HSS

LRFD Composite Load Tables

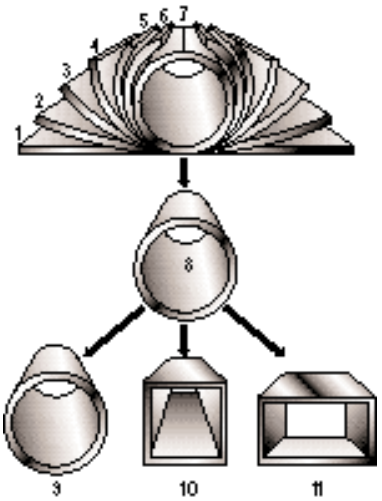
Steel Tube Institute
OF NORTH AMERICA

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.

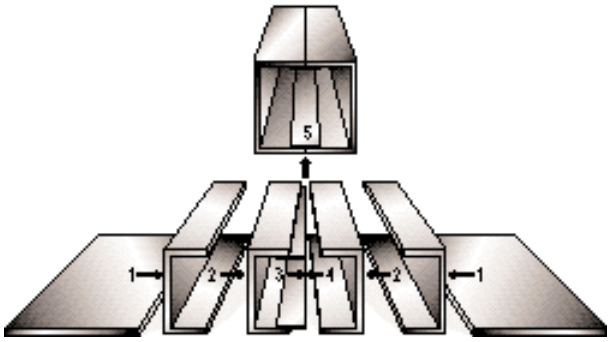


Form-Square Weld-Square (ERW) Process

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).



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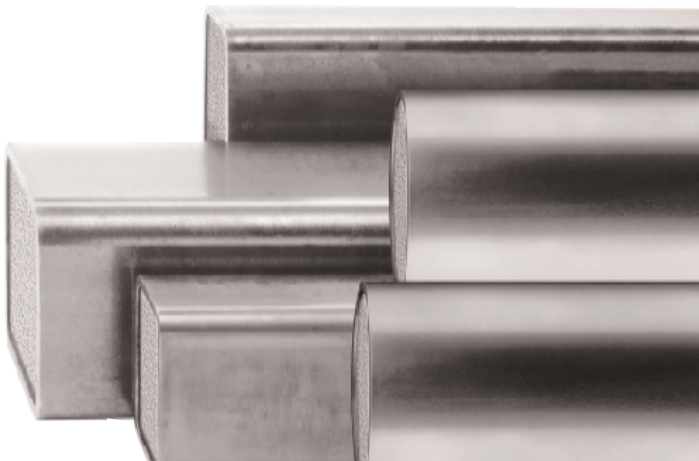
LRFD Composite Load Tables

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.*



"Designs for the 21st Century"

The HSS composite photographs were supplied courtesy of Dean Lally L.P.

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Foreword

Load and Resistance Factor Design (LRFD) column load tables are presented for concrete-filled square, rectangular and round Hollow Structural Sections (HSS) manufactured by the electric resistance welding (ERW) process and for concrete-filled square and rectangular HSS manufactured by the submerged arc welding (SAW) process.

The tabulated design strength loads have been calculated in accordance with the AISC *"Load and Resistance Factor Design Specification for Structural Steel Buildings"*– December 1993. A detailed explanation of the background of the Specification requirements can be found in the report of Task Group 20, Structural Stability Research Council, *"A Specification for the Design of Steel Concrete Composite Columns"*, American Institute of Steel Construction (AISC) Engineering Journal, 4th Quarter, 1979.

Tables are presented for HSS with a minimum specified yield strength equal to 46 ksi (ASTM A 500 Gr. B) and three specified compressive concrete strengths; f'_c = 3.5 ksi, f'_c = 5.0 ksi and f'_c = 8.0 ksi. The tables apply to normal weight concrete.

The design strength loads have been calculated for effective lengths, KL, with respect to the least radius of gyration (r_m or r_{my}) varying from 0 feet to 40 feet. The heavy horizontal lines within the tables indicate $KL/r = 200$. Loads are not tabulated beyond this point. Data for ERW and SAW sections are presented in separate tables. The properties at the bottom of the tables are useful for checking strength about the major axis and for the design of composite columns subject to combined axial and bending loads.

Refer to Part 5, Composite Design in the AISC 2nd Edition *"Manual of Steel Construction – Load and Resistance Factor Design"* for a discussion of effective length, range of KL/r, strength about the major axis, and combined axial and bending strength (interaction). Symbols used in these tables follow those used in the AISC "Manual".

Another recently published LRFD design aid publication, *"HSS LRFD Column Load Tables"*, is also available from the STI. Visit the STI web site at "www.steeltubeinstitute.org" for a description of all of the STI HSS publications.

The *"Hollow Structural Sections – Connections Manual"*, published in 1998 by the AISC in conjunction with the STI, is available through the AISC publications department at 1-800-644-2400.

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How To Use The LRFD Composite Load Tables

Example 1

Design the lightest 10-inch square ERW HSS (ASTM A 500 Grade B) column filled with f'_c = 5.0 ksi normal weight concrete to support a factored concentric axial compressive load of 645 kips. The largest effective length, KL, is equal to 16 feet.

Enter the f'_c = 5.0 ksi table for the 10-inch square HSS. Read across the row at KL = 16 and note the following:

10 x 10 x 5/8	is good for 910 kips > 645 kips	O.K.
10 x 10 x 1/2	is good for 801 kips > 645 kips	O.K.
10 x 10 x 3/8	is good for 684 kips > 645 kips	O.K.
10 x 10 x 5/16	is good for 621 kips < 645 kips	Not good

Select: **10 x 10 x 3/8**
(weight = 47.90 lbs. Per foot)

Note: Without concrete filling, the application would require:

10 x 10 x 5/8 HSS* (weight = 76.33 lbs per foot)
or
12 x 12 x 1/2 HSS* (weight = 76.07 lbs. Per foot)
or
14 x 14 x 3/8 HSS* (weight = 68.31 lbs. Per foot)

*See *"Hollow Structural Sections – LRFD Column Load Tables"* available from the Steel Tube Institute of North America.

Example 2

Design the lightest 10-inch x 6-inch rectangular ERW HSS (ASTM A 500 Grade B) column filled with f'_c = 8.0 ksi normal weight concrete to support a factored concentric axial compressive load of 605 kips. The effective length, KL, with respect to the minor axis is equal to 14 feet. The effective length, KL, with respect to the major axis is equal to 26 feet.

Enter the f'_c = 8.0 ksi table for the 12-inch x 6-inch rectangular HSS. Read across the row at KL = 14 and note the following:

12 x 6 x 5/8	is good for 696 kips > 605 kips	O.K.
12 x 6 x 1/2	is good for 622 kips > 605 kips	O.K.
12 x 6 x 3/8	is good for 542 kips < 605 kips	Not good

Tentatively select: **12 x 6 x 1/2**
Note that r_{mx}/r_{my} = 1.73

Equivalent effective length for the major axis:
26 / 1.73 = 15 .0 ft. > 14 ft. Therefore, major axis governs.

Enter the same table, read across the row at KL = 15.0 and note the following:

12 x 6 x 1/2	is good for 587 kips < 605 kips	Not good
12 x 6 x 5/8	is good for 657 kips > 605 kips	O.K.
Note that r_{mx}/r_{my} = 1.73 > r_{mx}/r_{my} above.		O.K.

Final selection:
12 x 6 x 5/8 (weight = 67.82 lbs. Per ft.)

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		16 x 16		14 x 14			12 x 12			
Wall Thickness		5/8	1/2	5/8	1/2	3/8	5/8	1/2	3/8	5/16
Weight Per Foot		127.37	103.30	110.36	89.68	68.31	93.34	76.07	58.10	48.86
Design Wall Thickness		0.581	0.465	0.581	0.465	0.349	0.581	0.465	0.349	0.291
		F_y = 46 ksi								
Effective length KL in feet	0	1920	1680	1600	1390	1180	1300	1130	948	853
	4	1920	1670	1590	1390	1170	1290	1120	941	847
	5	1910	1670	1590	1380	1170	1290	1110	937	843
	6	1910	1660	1580	1380	1160	1280	1110	932	839
	7	1900	1660	1570	1370	1160	1270	1100	926	833
	8	1890	1650	1560	1360	1150	1260	1090	919	827
	9	1880	1640	1560	1350	1140	1250	1080	912	821
	10	1870	1640	1540	1340	1140	1240	1070	904	813
	11	1860	1630	1530	1330	1130	1230	1060	895	805
	12	1850	1620	1520	1320	1120	1210	1050	885	796
	13	1840	1610	1510	1310	1110	1200	1040	874	786
	14	1820	1590	1490	1300	1100	1180	1020	863	776
	15	1810	1580	1480	1290	1090	1170	1010	851	765
	16	1800	1570	1460	1270	1080	1150	996	838	754
	17	1780	1550	1440	1260	1060	1130	980	825	742
	18	1760	1540	1430	1240	1050	1110	964	811	730
	19	1740	1520	1410	1230	1040	1090	947	797	717
	20	1730	1510	1390	1210	1020	1070	929	782	703
	21	1710	1490	1370	1190	1010	1050	911	766	689
	22	1690	1470	1350	1170	992	1030	892	751	675
	23	1670	1460	1330	1150	976	1010	873	735	661
	24	1650	1440	1300	1140	960	983	853	718	646
	25	1620	1420	1280	1120	944	959	833	701	631
	26	1600	1400	1260	1100	927	936	813	684	615
	27	1580	1380	1240	1080	909	912	793	667	600
	28	1560	1360	1210	1060	892	888	772	649	584
	29	1530	1340	1190	1030	874	864	751	632	568
	30	1510	1320	1160	1010	856	839	730	614	552
	31	1480	1290	1140	991	837	814	709	596	536
	32	1460	1270	1110	969	819	790	687	578	520
	33	1430	1250	1090	947	800	765	666	561	504
	34	1410	1230	1060	925	781	741	645	543	488
	35	1380	1210	1040	902	762	716	624	525	472
	36	1350	1180	1010	880	743	692	603	507	456
	37	1330	1160	984	857	724	668	582	490	440
	38	1300	1140	958	835	705	644	561	472	424
	39	1270	1110	932	812	686	620	541	455	409
	40	1250	1090	907	790	667	596	521	438	393
PROPERTIES										
r_m (in.)		6.25	6.31	5.44	5.49	5.55	4.62	4.68	4.73	4.76
$\phi_b M_n$ (kip-ft)		690	566	521	428	329	376	309	239	202
P_e $(KL)^2/10^4$ (kip-ft^2)		349	305	222	193	163	131	115	96.7	86.8

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		10 x 10					9 x 9			
Wall Thickness		5/8	1/2	3/8	5/16	1/4	1/2	3/8	5/16	1/4
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	55.66	42.79	36.10	29.23
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.465	0.349	0.291	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	1020	880	735	658	580	762	635	567	498
	4	1010	870	727	651	574	752	627	559	491
	5	1000	865	722	647	570	746	622	555	487
	6	992	858	717	642	566	739	616	550	483
	7	983	850	710	636	561	731	609	544	477
	8	973	842	703	629	555	721	601	537	471
	9	961	832	695	622	548	711	593	529	464
	10	948	821	685	614	541	699	583	520	457
	11	934	809	676	605	533	686	573	511	449
	12	919	796	665	595	525	673	562	501	440
	13	902	782	653	585	515	658	550	491	431
	14	885	767	641	574	506	643	537	479	421
	15	867	752	629	563	496	627	524	468	410
	16	848	736	615	551	485	610	510	455	400
	17	828	719	601	538	474	593	496	443	388
	18	808	701	587	525	463	575	481	430	377
	19	787	684	572	512	451	557	466	416	365
	20	765	665	557	498	439	538	451	403	353
	21	743	646	541	484	426	519	435	389	341
	22	721	627	525	470	414	500	420	375	328
	23	698	608	509	455	401	481	404	361	316
	24	675	588	493	441	388	462	388	346	303
	25	652	568	476	426	375	442	372	332	291
	26	629	548	460	411	362	423	356	318	278
	27	605	528	443	396	349	404	340	304	266
	28	582	508	427	381	335	385	324	290	254
	29	559	488	410	367	322	367	309	276	241
	30	536	469	394	352	309	348	294	263	230
	31	513	449	377	337	296	330	279	249	218
	32	491	430	361	323	284	313	264	236	206
	33	468	411	345	308	271	295	250	223	195
	34	447	392	330	294	259	278	235	211	184
	35	425	373	314	281	247	262	222	199	173
	36	404	355	299	267	235	248	210	188	164
	37	383	337	284	254	223	235	199	178	155
	38	363	319	270	240	211	223	188	169	147
	39	345	303	256	228	200	211	179	160	140
	40	328	288	243	217	191	201	170	152	133
PROPERTIES										
r_m (in.)		3.80	3.86	3.92	3.94	3.97	3.45	3.51	3.54	3.56
$\phi_b M_n$ (kip-ft)		253	209	163	138	113	167	130	111	90.4
P_e $(KL)^2/10^4$ (kip-ft^2)		70.3	61.9	52.2	46.6	40.9	43.1	36.5	32.7	28.5

