERW HSS column of $F_y = 46$ ksi (ASTM A500 Gr. B) to support a concentrated axial compressive load of 152 kips. The largest effective length, KL, is 20 feet.

Enter the $F_y = 46$ ksi table (page 8) for the 8-inch square ERW HSS. Read across the row at $KL = 20$ and note the following:

8 x 8 x 5/8	can carry 296 kips	> 152 kips - O.K.
x 1/2	can carry 247 kips	> 152 kips - O.K.
x 3/8	can carry 193 kips	> 152 kips - O.K.
x 5/16	can carry 163 kips	> 152 kips - O.K.
x 1/4	can carry 133 kips	< 152 kips - No Good

Select: **8 x 8 x 5/16** HSS (Weight = 31.84 lbs./ft.)

Example II

Select the lightest square ERW HSS column of $F_y = 46$ ksi (ASTM A500 Gr. B) to support a concentrated axial compressive load of 120 kips. The largest effective length, KL, is 14 feet.

Enter the $F_y = 46$ ksi tables for square HSS. Read across the rows at $KL = 14$ and note the following:

5 x 5 x 1/2 can carry 125 kips > 120 kips - O.K.
(Weight = 28.43 lbs./ft.) (page 10)

5 1/2 x 5 1/2 x 3/8 can carry 124 kips > 120 kips - O.K.
(Weight = 24.93 lbs./ft.) (page 9)

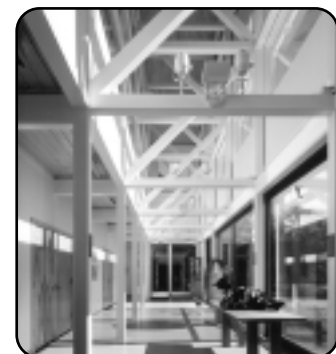
6 x 6 x 5/16 can carry 124 kips > 120 kips - O.K.
(Weight = 23.34 lbs./ft.) (page 9)

7 x 7 x 1/4 can carry 130 kips > 120 kips - O.K.
(Weight = 22.42 lbs./ft.) (page 8)

8 x 8 x 1/4 can carry 158 kips > 120 kips - O.K.
(Weight = 25.82 lbs./ft.) (page 8)

9 x 9 x 3/16 can carry 129 kips > 120 kips - O.K.
(Weight = 22.18 lbs./ft.) (page 7)

Final Selection: **9 x 9 x 3/16** HSS (Weight = 22.18 lbs./ft.)



Example III

Select the lightest 10-inch x 6-inch rectangular ERW HSS column of $F_y = 50$ ksi (ASTM A500 Gr. C) to support a concentrated axial compressive load of 220 kips. The effective length, KL, with respect to the minor axis is 16 feet. The effective length, KL, with respect to the major axis is 30 feet.

Enter the $F_y = 50$ ksi table (page 51) for the 10-inch x 6-inch rectangular ERW HSS. Read across the row at $KL = 16$ and note the following:

10 x 6 x 5/8	can carry 305 kips	> 220 kips - O.K.
x 1/2	can carry 256 kips	> 220 kips - O.K.
x 3/8	can carry 200 kips	< 220 kips - No Good

Tentatively select: 10 x 6 x 1/2
 $r_x / r_y = 1.49$

Equivalent effective length for the major axis:
 $30 / 1.49 = 20.1$ ft. > 16 ft. Therefore major axis governs.

Enter the same table, read across the row at $KL = 20.1$ and note the following:

10 x 6 x 5/8 can carry 229 kips (interpolated) > 220 kips
 $r_x / r_y = 1.50$ - O.K.

10 x 6 x 1/2 can carry 195 kips (interpolated) < 220 kips - No Good

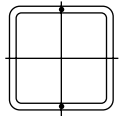
Final Selection: **10 x 6 x 5/8** HSS (Weight = 59.32 lbs./ft.)



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

Nominal Size		16 x 16				14 x 14				12 x 12				
Wall Thickness		5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		127.37	103.30	78.52	65.87	110.36	89.68	68.31	57.36	93.34	76.07	58.10	48.86	39.43
Design Wall Thickness		0.581	0.465	0.349*	0.291*	0.581	0.465	0.349	0.291*	0.581	0.465	0.349	0.291*	0.233*
F_y = 46 ksi														
Effective length KL in feet	0	966	781	552	418	836	679	516	392	709	577	442	365	259
	2	958	775	549	416	828	673	511	389	701	570	437	362	257
	3	954	771	547	415	824	669	509	388	697	567	434	360	256
	4	949	768	545	414	819	665	506	387	692	563	431	358	255
	5	944	764	543	412	814	661	503	385	687	559	428	357	254
	6	939	760	541	411	809	657	500	383	681	554	425	355	253
	7	934	755	539	409	803	653	496	382	675	550	421	352	251
	8	928	751	537	408	798	648	493	380	669	545	417	350	250
	9	923	746	534	406	792	643	489	378	663	540	414	347	248
	10	917	742	532	405	785	638	486	376	656	534	410	343	247
	11	910	737	530	403	779	633	482	374	649	529	405	340	245
	12	904	732	527	401	772	628	478	372	642	523	401	336	243
	13	897	726	524	399	765	622	473	369	635	517	397	333	241
	14	891	721	522	397	758	616	469	367	627	511	392	329	240
	15	884	715	519	395	751	610	465	365	619	505	387	325	238
	16	876	710	516	393	743	604	460	362	611	498	382	321	236
	17	869	704	513	391	735	598	456	359	603	492	377	317	233
	18	862	698	510	389	728	592	451	357	594	485	372	312	231
	19	854	691	506	387	719	585	446	354	585	478	367	308	229
	20	846	685	503	385	711	578	441	351	576	471	361	303	227
	21	838	679	500	382	702	572	436	348	567	463	356	299	224
	22	829	672	496	380	694	565	430	345	558	456	350	294	222
	23	821	665	492	377	685	557	425	342	548	448	344	289	219
	24	812	658	489	375	675	550	420	339	538	440	338	284	217
	25	804	651	485	372	666	542	414	336	528	432	332	279	214
	26	795	644	481	369	657	535	408	332	517	424	326	274	211
	27	785	637	477	367	647	527	402	329	507	415	320	269	208
	28	776	630	473	364	637	519	396	325	496	407	313	263	205
	29	767	622	468	361	627	511	390	321	485	398	307	258	202
	30	757	614	464	358	616	503	384	317	474	389	300	252	198
	31	747	607	460	355	606	494	378	313	462	380	293	247	195
	32	737	599	455	352	595	486	372	309	451	371	286	241	191
	33	727	591	450	349	585	477	365	305	439	361	279	235	188
	34	717	582	444	345	574	468	359	301	427	351	272	229	184
	35	707	574	438	342	562	460	352	296	415	342	264	223	180
	36	696	566	432	338	551	450	345	291	402	332	257	217	176
	37	685	557	426	335	539	441	338	285	389	322	249	210	171
	38	674	548	419	331	528	432	331	279	376	311	241	204	165
	39	663	540	412	327	516	422	324	273	363	301	234	197	160
	40	652	531	406	324	504	413	317	267	350	290	225	191	155
PROPERTIES														
Area, In. ²	35.0	28.3	21.5	18.1	30.3	24.6	18.7	15.7	25.7	20.9	16.0	13.4	10.8	
I, In. ⁴	1370	1130	873	739	896	743	577	490	548	457	357	304	248	
r, In.	6.25	6.31	6.37	6.39	5.44	5.49	5.55	5.58	4.62	4.68	4.73	4.76	4.79	
B, Bending Factor	0.204	0.200	0.197	0.196	0.237	0.232	0.227	0.224	0.281	0.274	0.269	0.264	0.261	
a ÷ 10 ⁶	205	169	130	110	134	111	86.2	73.2	81.8	68.2	53.3	45.4	37.0	

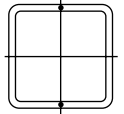
*Slender element section. Width-Thickness and Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

Nominal Size		10 x 10						9 x 9				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	24.73	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233*	0.174*	0.465	0.349	0.291	0.233	0.174*
F_y = 46 ksi												
Effective length KL in feet	0	580	475	364	306	239	152	422	326	274	222	145
	2	571	468	359	302	236	151	416	321	270	218	144
	3	567	464	356	300	235	150	412	318	267	216	143
	4	562	460	353	297	234	149	408	315	265	214	142
	5	556	456	350	295	232	148	403	311	262	212	141
	6	550	451	347	292	230	148	398	308	259	210	140
	7	544	446	343	289	229	147	393	304	256	207	139
	8	538	441	339	285	227	146	388	300	252	204	137
	9	531	436	335	282	225	144	382	295	249	201	136
	10	524	430	331	278	223	143	376	291	245	198	135
	11	516	424	326	275	220	142	370	286	241	195	133
	12	509	418	322	271	218	141	364	281	237	192	132
	13	501	411	317	267	216	139	357	276	233	189	130
	14	492	405	312	263	212	138	350	271	228	185	129
	15	484	398	307	258	209	137	343	266	224	182	127
	16	475	391	301	254	205	135	335	260	219	178	125
	17	466	384	296	249	202	134	328	254	215	174	123
	18	457	376	290	245	198	132	320	248	210	170	121
	19	447	368	284	240	194	130	312	242	205	166	119
	20	437	360	279	235	190	129	303	236	199	162	117
	21	427	352	272	230	186	127	295	230	194	158	115
	22	416	344	266	224	182	125	286	223	188	153	112
	23	406	335	260	219	178	123	277	216	183	149	110
	24	395	327	253	214	173	121	267	209	177	144	107
	25	384	318	247	208	169	119	258	202	171	139	104
	26	372	309	240	202	164	116	248	195	165	134	102
	27	360	299	233	196	160	114	238	187	159	129	98
	28	348	290	225	190	155	112	228	180	153	124	95
	29	336	280	218	184	150	109	217	172	146	119	91
	30	324	270	211	178	145	106	207	164	139	114	87
	31	311	260	203	172	140	103	196	155	133	108	83
	32	298	249	195	165	135	100	184	147	126	103	79
	33	284	239	187	159	129	97	173	138	118	97	74
	34	271	228	179	152	124	94	163	130	112	91	70
	35	257	216	171	145	118	90	154	123	105	86	66
	36	243	205	162	138	113	86	146	116	99	81	62
	37	230	194	154	131	107	82	138	110	94	77	59
	38	218	184	146	124	101	78	131	104	89	73	56
	39	207	175	138	117	96	74	124	99	85	69	53
	40	197	166	131	112	92	70	118	94	81	66	51
PROPERTIES												
Area, In. ²	21.0	17.2	13.2	11.1	8.96	6.76	15.3	11.8	9.92	8.03	6.06	
I, In. ⁴	304	256	202	172	141	108	182	145	124	102	78.2	
r, In.	3.80	3.86	3.92	3.94	3.97	4.00	3.45	3.51	3.54	3.56	3.59	
B, Bending Factor	0.345	0.336	0.327	0.323	0.318	0.313	0.378	0.366	0.360	0.354	0.349	
a ÷ 10 ⁶	45.4	38.2	30.2	25.7	21.1	16.1	27.2	21.7	18.5	15.2	11.7	

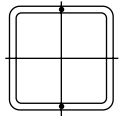
*Slender element section. Width-Thickness and Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

Nominal Size		8 x 8						7 x 7					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	19.63	50.81	42.05	32.58	27.59	22.42	17.08
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174*	0.581	0.465	0.349	0.291	0.233	0.174
F_y = 46 ksi													
Effective length KL in feet	0	453	373	287	242	196	138	386	320	248	209	170	129
	2	444	366	282	238	193	136	378	313	242	205	167	126
	3	439	362	279	235	191	135	373	309	239	203	165	125
	4	434	358	276	232	188	134	367	305	236	200	163	123
	5	428	353	272	229	186	133	361	300	232	197	160	121
	6	422	348	268	226	184	131	355	295	228	193	157	119
	7	415	342	264	223	181	130	348	289	224	190	155	117
	8	408	337	260	219	178	129	340	283	220	186	152	115
	9	401	331	256	216	175	127	332	277	215	182	148	113
	10	393	325	251	212	172	125	324	270	210	178	145	110
	11	385	318	246	208	169	124	315	263	205	174	142	107
	12	376	311	241	203	165	122	306	256	199	169	138	105
	13	367	304	236	199	162	120	297	248	194	164	134	102
	14	358	297	230	194	158	118	287	240	188	160	130	99
	15	349	289	224	190	154	116	277	232	181	154	126	96
	16	339	281	218	185	150	113	266	223	175	149	122	93
	17	328	273	212	180	146	111	255	215	169	144	118	89
	18	318	264	206	174	142	108	244	206	162	138	113	86
	19	307	256	199	169	137	105	232	196	155	132	108	83
	20	296	247	193	163	133	101	220	186	148	126	104	79
	21	284	237	186	158	128	98	208	176	140	120	99	75
	22	272	228	179	152	124	94	195	166	132	114	94	71
	23	260	218	171	146	119	91	182	155	124	107	88	68
	24	248	208	164	140	114	87	168	144	116	100	83	63
	25	235	198	156	133	109	83	155	133	108	93	77	59
	26	222	187	148	127	103	79	143	123	100	86	72	55
	27	208	176	140	120	98	75	133	114	92	80	66	51
	28	194	165	132	113	93	71	123	106	86	74	62	47
	29	181	154	123	106	87	67	115	99	80	69	58	44
	30	169	144	115	99	81	63	107	92	75	65	54	41
	31	158	135	108	93	76	59	101	87	70	61	50	39
	32	148	126	101	87	71	55	94	81	66	57	47	36
	33	140	119	95	82	67	52	89	76	62	53	44	34
	34	132	112	90	77	63	49	84	72	58	50	42	32
	35	124	106	85	73	60	46	79	68	55	48	40	30
	36	117	100	80	69	56	43	75	64	52	45	37	29
	37	111	95	76	65	53	41	71	61	49	43	35	27
	38	105	90	72	62	51	39	67	58	47	40	34	26
	39	100	85	68	59	48	37	64	55	44	38	32	24
	40	95	81	65	56	46	35	60	52	42	36	30	23
PROPERTIES													
Area, in. ²	16.4	13.5	10.4	8.76	7.10	5.37	14.0	11.6	8.97	7.59	6.17	4.67	
I, in. ⁴	146	125	99.6	85.6	70.7	54.4	93.3	80.5	64.9	56.1	46.5	36.0	
r, in.	2.99	3.04	3.10	3.13	3.15	3.18	2.58	2.63	2.69	2.72	2.75	2.77	
B, Bending Factor	0.449	0.432	0.418	0.409	0.402	0.395	0.525	0.504	0.484	0.474	0.464	0.454	
a ÷ 10 ⁶	21.8	18.7	14.9	12.8	10.6	8.12	13.9	12.0	9.69	8.38	6.94	5.38	