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		8 x 8					7 x 7					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	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	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	0.581	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi										
Effective length KL in feet	0	759	654	541	481	421	633	546	451	401	349	294
	4	745	642	532	473	414	618	534	441	392	341	288
	5	737	636	527	469	410	609	526	435	387	337	284
	6	728	628	520	463	405	599	518	428	381	332	280
	7	718	619	513	457	399	588	508	420	374	326	275
	8	705	609	505	449	393	574	497	411	366	319	269
	9	692	597	495	441	385	560	485	401	357	311	262
	10	677	585	485	432	378	544	471	391	348	303	255
	11	661	571	474	422	369	527	457	379	337	294	248
	12	644	557	463	412	360	509	442	367	327	285	240
	13	626	542	450	401	350	490	426	354	315	275	231
	14	607	526	437	389	340	470	409	340	303	265	223
	15	587	509	423	377	330	450	392	326	291	254	214
	16	567	492	409	365	319	429	374	312	279	243	204
	17	546	474	395	352	307	408	357	298	266	232	195
	18	525	456	380	339	296	387	339	283	253	221	185
	19	503	437	365	326	284	366	321	269	240	210	176
	20	481	419	350	312	272	345	303	254	227	198	166
	21	460	400	335	299	260	324	285	239	214	187	157
	22	438	381	319	285	249	304	267	225	201	176	148
	23	416	363	304	271	237	284	250	211	189	165	138
	24	394	344	289	258	225	264	233	197	177	155	129
	25	373	326	274	245	213	245	217	184	165	144	121
	26	352	308	259	231	202	226	201	171	153	134	112
	27	331	290	244	219	190	210	186	158	142	124	104
	28	311	273	230	206	179	195	173	147	132	116	97
	29	291	256	216	194	169	182	161	137	123	108	90
	30	272	240	202	181	158	170	151	128	115	101	84
	31	255	224	190	170	148	159	141	120	108	94	79
	32	239	211	178	159	139	150	133	113	101	89	74
	33	225	198	167	150	130	141	125	106	95	83	70
	34	212	186	158	141	123	132	117	100	90	78	66
	35	200	176	149	133	116	125	111	94	84	74	62
	36	189	166	141	126	110	118	105	89	80	70	58
	37	179	157	133	119	104	112	99	84	76	66	55
	38	170	149	126	113	98	106	94	80	72	63	52
	39	161	142	120	107	93	101	89	76	68	60	50
	40	153	135	114	102	89	96	85	72	65	57	47
PROPERTIES												
r_m (in.)		2.99	3.04	3.10	3.13	3.15	2.58	2.63	2.69	2.72	2.75	2.77
$\phi_b M_n$ (kip-ft)		154	129	101	86.6	70.7	114	96.3	76.2	65.2	53.5	41.1
P_e $(KL)^2/10^4$ (kip-ft^2)		32.9	28.9	24.4	21.9	19.0	20.5	18.2	15.5	13.9	12.2	10.2

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 3.5

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	3/8	5/16	1/4	3/16
Weight Per Foot		42.30	35.24	27.48	23.34	19.02	14.53	24.93	21.21	17.32	13.25
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	516	445	367	325	282	236	327	290	250	209
	4	499	431	356	315	274	229	315	279	241	201
	5	489	423	349	310	269	225	308	273	236	197
	6	478	414	342	303	263	221	300	266	230	192
	7	465	403	333	296	257	215	291	259	224	187
	8	450	391	324	287	249	209	281	250	216	180
	9	434	378	313	278	241	202	270	240	208	173
	10	417	363	301	268	233	195	258	230	199	166
	11	399	348	289	257	223	187	246	219	189	158
	12	380	332	276	246	214	179	233	207	179	150
	13	360	316	263	234	204	171	219	196	169	142
	14	340	299	249	222	193	162	206	184	159	133
	15	319	282	235	210	183	153	192	172	149	125
	16	299	264	221	198	172	144	178	160	138	116
	17	279	247	207	185	162	136	165	148	128	108
	18	259	230	193	173	151	127	152	136	118	99
	19	239	213	180	161	141	118	139	125	109	91
	20	220	197	166	149	130	109	127	114	99	83
	21	202	181	153	138	121	101	115	104	90	76
	22	184	166	141	127	111	93	105	95	82	69
	23	168	152	129	116	101	85	96	86	75	63
	24	154	139	118	106	93	78	88	79	69	58
	25	142	128	109	98	86	72	81	73	64	53
	26	132	119	101	91	79	67	75	68	59	49
	27	122	110	93	84	74	62	70	63	54	46
	28	113	102	87	78	68	58	65	58	51	43
	29	106	95	81	73	64	54	60	54	47	40
	30	99	89	76	68	60	50	56	51	44	37
	31	93	83	71	64	56	47	53	48	41	35
	32	87	78	67	60	52	44	50	45	39	33
	33	82	74	63	56	49	41	47	42	36	31
	34	77	69	59	53	46	39	44	40	34	29
	35	73	66	56	50	44	37		37	32	27
	36	69	62	53	47	41	35				26
	37		59	50	45	39	33				
	38			47	42	37	31				
	39					35	30				
	40										
PROPERTIES											
r_m (in.)		2.17	2.23	2.28	2.31	2.34	2.37	2.08	2.11	2.13	2.16
$\phi_b M_n$ (kip-ft)		80.0	68.3	54.5	46.9	38.6	29.8	45.2	39.0	32.2	24.8
P_e $(KL)^2/10^4$ (kip-ft^2)		11.9	10.8	9.14	8.22	7.20	6.05	6.81	6.14	5.33	4.47

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 3.5

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	350	288	255	220	183	145	304	251	222	191	158	124
	4	333	275	243	210	175	138	285	236	209	181	150	118
	5	324	268	237	205	171	135	276	229	203	175	145	114
	6	313	259	230	199	166	131	264	220	195	169	140	110
	7	301	250	222	192	160	126	251	210	186	161	133	105
	8	288	239	212	184	153	121	237	199	177	153	127	100
	9	273	228	202	175	146	115	222	187	166	144	120	94
	10	258	215	192	166	139	110	206	174	156	135	112	88
	11	242	203	181	157	131	103	190	161	144	126	104	82
	12	226	189	169	147	123	97	174	148	133	116	96	76
	13	209	176	157	137	114	90	158	136	122	106	88	69
	14	193	163	146	127	106	84	142	123	111	97	80	63
	15	177	150	134	117	98	77	127	111	100	88	73	57
	16	161	137	123	107	90	71	113	99	90	79	65	51
	17	145	124	112	98	82	65	100	88	80	70	58	46
	18	131	112	101	89	74	59	89	78	71	63	52	41
	19	117	101	91	80	67	53	80	70	64	56	47	37
	20	106	91	82	72	61	48	72	63	57	51	42	33
	21	96	82	74	65	55	43	65	57	52	46	38	30
	22	87	75	68	60	50	39	60	52	47	42	35	27
	23	80	69	62	55	46	36	55	48	43	38	32	25
	24	73	63	57	50	42	33	50	44	40	35	29	23
	25	68	58	53	46	39	31	46	41	37	32	27	21
	26	63	54	49	43	36	28	43	37	34	30	25	20
	27	58	50	45	40	33	26		35	32	28	23	18
	28	54	46	42	37	31	24			29	26	21	17
	29	50	43	39	34	29	23					20	16
	30	47	40	36	32	27	21						
	31		38	34	30	25	20						
	32				28	24	19						
	33						18						
	34												
	35												
	36												
	37												
	38												
	39												
	40												
PROPERTIES													
r_m (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
$\phi_b M_n$ (kip-ft)		45.2	36.6	31.6	26.3	20.3	14.0	35.2	28.8	25.1	20.9	16.2	11.3
P_e $(KL)^2/10^4$ (kip-ft^2)		5.67	4.87	4.40	3.87	3.25	2.56	3.87	3.40	3.08	2.72	2.26	1.78

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		4 x 4					
Wall Thickness		1/2	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
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116
		F_y = 46 ksi					
Effective length KL in feet	0	259	214	190	163	135	105
	4	239	199	176	152	125	98
	5	228	190	169	146	121	94
	6	216	181	161	139	115	90
	7	202	170	152	131	109	85
	8	188	158	141	123	102	80
	9	172	146	131	114	94	74
	10	157	134	120	105	87	68
	11	141	121	109	95	79	62
	12	126	108	98	86	72	56
	13	111	96	87	77	64	51
	14	97	85	77	68	57	45
	15	84	74	68	60	50	40
	16	74	65	59	53	44	35
	17	66	58	53	47	39	31
	18	59	51	47	42	35	28
	19	53	46	42	37	31	25
	20	47	42	38	34	28	22
	21	43	38	34	31	26	20
	22	39	34	31	28	23	18
	23	36	31	29	25	21	17
	24		29	26	23	20	15
	25				22	18	14
	26						13
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
PROPERTIES							
r_m (in.)		1.41	1.46	1.49	1.52	1.55	1.58
$\phi_b M_n$ (kip-ft)		26.6	22.0	19.3	16.2	12.7	8.83
P_e $(KL)^2/10^4$ (kip-ft^2)		2.54	2.23	2.04	1.81	1.52	1.20

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		20 x 12	20 x 8		18 x 6		16 x 12
Wall Thickness		1/2	5/8	1/2	5/8	1/2	1/2
Weight Per Foot		103.30	110.36	89.68	93.34	76.07	89.68
Design Wall Thickness		0.465	0.581	0.465	0.581	0.465	0.465
		F_y = 46 ksi					
Effective length KL in feet	0	1640	1510	1300	1210	1040	1380
	4	1630	1490	1280	1180	1010	1370
	5	1620	1480	1270	1160	995	1370
	6	1610	1460	1260	1140	977	1360
	7	1610	1440	1250	1120	957	1350
	8	1600	1420	1230	1090	934	1340
	9	1580	1400	1210	1060	908	1330
	10	1570	1380	1190	1030	881	1320
	11	1560	1350	1170	990	852	1310
	12	1540	1320	1140	953	820	1300
	13	1520	1290	1120	914	788	1280
	14	1510	1260	1090	874	754	1270
	15	1490	1220	1060	833	720	1250
	16	1470	1190	1030	791	685	1230
	17	1450	1150	1000	749	649	1210
	18	1430	1120	968	707	613	1190
	19	1400	1080	936	665	578	1180
	20	1380	1040	903	623	542	1150
	21	1360	1000	870	582	508	1130
	22	1330	963	836	542	474	1110
	23	1310	924	802	503	440	1090
	24	1280	884	769	464	408	1070
	25	1250	845	735	428	376	1040
	26	1220	806	701	396	348	1020
	27	1200	767	668	367	323	995
	28	1170	729	635	341	300	971
	29	1140	691	603	318	280	946
	30	1110	654	571	297	261	921
	31	1080	618	540	278	245	896
	32	1050	583	510	261	230	871
	33	1020	548	479	246	216	846
	34	996	516	452	231	203	820
	35	966	487	426	218	192	795
	36	937	460	403	206	181	770
	37	908	436	381	195	172	745
	38	879	413	362	185	163	720
	39	851	392	343	176	155	696
	40	822	373	326	167	147	671
PROPERTIES							
r_{my} (in.)		4.99	3.34	3.39	2.48	2.53	4.86
r_{mx}/r_{my}		1.48	2.06	2.05	2.42	2.40	1.25
$\phi_b M_{nx}$ (kip-ft)		649	638	524	466	386	466
$\phi_b M_{ny}$ (kip-ft)		455	333	274	210	175	383
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		410	341	295	210	182	234
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		187	80.0	70.0	35.9	31.5	151

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		16 x 8		14 x 10			14 x 6		
Wall Thickness		5/8	1/2	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		93.34	76.07	93.34	76.07	58.10	76.33	62.46	47.90
Design Wall Thickness		0.581	0.465	0.581	0.465	0.349	0.581	0.465	0.349
		F_y = 46 ksi							
Effective length KL in feet	0	1260	1090	1290	1120	938	977	840	694
	4	1240	1070	1280	1110	929	951	817	676
	5	1230	1060	1270	1100	923	936	805	666
	6	1220	1050	1260	1090	917	919	790	654
	7	1200	1040	1250	1080	909	898	773	641
	8	1190	1020	1240	1070	900	875	754	625
	9	1170	1010	1220	1060	891	850	733	608
	10	1140	988	1210	1050	880	823	710	589
	11	1120	968	1190	1030	868	793	685	569
	12	1100	947	1170	1020	855	763	660	548
	13	1070	925	1160	1000	841	730	632	526
	14	1040	902	1140	984	827	697	605	503
	15	1010	877	1110	965	812	663	576	480
	16	985	852	1090	946	796	629	547	456
	17	954	825	1070	926	779	594	517	432
	18	922	798	1040	906	761	559	488	408
	19	890	771	1020	884	744	525	458	384
	20	857	743	993	862	725	490	429	360
	21	824	714	967	840	706	457	401	337
	22	790	686	940	817	687	424	373	314
	23	757	657	913	793	667	393	346	291
	24	723	628	885	770	647	361	319	270
	25	690	600	857	746	627	333	294	248
	26	656	571	829	721	607	308	272	230
	27	624	543	801	697	587	285	252	213
	28	591	516	772	673	566	265	235	198
	29	560	488	744	648	546	247	219	185
	30	529	462	716	624	525	231	204	173
	31	499	436	688	600	505	217	191	162
	32	468	410	660	576	485	203	180	152
	33	440	385	632	552	465	191	169	143
	34	415	363	605	529	446	180	159	134
	35	391	343	578	506	426	170	150	127
	36	370	324	552	483	407	161	142	120
	37	350	306	526	461	388	152	134	113
	38	332	291	501	439	370	144	127	108
	39	315	276	475	417	352	137	121	102
	40	300	262	452	396	334	130	115	97
PROPERTIES									
r_{my} (in.)		3.27	3.32	3.98	4.04	4.09	2.43	2.48	2.53
r_{mx}/r_{my}		1.72	1.72	1.30	1.29	1.29	1.96	1.95	1.94
$\phi_b M_{nx}$ (kip-ft)		445	366	414	341	263	306	254	198
$\phi_b M_{ny}$ (kip-ft)		273	226	328	271	209	167	139	109
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		191	166	164	143	120	108	93.9	78.5
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		64.3	56.3	97.0	85.1	71.7	27.9	24.7	20.8

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		12 x 10			12 x 8			
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16
Weight Per Foot		69.27	53.00	44.60	76.33	62.46	47.90	40.35
Design Wall Thickness		0.465	0.349	0.581	0.581	0.465	0.349	0.291
		F_y = 46 ksi						
Effective length KL in feet	0	996	836	749	1010	870	725	648
	4	986	828	741	991	856	713	638
	5	980	823	736	982	848	707	632
	6	973	817	731	971	839	699	625
	7	964	810	725	958	828	690	617
	8	955	802	717	944	816	680	608
	9	944	792	709	927	802	669	598
	10	932	783	700	909	786	656	587
	11	919	772	691	890	770	643	575
	12	905	760	680	869	752	628	562
	13	890	747	669	847	734	613	548
	14	874	734	657	824	714	596	533
	15	857	720	644	800	693	580	518
	16	839	705	631	775	672	562	502
	17	821	690	618	749	650	544	486
	18	802	674	603	722	627	525	470
	19	782	658	589	695	604	506	453
	20	762	641	573	668	581	487	435
	21	742	623	558	640	557	468	418
	22	721	606	542	613	534	448	400
	23	699	588	526	585	510	429	383
	24	678	570	510	558	486	409	365
	25	656	551	494	530	463	390	348
	26	634	533	477	503	440	370	331
	27	612	515	460	476	417	351	314
	28	590	496	444	450	394	333	297
	29	567	477	427	425	372	314	281
	30	545	459	411	400	351	297	265
	31	524	441	394	375	329	279	249
	32	502	423	378	351	309	262	234
	33	481	405	362	330	290	246	220
	34	460	387	346	311	274	232	207
	35	439	370	331	294	258	219	195
	36	418	353	315	278	244	207	185
	37	399	336	300	263	231	196	175
	38	378	319	285	249	219	186	166
	39	359	303	271	237	208	176	157
	40	341	288	258	225	198	167	149
PROPERTIES								
r_{my} (in.)		3.96	4.01	4.04	3.16	3.21	3.27	3.29
r_{mx}/r_{my}		1.15	1.15	1.15	1.37	1.37	1.37	1.37
$\phi_b M_{nx}$ (kip-ft)		272	211	178	283	235	183	155
$\phi_b M_{ny}$ (kip-ft)		240	186	158	214	178	138	118
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		97.2	81.7	72.9	91.1	79.7	67.2	60.0
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		73.3	61.8	55.3	48.3	42.4	35.9	32.1

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		12 x 6				12 x 4			
Wall Thickness		5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16
Weight Per Foot		67.82	55.66	42.79	36.10	59.32	48.85	37.69	31.84
Design Wall Thickness		0.581	0.465	0.349	0.291	0.581	0.465	0.349	0.291
		F_y = 46 ksi							
Effective length KL in feet	0	863	740	613	544	718	613	501	441
	4	839	720	596	530	673	577	472	416
	5	826	708	587	522	649	557	457	403
	6	810	695	577	512	621	534	439	387
	7	791	680	564	501	589	508	418	370
	8	770	662	550	489	554	479	396	350
	9	747	643	534	475	517	449	372	330
	10	722	622	517	460	479	417	346	308
	11	696	600	499	445	439	385	321	285
	12	668	577	480	428	400	352	295	263
	13	639	552	461	410	362	320	269	240
	14	609	527	440	392	324	288	243	218
	15	578	502	419	374	288	258	219	196
	16	547	475	398	355	254	228	195	176
	17	516	449	376	336	225	202	173	156
	18	485	423	354	317	200	180	154	139
	19	454	397	333	298	180	162	138	125
	20	424	371	312	279	162	146	125	113
	21	394	345	291	260	147	132	113	102
	22	365	321	271	242	134	121	103	93
	23	337	297	251	225	123	110	94	85
	24	309	273	231	208	113	101	87	78
	25	285	252	213	191	104	93	80	72
	26	264	233	197	177	96	86	74	67
	27	244	216	183	164		80	68	62
	28	227	201	170	152				57
	29	212	187	158	142				
	30	198	175	148	133				
	31	185	164	139	124				
	32	174	154	130	117				
	33	164	144	122	110				
	34	154	136	115	103				
	35	145	128	109	98				
	36	137	121	103	92				
	37	130	115	97	87				
	38	123	109	92	83				
	39	117	103	88	79				
	40		98	83	75				
PROPERTIES									
r_{my} (in.)		2.39	2.44	2.49	2.52	1.57	1.62	1.67	1.70
r_{mx}/r_{my}		1.73	1.73	1.72	1.71	2.46	2.44	2.41	2.39
$\phi_b M_{nx}$ (kip-ft)		237	198	155	131	191	161	127	108
$\phi_b M_{ny}$ (kip-ft)		145	121	95.6	81.4	84.5	72.1	57.3	49.0
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		71.7	62.8	52.8	46.9	52.9	46.6	38.8	34.5
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		23.9	21.1	17.9	16.0	8.71	7.84	6.69	6.04

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		10 x 8				10 x 6				
Wall Thickness		1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		55.66	42.79	36.10	29.23	59.32	48.85	37.69	31.84	25.82
Design Wall Thickness		0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	760	633	564	495	749	644	531	471	411
	4	747	622	555	487	727	625	516	458	400
	5	740	617	550	483	715	615	508	451	393
	6	732	610	544	477	700	603	499	443	386
	7	722	602	537	471	684	590	487	433	377
	8	711	592	528	464	665	574	475	422	368
	9	698	582	519	456	644	557	461	410	357
	10	684	571	509	447	622	538	446	396	346
	11	669	558	498	437	599	518	430	382	333
	12	653	545	486	427	574	497	413	367	320
	13	636	531	474	416	548	475	395	352	307
	14	619	516	461	405	521	453	377	336	293
	15	600	501	447	393	494	430	358	319	278
	16	581	485	433	380	466	407	339	303	264
	17	561	469	419	368	439	383	320	286	249
	18	541	452	404	355	411	360	301	269	234
	19	520	435	389	341	384	337	282	252	220
	20	499	418	373	328	357	314	264	236	205
	21	478	401	358	314	331	292	245	220	191
	22	457	383	342	301	306	270	228	204	178
	23	436	366	327	287	281	249	210	189	164
	24	415	348	311	273	258	229	193	174	151
	25	394	331	296	260	238	211	178	160	139
	26	374	314	281	247	220	195	165	148	129
	27	353	297	266	234	204	181	153	137	119
	28	334	281	251	221	190	168	142	127	111
	29	314	265	237	208	177	157	132	119	103
	30	295	249	223	196	165	146	124	111	97
	31	276	233	209	183	155	137	116	104	91
	32	259	219	196	172	145	129	109	98	85
	33	244	206	184	162	136	121	102	92	80
	34	230	194	174	152	129	114	96	86	75
	35	217	183	164	144	121	108	91	82	71
	36	205	173	155	136	115	102	86	77	67
	37	194	164	147	129	109	96	81	73	64
	38	184	155	139	122	103	91	77	69	60
	39	175	147	132	116	98	87	73	66	57
	40	166	140	125	110			70	62	54
Properties										
r_{my} (in.)		3.14	3.19	3.22	3.25	2.34	2.39	2.44	2.47	2.49
r_{mx}/r_{my}		1.19	1.19	1.19	1.18	1.50	1.49	1.49	1.48	1.48
$\phi_b M_{nx}$ (kip-ft)		179	140	119	96.9	177	148	117	99.4	81.4
$\phi_b M_{ny}$ (kip-ft)		154	120	102	83.5	124	104	81.8	69.7	57.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		50.3	42.4	37.9	33.2	44.6	39.4	33.0	29.4	25.6
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		35.6	30.0	26.9	23.6	19.9	17.7	14.9	13.4	11.7

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		10 x 5			10 x 4				
Wall Thickness		3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		35.13	29.72	24.12	50.81	42.05	32.58	27.59	22.42
Design Wall Thickness		0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi							
Effective length KL in feet	0	479	424	368	610	524	428	378	326
	4	461	408	354	570	491	403	356	308
	5	450	399	347	549	474	389	344	298
	6	438	389	338	524	453	373	331	286
	7	425	377	327	496	430	355	315	273
	8	409	363	316	466	405	335	298	259
	9	392	348	303	434	379	314	280	243
	10	374	332	289	400	351	292	261	227
	11	356	316	275	366	323	270	241	210
	12	336	299	260	332	295	247	221	193
	13	316	281	245	299	267	225	202	176
	14	296	263	230	267	239	203	182	160
	15	275	245	214	236	213	182	164	144
	16	255	227	199	208	188	161	146	129
	17	235	209	183	184	167	143	129	114
	18	216	192	169	164	149	127	115	102
	19	197	176	154	147	133	114	103	91
	20	179	159	140	133	120	103	93	82
	21	162	145	127	120	109	94	85	75
	22	148	132	116	110	99	85	77	68
	23	135	121	106	100	91	78	71	62
	24	124	111	97	92	84	72	65	57
	25	114	102	90	85	77	66	60	53
	26	106	94	83		71	61	55	49
	27	98	87	77			57	51	45
	28	91	81	71					42
	29	85	76	67					
	30	79	71	62					
	31	74	66	58					
	32	70	62	55					
	33	66	59	51					
	34	62	55	48					
	35			46					
	36								
	37								
	38								
	39								
	40								
PROPERTIES									
r_{my} (in.)		2.05	2.07	2.10	1.54	1.59	1.64	1.67	1.70
r_{mx}/r_{my}		1.72	1.72	1.71	2.12	2.10	2.08	2.06	2.05
$\phi_b M_{nx}$ (kip-ft)		105	89.7	73.5	139	118	93.1	79.7	65.5
$\phi_b M_{ny}$ (kip-ft)		64.5	55.2	45.5	71.1	60.7	48.3	41.7	34.4
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		28.4	25.3	22.1	31.9	28.5	23.9	21.3	18.5
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		9.58	8.55	7.52	7.13	6.46	5.53	5.01	4.42