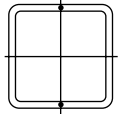
*Slender element section. Width-Thickness and Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

Nominal Size		6 x 6						5 1/2 x 5 1/2					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		42.30	35.24	27.48	23.34	19.02	14.53	9.86	24.93	21.21	17.32	13.25	9.01
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.116*	0.349	0.291	0.233	0.174	0.116*
F_y = 46 ksi													
Effective length KL in feet	0	323	269	209	177	145	110	65	190	161	132	100	62
	2	314	262	204	173	141	107	64	185	157	128	98	61
	3	309	258	201	170	139	106	63	181	154	126	96	60
	4	303	253	197	167	137	104	62	178	151	123	94	59
	5	297	248	193	164	134	102	62	174	148	121	92	58
	6	290	242	189	161	131	100	61	169	144	118	90	57
	7	282	236	185	157	128	98	60	165	140	115	88	56
	8	274	230	180	153	125	95	59	160	136	111	85	55
	9	266	223	175	149	122	93	58	154	132	108	82	54
	10	257	216	169	144	118	90	57	149	127	104	80	53
	11	248	208	164	140	114	87	55	143	122	100	77	51
	12	238	201	158	135	110	84	54	137	117	96	74	50
	13	227	192	152	129	106	81	53	130	112	92	70	48
	14	217	184	145	124	102	78	51	124	106	87	67	46
	15	206	175	138	119	98	75	49	116	100	83	64	44
	16	194	166	132	113	93	71	48	109	94	78	60	41
	17	182	156	124	107	88	68	46	102	88	73	56	39
	18	169	146	117	101	83	64	44	94	81	67	52	36
	19	156	136	109	94	78	60	41	85	75	62	48	33
	20	143	125	101	87	73	56	39	77	68	56	44	31
	21	130	114	93	81	67	52	36	70	61	51	40	28
	22	118	104	84	74	61	48	33	64	56	46	36	25
	23	108	95	77	67	56	44	30	58	51	42	33	23
	24	99	87	71	62	52	40	28	54	47	39	30	21
	25	91	80	65	57	48	37	26	49	43	36	28	20
	26	85	74	60	53	44	34	24	46	40	33	26	18
	27	78	69	56	49	41	32	22	42	37	31	24	17
	28	73	64	52	45	38	30	20	39	34	29	22	16
	29	68	60	49	42	35	28	19	37	32	27	21	15
	30	63	56	45	40	33	26	18	34	30	25	20	14
	31	59	52	43	37	31	24	17	32	28	23	18	13
	32	56	49	40	35	29	23	16	30	26	22	17	12
	33	52	46	38	33	27	21	15	28	25	21	16	11
	34	49	43	35	31	26	20	14	27	23	19	15	11
	35	47	41	33	29	24	19	13	==	==	18	14	10
	36	44	39	32	27	23	18	12				14	9
	37	==	37	30	26	22	17	12				==	==
	38		==	28	25	21	16	11					
	39			==	==	20	15	11					
	40					==	==	==					
PROPERTIES													
Area, In. ²	11.7	9.74	7.58	6.43	5.24	3.98	2.70	6.88	5.85	4.77	3.63	2.46	
I, In. ⁴	55.1	48.2	39.4	34.3	28.6	22.3	15.5	29.7	25.9	21.7	17.0	11.8	
r, In.	2.17	2.23	2.28	2.31	2.34	2.37	2.39	2.08	2.11	2.13	2.16	2.19	
B, Bending Factor	0.637	0.606	0.577	0.562	0.550	0.535	0.523	0.637	0.621	0.604	0.587	0.573	
a ÷ 10 ⁶	8.23	7.20	5.88	5.12	4.27	3.33	2.31	4.44	3.87	3.24	2.54	1.76	

*Slender element section. Width-Thickness and Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.

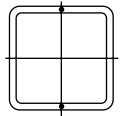
Note: Double Horizontal Line indicates k/lr limit of 200.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

Nominal Size		5 x 5						4 1/2 x 4 1/2					
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	25.03	19.82	16.96	13.91	10.70	7.31
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174	0.116
F_y = 46 ksi													
Effective length KL in feet	0	217	171	145	119	91	59	192	151	129	106	81	55
	2	210	165	141	115	88	58	185	146	125	102	78	53
	3	206	162	138	113	86	57	180	142	122	100	76	52
	4	201	158	135	110	84	56	175	138	118	97	74	51
	5	195	154	131	108	82	55	169	134	115	94	72	49
	6	189	149	127	104	80	54	163	129	111	91	70	48
	7	183	144	123	101	77	53	156	124	107	88	67	46
	8	176	139	119	98	75	51	148	119	102	84	65	44
	9	168	134	114	94	72	49	140	113	97	80	62	42
	10	161	128	109	90	69	47	132	107	92	76	59	40
	11	152	121	104	86	66	45	123	100	87	72	55	38
	12	144	115	99	82	63	43	114	93	81	67	52	36
	13	135	108	93	77	60	41	104	86	75	62	48	33
	14	125	101	87	72	56	39	94	78	68	57	44	31
	15	115	93	81	67	52	36	83	70	62	52	40	28
	16	105	86	75	62	49	34	73	62	55	47	36	26
	17	94	77	68	57	44	31	65	55	49	41	32	23
	18	84	69	61	51	40	28	58	49	43	37	29	20
	19	75	62	55	46	36	25	52	44	39	33	26	18
	20	68	56	49	42	33	23	47	40	35	30	23	16
	21	61	51	45	38	30	21	42	36	32	27	21	15
	22	56	46	41	34	27	19	39	33	29	25	19	14
	23	51	42	37	31	25	17	35	30	27	23	18	12
	24	47	39	34	29	23	16	32	28	24	21	16	11
	25	43	36	32	27	21	15	30	25	22	19	15	11
	26	40	33	29	25	19	14	28	23	21	18	14	10
	27	37	31	27	23	18	13	==	22	19	16	13	9
	28	35	29	25	21	17	12	==	==	18	15	12	8
	29	32	27	23	20	16	11	==	==	==	==	11	8
	30	30	25	22	18	15	10	==	==	==	==	==	==
	31	==	23	20	17	14	10	==	==	==	==	==	==
	32	==	==	==	16	13	9	==	==	==	==	==	==
	33	==	==	==	==	==	8	==	==	==	==	==	==
	34	==	==	==	==	==	==	==	==	==	==	==	==
	35	==	==	==	==	==	==	==	==	==	==	==	==
	36	==	==	==	==	==	==	==	==	==	==	==	==
	37	==	==	==	==	==	==	==	==	==	==	==	==
	38	==	==	==	==	==	==	==	==	==	==	==	==
	39	==	==	==	==	==	==	==	==	==	==	==	==
	40	==	==	==	==	==	==	==	==	==	==	==	==
PROPERTIES													
Area, in. ²	7.88	6.18	5.26	4.30	3.28	2.23	6.95	5.48	4.68	3.84	2.93	2.00	
I, in. ⁴	26.0	21.7	19.0	16.0	12.6	8.80	18.0	15.3	13.5	11.4	9.02	6.35	
r, in.	1.82	1.87	1.90	1.93	1.96	1.99	1.61	1.67	1.70	1.73	1.75	1.78	
B, Bending Factor	0.758	0.712	0.692	0.672	0.651	0.634	0.869	0.806	0.780	0.758	0.731	0.709	
a ÷ 10 ⁶	3.88	3.24	2.84	2.39	1.88	1.31	2.69	2.28	2.02	1.70	1.35	0.948	

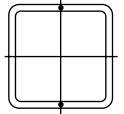
*Slender element section. Width-Thickness and Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of 253/√F_y
 Note: Double Horizontal Line indicates k ℓ/r limit of 200.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

Nominal Size		4 x 4						3 1/2 x 3 1/2				
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		21.63	17.27	14.83	12.21	9.42	6.46	14.72	12.70	10.51	8.15	5.61
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116
F_y = 46 ksi												
Effective length KL in feet	0	166	132	113	93	71	49	113	97	80	62	43
	2	159	126	108	89	68	47	107	92	76	59	41
	3	154	123	105	87	67	46	103	89	74	57	39
	4	149	119	102	84	65	44	99	86	71	55	38
	5	142	114	98	81	62	43	94	82	68	52	36
	6	136	109	94	78	60	41	89	77	64	50	34
	7	128	103	89	74	57	39	83	72	60	47	32
	8	121	98	85	70	54	37	77	67	56	44	30
	9	112	91	79	66	51	35	70	61	52	41	28
	10	103	85	74	62	48	33	63	55	47	37	26
	11	94	78	68	57	44	31	55	49	42	33	23
	12	84	70	62	52	41	28	47	42	36	29	21
	13	73	62	55	47	37	26	40	36	31	25	18
	14	63	54	48	41	33	23	34	31	27	22	15
	15	55	47	42	36	29	20	30	27	23	19	13
	16	48	41	37	32	25	18	26	24	21	17	12
	17	43	37	33	28	22	16	23	21	18	15	10
	18	38	33	29	25	20	14	21	19	16	13	9
	19	34	29	26	22	18	13	19	17	15	12	8
	20	31	26	24	20	16	11	17	15	13	11	7
	21	28	24	21	18	15	10	15	14	12	10	7
	22	26	22	20	17	13	9	15	14	11	9	6
	23	23	20	18	15	12	9	15	14	11	9	6
	24	21	18	16	14	11	8	15	14	11	9	6
	25	20	17	15	13	10	7	15	14	11	9	6
	26	19	16	14	12	10	7	15	14	11	9	6
	27	18	15	13	11	9	7	15	14	11	9	6
	28	17	14	12	10	8	6	15	14	11	9	6
	29	16	13	11	9	7	6	15	14	11	9	6
	30	15	12	10	8	6	5	15	14	11	9	6
	31	14	11	9	7	5	4	15	14	11	9	6
	32	13	10	8	6	4	3	15	14	11	9	6
	33	12	9	7	5	3	2	15	14	11	9	6
	34	11	8	6	4	2	1	15	14	11	9	6
	35	10	7	5	3	1	1	15	14	11	9	6
	36	9	6	4	2	1	1	15	14	11	9	6
	37	8	5	3	1	1	1	15	14	11	9	6
	38	7	4	2	1	1	1	15	14	11	9	6
	39	6	3	1	1	1	1	15	14	11	9	6
	40	5	2	1	1	1	1	15	14	11	9	6
PROPERTIES												
Area, In. ²	6.02	4.78	4.10	3.37	2.58	1.77	4.09	3.52	2.91	2.24	1.54	
I, In. ⁴	11.9	10.3	9.14	7.80	6.21	4.40	6.48	5.84	5.04	4.05	2.90	
r, In.	1.41	1.46	1.49	1.52	1.55	1.58	1.26	1.29	1.32	1.35	1.37	
B, Bending Factor	1.01	0.928	0.897	0.864	0.831	0.805	1.10	1.05	1.01	0.968	0.929	
a ÷ 10 ⁶	1.78	1.54	1.36	1.16	0.927	0.657	0.968	0.872	0.753	0.605	0.433	

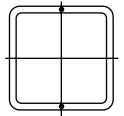
Note: Double Horizontal Line indicates k l/r limit of 200.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

Nominal Size		3 x 3					2 1/2 x 2 1/2				2 1/4 x 2 1/4		
Wall Thickness		3/8	5/16	1/4	3/16	1/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8
Weight Per Foot		12.17	10.58	8.81	6.87	4.75	8.45	7.11	5.59	3.90	6.26	4.96	3.48
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.291	0.233	0.174	0.116	0.233	0.174	0.116
F_y = 46 ksi													
Effective length KL in feet	0	94	81	67	52	36	65	54	43	30	48	38	26
	2	88	76	63	49	34	60	50	39	27	44	35	24
	3	84	73	61	47	33	56	47	37	26	41	32	23
	4	79	69	58	45	31	52	44	35	24	37	30	21
	5	74	64	54	42	29	47	40	32	22	33	27	19
	6	68	60	50	39	27	42	36	29	20	29	23	17
	7	61	54	46	36	25	36	31	25	18	24	20	14
	8	54	49	41	33	23	29	26	21	16	18	15	12
	9	47	42	36	29	21	23	21	17	13	14	12	9
	10	39	36	31	25	18	19	17	14	10	12	10	7
	11	32	29	26	21	15	16	14	12	9	10	8	6
	12	27	25	22	18	13	13	12	10	7	8	7	5
	13	23	21	18	15	11	11	10	8	6	7	6	4
	14	20	18	16	13	9	10	9	7	5	5	5	4
	15	17	16	14	11	8	7	7	6	5	5	5	4
	16	15	14	12	10	7	7	7	6	5	4	4	4
	17	13	12	11	9	6	6	6	5	4	4	4	4
	18	11	11	10	8	5	5	5	4	3	3	3	3
	19	9	9	8	7	4	4	4	3	2	2	2	2
	20	7	7	6	5	3	3	3	2	1	1	1	1
	21	6	6	5	4	2	2	2	1	1	1	1	1
	22	5	5	4	3	2	2	2	1	1	1	1	1
	23	4	4	3	2	1	1	1	1	1	1	1	1
	24	3	3	2	1	1	1	1	1	1	1	1	1
	25	2	2	1	1	1	1	1	1	1	1	1	1
	26	1	1	1	1	1	1	1	1	1	1	1	1
	27	1	1	1	1	1	1	1	1	1	1	1	1
	28	1	1	1	1	1	1	1	1	1	1	1	1
	29	1	1	1	1	1	1	1	1	1	1	1	1
	30	1	1	1	1	1	1	1	1	1	1	1	1
	31	1	1	1	1	1	1	1	1	1	1	1	1
	32	1	1	1	1	1	1	1	1	1	1	1	1
	33	1	1	1	1	1	1	1	1	1	1	1	1
	34	1	1	1	1	1	1	1	1	1	1	1	1
	35	1	1	1	1	1	1	1	1	1	1	1	1
	36	1	1	1	1	1	1	1	1	1	1	1	1
	37	1	1	1	1	1	1	1	1	1	1	1	1
	38	1	1	1	1	1	1	1	1	1	1	1	1
	39	1	1	1	1	1	1	1	1	1	1	1	1
	40	1	1	1	1	1	1	1	1	1	1	1	1
PROPERTIES													
Area, In. ²	3.39	2.94	2.44	1.89	1.30	2.35	1.97	1.54	1.07	1.74	1.37	0.96	
I, In. ⁴	3.77	3.45	3.02	2.46	1.78	1.82	1.63	1.35	0.998	1.13	0.952	0.712	
r, In.	1.05	1.08	1.11	1.14	1.17	0.879	0.908	0.937	0.965	0.805	0.835	0.863	
B, Bending Factor	1.35	1.28	1.21	1.15	1.10	1.61	1.51	1.43	1.34	1.73	1.62	1.52	
a ÷ 10 ⁶	0.563	0.515	0.451	0.367	0.266	0.272	0.243	0.202	0.149	0.169	0.142	0.106	