Note: Heavy horizontal line indicates $K\ell/r$ limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		9 x 7					9 x 5				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	50.81	42.05	32.58	27.59	22.42
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi									
Effective length KL in feet	0	756	651	539	479	418	623	536	441	391	339
	4	739	637	527	469	410	596	514	423	375	326
	5	730	629	521	463	405	582	502	414	367	319
	6	719	620	513	456	399	564	488	403	357	310
	7	706	609	504	448	392	545	472	390	346	301
	8	691	596	494	440	384	523	453	375	333	290
	9	674	582	483	430	376	499	434	360	319	278
	10	657	567	470	419	366	474	413	343	305	265
	11	637	551	457	407	356	448	391	325	289	252
	12	617	534	443	395	345	420	368	307	273	238
	13	595	516	428	382	334	393	344	289	257	224
	14	573	497	413	368	322	365	321	270	240	210
	15	550	478	397	354	310	337	297	251	223	195
	16	527	458	381	340	297	310	274	232	207	181
	17	503	437	364	325	284	283	252	214	190	167
	18	478	417	347	310	271	257	230	196	175	153
	19	454	396	330	295	258	232	208	178	159	140
	20	430	375	313	280	245	210	188	161	144	127
	21	405	355	296	265	232	190	170	146	131	115
	22	381	334	280	250	219	173	155	133	119	105
	23	358	314	263	235	206	158	142	122	109	96
	24	335	294	247	221	194	145	130	112	100	88
	25	313	275	231	207	181	134	120	103	92	81
	26	290	256	216	193	169	124	111	96	85	75
	27	269	238	200	180	158	115	103	89	79	70
	28	250	221	186	167	146	107	96	82	74	65
	29	233	206	174	156	137	100	89	77	69	60
	30	218	193	162	145	128	93	84	72	64	56
	31	204	180	152	136	120	87	78	67	60	53
	32	192	169	143	128	112	82	73	63	56	50
	33	180	159	134	120	105			59	53	47
	34	170	150	126	113	99				50	44
	35	160	142	119	107	94					
	36	151	134	113	101	89					
	37	143	127	107	96	84					
	38	136	120	101	91	80					
	39	129	114	96	86	76					
	40	123	108	91	82	72					
PROPERTIES											
r_{my} (in.)		2.68	2.73	2.78	2.81	2.84	1.92	1.97	2.03	2.05	2.08
r_{mx}/r_{my}		1.22	1.22	1.22	1.21	1.21	1.60	1.59	1.58	1.58	1.57
$\phi_b M_{nx}$ (kip-ft)		167	140	110	93.5	76.6	133	112	88.7	75.9	62.4
$\phi_b M_{ny}$ (kip-ft)		140	117	92.1	78.7	64.5	87.3	74.2	59.0	50.4	41.4
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		39.0	34.4	29.0	25.9	22.6	28.9	25.6	21.7	19.3	16.8
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		26.3	23.3	19.6	17.6	15.4	11.2	10.1	8.66	7.74	6.80

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		8 x 6					8 x 4				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	42.30	35.24	27.48	23.34	19.02
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi									
Effective length KL in feet	0	630	544	448	398	347	506	435	357	315	272
	4	611	527	435	387	337	472	407	335	296	256
	5	600	519	428	380	331	453	392	324	286	247
	6	587	508	420	373	325	432	375	310	274	237
	7	573	496	410	364	317	408	355	294	261	226
	8	556	482	399	354	309	382	334	277	246	213
	9	538	466	387	344	299	355	311	260	230	200
	10	518	450	373	332	289	327	288	241	214	186
	11	497	432	359	319	278	298	264	222	197	172
	12	475	414	344	306	267	269	240	202	180	157
	13	453	395	329	293	255	241	216	183	164	143
	14	429	375	313	279	243	215	193	165	147	129
	15	406	355	297	264	231	189	172	147	132	116
	16	382	335	281	250	218	166	151	130	116	103
	17	358	314	264	235	206	147	134	115	103	91
	18	334	294	248	221	193	131	119	103	92	81
	19	311	274	232	206	181	118	107	92	83	73
	20	288	255	216	192	168	106	97	83	74	66
	21	266	236	200	178	156	96	88	75	68	60
	22	244	217	185	165	145	88	80	69	62	54
	23	223	199	170	152	133	80	73	63	56	50
	24	205	183	156	139	122	74	67	58	52	46
	25	189	169	144	128	113	68	62	53	48	42
	26	175	156	133	119	104		57	49	44	39
	27	162	144	123	110	97				41	36
	28	151	134	115	102	90					
	29	141	125	107	95	84					
	30	131	117	100	89	78					
	31	123	110	94	83	73					
	32	115	103	88	78	69					
	33	109	97	83	74	65					
	34	102	91	78	69	61					
	35	96	86	73	65	57					
	36	91	81	69	62	54					
	37	86	77	66	59	51					
	38		73	62	56	49					
	39			59	53	46					
	40				50	44					
PROPERTIES											
r_{my} (in.)		2.27	2.32	2.38	2.40	2.43	1.51	1.56	1.61	1.63	1.66
r_{mx}/r_{my}		1.26	1.25	1.25	1.25	1.25	1.75	1.74	1.73	1.73	1.72
$\phi_b M_{nx}$ (kip-ft)		125	105	83.1	71.1	58.3	94.5	81.1	64.9	55.5	45.9
$\phi_b M_{ny}$ (kip-ft)		102	85.9	68.3	58.3	48.0	57.3	49.3	39.7	34.2	28.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		25.0	22.2	18.8	16.8	14.7	17.4	15.6	13.3	12.0	10.4
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		15.9	14.1	12.1	10.8	9.44	5.69	5.18	4.46	4.00	3.53

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		7 x 5						7 x 4				
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		42.30	35.24	27.48	23.34	19.02	14.53	31.84	24.93	21.21	17.32	13.25
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	513	443	365	323	280	234	391	321	284	245	203
	4	490	424	349	310	268	224	365	301	267	230	191
	5	478	413	341	302	262	219	351	290	257	222	185
	6	463	401	331	294	255	213	335	277	246	213	177
	7	445	387	320	284	246	206	317	263	234	202	168
	8	427	371	307	273	237	198	297	247	220	191	159
	9	406	354	294	261	227	190	276	231	206	179	149
	10	384	336	279	248	216	181	255	214	191	166	138
	11	362	317	264	235	205	171	233	196	176	153	127
	12	338	297	248	221	193	161	211	179	160	140	116
	13	315	277	232	207	181	151	189	161	145	127	106
	14	291	257	216	193	169	141	169	144	130	114	95
	15	268	237	200	179	156	131	149	128	116	102	85
	16	245	218	184	165	144	121	131	113	103	90	75
	17	222	199	168	151	133	111	116	100	91	80	67
	18	201	180	153	138	121	102	103	89	81	71	60
	19	180	162	139	125	110	93	93	80	73	64	53
	20	163	147	125	113	99	84	84	72	66	58	48
	21	148	133	114	103	90	76	76	66	60	52	44
	22	134	121	103	93	82	69	69	60	54	48	40
	23	123	111	95	85	75	63	63	55	50	44	36
	24	113	102	87	78	69	58	58	50	46	40	33
	25	104	94	80	72	64	53	54	46	42	37	31
	26	96	87	74	67	59	49		43	39	34	29
	27	89	80	69	62	55	46				32	26
	28	83	75	64	58	51	43					
	29	77	70	60	54	47	40					
	30	72	65	56	50	44	37					
	31	68	61	52	47	41	35					
	32			49	44	39	33					
	33				42	36	31					
	34						29					
	35											
	36											
	37											
	38											
	39											
	40											
PROPERTIES												
r_{my} (in.)		1.86	1.91	1.96	1.99	2.02	2.05	1.53	1.58	1.61	1.64	1.66
r_{mx}/r_{my}		1.31	1.30	1.31	1.30	1.30	1.29	1.57	1.56	1.55	1.54	1.54
$\phi_b M_{nx}$ (kip-ft)		88.3	75.6	60.4	51.8	42.8	32.8	64.9	52.1	45.2	37.3	28.7
$\phi_b M_{ny}$ (kip-ft)		69.7	59.7	47.6	41.1	33.9	26.1	43.5	35.2	30.5	25.3	19.6
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		14.9	13.4	11.5	10.3	8.97	7.49	11.0	9.40	8.49	7.39	6.15
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		8.73	7.86	6.72	6.06	5.33	4.49	4.49	3.88	3.52	3.11	2.59

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		6 x 5				6 x 4				
Wall Thickness		3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		24.93	21.21	17.32	13.25	28.43	22.37	19.08	15.62	11.97
Design Wall Thickness		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	326	289	250	208	347	286	252	217	180
	4	312	277	239	200	323	267	236	204	169
	5	305	270	234	195	310	257	228	197	163
	6	295	262	227	189	296	245	218	188	156
	7	285	253	219	183	279	232	206	179	148
	8	273	243	211	176	261	218	194	168	140
	9	261	232	201	168	242	203	181	157	130
	10	247	220	191	160	222	187	167	146	121
	11	233	208	181	151	202	171	153	134	111
	12	219	195	170	142	183	155	140	122	101
	13	204	183	159	133	163	140	126	110	92
	14	189	170	148	124	145	125	113	99	82
	15	175	157	137	115	127	110	100	88	73
	16	160	144	126	106	112	97	88	78	65
	17	146	132	115	97	99	86	78	69	57
	18	133	120	105	88	88	77	70	61	51
	19	120	108	95	80	79	69	62	55	46
	20	108	98	86	72	71	62	56	50	41
	21	98	88	78	65	65	56	51	45	38
	22	89	81	71	60	59	51	47	41	34
	23	82	74	65	54	54	47	43	38	31
	24	75	68	59	50	50	43	39	35	29
	25	69	62	55	46	46	40	36	32	27
	26	64	58	51	43			33	29	25
	27	59	54	47	40					23
	28	55	50	44	37					
	29	51	46	41	34					
	30	48	43	38	32					
	31	45	41	36	30					
	32	42	38	33	28					
	33			31	26					
	34									
	35									
	36									
	37									
	38									
	39									
	40									
PROPERTIES										
r_{my} (in.)		1.92	1.95	1.98	2.01	1.50	1.55	1.58	1.61	1.63
r_{mx}/r_{my}		1.16	1.15	1.15	1.15	1.39	1.38	1.37	1.37	1.37
$\phi_b M_{nx}$ (kip-ft)		47.6	41.1	34.1	26.3	50.4	41.1	35.5	29.4	22.8
$\phi_b M_{ny}$ (kip-ft)		42.1	36.2	30.1	23.2	38.0	30.8	26.7	22.3	17.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		7.74	6.97	6.09	5.11	7.37	6.34	5.70	4.98	4.16
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		5.79	5.23	4.60	3.87	3.83	3.33	3.02	2.67	2.22

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		5 x 4				
Wall Thickness		1/2	3/8	5/16	1/4	3/16
Weight Per Foot		25.03	19.82	16.96	13.91	10.70
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi				
Effective length KL in feet	0	303	250	221	191	157
	4	281	233	206	178	147
	5	269	224	198	172	142
	6	256	213	189	164	136
	7	241	202	179	155	129
	8	224	189	168	146	121
	9	207	175	156	136	113
	10	189	161	144	125	104
	11	172	147	131	115	96
	12	154	133	119	104	87
	13	137	119	107	94	78
	14	121	106	95	84	70
	15	105	93	84	74	62
	16	93	82	74	65	55
	17	82	72	65	58	48
	18	73	65	58	51	43
	19	66	58	52	46	39
	20	59	52	47	42	35
	21	54	47	43	38	32
	22	49	43	39	34	29
	23	45	40	36	31	26
	24	41	36	33	29	24
	25		33	30	27	22
	26				25	21
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
PROPERTIES						
r_{my} (in.)		1.46	1.52	1.54	1.57	1.60
r_{mx}/r_{my}		1.20	1.19	1.19	1.19	1.19
$\phi_b M_{nx}$ (kip-ft)		37.6	30.9	26.9	22.4	17.4
$\phi_b M_{ny}$ (kip-ft)		32.3	26.5	23.0	19.2	15.0
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		4.57	3.98	3.60	3.17	2.65
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		3.18	2.81	2.53	2.23	1.88

Note: Heavy horizontal line indicates KL/r limit of 200.