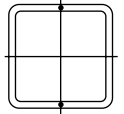
Note: Double Horizontal Line indicates k ℓ/r limit of 200.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=46



ERW

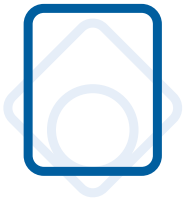
Nominal Size	2 x 2			1 3/4 x 1 3/4	1 5/8 x 1 5/8		1 1/2 x 1 1/2		1 1/4 x 1 1/4	
Wall Thickness	1/4	3/16	1/8	3/16	3/16	1/8	3/16	1/8	3/16	1/8
Weight Per Foot	5.41	4.32	3.05	3.68	3.36	2.42	3.04	2.20	2.40	1.78
Design Wall Thickness	0.233	0.174	0.116	0.174	0.174	0.116	0.174	0.116	0.174	0.116

		F _y = 46 ksi									
Effective length KL in feet	0	42	33	23	28	26	18	23	17	18	14
	2	37	30	21	25	22	16	20	14	15	11
	3	34	27	19	22	19	14	17	13	12	9
	4	30	24	17	19	16	12	14	10	8	6
	5	26	21	15	16	13	10	10	8	5	4
	6	21	18	13	12	9	7	7	5	3	3
	7	16	13	10	9	7	5	5	4	3	2
	8	12	10	8	7	5	4	4	3	==	==
	9	10	8	6	5	4	3	==	2	==	==
	10	8	7	5	4	==	3	==	==	==	==
	11	6	5	4	==	==	==	==	==	==	==
	12	==	5	4	==	==	==	==	==	==	==
	13	==	==	==	==	==	==	==	==	==	==
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PROPERTIES

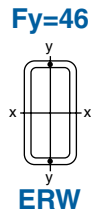
Area, In. ²	1.51	1.19	0.84	1.02	0.93	0.67	0.84	0.61	0.67	0.49
I, In. ⁴	0.745	0.640	0.486	0.405	0.312	0.246	0.235	0.188	0.121	0.101
r, In.	0.703	0.732	0.761	0.630	0.579	0.608	0.528	0.556	0.425	0.454
B, Bending Factor	2.03	1.86	1.73	2.20	2.42	2.21	2.68	2.43	3.46	3.03
a ÷ 10 ⁶	0.111	0.096	0.073	0.060	0.047	0.037	0.035	0.028	0.018	0.015

Note: Double Horizontal Line indicates k ℓ/r limit of 200.



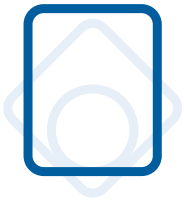
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



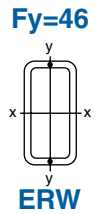
Nominal Size		20 x 12			20 x 8			20 x 4			
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/2	3/8	5/16
Weight Per Foot		103.30	78.52	65.87	110.30	89.68	68.31	57.36	76.07	58.10	48.86
Design Wall Thickness		0.465*	0.349*	0.291*	0.581	0.465*	0.349*	0.291*	0.465*	0.349*	0.291*
F_y = 46 ksi											
Effective length KL in feet	0	761	517	406	836	660	442	343	558	370	282
	2	755	513	403	823	651	437	339	543	361	276
	3	751	511	402	815	647	434	337	533	356	272
	4	747	509	400	806	641	431	334	522	349	268
	5	743	506	398	797	636	427	332	509	342	263
	6	739	503	396	787	629	424	329	494	334	257
	7	734	500	394	776	623	420	326	474	325	251
	8	730	497	391	765	616	416	323	453	316	245
	9	724	494	389	753	608	411	320	431	305	237
	10	719	491	387	741	600	407	317	408	294	230
	11	714	488	384	728	592	402	313	383	282	221
	12	708	484	382	715	582	397	310	357	268	212
	13	702	480	379	701	571	391	306	330	253	202
	14	696	477	376	686	560	386	302	301	236	191
	15	689	473	373	671	548	380	298	270	217	178
	16	683	469	370	656	536	374	293	239	194	164
	17	675	464	367	640	523	367	289	212	172	147
	18	667	460	364	624	510	360	284	189	153	131
	19	658	456	360	607	496	353	279	169	138	118
	20	649	451	357	589	483	346	274	153	124	106
	21	640	446	354	571	468	339	268	139	113	97
	22	631	441	350	553	454	331	263	126	103	88
	23	621	436	346	534	439	322	257	116	94	80
	24	612	431	342	515	424	314	251	106	86	74
	25	602	426	339	495	408	305	245	98	79	68
	26	592	420	334	475	392	295	238	90	73	63
	27	581	415	330	454	375	285	231	84	68	58
	28	571	409	326	432	358	274	224	78	63	54
	29	560	403	322	410	341	263	216	==	==	51
	30	549	397	317	388	323	251	208	==	==	==
	31	538	391	313	365	305	238	199			
	32	526	384	308	342	286	224	190			
	33	515	377	303	322	269	211	180			
	34	503	371	298	303	254	199	170			
	35	491	364	293	286	239	187	160			
	36	479	356	288	270	226	177	151			
	37	467	349	282	256	214	168	143			
	38	454	341	277	243	203	159	136			
	39	441	333	271	230	193	151	129			
	40	428	325	265	219	183	143	123			
PROPERTIES											
Area, In. ²	28.3	21.5	18.1	30.3	24.6	18.7	15.7	20.9	16.0	13.4	
I _x , In. ⁴	1550	1200	1010	1440	1190	926	786	838	657	560	
I _y , In. ⁴	705	547	464	338	283	222	189	58.7	47.6	41.2	
Ratio r _x / r _y	1.48	1.48	1.48	2.06	2.05	2.04	2.04	3.78	3.72	3.69	
r _y , In.	4.99	5.04	5.07	3.34	3.39	3.44	3.47	1.68	1.73	1.75	
B _x , Bending Factor	0.183	0.179	0.179	0.210	0.207	0.202	0.200	0.249	0.244	0.239	
B _y , Bending Factor	0.241	0.236	0.234	0.359	0.348	0.337	0.332	0.712	0.672	0.650	
a _x , ÷ 10 ⁶	231	179	151	215	178	138	117	125	98.1	83.6	
a _y , ÷ 10 ⁶	105	81.7	69.3	50.5	42.3	33.2	28.2	8.77	7.11	6.15	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of 253 / √F_y.
 Note: Double Horizontal Line indicates k ℓ/r limit of 200.



HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



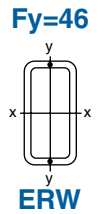
Nominal Size		18 x 6					16 x 12			16 x 8			
Wall Thickness		5/8	1/2	3/8	5/16	1/4	1/2	3/8	5/16	5/8	1/2	3/8	5/16
Weight Per Foot		93.34	76.07	58.10	48.86	39.43	89.68	68.31	57.36	93.34	76.07	58.10	48.86
Design Wall Thickness		0.581	0.465	0.349*	0.291*	0.233*	0.465	0.349*	0.291*	0.581	0.465	0.349*	0.291*
F_y = 46 ksi													
Effective length KL in feet	0	709	577	395	304	221	679	493	388	709	577	419	325
	2	693	564	388	299	218	672	488	384	697	567	413	321
	3	683	556	384	297	216	668	486	382	691	562	410	319
	4	673	548	380	293	214	663	483	381	683	556	407	317
	5	661	538	376	290	212	658	481	379	675	549	403	314
	6	648	528	371	287	209	654	478	376	666	543	399	311
	7	635	518	365	283	207	648	475	374	657	535	395	308
	8	620	506	359	279	204	643	472	372	647	527	391	305
	9	605	494	353	274	201	637	468	369	637	519	386	301
	10	589	481	346	270	198	631	465	367	626	511	381	298
	11	572	468	339	265	195	625	461	364	615	502	376	294
	12	554	454	332	259	191	619	457	361	603	492	370	290
	13	536	440	324	254	188	612	453	358	591	483	364	286
	14	517	425	316	248	184	605	449	355	578	473	358	282
	15	497	409	307	242	180	598	445	352	565	462	352	277
	16	476	393	297	235	175	591	441	349	552	451	345	272
	17	455	376	287	228	171	584	436	345	538	440	338	267
	18	433	358	276	221	166	576	431	342	523	429	331	262
	19	410	340	265	213	161	568	427	338	509	417	322	257
	20	386	322	252	205	156	560	422	335	493	405	313	251
	21	361	302	237	196	150	552	416	331	478	392	303	245
	22	336	282	223	186	144	544	411	327	462	380	294	239
	23	310	262	208	176	138	535	406	323	445	367	284	233
	24	285	241	192	164	131	526	400	319	428	353	274	226
	25	262	222	177	151	123	517	394	315	411	339	264	219
	26	242	205	163	140	115	508	388	310	393	325	253	212
	27	225	190	152	130	106	499	381	306	374	311	242	204
	28	209	177	141	121	99	489	374	301	356	296	231	195
	29	195	165	131	113	92	479	367	296	336	280	220	186
	30	182	154	123	105	86	469	359	291	316	265	208	177
	31	171	144	115	99	81	459	352	286	297	249	196	167
	32	160	135	108	92	76	449	344	281	278	233	184	157
	33	151	127	101	87	71	439	336	276	262	219	173	148
	34	142	120	96	82	67	428	328	270	247	207	163	139
	35	134	113	90	77	63	417	320	265	233	195	154	131
	36	126	107	85	73	60	406	312	259	220	184	145	124
	37	120	101	81	69	57	395	303	253	208	175	138	117
	38	114	96	76	66	54	383	295	247	197	165	130	111
	39	108	91	73	62	51	372	286	240	187	157	124	106
	40	102	87	69	59	48	360	277	234	178	149	118	100
PROPERTIES													
Area, In. ²	25.7	20.9	16.0	13.4	10.8	24.6	18.7	15.7	25.7	20.9	16.0	13.4	
I _x , In. ⁴	923	770	602	513	419	904	702	595	815	679	531	451	
I _y , In. ⁴	158	134	106	91.3	75.1	581	452	384	274	230	181	155	
Ratio r _x / r _y	2.42	2.40	2.38	2.37	2.36	1.25	1.25	1.24	1.72	1.72	1.71	1.71	
r _y , In.	2.48	2.53	2.58	2.61	2.63	4.86	4.91	4.94	3.27	3.32	3.37	3.40	
B _x , Bending Factor	0.251	0.244	0.239	0.235	0.232	0.218	0.213	0.211	0.252	0.246	0.241	0.238	
B _y , Bending Factor	0.488	0.468	0.453	0.440	0.431	0.254	0.248	0.245	0.375	0.363	0.354	0.346	
a _x , ÷ 10 ⁶	138	115	89.9	76.6	62.6	135	105	88.9	122	101	79.3	67.3	
a _y , ÷ 10 ⁶	23.6	20.0	15.8	13.6	11.2	86.8	67.5	57.3	40.9	34.3	27.0	23.1	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of 253 / √F_y.



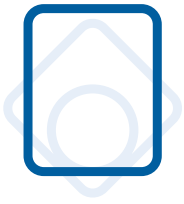
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



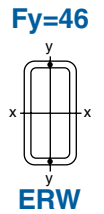
Nominal Size		16 x 4			14 x 10				
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		62.46	47.90	40.35	93.34	76.07	58.10	48.86	39.43
Design Wall Thickness		0.465	0.349*	0.291*	0.581	0.465	0.349	0.291*	0.233*
F_y = 46 ksi									
Effective length KL in feet	0	475	342	264	709	577	442	347	258
	2	457	333	257	700	569	436	343	255
	3	446	328	253	694	565	433	341	254
	4	434	321	248	688	560	429	339	252
	5	420	313	243	682	555	425	336	250
	6	405	305	237	676	550	421	334	249
	7	388	296	231	669	544	417	331	247
	8	371	286	224	661	538	413	328	245
	9	352	275	216	653	532	408	325	243
	10	332	260	208	645	526	403	322	241
	11	311	245	199	637	519	398	319	238
	12	289	229	189	628	512	393	316	236
	13	266	212	178	619	505	387	312	234
	14	241	194	165	609	497	381	308	231
	15	215	176	151	599	489	376	305	228
	16	190	156	135	589	481	370	301	226
	17	168	139	119	579	473	363	297	223
	18	150	124	106	568	464	357	292	220
	19	135	111	95	557	456	350	288	217
	20	121	100	86	546	447	344	283	214
	21	110	91	78	534	437	337	278	210
	22	100	83	71	522	428	330	274	207
	23	92	76	65	510	418	322	268	203
	24	84	69	60	498	408	315	263	200
	25	78	64	55	485	398	307	258	196
	26	72	59	51	472	388	299	252	192
	27	67	55	47	459	377	292	245	188
	28	==	51	44	445	366	283	239	184
	29	==	==	==	431	355	275	232	180
	30	==	==	==	417	344	267	225	175
	31				402	333	258	218	171
	32				387	321	249	210	166
	33				372	309	240	203	161
	34				357	297	231	195	156
	35				341	284	222	188	151
	36				325	271	212	180	145
	37				308	258	202	172	139
	38				292	245	192	163	133
	39				278	233	182	155	126
	40				264	221	173	147	120
PROPERTIES									
Area, In. ²	17.2	13.2	11.1	25.7	20.9	16.0	13.4	10.8	
I _x , In. ⁴	455	360	308	687	573	447	380	310	
I _y , In. ⁴	47.0	38.3	33.2	407	341	267	227	186	
Ratio r _x / r _y	3.11	3.07	3.05	1.30	1.30	1.29	1.29	1.29	
r _y , In.	1.65	1.71	1.73	3.98	4.04	4.09	4.12	4.14	
B _x , Bending Factor	0.302	0.293	0.288	0.262	0.255	0.251	0.247	0.244	
B _y , Bending Factor	0.732	0.689	0.669	0.316	0.306	0.300	0.295	0.290	
a _x , ÷ 10 ⁶	67.9	53.8	46.0	103	85.6	66.8	56.7	46.3	
a _y , ÷ 10 ⁶	7.02	5.72	4.96	60.8	50.9	39.9	33.9	27.8	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / r limit of 200.