Notes

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		16 x 16		14 x 14			12 x 12			
Wall Thickness		5/8	1/2	5/8	1/2	3/8	5/8	1/2	3/8	5/16
Weight Per Foot		127.37	103.30	110.36	89.68	68.31	93.34	76.07	58.10	48.86
Design Wall Thickness		0.581	0.465	0.581	0.465	0.349	0.581	0.465	0.349	0.291
		F_y = 46 ksi								
Effective length KL in feet	0	2160	1930	1780	1580	1370	1430	1260	1090	995
	4	2150	1920	1770	1570	1360	1420	1250	1080	986
	5	2150	1910	1760	1560	1360	1410	1240	1070	981
	6	2140	1910	1750	1560	1350	1400	1240	1070	976
	7	2130	1900	1750	1550	1340	1390	1230	1060	969
	8	2120	1890	1740	1540	1340	1380	1220	1050	961
	9	2110	1880	1730	1530	1330	1370	1210	1040	953
	10	2100	1870	1710	1520	1320	1360	1200	1030	943
	11	2090	1860	1700	1510	1310	1340	1180	1020	933
	12	2070	1850	1680	1490	1300	1330	1170	1010	921
	13	2060	1830	1670	1480	1280	1310	1150	994	909
	14	2040	1820	1650	1460	1270	1290	1140	980	896
	15	2020	1800	1630	1450	1250	1270	1120	965	882
	16	2010	1790	1610	1430	1240	1250	1100	950	868
	17	1990	1770	1590	1410	1220	1230	1080	933	853
	18	1970	1750	1570	1390	1210	1210	1060	916	837
	19	1950	1730	1550	1370	1190	1180	1040	899	821
	20	1920	1710	1530	1350	1170	1160	1020	880	804
	21	1900	1690	1500	1330	1150	1140	1000	862	786
	22	1880	1670	1480	1310	1130	1110	980	842	769
	23	1850	1650	1450	1290	1110	1090	957	823	750
	24	1830	1620	1430	1270	1090	1060	934	803	732
	25	1800	1600	1400	1240	1070	1030	911	782	713
	26	1770	1580	1380	1220	1050	1010	887	761	694
	27	1750	1550	1350	1190	1030	979	863	741	675
	28	1720	1530	1320	1170	1010	952	839	719	655
	29	1690	1500	1290	1140	987	924	814	698	635
	30	1660	1480	1260	1120	964	896	790	677	616
	31	1630	1450	1230	1090	941	868	765	655	596
	32	1600	1420	1210	1070	919	840	741	634	576
	33	1570	1400	1180	1040	896	813	716	613	557
	34	1540	1370	1150	1010	872	785	692	592	537
	35	1510	1340	1120	986	849	757	667	570	518
	36	1480	1310	1090	960	826	730	643	550	499
	37	1450	1280	1060	933	803	703	620	529	480
	38	1420	1260	1030	907	780	676	596	508	461
	39	1390	1230	998	880	757	650	573	488	442
	40	1350	1200	968	854	734	624	550	468	424
PROPERTIES										
r_m (in.)		6.25	6.31	5.44	5.49	5.55	4.62	4.68	4.73	4.76
$\phi_b M_n$ (kip-ft)		690	566	521	428	329	376	309	239	202
P_e $(KL)^2/10^4$ (kip-ft^2)		364	321	230	202	173	136	120	102	91.9

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		10 x 10					9 x 9			
Wall Thickness		5/8	1/2	3/8	5/16	1/4	1/2	3/8	5/16	1/4
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	55.66	42.79	36.10	29.23
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.465	0.349	0.291	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	1100	969	828	754	679	833	710	644	577
	4	1090	958	818	745	670	821	700	634	568
	5	1080	951	813	740	666	814	694	629	563
	6	1070	943	806	734	660	806	687	622	558
	7	1060	934	799	727	653	796	679	615	551
	8	1050	924	790	718	646	785	669	607	543
	9	1040	912	780	709	638	773	659	597	534
	10	1020	899	769	699	628	759	648	587	525
	11	1010	885	757	688	618	745	635	575	515
	12	989	870	744	676	607	729	622	563	504
	13	971	854	730	663	596	713	608	550	492
	14	951	837	715	650	583	695	593	537	479
	15	931	819	700	636	571	677	577	522	467
	16	910	801	684	621	557	658	561	508	453
	17	887	781	667	606	543	638	544	492	439
	18	864	761	650	590	529	618	527	477	425
	19	841	740	632	574	514	597	509	461	410
	20	816	719	614	557	499	576	491	444	396
	21	792	698	596	540	483	555	473	428	380
	22	766	676	577	522	467	533	455	411	365
	23	741	653	558	505	452	511	436	394	350
	24	715	631	538	487	435	490	418	377	335
	25	689	608	519	470	419	468	399	361	320
	26	664	586	500	452	403	446	381	344	305
	27	638	563	480	434	387	425	363	328	290
	28	612	540	461	416	371	404	345	311	275
	29	586	518	442	399	355	383	327	295	261
	30	561	496	423	381	339	363	310	280	247
	31	536	473	404	364	324	343	293	264	233
	32	511	452	385	347	308	324	276	249	219
	33	487	430	367	330	293	304	260	234	206
	34	463	409	349	314	279	287	245	221	194
	35	439	389	331	298	264	271	231	208	183
	36	416	368	314	282	250	256	218	197	173
	37	394	349	297	267	236	242	207	186	164
	38	373	331	282	253	224	230	196	177	155
	39	354	314	267	240	213	218	186	168	148
	40	337	298	254	228	202	207	177	159	140
PROPERTIES										
r_m (in.)		3.80	3.86	3.92	3.94	3.97	3.45	3.51	3.54	3.56
$\phi_b M_n$ (kip-ft)		253	209	163	138	113	167	130	111	90.4
P_e $(KL)^2/10^4$ (kip-ft^2)		72.3	64.0	54.5	49.0	43.4	44.5	38.0	34.2	30.1

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		8 x 8					7 x 7					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	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	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	0.581	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi										
Effective length KL in feet	0	809	708	599	541	482	669	586	494	445	395	342
	4	794	695	588	531	473	653	572	482	435	386	334
	5	785	687	582	525	468	644	564	475	429	380	329
	6	775	678	574	519	462	633	554	467	422	374	324
	7	763	668	566	511	455	620	543	458	413	367	317
	8	750	657	556	502	447	605	531	448	404	358	310
	9	735	644	545	492	438	589	517	437	394	349	302
	10	719	629	533	481	429	572	502	424	382	339	293
	11	701	614	520	470	418	553	486	411	370	329	283
	12	682	598	506	457	407	534	469	397	358	317	273
	13	662	581	492	444	395	513	451	382	344	305	263
	14	641	562	477	430	382	492	433	366	331	293	252
	15	620	544	461	416	369	470	414	351	316	280	241
	16	597	524	445	401	356	447	394	334	302	267	229
	17	574	504	428	386	342	425	375	318	287	254	218
	18	551	484	411	371	329	402	355	302	272	241	206
	19	527	464	393	355	314	379	335	285	257	228	194
	20	503	443	376	339	300	357	316	269	242	214	183
	21	480	422	358	323	286	334	296	252	228	201	171
	22	456	401	341	307	272	312	277	236	213	189	160
	23	432	381	324	292	258	291	259	221	199	176	149
	24	409	360	306	276	244	270	240	205	185	164	139
	25	386	340	289	261	230	250	223	190	172	152	128
	26	363	320	273	246	216	231	206	176	159	140	119
	27	341	301	256	231	203	214	191	163	147	130	110
	28	319	282	240	217	190	199	177	152	137	121	102
	29	298	263	225	202	178	186	165	142	128	113	95
	30	278	246	210	189	166	173	155	132	119	105	89
	31	261	231	197	177	155	162	145	124	112	99	83
	32	245	216	184	166	146	152	136	116	105	93	78
	33	230	203	173	156	137	143	128	109	99	87	74
	34	217	192	163	147	129	135	120	103	93	82	69
	35	204	181	154	139	122	127	114	97	88	77	65
	36	193	171	146	131	115	120	107	92	83	73	62
	37	183	162	138	124	109	114	102	87	79	69	59
	38	173	153	131	118	103	108	96	82	74	66	56
	39	165	146	124	112	98	103	91	78	71	62	53
	40	156	138	118	106	93	98	87	74	67	59	50
PROPERTIES												
r_m (in.)		2.99	3.04	3.10	3.13	3.15	2.58	2.63	2.69	2.72	2.75	2.77
$\phi_b M_n$ (kip-ft)		154	129	101	86.6	70.7	114	96.3	76.2	65.2	53.5	41.1
P_e $(KL)^2/10^4$ (kip-ft^2)		33.6	29.7	25.3	22.8	20.0	20.9	18.7	16.0	14.4	12.7	10.8

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 5.0

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	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	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	0.349	0.291	0.233	0.174	0.116
		F_y = 46 ksi										
Effective length KL in feet	0	541	473	398	357	315	271	352	316	278	238	196
	4	522	457	385	346	305	262	338	304	267	228	188
	5	512	449	377	339	299	257	331	297	261	223	184
	6	500	438	369	332	293	251	322	289	254	217	179
	7	486	426	359	323	285	244	312	280	246	210	173
	8	470	413	348	313	276	237	300	270	237	203	167
	9	453	398	336	302	267	229	288	259	227	194	160
	10	434	383	323	290	256	220	275	247	217	185	152
	11	415	366	309	278	245	210	261	235	206	176	144
	12	394	349	294	265	234	200	246	222	195	166	136
	13	373	331	280	252	222	190	231	208	183	156	127
	14	352	312	264	238	210	180	216	195	171	146	119
	15	330	294	249	224	198	169	201	182	159	136	110
	16	308	275	233	210	186	158	186	168	147	125	102
	17	287	256	218	196	173	148	172	155	136	116	94
	18	265	238	202	183	161	137	157	142	125	106	86
	19	245	220	187	169	149	127	144	130	114	97	78
	20	225	203	173	156	138	117	130	118	103	87	70
	21	205	186	159	143	126	107	118	107	93	79	64
	22	187	169	145	131	115	98	107	97	85	72	58
	23	171	155	132	120	106	90	98	89	78	66	53
	24	157	142	122	110	97	82	90	82	72	61	49
	25	145	131	112	101	89	76	83	75	66	56	45
	26	134	121	104	94	83	70	77	70	61	52	42
	27	124	112	96	87	77	65	71	65	57	48	39
	28	115	104	89	81	71	60	66	60	53	45	36
	29	107	97	83	75	66	56	62	56	49	42	33
	30	100	91	78	70	62	53	58	52	46	39	31
	31	94	85	73	66	58	49	54	49	43	36	29
	32	88	80	68	62	55	46	51	46	40	34	27
	33	83	75	64	58	51	44	48	43	38	32	26
	34	78	71	61	55	48	41	45	41	36	30	24
	35	74	67	57	52	46	39		38	34	29	23
	36	70	63	54	49	43	37				27	22
	37		60	51	46	41	35					
	38			48	44	39	33					
	39					37	31					
	40											
PROPERTIES												
r_m (in.)		2.17	2.23	2.28	2.31	2.34	2.37	2.08	2.11	2.13	2.16	2.19
$\phi_b M_n$ (kip-ft)		80.0	68.3	54.5	46.9	38.6	29.8	45.2	39.0	32.2	24.8	17.1
P_e $(KL)^2/10^4$ (kip-ft^2)		12.1	11.0	9.39	8.49	7.50	6.36	6.98	6.33	5.53	4.69	3.77

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 5.0

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	367	308	276	242	206	169	317	266	238	209	177	144
	4	349	293	263	231	197	161	298	250	224	197	167	136
	5	340	286	256	225	191	157	287	242	217	190	161	131
	6	328	276	248	218	185	152	275	232	208	183	155	126
	7	315	265	238	209	178	146	261	221	199	174	147	120
	8	301	254	228	200	170	139	246	209	188	165	139	113
	9	285	241	216	190	162	132	230	196	176	155	131	106
	10	268	227	204	180	153	125	213	182	164	145	122	99
	11	251	213	192	169	144	117	196	168	152	134	113	91
	12	234	199	179	158	134	109	179	154	140	123	104	84
	13	216	184	166	146	124	101	162	140	127	112	94	76
	14	199	170	153	135	115	93	146	127	115	102	85	69
	15	181	155	140	124	105	85	130	114	103	92	77	62
	16	165	141	128	113	96	77	114	101	92	82	68	55
	17	148	128	116	102	87	70	101	89	82	72	61	48
	18	133	115	104	92	78	63	90	80	73	65	54	43
	19	119	103	93	83	70	56	81	72	65	58	48	39
	20	108	93	84	75	63	51	73	65	59	52	44	35
	21	98	84	76	68	57	46	66	59	53	47	40	32
	22	89	77	70	62	52	42	61	53	49	43	36	29
	23	81	70	64	56	48	38	55	49	45	40	33	26
	24	75	65	59	52	44	35	51	45	41	36	30	24
	25	69	59	54	48	40	32	47	41	38	33	28	22
	26	64	55	50	44	37	30	43	38	35	31	26	21
	27	59	51	46	41	35	28		35	32	29	24	19
	28	55	47	43	38	32	26			30	27	22	18
	29	51	44	40	35	30	24					21	17
	30	48	41	37	33	28	23						
	31		39	35	31	26	21						
	32				29	25	20						
	33						19						
	34												
	35												
	36												
	37												
	38												
	39												
	40												
PROPERTIES													
r_m (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
$\phi_b M_n$ (kip-ft)		45.2	36.6	31.6	26.3	20.3	14.0	35.2	28.8	25.1	20.9	16.2	11.3
P_e $(KL)^2/10^4$ (kip-ft^2)		5.77	4.98	4.53	4.00	3.39	2.72	3.93	3.47	3.16	2.80	2.35	1.88