HSS / Rectangular Structural Steel Tubing

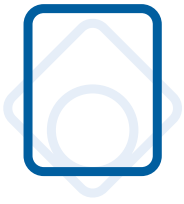
Allowable Concentric Loads in Kips



Nominal Size		14 x 6						14 x 4					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	24.73	67.82	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.581	0.465	0.349	0.291*	0.233*	0.174*	0.581	0.465	0.349	0.291*	0.233*	0.174*
F_y = 46 ksi													
Effective length KL in feet	0	580	475	364	284	208	139	516	422	326	252	183	120
	2	566	464	356	279	205	137	496	407	314	245	179	118
	3	558	457	351	276	203	135	484	397	307	241	176	116
	4	549	450	346	273	201	134	469	386	298	236	173	114
	5	539	442	340	269	198	133	453	373	289	231	170	112
	6	528	434	334	266	196	131	436	359	279	225	166	110
	7	517	425	327	261	193	130	417	345	268	218	161	108
	8	505	415	320	257	190	128	397	329	257	211	157	105
	9	492	405	312	252	187	126	375	312	244	203	152	102
	10	478	394	304	247	184	124	353	294	231	195	146	99
	11	464	383	296	242	180	122	328	275	217	185	140	96
	12	449	371	287	236	176	119	303	256	203	173	133	92
	13	434	359	278	230	172	117	276	235	187	160	126	88
	14	418	346	268	224	168	115	248	213	171	147	118	84
	15	401	332	258	217	163	112	218	189	154	133	109	79
	16	383	319	248	209	159	109	192	167	137	119	98	74
	17	365	304	237	201	154	106	170	148	121	105	87	68
	18	347	290	226	192	148	103	151	132	108	94	78	61
	19	327	274	215	182	143	100	136	118	97	84	70	55
	20	307	258	203	172	137	97	123	107	87	76	63	49
	21	286	242	191	162	130	93	111	97	79	69	57	45
	22	265	225	178	152	123	89	101	88	72	63	52	41
	23	243	207	165	141	116	85	93	81	66	58	48	37
	24	223	190	152	130	107	81	85	74	61	53	44	34
	25	206	176	140	120	99	76	78	68	56	49	40	32
	26	190	162	130	111	91	71	73	63	52	45	37	29
	27	176	150	120	103	85	66	====	59	48	42	35	27
	28	164	140	112	95	79	61	====	====	45	39	32	25
	29	153	130	104	89	74	57	====	====	====	====	30	23
	30	143	122	97	83	69	53	====	====	====	====	====	====
	31	134	114	91	78	64	50	====	====	====	====	====	====
	32	126	107	86	73	60	47	====	====	====	====	====	====
	33	118	101	80	69	57	44	====	====	====	====	====	====
	34	111	95	76	65	54	41	====	====	====	====	====	====
	35	105	90	72	61	50	39	====	====	====	====	====	====
	36	99	85	68	58	48	37	====	====	====	====	====	====
	37	94	80	64	55	45	35	====	====	====	====	====	====
	38	89	76	61	52	43	33	====	====	====	====	====	====
	39	85	72	58	49	41	31	====	====	====	====	====	====
	40	80	69	55	47	39	30	====	====	====	====	====	====
PROPERTIES													
Area, In. ²	21.0	17.2	13.2	11.1	8.96	6.76	18.7	15.3	11.8	9.92	8.03	6.06	
I _x , In. ⁴	478	402	317	271	222	170	373	317	252	216	178	137	
I _y , In. ⁴	124	105	84.1	72.3	59.6	45.9	47.1	41.1	33.6	29.2	24.4	19.0	
Ratio r _x / r _y	1.96	1.96	1.94	1.94	1.93	1.92	2.81	2.78	2.74	2.72	2.70	2.69	
r _y , In.	2.43	2.48	2.53	2.55	2.58	2.61	1.59	1.64	1.69	1.72	1.74	1.77	
B _x , Bending Factor	0.308	0.300	0.291	0.287	0.283	0.278	0.351	0.338	0.328	0.321	0.316	0.310	
B _y , Bending Factor	0.508	0.491	0.471	0.461	0.451	0.442	0.794	0.745	0.702	0.679	0.658	0.638	
a _x , ÷ 10 ⁶	71.4	60.0	47.3	40.5	33.2	25.4	55.7	47.3	37.6	32.3	26.6	20.5	
a _y , ÷ 10 ⁶	18.5	15.7	12.6	10.8	8.90	6.85	7.03	6.14	5.02	4.36	3.64	2.84	

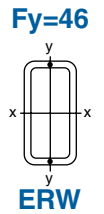
*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.

Note: Double Horizontal Line indicates k l/r limit of 200.



HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



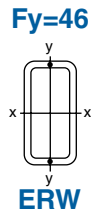
Nominal Size		12 x 10				12 x 8					
Wall Thickness		1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		69.27	53.00	44.60	36.03	76.33	62.46	47.90	40.35	32.63	24.73
Design Wall Thickness		0.465	0.349	0.291*	0.233*	0.581	0.465	0.349	0.291*	0.233*	0.174*
F_y = 46 ksi											
Effective length KL in feet	0	524	403	334	249	580	475	364	304	226	151
	2	517	398	330	247	570	467	358	299	223	150
	3	513	395	328	246	564	462	355	297	221	149
	4	509	391	326	244	557	457	351	294	219	148
	5	504	388	323	243	550	451	347	292	217	147
	6	499	384	321	241	543	445	342	288	215	145
	7	494	380	318	240	535	439	337	284	213	144
	8	489	376	314	238	527	432	332	280	210	143
	9	483	371	311	236	518	425	327	275	208	141
	10	477	367	307	233	509	418	322	271	205	140
	11	470	362	303	231	499	410	316	266	202	138
	12	464	357	299	228	489	402	310	261	199	136
	13	457	352	295	226	478	394	304	256	196	134
	14	450	347	290	223	467	385	297	250	193	132
	15	443	341	286	220	456	376	290	245	189	130
	16	435	335	281	217	445	367	283	239	186	128
	17	427	330	276	214	433	357	276	233	182	126
	18	419	324	271	211	420	347	269	227	178	123
	19	411	317	266	208	407	337	261	220	174	121
	20	403	311	261	205	394	326	253	214	170	118
	21	394	305	255	201	381	315	245	207	165	116
	22	385	298	250	198	367	304	237	200	161	113
	23	376	291	244	194	353	293	229	193	156	110
	24	367	284	238	190	338	281	220	186	151	107
	25	357	277	232	186	323	269	211	178	145	104
	26	348	270	226	182	307	257	202	171	139	101
	27	338	262	220	178	291	244	192	163	133	97
	28	327	254	214	173	275	231	183	155	127	94
	29	317	247	207	169	258	218	173	147	120	90
	30	307	239	201	164	242	204	163	138	113	86
	31	296	230	194	159	226	191	152	130	107	81
	32	285	222	187	153	212	179	143	122	100	77
	33	273	214	180	148	200	169	134	114	94	72
	34	262	205	173	142	188	159	127	108	89	68
	35	250	196	166	136	178	150	119	102	84	64
	36	238	187	158	130	168	142	113	96	79	61
	37	226	178	151	124	159	134	107	91	75	57
	38	214	169	143	118	151	127	101	86	71	54
	39	203	160	136	112	143	121	96	82	67	52
	40	193	152	129	106	136	115	91	78	64	49
PROPERTIES											
Area, In. ²	19.0	14.6	12.2	9.90	21.0	17.2	13.2	11.1	8.96	6.76	
I _x , In. ⁴	395	310	264	216	396	333	262	224	184	140	
I _y , In. ⁴	298	234	200	164	210	177	140	120	98.8	75.7	
Ratio r _x / r _y	1.15	1.15	1.15	1.15	1.37	1.37	1.37	1.37	1.36	1.36	
r _y , In.	3.96	4.01	4.04	4.07	3.16	3.21	3.27	3.29	3.32	3.35	
B _x , Bending Factor	0.289	0.283	0.277	0.275	0.318	0.310	0.302	0.297	0.292	0.290	
B _y , Bending Factor	0.319	0.312	0.305	0.302	0.400	0.389	0.377	0.370	0.363	0.357	
a _x , ÷ 10 ⁶	59.0	46.3	39.4	32.3	59.1	49.7	39.1	33.5	27.5	20.9	
a _y , ÷ 10 ⁶	44.5	34.9	29.9	24.5	31.4	26.4	20.9	17.9	14.8	11.3	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.



HSS / Rectangular Structural Steel Tubing

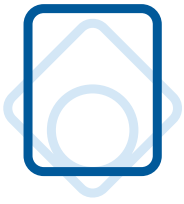
Allowable Concentric Loads in Kips



Nominal Size		12 x 6						12 x 4					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		67.82	55.66	42.79	36.10	29.23	22.18	59.32	48.85	37.69	31.84	25.82	19.63
Design Wall Thickness		0.581	0.465	0.349	0.291*	0.233*	0.174*	0.581	0.465	0.349	0.291*	0.233*	0.174*
F_y = 46 ksi													
Effective length KL in feet	0	516	422	326	271	200	134	453	373	287	239	175	116
	2	504	412	318	266	197	132	435	359	277	232	171	113
	3	496	407	314	263	195	131	424	350	270	228	168	111
	4	488	400	309	260	193	129	411	340	263	222	164	110
	5	479	393	304	255	190	128	397	328	254	215	161	107
	6	469	385	298	251	187	126	381	316	245	207	157	105
	7	459	377	292	246	185	124	364	303	236	199	152	102
	8	448	368	285	240	181	123	346	289	225	191	147	100
	9	436	359	278	234	178	121	327	274	214	182	142	97
	10	424	349	271	228	175	118	307	258	202	172	136	93
	11	411	339	263	222	171	116	285	241	190	162	130	90
	12	397	328	255	215	167	114	262	223	177	151	123	86
	13	383	317	246	208	163	111	238	204	163	140	115	82
	14	368	305	238	201	158	109	213	184	148	128	105	77
	15	353	293	229	194	153	106	186	163	133	116	95	72
	16	337	280	219	186	148	103	164	144	117	103	85	66
	17	321	267	209	178	143	100	145	127	104	91	75	59
	18	304	254	199	169	137	97	129	113	93	81	67	53
	19	286	240	189	161	131	93	116	102	83	73	60	47
	20	267	225	178	152	124	89	105	92	75	66	54	43
	21	248	210	167	143	117	86	95	83	68	60	49	39
	22	229	195	155	133	109	81	87	76	62	54	45	35
	23	209	179	143	123	101	77	79	69	57	50	41	32
	24	192	164	132	113	93	72	73	64	52	46	38	30
	25	177	151	121	105	86	66	67	59	48	42	35	27
	26	164	140	112	97	79	61	62	54	44	39	32	25
	27	152	130	104	90	74	57	====	50	41	36	30	23
	28	141	120	97	83	69	53	====	====	====	33	28	22
	29	132	112	90	78	64	49	====	====	====	====	====	20
	30	123	105	84	73	60	46	====	====	====	====	====	====
	31	115	98	79	68	56	43	====	====	====	====	====	====
	32	108	92	74	64	52	41	====	====	====	====	====	====
	33	102	87	70	60	49	38	====	====	====	====	====	====
	34	96	82	66	57	46	36	====	====	====	====	====	====
	35	90	77	62	53	44	34	====	====	====	====	====	====
	36	85	73	59	50	41	32	====	====	====	====	====	====
	37	81	69	55	48	39	30	====	====	====	====	====	====
	38	77	65	53	45	37	29	====	====	====	====	====	====
	39	73	62	50	43	35	27	====	====	====	====	====	====
	40	====	59	47	41	34	26	====	====	====	====	====	====
PROPERTIES													
Area, In. ²	18.7	15.3	11.8	9.92	8.03	6.06	16.4	13.5	10.4	8.76	7.10	5.37	
I _x , In. ⁴	321	271	215	184	151	116	245	209	168	144	119	91.8	
I _y , In. ⁴	106	91.1	72.9	62.8	51.9	40.0	40.3	35.3	28.9	25.2	21.0	16.4	
Ratio r _x / r _y	1.74	1.72	1.72	1.71	1.71	1.70	2.47	2.43	2.41	2.39	2.38	2.37	
r _y , In.	2.39	2.44	2.49	2.52	2.54	2.57	1.57	1.62	1.67	1.70	1.72	1.75	
B _x , Bending Factor	0.350	0.339	0.329	0.323	0.319	0.313	0.402	0.388	0.371	0.365	0.358	0.351	
B _y , Bending Factor	0.529	0.504	0.486	0.474	0.464	0.455	0.814	0.765	0.720	0.695	0.676	0.655	
a _x , ÷ 10 ⁶	47.9	40.5	32.1	27.5	22.5	17.3	36.6	31.2	25.1	21.5	17.8	13.7	
a _y , ÷ 10 ⁶	15.8	13.6	10.9	9.38	7.75	5.97	6.02	5.27	4.32	3.76	3.14	2.45	

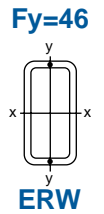
*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of 253 / √F_y.

Note: Double Horizontal Line indicates k / r limit of 200.



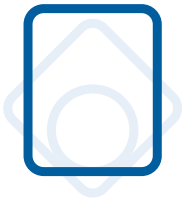
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



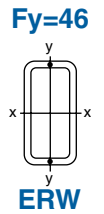
Nominal Size		12 x 3 1/2		12 x 3			12 x 2		10 x 8				
Wall Thickness		3/8	5/16	5/16	1/4	3/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		36.41	30.78	29.72	24.12	18.35	22.42	17.08	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.349	0.291*	0.291*	0.233*	0.174*	0.233*	0.174*	0.465	0.349	0.291	0.233*	0.174*
F_y = 46 ksi													
Effective length KL in feet	0	276	231	223	163	107	150	98	422	326	274	217	145
	2	264	223	214	157	103	141	93	415	320	269	214	143
	3	257	217	207	153	101	135	89	411	317	266	212	142
	4	248	210	198	148	98	127	85	406	313	263	210	141
	5	238	202	188	143	96	117	79	401	309	260	208	140
	6	228	194	178	137	92	105	73	395	305	257	206	139
	7	216	184	166	130	89	89	66	390	301	253	203	138
	8	204	174	154	123	84	71	57	383	296	249	201	136
	9	191	163	141	114	80	56	45	377	291	245	198	135
	10	177	151	126	104	75	46	37	370	286	241	195	133
	11	162	139	111	92	69	38	30	363	281	237	192	132
	12	147	126	95	79	62	32	26	356	275	232	188	130
	13	130	112	81	68	54	27	22	348	270	227	184	128
	14	113	98	70	58	46	23	19	340	263	222	180	126
	15	98	85	61	51	40	==	==	332	257	217	176	124
	16	86	75	53	45	35			323	251	212	172	122
	17	76	66	47	40	31			314	244	206	168	119
	18	68	59	42	35	28			305	237	200	163	117
	19	61	53	38	32	25			296	230	195	158	114
	20	55	48	34	29	23			286	223	189	154	111
	21	50	44	31	26	21			276	215	182	149	108
	22	46	40	==	==	19			266	208	176	144	105
	23	42	36			==			255	200	169	138	102
	24	38	33						245	192	163	133	99
	25	==	==						233	183	156	127	95
	26								222	175	149	122	92
	27								210	166	141	116	88
	28								198	157	134	110	84
	29								186	148	126	104	80
	30								174	138	119	98	75
	31								163	130	111	92	70
	32								153	122	104	86	66
	33								144	114	98	81	62
	34								135	108	92	76	58
	35								128	102	87	72	55
	36								121	96	82	68	52
	37								114	91	78	64	49
	38								108	86	74	61	47
	39								103	82	70	58	44
	40								98	78	67	55	42
PROPERTIES													
Area, In. ²	10.0	8.46	8.17	6.63	5.02	6.17	4.67	15.3	11.8	9.92	8.03	6.06	
I _x , In. ⁴	156	134	124	103	79.6	86.9	67.4	214	169	145	119	91.4	
I _y , In. ⁴	21.3	18.6	13.1	11.1	8.72	4.40	3.55	151	120	103	84.7	65.1	
Ratio r _x / r _y	2.71	2.68	3.08	3.05	3.02	4.44	4.36	1.19	1.19	1.19	1.19	1.18	
r _y , In.	1.46	1.48	1.27	1.29	1.32	0.845	0.872	3.14	3.19	3.22	3.25	3.28	
B _x , Bending Factor	0.385	0.379	0.395	0.386	0.378	0.426	0.416	0.357	0.349	0.342	0.337	0.332	
B _y , Bending Factor	0.822	0.796	0.935	0.896	0.864	1.40	1.32	0.405	0.393	0.385	0.379	0.372	
a _{xx} ÷ 10 ⁶	23.3	20.0	18.5	15.4	11.9	13.0	10.1	32.0	25.2	21.7	17.8	13.6	
a _{yy} ÷ 10 ⁶	3.18	2.78	1.96	1.66	1.30	0.657	0.530	22.5	17.9	15.4	12.6	9.72	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of 253 / √F_y.
 Note: Double Horizontal Line indicates k ℓ/r limit of 200.



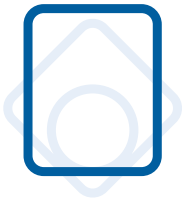
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



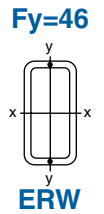
Nominal Size		10 x 6					10 x 5				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	3/8	5/16	1/4	3/16
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	19.63	35.13	29.72	24.12	18.35
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233*	0.174*	0.349	0.291	0.233*	0.174*
F_y = 46 ksi											
Effective length KL in feet	0	453	373	287	242	191	129	267	225	178	120
	2	442	364	280	236	188	127	259	219	174	117
	3	435	358	276	233	186	126	255	215	172	116
	4	427	352	272	229	183	124	249	211	169	114
	5	419	346	267	225	181	123	244	206	166	112
	6	411	339	262	221	178	121	237	201	163	110
	7	401	331	256	216	175	119	231	195	159	108
	8	391	323	250	211	171	117	224	189	154	106
	9	380	315	244	206	167	115	216	183	149	103
	10	369	306	237	200	163	113	208	176	144	100
	11	358	297	230	195	158	110	199	169	138	98
	12	345	287	223	189	153	108	191	162	132	94
	13	332	277	215	182	148	105	181	154	126	91
	14	319	266	207	176	143	102	172	146	120	88
	15	305	255	199	169	138	99	162	138	113	84
	16	291	243	190	162	132	96	151	129	106	80
	17	276	231	182	154	126	93	140	120	99	75
	18	260	219	172	147	120	89	129	110	92	70
	19	244	206	163	139	114	85	117	101	84	65
	20	228	193	153	131	107	81	105	91	76	59
	21	210	179	143	122	100	77	96	82	69	54
	22	192	165	132	114	93	72	87	75	63	49
	23	176	151	121	105	86	67	80	69	57	45
	24	162	139	111	96	79	61	73	63	53	41
	25	149	128	103	89	73	57	67	58	49	38
	26	138	118	95	82	68	52	62	54	45	35
	27	128	110	88	76	63	49	58	50	42	32
	28	119	102	82	71	58	45	54	46	39	30
	29	111	95	76	66	54	42	50	43	36	28
	30	103	89	71	62	51	39	47	40	34	26
	31	97	83	67	58	48	37	44	38	32	25
	32	91	78	63	54	45	35	41	35	30	23
	33	86	73	59	51	42	32	39	33	28	22
	34	81	69	56	48	39	31	36	31	26	20
	35	76	65	52	45	37	29	====	====	25	19
	36	72	62	50	43	35	27			====	====
	37	68	58	47	40	33	26				
	38	64	55	44	38	32	24				
	39	61	53	42	36	30	23				
	40	====	====	40	35	29	22				
PROPERTIES											
Area, In. ²	16.4	13.5	10.4	8.76	7.10	5.37	9.67	8.17	6.63	5.02	
I _x , In. ⁴	201	171	137	118	96.9	74.6	120	104	85.8	66.2	
I _y , In. ⁴	89.4	76.8	61.8	53.3	44.1	34.1	40.6	35.2	29.3	22.7	
Ratio r _x / r _y	1.50	1.49	1.49	1.49	1.48	1.48	1.72	1.72	1.71	1.71	
r _y , In.	2.34	2.39	2.44	2.47	2.49	2.52	2.05	2.07	2.10	2.13	
B _x , Bending Factor	0.408	0.395	0.380	0.371	0.366	0.360	0.403	0.393	0.386	0.379	
B _y , Bending Factor	0.550	0.527	0.505	0.493	0.483	0.472	0.595	0.580	0.566	0.553	
a _x , ÷ 10 ⁶	30.0	25.5	20.5	17.6	14.5	11.1	17.9	15.5	12.8	9.89	
a _y , ÷ 10 ⁶	13.4	11.5	9.23	7.96	6.59	5.09	6.06	5.26	4.38	3.39	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k ℓ/r limit of 200.



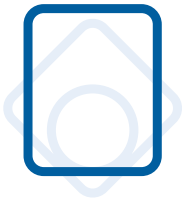
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



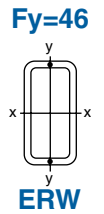
Nominal Size		10 x 4					10 x 3 1/2	10 x 3					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	3/16	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	16.44	30.03	25.46	20.72	15.80	10.71
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233*	0.174*	0.174*	0.349	0.291	0.233*	0.174*	0.116*
F_y = 46 ksi													
Effective length KL in feet	0	386	320	248	209	166	110	106	228	193	153	101	57
	2	371	308	238	202	161	108	103	216	184	147	97	55
	3	361	300	233	197	158	106	101	208	177	143	95	54
	4	350	291	226	192	155	104	98	199	169	138	92	53
	5	337	281	219	186	151	101	96	189	161	132	89	51
	6	324	270	211	179	146	99	93	177	152	124	86	49
	7	309	259	202	172	140	96	90	165	142	116	82	48
	8	293	246	193	164	134	93	86	151	131	108	78	46
	9	276	233	183	156	128	90	82	137	119	99	73	44
	10	258	219	173	148	121	86	78	122	106	89	67	41
	11	239	204	161	139	114	83	73	105	93	78	60	38
	12	219	188	150	129	107	78	68	89	79	67	53	35
	13	198	171	138	119	99	74	62	76	67	57	45	32
	14	175	154	125	108	90	68	54	65	58	49	39	27
	15	153	135	111	97	81	63	47	57	50	43	34	24
	16	134	119	98	86	72	56	42	50	44	38	30	21
	17	119	105	87	76	64	50	37	44	39	34	26	19
	18	106	94	77	68	57	44	33	39	35	30	23	17
	19	95	84	69	61	51	40	29	35	31	27	21	15
	20	86	76	63	55	46	36	27	32	28	24	19	13
	21	78	69	57	50	42	32	24	24	22	22	17	12
	22	71	63	52	45	38	30	22	22	22	22	17	11
	23	65	57	47	41	35	27	20	20	20	20	17	11
	24	60	53	43	38	32	25	18	18	18	18	17	11
	25	55	49	40	35	30	23	17	17	17	17	17	11
	26	50	45	37	32	27	21	16	16	16	16	16	11
	27	46	41	34	30	25	20	15	15	15	15	15	11
	28	42	37	30	26	22	18	14	14	14	14	14	11
	29	38	33	27	23	19	15	13	13	13	13	13	11
	30	34	29	23	19	15	12	11	11	11	11	11	11
	31	30	25	19	15	12	10	10	10	10	10	10	10
	32	26	21	15	12	9	8	8	8	8	8	8	8
	33	22	17	12	9	7	6	6	6	6	6	6	6
	34	18	13	9	7	5	4	4	4	4	4	4	4
	35	14	10	7	5	4	3	3	3	3	3	3	3
	36	10	7	5	4	3	2	2	2	2	2	2	2
	37	6	5	4	3	2	2	2	2	2	2	2	2
	38	4	3	3	2	2	2	2	2	2	2	2	2
	39	3	2	2	2	2	2	2	2	2	2	2	2
	40	2	2	2	2	2	2	2	2	2	2	2	2
PROPERTIES													
Area, In. ²	14.0	11.6	8.97	7.59	6.17	4.67	4.50	8.27	7.01	5.70	4.32	2.93	
I _x , In. ⁴	149	129	104	90.1	74.7	57.8	53.6	88.0	76.3	63.6	49.4	34.2	
I _y , In. ⁴	33.4	29.4	24.3	21.2	17.7	13.9	10.3	12.4	11.0	9.28	7.33	5.16	
Ratio r _x / r _y	2.11	2.09	2.07	2.06	2.05	2.04	2.28	2.66	2.63	2.62	2.60	2.57	
r _y , In.	1.54	1.59	1.64	1.67	1.70	1.72	1.51	1.22	1.25	1.28	1.30	1.33	
B _x , Bending Factor	0.470	0.450	0.431	0.421	0.413	0.404	0.420	0.470	0.459	0.448	0.437	0.428	
B _y , Bending Factor	0.838	0.789	0.738	0.716	0.697	0.672	0.765	1.00	0.956	0.921	0.884	0.852	
a _{xx} ÷ 10 ⁶	22.3	19.3	15.5	13.5	11.2	8.63	8.00	13.1	11.4	9.50	7.38	5.11	
a _{yy} ÷ 10 ⁶	4.99	4.39	3.63	3.17	2.64	2.08	1.54	1.85	1.64	1.39	1.09	0.771	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / r limit of 200.



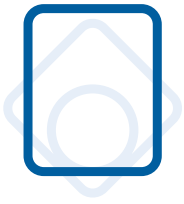
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



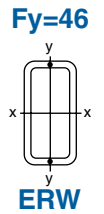
Nominal Size		10 x 2				9 x 7					
Wall Thickness		3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		27.48	23.34	19.02	14.53	59.32	48.85	37.69	31.84	25.82	19.63
Design Wall Thickness		0.349	0.291	0.233*	0.174*	0.581	0.465	0.349	0.291	0.233	0.174*
F_y = 46 ksi											
Effective length KL in feet	0	209	177	140	92	453	373	287	242	196	136
	2	190	162	131	87	443	365	281	237	192	134
	3	176	151	124	83	438	360	278	234	190	132
	4	160	138	114	78	431	355	274	231	187	131
	5	142	123	102	73	425	350	270	228	185	130
	6	121	106	89	67	417	344	266	224	182	128
	7	98	88	75	59	410	338	261	220	179	126
	8	76	69	59	48	401	331	256	216	175	124
	9	60	54	47	38	393	324	251	212	172	122
	10	49	44	38	31	383	317	245	207	168	120
	11	40	36	31	25	374	309	239	202	164	118
	12	34	31	26	21	364	301	233	197	160	116
	13	29	26	23	18	353	293	227	192	156	114
	14	==	==	==	16	342	284	221	187	152	111
	15				==	331	275	214	181	148	108
	16					319	266	207	175	143	106
	17					307	256	200	169	138	103
	18					295	246	192	163	133	100
	19					282	236	184	157	128	96
	20					269	225	176	150	123	93
	21					255	214	168	143	117	89
	22					241	203	160	136	112	86
	23					226	191	151	129	106	81
	24					211	179	142	122	100	77
	25					195	167	133	114	94	72
	26					181	154	123	106	88	68
	27					168	143	114	98	81	63
	28					156	133	106	91	76	59
	29					145	124	99	85	71	55
	30					136	116	93	80	66	51
	31					127	109	87	75	62	48
	32					119	102	81	70	58	45
	33					112	96	77	66	55	42
	34					106	90	72	62	51	40
	35					100	85	68	59	48	37
	36					94	81	64	55	46	35
	37					89	76	61	52	43	34
	38					85	72	58	50	41	32
	39					80	69	55	47	39	30
	40					76	65	52	45	37	29
PROPERTIES											
Area, In. ²	7.58	6.43	5.24	3.98	16.4	13.5	10.4	8.76	7.10	5.37	
I _x , In. ⁴	71.7	62.6	52.5	41.0	174	149	119	102	84.1	64.7	
I _y , In. ⁴	4.69	4.24	3.67	2.97	117	100	80.4	69.2	57.2	44.1	
Ratio r _x / r _y	3.91	3.84	3.78	3.72	1.22	1.22	1.22	1.21	1.21	1.21	
r _y , In.	0.786	0.812	0.837	0.864	2.68	2.73	2.78	2.81	2.84	2.87	
B _x , Bending Factor	0.529	0.514	0.499	0.485	0.424	0.408	0.393	0.386	0.380	0.373	
B _y , Bending Factor	1.62	1.52	1.43	1.34	0.491	0.473	0.453	0.443	0.434	0.426	
a _x , ÷ 10 ⁶	10.7	9.35	7.84	6.12	26.0	22.3	17.8	15.2	12.6	9.66	
a _y , ÷ 10 ⁶	0.700	0.633	0.548	0.444	17.5	14.9	12.0	10.3	8.54	6.59	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k ℓ/r limit of 200.