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		4 x 4					
Wall Thickness		1/2	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
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116
		F_y = 46 ksi					
Effective length KL in feet	0	269	226	202	177	149	120
	4	248	209	187	164	138	112
	5	236	200	179	157	133	107
	6	223	189	170	149	126	102
	7	209	178	160	140	119	96
	8	193	165	149	131	111	89
	9	177	152	137	121	102	82
	10	161	138	125	111	93	75
	11	144	125	113	100	85	68
	12	128	112	102	90	76	61
	13	113	99	90	80	68	54
	14	98	86	79	70	60	48
	15	85	75	69	61	52	42
	16	75	66	61	54	46	37
	17	66	59	54	48	41	32
	18	59	52	48	43	36	29
	19	53	47	43	38	33	26
	20	48	42	39	35	29	23
	21	44	38	35	31	27	21
	22	40	35	32	29	24	19
	23	36	32	29	26	22	18
	24		29	27	24	20	16
	25				22	19	15
	26						14
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
PROPERTIES							
r_m (in.)		1.41	1.46	1.49	1.52	1.55	1.58
$\phi_b M_n$ (kip-ft)		26.6	22.0	19.3	16.2	12.7	8.83
P_e $(KL)^2/10^4$ (kip-ft^2)		2.58	2.27	2.09	1.86	1.57	1.26

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		20 x 12	20 x 8		18 x 6		16 x 12
Wall Thickness		1/2	5/8	1/2	5/8	1/2	1/2
Weight Per Foot		103.30	110.36	89.68	93.34	76.07	89.68
Design Wall Thickness		0.465	0.581	0.465	0.581	0.465	0.465
		F_y = 46 ksi					
Effective length KL in feet	0	1870	1650	1450	1300	1130	1560
	4	1850	1620	1430	1260	1100	1550
	5	1850	1610	1410	1240	1080	1540
	6	1840	1590	1400	1220	1060	1540
	7	1830	1570	1380	1190	1040	1530
	8	1810	1550	1360	1160	1010	1520
	9	1800	1520	1340	1130	983	1500
	10	1780	1490	1310	1090	952	1490
	11	1770	1460	1290	1050	918	1470
	12	1750	1430	1260	1010	883	1460
	13	1730	1400	1230	968	846	1440
	14	1700	1360	1200	923	808	1420
	15	1680	1320	1160	878	768	1400
	16	1660	1280	1130	832	729	1380
	17	1630	1240	1090	785	689	1360
	18	1610	1200	1050	739	649	1330
	19	1580	1160	1020	693	609	1310
	20	1550	1110	979	648	570	1290
	21	1520	1070	940	603	531	1260
	22	1490	1020	901	560	493	1230
	23	1460	980	862	517	457	1210
	24	1430	936	823	476	421	1180
	25	1390	892	785	438	388	1150
	26	1360	848	747	405	358	1120
	27	1330	805	709	376	332	1100
	28	1290	762	672	350	309	1070
	29	1260	721	635	326	288	1040
	30	1230	680	599	304	269	1010
	31	1190	640	564	285	252	978
	32	1160	601	530	268	237	948
	33	1120	565	498	252	223	919
	34	1090	532	469	237	210	889
	35	1050	502	443	224	198	860
	36	1020	475	418	211	187	830
	37	984	449	396	200	177	801
	38	950	426	376	190	168	772
	39	916	404	357	180	159	744
	40	883	385	339	171	151	716
PROPERTIES							
r_{my} (in.)		4.99	3.34	3.39	2.48	2.53	4.86
r_{mx}/r_{my}		1.48	2.06	2.05	2.42	2.40	1.25
$\phi_b M_{nx}$ (kip-ft)		649	638	524	466	386	466
$\phi_b M_{ny}$ (kip-ft)		455	333	274	210	175	383
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		430	351	307	215	187	245
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		196	82.5	72.8	36.8	32.5	158

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		16 x 8		14 x 10			14 x 6		
Wall Thickness		5/8	1/2	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		93.34	76.07	93.34	76.07	58.10	76.33	62.46	47.90
Design Wall Thickness		0.581	0.465	0.581	0.465	0.349	0.581	0.465	0.349
		F_y = 46 ksi							
Effective length KL in feet	0	1370	1200	1410	1240	1070	1040	911	771
	4	1350	1180	1400	1230	1060	1010	886	749
	5	1340	1170	1390	1220	1050	998	872	737
	6	1320	1160	1380	1210	1050	979	855	723
	7	1300	1140	1370	1200	1040	956	836	707
	8	1280	1130	1350	1190	1030	931	814	689
	9	1260	1110	1340	1180	1010	903	790	668
	10	1240	1090	1320	1160	1000	872	764	646
	11	1210	1060	1300	1140	985	840	736	623
	12	1180	1040	1280	1130	969	806	706	598
	13	1150	1010	1260	1110	952	770	676	573
	14	1120	985	1230	1090	935	734	644	546
	15	1090	956	1210	1070	916	696	612	519
	16	1060	927	1180	1040	896	659	579	492
	17	1020	896	1160	1020	876	621	547	464
	18	985	865	1130	995	854	583	514	436
	19	948	833	1100	969	833	545	481	409
	20	912	801	1070	944	810	508	449	382
	21	874	768	1040	917	787	472	418	355
	22	837	735	1010	890	764	437	387	330
	23	799	703	979	863	740	402	358	304
	24	762	670	947	835	716	370	328	280
	25	725	637	915	807	692	341	303	258
	26	688	605	883	779	668	315	280	238
	27	652	574	852	751	643	292	259	221
	28	616	543	820	723	619	272	241	206
	29	581	512	788	695	595	253	225	192
	30	548	482	756	667	571	237	210	179
	31	514	453	725	640	547	221	197	168
	32	482	425	694	612	523	208	185	157
	33	453	399	663	585	500	195	174	148
	34	427	376	633	559	477	184	164	139
	35	403	355	603	533	454	174	154	132
	36	381	336	574	507	432	164	146	124
	37	360	318	545	482	410	155	138	118
	38	342	301	517	457	389	147	131	112
	39	324	286	491	434	369	140	124	106
	40	308	272	466	412	351	133	118	101
PROPERTIES									
r_{my} (in.)		3.27	3.32	3.98	4.04	4.09	2.43	2.48	2.53
r_{mx}/r_{my}		1.72	1.72	1.30	1.29	1.29	1.96	1.95	1.94
$\phi_b M_{nx}$ (kip-ft)		445	366	414	341	263	306	254	198
$\phi_b M_{ny}$ (kip-ft)		273	226	328	271	209	167	139	109
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		196	172	169	148	126	110	96.7	81.4
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		66.2	58.3	100	88.5	75.3	28.6	25.4	21.6

LRFD Composite Columns
Rectangular HSS

ERW

f'c = 5.0

Axial Design Strength in Kips

Nominal Size		12 x 10			12 x 8			
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16
Weight Per Foot		69.27	53.00	44.60	76.33	62.46	47.90	40.35
Design Wall Thickness		0.465	0.349	0.581	0.581	0.465	0.349	0.291
		F_y = 46 ksi						
Effective length KL in feet	0	1100	950	865	1090	955	814	740
	4	1090	939	855	1070	938	800	727
	5	1090	933	850	1060	929	792	720
	6	1080	926	843	1050	918	783	711
	7	1070	917	835	1030	906	772	702
	8	1060	907	826	1020	891	760	690
	9	1040	896	816	997	875	746	678
	10	1030	884	804	976	858	731	664
	11	1010	871	792	954	838	715	649
	12	997	856	779	931	818	698	633
	13	979	841	765	906	796	679	616
	14	960	825	750	880	774	660	598
	15	941	808	734	853	750	640	580
	16	920	790	718	825	725	619	561
	17	899	771	701	796	700	598	541
	18	876	752	683	766	674	576	521
	19	853	732	665	736	648	553	501
	20	830	712	646	706	622	531	480
	21	806	691	627	675	595	508	459
	22	782	670	608	645	568	485	438
	23	757	648	588	614	541	462	417
	24	732	627	568	584	515	440	397
	25	707	605	548	554	488	417	376
	26	681	583	528	524	462	395	356
	27	656	561	508	495	437	373	336
	28	631	539	488	466	412	352	317
	29	605	517	468	438	387	331	298
	30	580	496	448	411	363	311	279
	31	556	474	429	385	340	291	261
	32	531	453	410	361	319	273	245
	33	507	433	391	339	300	257	231
	34	483	412	372	320	283	242	217
	35	460	392	354	302	267	228	205
	36	437	372	336	285	252	216	194
	37	414	353	318	270	239	204	183
	38	393	334	301	256	226	194	174
	39	373	317	286	243	215	184	165
	40	354	302	272	231	204	175	157
PROPERTIES								
r_{my} (in.)		3.96	4.01	4.04	3.16	3.21	3.27	3.29
r_{mx}/r_{my}		1.15	1.15	1.15	1.37	1.37	1.37	1.37
$\phi_b M_{nx}$ (kip-ft)		272	211	178	283	235	183	155
$\phi_b M_{ny}$ (kip-ft)		240	186	158	214	178	138	118
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		101	85.6	77.0	93.5	82.4	70.1	63.0
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		76.0	64.7	58.4	49.6	43.8	37.5	33.7

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		12 x 6				12 x 4			
Wall Thickness		5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16
Weight Per Foot		67.82	55.66	42.79	36.10	59.32	48.85	37.69	31.84
Design Wall Thickness		0.581	0.465	0.349	0.291	0.581	0.465	0.349	0.291
		F_y = 46 ksi							
Effective length KL in feet	0	920	800	677	611	751	650	541	483
	4	893	777	658	594	703	610	509	455
	5	878	765	648	584	677	588	491	439
	6	860	750	635	573	646	563	471	421
	7	840	732	620	560	612	534	448	401
	8	817	712	604	545	575	503	422	379
	9	791	691	585	528	535	470	395	355
	10	764	667	566	510	494	435	367	330
	11	735	642	545	492	453	400	339	305
	12	704	616	523	472	411	365	310	279
	13	672	589	500	451	370	330	281	254
	14	639	560	476	429	331	296	253	229
	15	606	532	452	408	293	264	226	205
	16	572	502	427	386	257	233	200	182
	17	538	473	402	363	228	206	177	161
	18	504	444	378	341	203	184	158	143
	19	471	415	353	319	183	165	142	129
	20	438	387	329	298	165	149	128	116
	21	406	359	306	276	149	135	116	105
	22	375	332	283	256	136	123	106	96
	23	344	305	261	236	125	113	97	88
	24	316	280	240	216	114	103	89	81
	25	291	258	221	199	105	95	82	74
	26	269	239	204	184	97	88	76	69
	27	250	222	189	171		82	70	64
	28	232	206	176	159				59
	29	216	192	164	148				
	30	202	179	153	138				
	31	189	168	144	130				
	32	178	158	135	122				
	33	167	148	127	114				
	34	157	140	119	108				
	35	149	132	113	102				
	36	140	125	106	96				
	37	133	118	101	91				
	38	126	112	96	86				
	39	120	106	91	82				
	40		101	86	78				
PROPERTIES									
r_{my} (in.)		2.39	2.44	2.49	2.52	1.57	1.62	1.67	1.70
r_{mx}/r_{my}		1.73	1.73	1.72	1.71	2.46	2.44	2.41	2.39
$\phi_b M_{nx}$ (kip-ft)		237	198	155	131	191	161	127	108
$\phi_b M_{ny}$ (kip-ft)		145	121	95.6	81.4	84.5	72.1	57.3	49.0
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		73.3	64.5	54.7	48.9	53.7	47.5	39.8	35.6
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		24.4	21.7	18.5	16.7	8.84	7.99	6.88	6.24