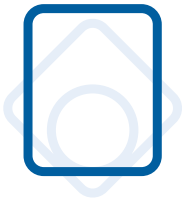
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



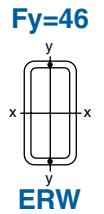
Nominal Size		9 x 5						9 x 3				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	35.24	27.48	23.34	19.02	14.53
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174*	0.465	0.349	0.291	0.233	0.174*
F_y = 46 ksi												
Effective length KL in feet	0	386	320	248	209	170	117	269	209	177	145	98
	2	375	311	240	204	166	114	254	198	168	137	94
	3	367	305	236	200	163	113	244	191	162	133	92
	4	359	298	231	196	159	111	232	182	155	127	89
	5	350	291	226	191	156	109	219	172	147	121	86
	6	340	283	220	186	152	107	204	162	139	114	82
	7	329	274	214	181	148	105	189	150	129	107	78
	8	318	265	207	175	143	102	171	138	119	99	74
	9	306	256	200	169	138	100	153	125	108	90	69
	10	293	245	192	163	133	97	133	110	97	81	63
	11	279	235	184	157	128	94	112	95	84	71	55
	12	265	223	176	150	123	90	94	80	71	61	48
	13	250	211	167	142	117	87	80	68	61	52	41
	14	235	199	158	135	111	83	69	59	52	45	35
	15	218	186	148	127	104	79	60	51	46	39	31
	16	201	173	138	119	98	75	53	45	40	34	27
	17	184	159	128	110	91	70	47	40	35	30	24
	18	165	144	117	101	84	65	42	36	32	27	21
	19	148	129	106	92	77	59	38	32	28	24	19
	20	134	117	96	83	69	53	==	29	26	22	17
	21	121	106	87	75	63	48		==	==	20	16
	22	111	96	79	68	57	44				==	==
	23	101	88	72	63	52	40					
	24	93	81	67	57	48	37					
	25	86	75	61	53	44	34					
	26	79	69	57	49	41	32					
	27	73	64	53	45	38	29					
	28	68	60	49	42	35	27					
	29	64	56	46	39	33	25					
	30	59	52	43	37	31	24					
	31	56	49	40	34	29	22					
	32	52	46	37	32	27	21					
	33	==	==	35	30	25	20					
	34			==	29	24	18					
	35				==	==	17					
	36											
	37											
	38											
	39											
	40											
PROPERTIES												
Area, In. ²	14.0	11.6	8.97	7.59	6.17	4.67	9.74	7.58	6.43	5.24	3.98	
I _x , In. ⁴	133	115	92.5	79.8	66.1	51.1	80.8	66.3	57.7	48.2	37.6	
I _y , In. ⁴	51.9	45.2	36.8	32.0	26.6	20.7	13.2	11.2	9.88	8.38	6.63	
Ratio r _x / r _y	1.60	1.60	1.59	1.58	1.58	1.57	2.47	2.43	2.42	2.40	2.38	
r _y , In.	1.92	1.97	2.03	2.05	2.08	2.10	1.16	1.21	1.24	1.27	1.29	
B _x , Bending Factor	0.474	0.454	0.436	0.428	0.420	0.411	0.542	0.514	0.501	0.489	0.476	
B _y , Bending Factor	0.674	0.642	0.609	0.593	0.580	0.564	1.11	1.02	0.976	0.938	0.900	
a _x , ÷ 10 ⁶	19.9	17.2	13.8	11.9	9.87	7.63	12.1	9.90	8.62	7.20	5.61	
a _y , ÷ 10 ⁶	7.75	6.75	5.50	4.78	3.97	3.09	1.97	1.67	1.48	1.25	0.990	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / l/r limit of 200.



HSS / Rectangular Structural Steel Tubing

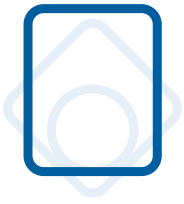
Allowable Concentric Loads in Kips



Nominal Size		8 x 6						8 x 4						
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	42.30	35.24	27.48	23.34	19.02	14.53	9.86
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174*	0.581	0.465	0.349	0.291	0.233	0.174*	0.116*
F_y = 46 ksi														
Effective length KL in feet	0	386	320	248	209	170	123	323	269	209	177	145	104	60
	2	377	312	242	205	166	121	310	258	201	171	139	101	58
	3	371	308	238	202	164	119	301	252	196	167	136	99	57
	4	364	302	234	198	161	118	292	244	191	162	132	97	56
	5	357	296	230	195	158	116	281	235	184	157	128	95	55
	6	349	290	225	191	155	114	269	226	177	151	123	92	54
	7	341	283	220	186	152	112	256	216	170	145	118	90	52
	8	332	276	215	182	148	110	243	205	162	138	113	86	51
	9	322	269	209	177	145	108	228	194	153	131	108	82	49
	10	312	261	203	172	141	105	213	181	144	123	102	78	47
	11	302	252	197	167	136	103	196	168	134	115	95	73	45
	12	291	243	190	162	132	100	179	155	124	107	89	68	43
	13	279	234	183	156	127	97	161	140	114	98	82	63	41
	14	267	225	176	150	123	93	141	125	102	89	74	58	38
	15	255	215	169	144	118	90	123	109	91	79	66	52	35
	16	242	204	161	137	113	86	108	96	80	69	58	46	32
	17	229	193	153	131	107	82	96	85	71	61	52	41	28
	18	215	182	145	124	102	78	85	76	63	55	46	36	25
	19	200	171	136	117	96	74	77	68	56	49	41	33	23
	20	185	159	128	109	90	69	69	61	51	44	37	29	20
	21	170	146	118	102	84	65	63	56	46	40	34	27	19
	22	155	134	109	94	78	60	57	51	42	37	31	24	17
	23	141	122	100	86	71	55	52	46	39	33	28	22	15
	24	130	112	91	79	66	51	48	43	35	31	26	20	14
	25	120	104	84	73	60	47	44	39	33	28	24	19	13
	26	111	96	78	67	56	43	==	==	==	==	==	==	==
	27	103	89	72	62	52	40	==	==	==	==	==	==	==
	28	95	83	67	58	48	37	==	==	==	==	==	==	==
	29	89	77	63	54	45	35	==	==	==	==	==	==	==
	30	83	72	59	50	42	33	==	==	==	==	==	==	==
	31	78	67	55	47	39	30	==	==	==	==	==	==	==
	32	73	63	51	44	37	29	==	==	==	==	==	==	==
	33	69	59	48	42	35	27	==	==	==	==	==	==	==
	34	65	56	46	39	33	25	==	==	==	==	==	==	==
	35	61	53	43	37	31	24	==	==	==	==	==	==	==
	36	58	50	41	35	29	23	==	==	==	==	==	==	==
	37	55	47	38	33	28	21	==	==	==	==	==	==	==
	38	==	45	36	31	26	20	==	==	==	==	==	==	==
	39	==	==	35	30	25	19	==	==	==	==	==	==	==
	40	==	==	==	28	24	18	==	==	==	==	==	==	==
PROPERTIES														
Area, In. ²	14.0	11.6	8.97	7.59	6.17	4.67	11.7	9.74	7.58	6.43	5.24	3.98	2.70	
I _x , In. ⁴	114	98.2	79.1	68.3	56.6	43.7	81.9	71.7	58.7	51.0	42.5	33.1	22.9	
I _y , In. ⁴	72.2	62.5	50.6	43.8	36.4	28.2	26.6	23.6	19.6	17.2	14.4	11.3	7.90	
Ratio r _x / r _y	1.26	1.25	1.25	1.25	1.25	1.24	1.75	1.74	1.73	1.72	1.72	1.71	1.70	
r _y , In.	2.27	2.32	2.38	2.40	2.43	2.46	1.51	1.56	1.61	1.63	1.66	1.69	1.71	
B _x , Bending Factor	0.491	0.473	0.454	0.445	0.436	0.427	0.571	0.543	0.517	0.504	0.493	0.481	0.472	
B _y , Bending Factor	0.582	0.557	0.532	0.520	0.509	0.497	0.880	0.825	0.773	0.748	0.728	0.704	0.684	
a _x , ÷ 10 ⁶	17.0	14.7	11.8	10.2	8.45	6.53	12.2	10.7	8.77	7.62	6.35	4.94	3.42	
a _y , ÷ 10 ⁶	10.8	9.33	7.56	6.54	5.44	4.21	3.97	3.52	2.93	2.57	2.15	1.69	1.18	

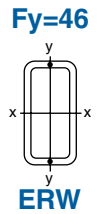
*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.

Note: Double Horizontal Line indicates k / r limit of 200.



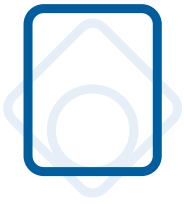
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



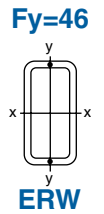
Nominal Size		8 x 3						8 x 2				
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		31.84	24.93	21.21	17.32	13.25	9.01	22.37	19.08	15.62	11.97	8.16
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174*	0.116*	0.349	0.291	0.233	0.174*	0.116*
F_y = 46 ksi												
Effective length KL in feet	0	243	190	161	132	94	53	171	145	119	85	47
	2	229	180	153	125	91	52	155	132	108	80	45
	3	220	173	147	120	88	50	143	123	101	76	43
	4	209	165	141	115	86	49	130	112	93	71	41
	5	197	156	134	110	82	48	115	100	83	65	38
	6	184	146	126	103	79	46	98	86	72	57	35
	7	170	136	117	96	74	44	79	71	61	48	32
	8	154	124	108	89	69	42	60	55	48	39	27
	9	137	112	98	81	63	39	48	43	38	31	22
	10	119	99	87	72	57	37	39	35	30	25	18
	11	100	85	75	63	50	34	32	29	25	20	15
	12	84	71	64	54	43	30	27	24	21	17	12
	13	71	61	54	46	36	26	==	21	18	15	11
	14	62	52	47	39	31	22	==	==	==	13	9
	15	54	46	41	34	27	19	==	==	==	==	==
	16	47	40	36	30	24	17					
	17	42	36	32	27	21	15					
	18	37	32	28	24	19	14					
	19	33	28	25	21	17	12					
	20	==	26	23	19	15	11					
	21		==	==	==	==	14	10				
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	40											
PROPERTIES												
Area, In. ²	8.81	6.88	5.85	4.77	3.63	2.46	6.18	5.26	4.30	3.28	2.23	
I _x , In. ⁴	58.5	48.5	42.4	35.5	27.8	19.3	38.2	33.7	28.5	22.4	15.7	
I _y , In. ⁴	11.7	9.94	8.81	7.49	5.94	4.20	3.72	3.38	2.94	2.39	1.72	
Ratio r _x / r _y	2.24	2.21	2.19	2.18	2.16	2.14	3.20	3.16	3.11	3.06	3.02	
r _y , In.	1.15	1.20	1.23	1.25	1.28	1.31	0.776	0.801	0.827	0.853	0.879	
B _x , Bending Factor	0.602	0.567	0.552	0.537	0.522	0.510	0.647	0.624	0.604	0.586	0.568	
B _y , Bending Factor	1.13	1.04	0.996	0.955	0.917	0.879	1.66	1.56	1.46	1.37	1.30	
a _x , ÷ 10 ⁶	8.74	7.24	6.33	5.30	4.15	2.88	5.70	5.03	4.26	3.35	2.34	
a _y , ÷ 10 ⁶	1.75	1.48	1.32	1.12	0.887	0.627	0.556	0.505	0.439	0.357	0.257	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / r limit of 200.



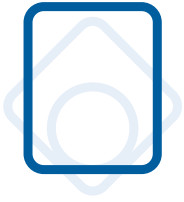
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



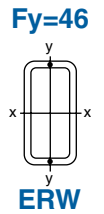
Nominal Size		7 x 5						7 x 4						
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		42.30	35.24	27.48	23.34	19.02	14.53	9.86	31.84	24.93	21.21	17.32	13.25	9.01
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174	0.116*
F_y = 46 ksi														
Effective length KL in feet	0	323	269	209	177	145	110	64	243	190	161	132	100	58
	2	313	261	203	172	140	107	63	233	183	155	127	97	56
	3	306	255	199	169	138	105	62	227	178	151	124	94	55
	4	299	250	195	165	135	103	61	220	173	147	120	92	54
	5	291	243	190	161	132	100	60	212	167	142	116	89	53
	6	282	236	185	157	128	98	59	203	160	137	112	86	52
	7	273	229	179	152	125	95	58	194	153	131	107	82	50
	8	263	221	173	147	121	92	56	184	146	125	103	78	48
	9	252	212	167	142	116	89	55	173	138	118	97	74	47
	10	241	203	160	137	112	86	53	162	129	111	92	70	45
	11	229	194	153	131	107	82	52	150	120	104	86	66	43
	12	217	184	145	125	102	78	50	137	111	96	80	61	40
	13	204	173	138	118	97	75	48	123	101	88	73	56	38
	14	190	162	129	111	92	71	46	109	90	79	66	51	35
	15	176	151	121	104	86	66	44	95	79	70	59	46	32
	16	161	139	112	97	80	62	42	84	70	61	52	41	28
	17	145	127	103	89	74	58	39	74	62	54	46	36	25
	18	130	114	93	81	68	53	36	66	55	49	41	32	22
	19	116	102	84	73	61	48	33	59	49	44	37	29	20
	20	105	92	75	66	55	43	30	53	45	39	33	26	18
	21	95	84	68	60	50	39	27	48	40	36	30	24	17
	22	87	76	62	55	46	36	25	44	37	32	27	21	15
	23	79	70	57	50	42	33	23	40	34	30	25	20	14
	24	73	64	52	46	38	30	21	37	31	27	23	18	13
	25	67	59	48	42	35	28	19	34	28	25	21	17	12
	26	62	55	45	39	33	26	18	31	26	23	20	15	11
	27	58	51	41	36	30	24	16	28	24	21	18	14	10
	28	54	47	39	34	28	22	15	26	22	19	16	13	9
	29	50	44	36	31	26	21	14	24	20	17	14	11	8
	30	47	41	34	29	25	19	13	22	18	15	12	10	7
	31	44	38	31	27	23	18	12	20	16	13	10	8	6
	32	41	35	29	25	21	16	11	18	14	11	8	7	5
	33	38	32	27	23	19	14	10	16	12	9	7	6	4
	34	35	29	25	21	17	13	9	14	10	8	6	5	3
	35	32	26	22	18	14	11	8	12	9	7	5	4	2
	36	29	23	19	15	12	9	7	10	7	5	4	3	1
	37	26	20	16	12	9	7	6	8	6	4	3	2	1
	38	23	17	13	10	7	5	4	6	4	3	2	1	1
	39	20	14	10	7	5	4	3	4	3	2	1	1	1
	40	17	11	8	6	4	3	2	3	2	1	1	1	1
PROPERTIES														
Area, In. ²	11.7	9.74	7.58	6.43	5.24	3.98	2.70	8.81	6.88	5.85	4.77	3.63	2.46	
I _x , In. ⁴	69.3	60.6	49.5	43.0	35.8	27.9	19.3	50.6	41.8	36.4	30.5	23.8	16.6	
I _y , In. ⁴	40.5	35.6	29.2	25.5	21.3	16.6	11.6	20.7	17.3	15.2	12.8	10.0	7.03	
Ratio r _x / r _y	1.31	1.30	1.30	1.30	1.30	1.30	1.29	1.56	1.55	1.55	1.54	1.54	1.54	
r _y , In.	1.86	1.91	1.96	1.99	2.02	2.05	2.07	1.53	1.58	1.61	1.64	1.66	1.69	
B _x , Bending Factor	0.591	0.563	0.536	0.523	0.512	0.499	0.490	0.609	0.576	0.563	0.547	0.534	0.519	
B _y , Bending Factor	0.722	0.684	0.649	0.630	0.615	0.599	0.582	0.851	0.795	0.770	0.745	0.726	0.700	
a _x , ÷ 10 ⁶	10.3	9.05	7.39	6.42	5.35	4.17	2.88	7.56	6.24	5.44	4.55	3.55	2.48	
a _y , ÷ 10 ⁶	6.05	5.32	4.36	3.81	3.18	2.48	1.73	3.09	2.58	2.27	1.91	1.49	1.05	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / r limit of 200.



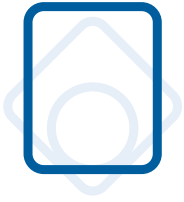
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



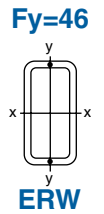
Nominal Size		7 x 3					6 x 5				
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	24.93	21.21	17.32	13.25
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116*	0.349	0.291	0.233	0.174
F_y = 46 ksi											
Effective length KL in feet	0	217	171	145	119	91	52	190	161	132	100
	2	205	161	137	113	86	50	184	157	128	97
	3	197	155	132	108	83	49	180	154	125	95
	4	187	148	126	104	79	47	176	150	123	93
	5	176	140	120	99	75	46	172	146	120	91
	6	164	131	112	93	71	44	167	142	116	89
	7	151	121	104	86	66	42	162	138	113	86
	8	137	111	96	80	61	39	156	133	109	83
	9	121	100	86	72	56	37	150	128	105	81
	10	105	88	77	65	50	34	144	123	101	77
	11	88	75	66	56	44	31	137	118	97	74
	12	74	63	55	48	38	27	130	112	92	71
	13	63	54	47	41	32	23	123	106	87	67
	14	54	46	41	35	28	20	115	99	82	63
	15	47	40	35	30	24	17	107	93	77	59
	16	41	35	31	27	21	15	99	86	71	55
	17	37	31	28	24	19	13	90	79	66	51
	18	33	28	25	21	17	12	81	71	60	47
	19	29	25	22	19	15	11	73	64	54	42
	20	==	==	==	==	14	10	66	58	48	38
	21					12	9	60	52	44	34
	22					==	==	54	48	40	31
	23							50	44	37	29
	24							46	40	34	26
	25							42	37	31	24
	26							39	34	29	22
	27							36	32	27	21
	28							34	29	25	19
	29							31	27	23	18
	30							29	26	22	17
	31							27	24	20	16
	32							26	23	19	15
	33							==	==	18	14
	34									==	==
	35										==
	36										
	37										
	38										
	39										
	40										
PROPERTIES											
Area, In. ²	7.88	6.18	5.26	4.30	3.28	2.23	6.88	5.85	4.77	3.63	
I _x , In. ⁴	40.7	34.0	29.9	25.2	19.8	13.8	33.9	29.6	24.7	19.3	
I _y , In. ⁴	10.2	8.70	7.74	6.59	5.24	3.71	25.5	22.3	18.7	14.6	
Ratio r _x / r _y	2.00	1.98	1.97	1.96	1.94	1.93	1.15	1.15	1.15	1.15	
r _y , In.	1.14	1.19	1.21	1.24	1.26	1.29	1.92	1.95	1.98	2.01	
B _x , Bending Factor	0.678	0.636	0.616	0.597	0.580	0.566	0.609	0.593	0.579	0.564	
B _y , Bending Factor	1.16	1.07	1.02	0.979	0.939	0.902	0.675	0.656	0.638	0.622	
a _x , ÷ 10 ⁶	6.08	5.08	4.47	3.76	2.96	2.06	5.06	4.42	3.69	2.88	
a _y , ÷ 10 ⁶	1.52	1.30	1.16	0.984	0.782	0.554	3.81	3.33	2.79	2.18	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / r limit of 200.



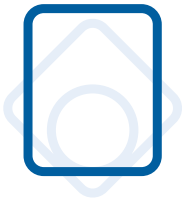
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



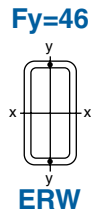
Nominal Size		6 x 4						6 x 3					
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	25.03	19.82	16.96	13.91	10.70	7.31
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174	0.116*
F_y = 46 ksi													
Effective length KL in feet	0	217	171	145	119	91	56	192	151	129	106	81	50
	2	209	164	140	114	87	54	181	143	122	100	77	48
	3	203	160	136	111	85	53	173	137	117	97	74	47
	4	196	155	132	108	83	52	164	131	112	92	71	45
	5	189	149	127	104	80	51	154	123	106	88	67	43
	6	181	143	122	101	77	49	143	115	99	82	63	41
	7	172	137	117	96	74	48	132	107	92	77	59	39
	8	163	130	111	92	70	46	119	97	84	70	55	37
	9	153	122	105	87	67	44	105	87	76	64	50	34
	10	143	114	99	82	63	42	90	76	67	56	44	31
	11	131	106	92	76	59	40	75	64	57	49	39	27
	12	120	97	85	71	54	38	63	54	48	41	33	23
	13	107	88	77	64	50	35	53	46	41	35	28	20
	14	94	78	69	58	45	32	46	40	35	30	24	17
	15	82	68	61	51	40	28	40	35	31	26	21	15
	16	72	60	53	45	35	25	35	30	27	23	19	13
	17	64	53	47	40	31	22	31	27	24	21	16	12
	18	57	48	42	36	28	20	28	24	21	18	15	10
	19	51	43	38	32	25	18	==	22	19	16	13	9
	20	46	38	34	29	23	16	==	==	==	15	12	8
	21	42	35	31	26	20	14				==	==	8
	22	38	32	28	24	19	13						==
	23	35	29	26	22	17	12						
	24	32	27	24	20	16	11						
	25	29	25	22	18	14	10						
	26	==	==										
	27			20	17	13	9						
	28			==	==	==	9						
	29							==					
	30												
	31												
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PROPERTIES													
Area, In. ²	7.88	6.18	5.26	4.30	3.28	2.23	6.95	5.48	4.68	3.84	2.93	2.00	
I _x , In. ⁴	33.9	28.3	24.8	20.9	16.4	11.4	26.8	22.7	20.1	17.0	13.4	9.43	
I _y , In. ⁴	17.7	14.9	13.1	11.1	8.76	6.15	8.65	7.47	6.66	5.70	4.55	3.23	
Ratio r _x / r _y	1.38	1.38	1.38	1.37	1.37	1.36	1.76	1.74	1.74	1.73	1.72	1.71	
r _y , In.	1.50	1.55	1.58	1.61	1.63	1.66	1.12	1.17	1.19	1.22	1.25	1.27	
B _x , Bending Factor	0.697	0.655	0.636	0.617	0.600	0.587	0.778	0.724	0.699	0.678	0.656	0.636	
B _y , Bending Factor	0.890	0.830	0.803	0.775	0.749	0.725	1.21	1.10	1.05	1.01	0.966	0.929	
a _{xx} ÷ 10 ⁶	5.06	4.23	3.70	3.12	2.45	1.70	4.00	3.39	3.00	2.54	2.00	1.41	
a _{yy} ÷ 10 ⁶	2.64	2.23	1.96	1.66	1.31	0.918	1.29	1.12	0.995	0.851	0.679	0.482	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k l/r limit of 200.



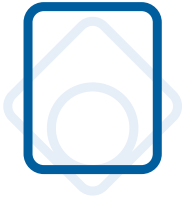
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



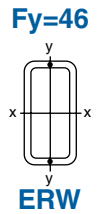
Nominal Size		6 x 2					5 x 4				
Wall Thickness		3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		17.27	14.83	12.21	9.42	6.46	25.03	19.82	16.96	13.91	10.70
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174
F_y = 46 ksi											
Effective length KL in feet	0	132	113	93	71	44	192	151	129	106	81
	2	119	103	85	65	41	184	145	124	102	78
	3	110	95	79	61	39	178	141	121	99	76
	4	99	87	72	56	37	172	137	117	96	74
	5	87	77	64	50	34	166	132	113	93	71
	6	74	65	56	44	31	158	126	108	89	68
	7	58	53	46	37	26	150	120	103	85	65
	8	45	41	36	29	21	142	114	98	81	62
	9	35	32	28	23	17	133	107	92	77	59
	10	29	26	23	19	14	123	100	86	72	55
	11	24	22	19	15	11	113	92	80	67	52
	12	20	18	16	13	9	102	84	73	61	48
	13	====	15	14	11	8	90	76	66	56	44
	14		====	====	====	7	78	67	59	50	39
	15					====	68	58	51	44	35
	16						60	51	45	38	30
	17						53	45	40	34	27
	18						47	41	36	30	24
	19						43	36	32	27	22
	20						38	33	29	25	19
	21						35	30	26	22	18
	22						32	27	24	20	16
	23						29	25	22	19	15
	24						27	23	20	17	14
	25						====	21	18	16	12
	26							====	====		
	27									15	12
	28									====	====
	29										
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	40										
PROPERTIES											
Area, In. ²	4.78	4.10	3.37	2.58	1.77	6.95	5.48	4.68	3.84	2.93	
I _x , In. ⁴	17.1	15.3	13.1	10.5	7.42	21.2	17.9	15.8	13.4	10.6	
I _y , In. ⁴	2.75	2.52	2.21	1.80	1.31	14.8	12.6	11.1	9.46	7.48	
Ratio r _x / r _y	2.49	2.46	2.43	2.42	2.38	1.20	1.19	1.19	1.19	1.19	
r _y , In.	0.759	0.784	0.809	0.835	0.861	1.46	1.52	1.54	1.57	1.60	
B _x , Bending Factor	0.839	0.804	0.772	0.737	0.716	0.820	0.765	0.741	0.716	0.691	
B _y , Bending Factor	1.74	1.63	1.52	1.43	1.35	0.939	0.870	0.843	0.812	0.783	
a _x , ÷ 10 ⁶	2.55	2.28	1.96	1.57	1.11	3.17	2.67	2.36	2.00	1.58	
a _y , ÷ 10 ⁶	0.411	0.376	0.330	0.269	0.196	2.21	1.88	1.66	1.41	1.12	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / l/r limit of 200.



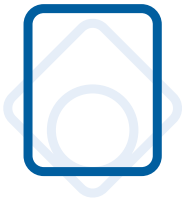
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



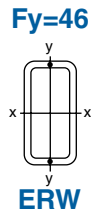
Nominal Size		5 x 3					5 x 2 1/2			
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8
Weight Per Foot		21.63	17.27	14.83	12.21	9.42	6.46	11.36	8.78	6.03
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116*	0.233	0.174	0.116*
F_y = 46 ksi										
Effective length KL in feet	0	166	132	113	93	71	48	87	67	44
	2	156	124	107	88	67	46	81	62	42
	3	149	119	103	85	65	44	77	59	40
	4	141	113	98	81	62	43	72	56	38
	5	132	107	92	76	59	41	67	52	36
	6	123	99	86	71	55	38	61	47	33
	7	112	92	80	66	51	36	54	43	30
	8	100	83	73	61	47	33	48	37	26
	9	88	74	65	54	43	30	40	32	23
	10	74	64	57	48	38	27	32	26	19
	11	61	53	48	41	33	23	27	21	16
	12	52	45	40	34	28	20	23	18	13
	13	44	38	34	29	24	17	19	15	11
	14	38	33	30	25	20	15	17	13	10
	15	33	29	26	22	18	13	14	12	8
	16	29	25	23	19	16	11	13	10	7
	17	26	22	20	17	14	10	10	9	7
	18	23	20	18	15	12	9	9	9	7
	19	20	18	16	14	11	8	8	8	7
	20	18	16	14	12	10	7	7	7	7
	21	16	14	12	10	8	6	6	6	6
	22	14	12	10	8	6	5	5	5	5
	23	12	10	8	6	5	4	4	4	4
	24	10	8	6	5	4	3	3	3	3
	25	8	6	5	4	3	2	2	2	2
	26	7	5	4	3	2	2	2	2	2
	27	6	4	3	2	2	2	2	2	2
	28	5	3	2	2	2	2	2	2	2
	29	4	2	2	2	2	2	2	2	2
	30	3	2	2	2	2	2	2	2	2
	31	2	2	2	2	2	2	2	2	2
	32	2	2	2	2	2	2	2	2	2
	33	2	2	2	2	2	2	2	2	2
	34	2	2	2	2	2	2	2	2	2
	35	2	2	2	2	2	2	2	2	2
	36	2	2	2	2	2	2	2	2	2
	37	2	2	2	2	2	2	2	2	2
	38	2	2	2	2	2	2	2	2	2
	39	2	2	2	2	2	2	2	2	2
	40	2	2	2	2	2	2	2	2	2
PROPERTIES										
Area, In. ²	6.02	4.78	4.10	3.37	2.58	1.77	3.14	2.41	1.65	
I _x , In. ⁴	16.4	14.1	12.6	10.7	8.53	6.03	9.40	7.51	5.34	
I _y , In. ⁴	7.14	6.23	5.59	4.81	3.85	2.75	3.13	2.53	1.82	
Ratio r _x / r _y	1.52	1.50	1.50	1.49	1.49	1.48	1.73	1.72	1.71	
r _y , In.	1.09	1.14	1.17	1.19	1.22	1.25	0.998	1.02	1.05	
B _x , Bending Factor	0.918	0.848	0.813	0.787	0.756	0.734	0.835	0.802	0.772	
B _y , Bending Factor	1.26	1.15	1.10	1.05	1.01	0.965	1.25	1.19	1.13	
a _x , ÷ 10 ⁶	2.45	2.11	1.88	1.60	1.27	0.900	1.40	1.12	0.797	
a _y , ÷ 10 ⁶	1.07	0.930	0.835	0.718	0.575	0.411	0.467	0.378	0.272	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.
 Note: Double Horizontal Line indicates k / l/r limit of 200.



HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips

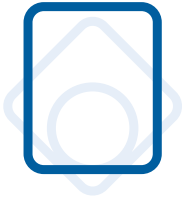


Nominal Size	5 x 2					4 x 3					4 x 2 1/2		
Wall Thickness	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	5/16	1/4	3/16
Weight Per Foot	14.72	12.70	10.51	8.15	5.61	14.72	12.70	10.51	8.15	5.61	11.64	9.66	7.51
Design Wall Thickness	0.349	0.291	0.233	0.174	0.116*	0.349	0.291	0.233	0.174	0.116	0.291	0.233	0.174

F _y = 46 ksi														
Effective length KL in feet	0	113	97	80	62	41	113	97	80	62	43	89	74	57
	2	102	88	73	56	39	106	92	76	58	40	83	69	53
	3	94	81	68	53	36	102	88	73	56	39	78	65	50
	4	84	74	62	48	34	96	83	69	54	37	73	61	47
	5	74	65	55	43	30	91	78	65	51	35	67	56	44
	6	62	55	47	38	27	84	73	61	48	33	61	51	40
	7	48	44	39	31	22	77	67	56	44	31	53	45	36
	8	37	34	30	25	18	69	61	51	40	28	46	39	31
	9	29	27	24	19	14	61	54	46	36	25	37	32	26
	10	24	22	19	16	11	52	46	40	32	22	30	26	21
	11	20	18	16	13	9	43	39	34	27	19	25	22	18
	12	16	15	13	11	8	36	32	28	23	16	21	18	15
	13	=====	=====	11	9	7	31	28	24	19	14	18	16	13
	14			=====	=====	6	27	24	21	17	12	15	13	11
	15					=====	23	21	18	15	10	13	12	9
	16						20	18	16	13	9	=====	10	8
	17						18	16	14	11	8		=====	=====
	18						16	14	13	10	7			
	19						=====	=====	11	9	6			
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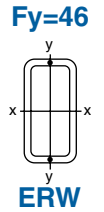
PROPERTIES														
Area, In. ²	4.09	3.52	2.91	2.24	1.54	4.09	3.52	2.91	2.24	1.54	3.23	2.67	2.06	
I _x , In. ⁴	10.3	9.34	8.08	6.50	4.65	7.92	7.13	6.15	4.93	3.52	6.13	5.32	4.30	
I _y , In. ⁴	2.27	2.09	1.84	1.51	1.10	5.00	4.52	3.91	3.16	2.27	2.89	2.53	2.06	
Ratio r _x / r _y	2.13	2.11	2.10	2.07	2.06	1.26	1.26	1.25	1.25	1.25	1.46	1.45	1.44	
r _y , In.	0.746	0.771	0.796	0.822	0.848	1.11	1.13	1.16	1.19	1.21	0.946	0.973	0.999	
B _x , Bending Factor	0.993	0.942	0.900	0.862	0.828	1.03	0.987	0.946	0.909	0.875	1.05	1.00	0.958	
B _y , Bending Factor	1.80	1.68	1.58	1.48	1.40	1.23	1.17	1.12	1.06	1.02	1.40	1.32	1.25	
a _x , ÷ 10 ⁶	1.54	1.39	1.21	0.971	0.694	1.18	1.06	0.918	0.736	0.526	0.915	0.794	0.642	
a _y , ÷ 10 ⁶	0.339	0.312	0.275	0.225	0.164	0.747	0.675	0.584	0.472	0.339	0.432	0.378	0.308	

*Slender element section. Width-Thickness and/or Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of 253 / √F_y.
 Note: Double Horizontal Line indicates k / r limit of 200.



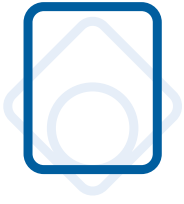
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



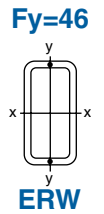
Nominal Size		4 x 2					3 1/2 x 2 1/2				
Wall Thickness		3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		12.17	10.58	8.81	6.87	4.75	12.17	10.58	8.81	6.87	4.75
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116
F_y = 46 ksi											
Effective length KL in feet	0	94	81	67	52	36	94	81	67	52	36
	2	84	73	61	48	33	86	75	63	49	33
	3	77	68	57	44	31	81	71	59	46	32
	4	69	61	51	40	28	75	66	55	43	30
	5	60	53	45	36	25	69	61	51	40	28
	6	49	45	39	31	22	61	54	46	36	25
	7	38	35	31	25	18	53	48	41	32	23
	8	29	27	24	20	15	44	40	35	28	20
	9	23	21	19	16	11	35	32	29	23	17
	10	19	17	15	13	9	29	26	23	19	14
	11	15	14	13	10	8	24	22	19	16	11
	12	13	12	11	9	6	20	18	16	13	10
	13	==	==	==	7	5	17	16	14	11	8
	14				==	==	15	13	12	10	7
	15						13	12	10	8	6
	16						==	==	==		
	17									7	5
	18									==	==
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PROPERTIES											
Area, In. ²	3.39	2.94	2.44	1.89	1.30	3.39	2.94	2.44	1.89	1.30	
I _x , In. ⁴	5.59	5.12	4.49	3.66	2.65	4.74	4.34	3.79	3.09	2.23	
I _y , In. ⁴	1.79	1.66	1.48	1.22	0.898	2.75	2.53	2.23	1.82	1.33	
Ratio r _x / r _y	1.77	1.76	1.74	1.73	1.72	1.31	1.31	1.30	1.30	1.29	
r _y , In.	0.727	0.752	0.778	0.804	0.830	0.902	0.929	0.956	0.983	1.01	
B _x , Bending Factor	1.21	1.15	1.09	1.03	0.981	1.25	1.19	1.13	1.07	1.02	
B _y , Bending Factor	1.89	1.77	1.65	1.55	1.45	1.54	1.45	1.37	1.30	1.22	
a _x , ÷ 10 ⁶	0.835	0.765	0.670	0.547	0.396	0.708	0.648	0.566	0.461	0.333	
a _y , ÷ 10 ⁶	0.267	0.248	0.221	0.182	0.134	0.411	0.378	0.333	0.272	0.199	

Note: Double Horizontal Line indicates k ℓ/r limit of 200.



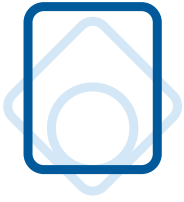
HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



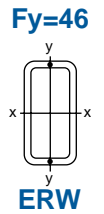
Nominal Size	3 x 2 1/2				3 x 2				3 x 1 1/2			
Wall Thickness	5/16	1/4	3/16	1/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8	
Weight Per Foot	9.51	7.96	6.23	4.33	8.45	7.11	5.59	3.90	6.26	4.96	3.48	
Design Wall Thickness	0.291	0.233	0.174	0.116	0.291	0.233	0.174	0.116	0.233	0.174	0.116	
F_y = 46 ksi												
Effective length KL in feet	0	73	61	47	33	65	54	43	30	48	38	26
	2	67	57	44	31	58	49	39	27	41	33	23
	3	63	53	42	29	53	45	36	25	36	29	21
	4	59	50	39	27	48	41	32	23	30	24	18
	5	54	46	36	25	41	36	29	20	22	19	14
	6	48	41	32	23	34	30	24	18	16	13	10
	7	42	36	29	21	26	23	20	14	11	10	8
	8	35	31	25	18	20	18	15	11	9	8	6
	9	28	25	20	15	16	14	12	9	7	6	5
	10	23	20	16	12	13	11	10	7	=====	=====	=====
	11	19	17	14	10	11	9	8	6			
	12	16	14	11	8	9	8	7	5			
	13	13	12	10	7	=====	=====	=====	4			
	14	11	10	8	6				=====			
	15	10	9	7	5							
	16	=====	=====	6	5							
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PROPERTIES												
Area, In. ²	2.64	2.21	1.71	1.19	2.35	1.97	1.54	1.07	1.74	1.37	0.96	
I _x , In. ⁴	2.91	2.57	2.11	1.54	2.38	2.12	1.76	1.30	1.68	1.42	1.06	
I _y , In. ⁴	2.17	1.93	1.59	1.16	1.23	1.11	0.931	0.692	0.541	0.466	0.355	
Ratio r _x / r _y	1.16	1.15	1.15	1.15	1.39	1.38	1.37	1.37	1.76	1.75	1.73	
r _y , In.	0.907	0.935	0.962	0.990	0.724	0.750	0.777	0.804	0.558	0.584	0.610	
B _x , Bending Factor	1.36	1.29	1.22	1.16	1.48	1.39	1.31	1.23	1.55	1.45	1.36	
B _y , Bending Factor	1.52	1.43	1.34	1.28	1.91	1.77	1.65	1.55	2.41	2.20	2.03	
a _x , ÷ 10 ⁶	0.435	0.384	0.315	0.230	0.355	0.317	0.263	0.194	0.251	0.212	0.158	
a _y , ÷ 10 ⁶	0.324	0.288	0.237	0.173	0.184	0.166	0.139	0.103	0.081	0.070	0.053	

Note: Double Horizontal Line indicates k ℓ/r limit of 200.



HSS / Rectangular Structural Steel Tubing

Allowable Concentric Loads in Kips



Nominal Size		3 x 1		2 1/2 x 1 1/2			2 x 1 1/2		2 x 1	
Wall Thickness	3/16	1/8	1/4	3/16	1/8	3/16	1/8	3/16	1/8	
Weight Per Foot	4.32	3.05	5.41	4.32	3.05	3.68	2.63	3.04	2.20	
Design Wall Thickness	0.174	0.116	0.233	0.174	0.116	0.174	0.116	0.174	0.116	
F_y = 46 ksi										
Effective length KL in feet	0	33	23	42	33	23	28	20	23	17
	2	25	18	35	28	20	24	17	17	13
	3	18	14	31	25	18	21	15	12	10
	4	11	9	25	21	15	17	13	7	6
	5	7	6	19	16	12	13	10	5	4
	6	5	4	13	11	9	9	7	3	3
	7	<u>5</u>	<u>4</u>	9	8	6	7	5	<u>3</u>	<u>3</u>
	8			7	6	5	5	4		
	9			6	5	4	4	3		
	10			<u>6</u>	<u>5</u>	<u>4</u>	<u>4</u>	<u>3</u>		
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PROPERTIES										
Area, In. ²	1.19	0.84	1.51	1.19	0.84	1.02	0.72	0.84	0.61	
I _x , In. ⁴	1.07	0.817	1.03	0.881	0.668	0.494	0.383	0.349	0.280	
I _y , In. ⁴	0.172	0.138	0.447	0.389	0.299	0.312	0.244	0.112	0.092	
Ratio r _x / r _y	2.49	2.43	1.52	1.50	1.49	1.26	1.25	1.77	1.74	
r _y , In.	0.380	0.405	0.544	0.571	0.597	0.553	0.580	0.364	0.389	
B _x , Bending Factor	1.67	1.54	1.83	1.69	1.57	2.06	1.88	2.41	2.18	
B _y , Bending Factor	3.46	3.04	2.53	2.29	2.11	2.45	2.21	3.75	3.32	
a _x , ÷ 10 ⁶	0.160	0.122	0.154	0.132	0.100	0.074	0.057	0.052	0.042	
a _y , ÷ 10 ⁶	0.026	0.021	0.067	0.058	0.045	0.047	0.036	0.017	0.014	

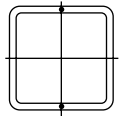
Note: Double Horizontal Line indicates k l/r limit of 200.



HSS / Square Structural Steel Tubing

Allowable Concentric Loads in Kips

F_y=50



ERW

Nominal Size		16 x 16				14 x 14				12 x 12				
Wall Thickness		5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		127.37	103.30	78.52	65.87	110.36	89.68	68.31	57.36	93.34	76.07	58.10	48.86	39.43
Design Wall Thickness		0.581	0.465	0.349*	0.291*	0.581	0.465	0.349*	0.291*	0.581	0.465	0.349	0.291*	0.233*
F_y = 50 ksi														
Effective length KL in feet	0	1050	849	587	444	909	738	550	417	771	627	480	388	275
	2	1040	842	583	442	900	731	546	414	762	620	474	385	273
	3	1040	838	581	441	895	727	544	412	757	615	471	383	272
	4	1030	834	579	439	889	722	542	411	751	611	468	381	271
	5	1030	829	577	438	884	718	539	409	745	606	464	379	269
	6	1020	824	575	436	878	713	537	407	739	601	461	377	268
	7	1010	820	573	435	871	708	534	405	732	596	456	374	267
	8	1010	815	570	433	865	703	531	403	725	590	452	372	265
	9	1000	809	568	431	858	697	528	401	718	584	448	369	263
	10	993	804	565	429	851	691	525	399	710	578	443	366	262
	11	986	798	562	427	843	685	521	396	702	572	439	363	260
	12	979	792	559	425	836	679	517	394	694	565	434	360	258
	13	971	786	556	423	828	673	512	392	686	559	428	357	256
	14	964	780	553	421	819	666	507	389	677	552	423	354	254
	15	955	774	550	419	811	659	502	386	668	544	418	350	252
	16	947	767	547	417	802	652	497	384	658	537	412	346	249
	17	939	760	543	414	793	645	491	381	649	529	406	341	247
	18	930	753	540	412	784	638	486	378	639	521	400	336	245
	19	921	746	536	410	774	630	480	375	628	513	394	331	242
	20	912	739	533	407	765	622	474	371	618	505	388	325	239
	21	903	731	529	404	755	614	468	368	607	496	381	320	237
	22	893	724	525	402	745	606	462	365	596	487	375	315	234
	23	883	716	521	399	734	598	456	361	585	478	368	309	231
	24	873	708	517	396	724	589	450	358	573	469	361	303	228
	25	863	700	512	393	713	581	443	354	562	460	354	297	225
	26	853	692	508	390	702	572	437	350	550	450	347	291	222
	27	842	683	503	387	691	563	430	346	537	441	339	285	218
	28	831	675	499	384	679	554	423	342	525	431	332	279	215
	29	820	666	494	381	667	544	416	338	512	420	324	273	211
	30	809	657	489	377	656	535	409	334	499	410	316	266	208
	31	798	648	484	374	643	525	402	329	486	399	309	260	204
	32	786	639	479	370	631	515	394	325	472	389	300	253	200
	33	775	629	474	367	619	505	387	320	459	378	292	246	195
	34	763	620	468	363	606	495	379	315	445	367	284	239	191
	35	751	610	463	359	593	485	371	310	430	355	275	232	186
	36	739	601	457	355	580	474	364	305	416	344	266	225	182
	37	726	591	451	351	566	463	356	299	401	332	257	217	177
	38	713	581	444	347	553	452	347	293	386	320	248	210	171
	39	701	570	436	343	539	441	339	286	370	307	239	202	165
	40	688	560	428	339	525	430	331	279	354	295	230	194	158
PROPERTIES														
Area, In. ²	35.0	28.3	21.5	18.1	30.3	24.6	18.7	15.7	25.7	20.9	16.0	13.4	10.8	
I, In. ⁴	1370	1130	873	739	896	743	577	490	548	457	357	304	248	
r, In.	6.25	6.31	6.37	6.39	5.44	5.49	5.55	5.58	4.62	4.68	4.73	4.76	4.79	
B, Bending Factor	0.204	0.200	0.197	0.196	0.237	0.232	0.227	0.224	0.281	0.274	0.269	0.264	0.261	
a ÷ 10 ⁶	205	169	130	110	134	111	86.2	73.2	81.8	68.2	53.3	45.4	37.0	

*Slender element section. Width-Thickness and Depth-Thickness ratio exceeds AISC "Specification" Section B5.1 limiting value of $253 / \sqrt{F_y}$.