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		10 x 8				10 x 6				
Wall Thickness		1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		55.66	42.79	36.10	29.23	59.32	48.85	37.69	31.84	25.82
Design Wall Thickness		0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	829	706	640	573	795	693	584	527	468
	4	815	694	629	563	771	673	567	511	454
	5	806	687	622	557	757	661	558	503	447
	6	797	679	615	550	741	648	547	493	437
	7	785	669	606	542	723	632	533	481	427
	8	772	658	596	533	703	615	519	468	415
	9	758	645	585	523	680	595	503	453	402
	10	742	632	572	512	656	574	485	437	388
	11	725	617	559	500	630	552	466	421	373
	12	707	602	545	487	602	529	447	403	357
	13	687	585	530	474	574	504	427	385	341
	14	667	568	514	459	545	479	406	366	324
	15	646	550	498	445	515	454	384	347	306
	16	624	531	481	429	486	428	363	327	289
	17	601	512	463	414	456	402	341	308	272
	18	578	493	446	397	426	377	320	288	254
	19	555	473	427	381	397	351	298	269	237
	20	532	453	409	365	368	326	277	250	220
	21	508	432	391	348	340	302	257	232	204
	22	484	412	373	332	313	279	237	214	188
	23	461	392	354	315	287	255	218	197	173
	24	437	372	336	299	263	235	200	181	159
	25	414	352	318	283	243	216	184	166	146
	26	391	333	301	267	224	200	170	154	135
	27	369	314	283	251	208	185	158	143	125
	28	347	295	266	236	193	172	147	133	116
	29	326	277	250	221	180	161	137	124	109
	30	304	259	233	207	168	150	128	116	101
	31	285	242	219	194	158	141	120	108	95
	32	267	228	205	182	148	132	112	102	89
	33	251	214	193	171	139	124	106	95	84
	34	237	202	182	161	131	117	100	90	79
	35	224	190	172	152	124	110	94	85	75
	36	211	180	162	144	117	104	89	80	70
	37	200	170	153	136	111	99	84	76	67
	38	190	161	146	129	105	94	80	72	63
	39	180	153	138	122	100	89	76	68	60
	40	171	146	131	116			72	65	57
Properties										
r_{my} (in.)		3.14	3.19	3.22	3.25	2.34	2.39	2.44	2.47	2.49
r_{mx}/r_{my}		1.19	1.19	1.19	1.18	1.50	1.49	1.49	1.48	1.48
$\phi_b M_{nx}$ (kip-ft)		179	140	119	96.9	177	148	117	99.4	81.4
$\phi_b M_{ny}$ (kip-ft)		154	120	102	83.5	124	104	81.8	69.7	57.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		51.8	44.1	39.7	35	45.5	40.4	34.2	30.6	26.9
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		36.7	31.3	28.2	25	20.3	18.1	15.4	14.0	12.2

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		10 x 5			10 x 4				
Wall Thickness		3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		35.13	29.72	24.12	50.81	42.05	32.58	27.59	22.42
Design Wall Thickness		0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi							
Effective length KL in feet	0	522	469	415	637	553	461	413	363
	4	501	450	398	594	518	433	388	341
	5	489	440	389	571	499	417	374	329
	6	476	427	378	545	477	399	358	315
	7	460	413	365	515	452	379	340	300
	8	442	397	351	483	425	357	321	283
	9	423	380	336	448	396	334	300	265
	10	403	362	320	413	366	309	279	246
	11	381	342	303	377	335	284	256	226
	12	359	322	285	341	305	259	234	207
	13	336	302	267	306	275	235	212	188
	14	313	282	249	272	246	211	191	169
	15	291	261	231	239	218	187	170	151
	16	268	241	213	210	192	165	150	134
	17	246	221	196	186	170	146	133	118
	18	225	202	179	166	151	131	119	105
	19	204	183	162	149	136	117	107	95
	20	184	165	146	135	123	106	96	85
	21	167	150	133	122	111	96	87	78
	22	152	137	121	111	101	87	80	71
	23	139	125	111	102	93	80	73	65
	24	128	115	102	94	85	73	67	59
	25	118	106	94	86	78	68	62	55
	26	109	98	87		73	63	57	51
	27	101	91	80			58	53	47
	28	94	84	75					44
	29	88	79	70					
	30	82	73	65					
	31	77	69	61					
	32	72	65	57					
	33	68	61	54					
	34	64	57	51					
	35			48					
	36								
	37								
	38								
	39								
	40								
PROPERTIES									
r_{my} (in.)		2.05	2.07	2.1	1.54	1.59	1.64	1.67	1.70
r_{mx}/r_{my}		1.72	1.72	1.71	2.12	2.10	2.08	2.06	2.05
$\phi_b M_{nx}$ (kip-ft)		105	89.7	73.5	139	118	93.2	79.7	65.6
$\phi_b M_{ny}$ (kip-ft)		64.5	55.2	45.5	71.1	60.7	48.3	41.7	34.4
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		29.3	26.2	23.1	32.4	29.0	24.5	21.9	19.2
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		9.87	8.86	7.85	7.23	6.58	5.68	5.17	4.59

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Rectangular HSS

ERW

f'c = 5.0

Axial Design Strength in Kips

Nominal Size		9 x 7					9 x 5				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	50.81	42.05	32.58	27.59	22.42
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi									
Effective length KL in feet	0	805	704	595	537	479	655	572	479	431	381
	4	787	688	582	525	468	626	547	459	413	365
	5	776	679	574	518	462	610	534	449	403	357
	6	764	668	565	510	454	592	518	436	392	346
	7	749	656	555	501	446	570	500	421	378	335
	8	733	642	543	490	436	547	480	405	364	322
	9	715	626	530	478	426	521	458	387	348	307
	10	695	609	515	465	414	494	435	368	331	292
	11	674	591	500	451	402	466	411	348	313	277
	12	651	571	483	436	388	436	386	327	294	260
	13	628	551	466	421	374	407	360	306	275	244
	14	603	530	449	405	360	377	335	285	256	227
	15	578	508	430	388	345	347	309	264	237	210
	16	552	486	411	371	330	318	284	243	219	194
	17	526	463	392	354	314	290	260	223	200	177
	18	500	440	373	336	299	263	236	203	183	162
	19	473	417	353	319	283	236	213	184	165	147
	20	447	394	334	301	267	213	192	166	149	132
	21	420	371	315	284	252	193	174	151	135	120
	22	395	349	296	267	237	176	159	137	123	109
	23	369	327	277	250	222	161	145	126	113	100
	24	345	305	259	234	207	148	133	115	104	92
	25	321	284	241	218	193	136	123	106	96	85
	26	297	263	224	202	179	126	114	98	88	78
	27	275	244	208	187	166	117	105	91	82	73
	28	256	227	193	174	154	109	98	85	76	67
	29	239	212	180	162	144	101	91	79	71	63
	30	223	198	168	152	134	95	85	74	66	59
	31	209	185	157	142	126	89	80	69	62	55
	32	196	174	148	133	118	83	75	65	58	52
	33	184	164	139	125	111			61	55	49
	34	174	154	131	118	104				52	46
	35	164	145	124	111	99					
	36	155	137	117	105	93					
	37	147	130	111	100	88					
	38	139	123	105	95	84					
	39	132	117	99	90	79					
	40	125	111	95	85	75					
PROPERTIES											
r_{my} (in.)		2.68	2.73	2.78	2.81	2.84	1.92	1.97	2.03	2.05	2.08
r_{mx}/r_{my}		1.22	1.22	1.22	1.21	1.21	1.60	1.59	1.58	1.58	1.57
$\phi_b M_{nx}$ (kip-ft)		167	140	110	93.5	76.6	133	112	88.7	75.9	62.4
$\phi_b M_{ny}$ (kip-ft)		140	117	92.1	78.7	64.5	87.3	74.2	59.0	50.4	41.4
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		39.8	35.3	30.0	27.0	23.8	29.4	26.2	22.3	20.0	17.5
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		26.9	23.9	20.3	18.3	16.2	11.4	10.3	8.92	8.01	7.10

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		8 x 6					8 x 4				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	42.30	35.24	27.48	23.34	19.02
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi									
Effective length KL in feet	0	666	582	490	442	392	527	459	383	343	301
	4	645	564	475	428	380	490	428	359	321	282
	5	633	554	467	421	373	471	412	346	309	272
	6	619	542	457	412	365	448	393	330	296	260
	7	603	528	446	401	356	422	372	313	280	247
	8	585	513	433	390	346	395	349	294	264	232
	9	565	496	419	377	334	366	324	274	246	217
	10	544	478	404	364	322	336	299	254	227	201
	11	521	458	388	349	309	306	273	233	209	184
	12	497	438	371	334	296	276	247	211	190	168
	13	472	417	353	318	282	246	222	191	171	152
	14	447	395	335	301	267	218	198	171	153	136
	15	422	373	317	285	252	191	175	151	136	121
	16	396	351	298	268	238	168	154	133	120	106
	17	370	328	280	252	223	149	136	118	106	94
	18	345	306	261	235	208	133	121	105	95	84
	19	320	285	243	219	194	119	109	94	85	75
	20	296	264	226	203	179	108	98	85	77	68
	21	272	243	208	187	166	98	89	77	70	62
	22	249	223	192	172	152	89	81	70	63	56
	23	228	204	175	157	139	81	74	64	58	51
	24	209	187	161	144	128	75	68	59	53	47
	25	193	173	148	133	118	69	63	55	49	44
	26	178	160	137	123	109		58	50	45	40
	27	165	148	127	114	101				42	37
	28	154	138	118	106	94					
	29	143	128	110	99	88					
	30	134	120	103	92	82					
	31	125	112	96	87	77					
	32	118	105	91	81	72					
	33	111	99	85	76	68					
	34	104	93	80	72	64					
	35	98	88	76	68	60					
	36	93	83	72	64	57					
	37	88	79	68	61	54					
	38		75	64	58	51					
	39			61	55	48					
	40				52	46					
Properties											
r_{my} (in.)		2.27	2.32	2.38	2.40	2.43	1.51	1.56	1.61	1.63	1.66
r_{mx}/r_{my}		1.26	1.25	1.25	1.25	1.25	1.75	1.74	1.73	1.73	1.72
$\phi_b M_{nx}$ (kip-ft)		125	105	83.1	71.1	58.3	94.5	81.1	64.9	55.5	45.9
$\phi_b M_{ny}$ (kip-ft)		102	85.9	68.3	58.3	48.0	57.3	49.3	39.7	34.2	28.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		25.5	22.8	19.4	17.4	15.4	17.6	15.9	13.6	12.3	10.8
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		16.1	14.5	12.4	11.2	9.87	5.77	5.27	4.57	4.11	3.65

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		7 x 5						7 x 4				
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		42.30	35.24	27.48	23.34	19.02	14.53	31.84	24.93	21.21	17.32	13.25
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	537	469	394	354	312	267	411	344	308	270	230
	4	512	448	377	338	298	255	383	321	288	252	215
	5	499	437	367	330	291	249	368	309	277	243	207
	6	483	423	356	320	282	242	350	295	265	232	198
	7	464	408	343	309	272	233	331	279	251	220	187
	8	444	390	329	296	261	223	309	262	235	207	176
	9	422	372	314	282	249	213	287	243	219	193	164
	10	399	352	297	268	236	202	264	224	202	178	151
	11	374	331	280	253	223	191	240	205	185	164	138
	12	350	310	263	237	209	179	217	186	168	149	126
	13	324	288	245	221	195	167	194	167	152	134	113
	14	299	267	227	205	181	155	172	149	135	120	101
	15	275	245	209	189	167	143	151	131	120	106	90
	16	250	224	192	173	153	131	133	116	105	94	79
	17	227	204	175	158	140	119	118	102	93	83	70
	18	204	185	158	144	127	108	105	91	83	74	62
	19	183	166	142	129	114	97	94	82	75	66	56
	20	165	149	129	117	103	88	85	74	67	60	50
	21	150	136	117	106	94	80	77	67	61	54	46
	22	137	124	106	96	85	73	70	61	56	49	42
	23	125	113	97	88	78	66	64	56	51	45	38
	24	115	104	89	81	72	61	59	51	47	42	35
	25	106	96	82	75	66	56	54	47	43	38	32
	26	98	88	76	69	61	52		44	40	35	30
	27	91	82	71	64	57	48				33	28
	28	84	76	66	60	53	45					
	29	79	71	61	55	49	42					
	30	73	66	57	52	46	39					
	31	69	62	54	49	43	37					
	32			50	46	40	34					
	33				43	38	32					
	34						30					
	35											
	36											
	37											
	38											
	39											
	40											
PROPERTIES												
r_{my} (in.)		1.86	1.91	1.96	1.99	2.02	2.05	1.53	1.58	1.61	1.64	1.66
r_{mx}/r_{my}		1.31	1.30	1.31	1.30	1.30	1.29	1.57	1.56	1.55	1.54	1.54
$\phi_b M_{nx}$ (kip-ft)		88.3	75.6	60.4	51.8	42.8	32.8	64.9	52.1	45.2	37.3	28.7
$\phi_b M_{ny}$ (kip-ft)		69.7	59.7	47.6	41.1	33.9	26.1	43.5	35.2	30.5	25.3	19.6
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		15.1	13.6	11.8	10.6	9.32	7.87	11.2	9.62	8.73	7.65	6.43
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		8.86	8.02	6.90	6.26	5.54	4.71	4.56	3.97	3.62	3.21	2.70

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		6 x 5				6 x 4				
Wall Thickness		3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		24.93	21.21	17.32	13.25	28.43	22.37	19.08	15.62	11.97
Design Wall Thickness		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	351	315	277	237	364	305	272	239	203
	4	335	301	265	226	338	284	254	223	189
	5	326	293	258	220	324	273	244	214	182
	6	316	284	250	214	308	260	233	205	174
	7	304	274	241	206	290	245	220	194	164
	8	291	262	231	197	271	230	207	182	154
	9	277	249	220	188	251	213	192	169	143
	10	262	236	208	178	230	196	177	156	132
	11	247	222	196	167	208	179	161	142	120
	12	231	208	183	156	188	161	146	129	109
	13	215	194	171	146	167	144	131	116	98
	14	198	179	158	135	148	128	117	103	87
	15	182	165	146	124	129	113	103	91	77
	16	167	151	133	113	113	99	90	80	68
	17	151	137	121	103	100	88	80	71	60
	18	137	124	110	93	90	78	71	63	53
	19	123	111	98	84	80	70	64	57	48
	20	111	100	89	75	73	63	58	51	43
	21	100	91	81	68	66	57	52	47	39
	22	91	83	73	62	60	52	48	42	36
	23	84	76	67	57	55	48	44	39	33
	24	77	70	62	52	50	44	40	36	30
	25	71	64	57	48	46	41	37	33	28
	26	65	59	53	45			34	30	26
	27	61	55	49	41					24
	28	56	51	45	39					
	29	53	48	42	36					
	30	49	45	39	34					
	31	46	42	37	31					
	32	43	39	35	29					
	33			33	28					
	34									
	35									
	36									
	37									
	38									
	39									
	40									
PROPERTIES										
r_{my} (in.)		1.92	1.95	1.98	2.01	1.50	1.55	1.58	1.61	1.63
r_{mx}/r_{my}		1.16	1.15	1.15	1.15	1.39	1.38	1.37	1.37	1.37
$\phi_b M_{nx}$ (kip-ft)		47.6	41.1	34.1	26.3	50.4	41.1	35.5	29.4	22.8
$\phi_b M_{ny}$ (kip-ft)		42.1	36.2	30.1	23.2	38.0	30.8	26.7	22.3	17.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		7.94	7.18	6.32	5.35	7.49	6.48	5.85	5.15	4.34
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		5.94	5.39	4.77	4.05	3.89	3.40	3.10	2.76	2.32

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		5 x 4				
Wall Thickness		1/2	3/8	5/16	1/4	3/16
Weight Per Foot		25.03	19.82	16.96	13.91	10.70
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi				
Effective length KL in feet	0	316	265	237	208	176
	4	293	247	221	194	164
	5	280	237	212	186	157
	6	266	225	202	177	150
	7	250	212	190	167	142
	8	232	198	178	156	132
	9	214	183	165	145	123
	10	195	168	151	133	113
	11	176	153	137	121	103
	12	158	138	124	110	93
	13	140	123	111	98	83
	14	123	109	98	87	74
	15	107	95	86	76	65
	16	94	83	75	67	57
	17	83	74	67	59	50
	18	74	66	60	53	45
	19	67	59	53	48	40
	20	60	53	48	43	36
	21	55	48	44	39	33
	22	50	44	40	35	30
	23	45	40	36	32	28
	24	42	37	33	30	25
	25		34	31	27	23
	26				25	22
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
PROPERTIES						
r_{my} (in.)		1.46	1.52	1.54	1.57	1.60
r_{mx}/r_{my}		1.20	1.19	1.19	1.19	1.19
$\phi_b M_{nx}$ (kip-ft)		37.6	30.9	26.9	22.4	17.4
$\phi_b M_{ny}$ (kip-ft)		32.3	26.5	23.0	19.2	15.0
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		4.63	4.06	3.69	3.27	2.76
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		3.23	2.87	2.59	2.30	1.96

Note: Heavy horizontal line indicates KL/r limit of 200.

Notes

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		16 x 16		14 x 14			12 x 12			
Wall Thickness		5/8	1/2	5/8	1/2	3/8	5/8	1/2	3/8	5/16
Weight Per Foot		127.37	103.30	110.36	89.68	68.31	93.34	76.07	58.10	48.86
Design Wall Thickness		0.581	0.465	0.581	0.465	0.349	0.581	0.465	0.349	0.291
		F_y = 46 ksi								
Effective length KL in feet	0	2640	2420	2140	1950	1750	1680	1520	1360	1280
	4	2630	2400	2120	1930	1740	1670	1510	1350	1260
	5	2620	2400	2110	1930	1730	1660	1500	1340	1260
	6	2610	2390	2100	1920	1720	1650	1490	1330	1250
	7	2600	2380	2090	1910	1710	1640	1480	1320	1240
	8	2580	2370	2080	1890	1700	1620	1470	1310	1230
	9	2570	2350	2060	1880	1690	1600	1450	1300	1210
	10	2550	2340	2050	1860	1670	1590	1440	1280	1200
	11	2530	2320	2030	1850	1660	1570	1420	1270	1180
	12	2520	2300	2010	1830	1640	1550	1400	1250	1170
	13	2490	2280	1990	1810	1620	1530	1380	1230	1150
	14	2470	2260	1960	1790	1600	1500	1360	1210	1130
	15	2450	2240	1940	1760	1580	1480	1330	1190	1110
	16	2420	2210	1910	1740	1560	1450	1310	1170	1090
	17	2400	2190	1890	1710	1540	1420	1290	1140	1070
	18	2370	2160	1860	1690	1510	1390	1260	1120	1040
	19	2340	2140	1830	1660	1490	1360	1230	1090	1020
	20	2310	2110	1800	1630	1460	1330	1200	1070	994
	21	2280	2080	1770	1600	1430	1300	1180	1040	969
	22	2240	2050	1730	1570	1400	1270	1150	1010	943
	23	2210	2020	1700	1540	1380	1240	1120	987	917
	24	2180	1980	1670	1510	1350	1200	1090	959	890
	25	2140	1950	1630	1480	1320	1170	1050	930	863
	26	2100	1920	1600	1440	1290	1140	1020	902	836
	27	2070	1880	1560	1410	1260	1100	992	873	809
	28	2030	1850	1520	1380	1220	1070	960	844	781
	29	1990	1810	1490	1340	1190	1030	928	815	754
	30	1950	1770	1450	1310	1160	998	897	786	726
	31	1910	1740	1410	1270	1130	964	865	758	699
	32	1870	1700	1370	1240	1100	929	833	729	672
	33	1830	1660	1340	1200	1060	895	802	701	645
	34	1790	1620	1300	1170	1030	861	771	672	619
	35	1750	1590	1260	1130	1000	827	740	645	593
	36	1710	1550	1220	1100	968	794	710	617	567
	37	1670	1510	1180	1060	936	761	680	590	541
	38	1630	1470	1150	1030	904	728	650	564	517
	39	1590	1430	1110	995	873	697	622	538	492
	40	1540	1390	1070	960	842	665	593	512	467
PROPERTIES										
r_m (in.)		6.25	6.31	5.44	5.49	5.55	4.62	4.68	4.73	4.76
$\phi_b M_n$ (kip-ft)		690	566	521	428	329	376	309	239	202
P_e $(KL)^2/10^4$ (kip-ft^2)		388	346	244	217	188	143	127	110	100

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		10 x 10					9 x 9			
Wall Thickness		5/8	1/2	3/8	5/16	1/4	1/2	3/8	5/16	1/4
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	55.66	42.79	36.10	29.23
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.465	0.349	0.291	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	1270	1150	1020	946	875	974	859	797	735
	4	1250	1130	1000	933	863	958	845	784	722
	5	1240	1120	994	926	856	949	837	776	715
	6	1230	1110	985	917	847	938	827	767	706
	7	1220	1100	974	906	837	926	816	756	696
	8	1210	1090	961	894	826	912	803	744	684
	9	1190	1070	947	881	813	896	789	731	672
	10	1170	1050	932	866	799	879	774	716	658
	11	1150	1040	916	851	784	860	757	700	643
	12	1130	1020	898	833	768	840	739	683	627
	13	1100	1000	879	815	751	818	720	665	609
	14	1080	973	858	796	733	796	700	646	592
	15	1050	950	837	776	714	773	679	627	573
	16	1030	926	815	755	694	748	657	606	554
	17	1000	901	793	734	673	723	635	585	534
	18	972	875	769	711	652	698	612	564	513
	19	942	848	745	688	631	672	589	542	493
	20	912	821	721	665	609	645	565	520	472
	21	882	793	696	642	586	619	541	497	451
	22	851	765	671	618	564	592	517	475	430
	23	820	737	645	594	541	565	494	453	409
	24	788	708	620	570	519	539	470	431	389
	25	757	680	594	546	496	512	446	409	368
	26	726	651	569	522	474	486	423	387	348
	27	694	623	543	498	451	460	400	366	328
	28	663	595	518	474	429	435	378	345	309
	29	633	567	494	451	408	410	356	324	290
	30	603	540	469	428	387	386	334	304	271
	31	573	513	445	406	366	362	313	285	254
	32	544	487	422	384	345	340	294	267	238
	33	515	461	399	362	325	319	276	251	224
	34	487	435	376	341	306	301	260	237	211
	35	459	411	355	322	289	284	246	223	199
	36	434	388	335	304	273	268	232	211	188
	37	411	368	317	288	258	254	220	200	178
	38	390	348	301	273	245	241	208	190	169
	39	370	331	286	259	233	229	198	180	160
	40	352	314	272	246	221	217	188	171	152
PROPERTIES										
r_m (in.)		3.80	3.86	3.92	3.94	3.97	3.45	3.51	3.54	3.56
$\phi_b M_n$ (kip-ft)		253	209	163	138	113	167	130	111	90.4
P_e $(KL)^2/10^4$ (kip-ft^2)		75.5	67.5	58.3	52.9	47.5	46.7	40.4	36.7	32.7

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		8 x 8					7 x 7					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	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	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	0.581	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi										
Effective length KL in feet	0	910	816	714	660	605	743	665	580	534	488	438
	4	891	799	699	646	592	723	648	564	520	474	425
	5	881	790	691	638	585	712	638	556	512	467	418
	6	869	779	681	629	576	699	626	545	502	458	410
	7	854	766	670	618	566	684	613	533	491	447	400
	8	838	751	657	606	554	666	597	520	479	436	389
	9	820	734	642	592	541	647	580	505	465	423	377
	10	800	717	626	578	527	627	562	489	450	409	364
	11	778	697	609	562	512	605	542	472	434	394	351
	12	756	677	591	545	496	582	522	454	417	379	336
	13	732	655	572	527	480	558	500	435	399	362	321
	14	707	633	552	508	462	533	478	415	381	345	305
	15	681	610	532	489	444	507	455	395	363	328	290
	16	654	586	510	469	425	481	432	375	344	311	273
	17	627	561	489	449	406	455	408	355	325	293	257
	18	599	536	467	428	387	429	385	334	306	276	241
	19	571	511	445	408	368	403	361	314	287	258	225
	20	543	486	422	387	349	377	338	294	268	241	210
	21	515	461	400	366	330	352	316	274	250	224	195
	22	488	436	378	346	311	327	294	254	232	208	180
	23	460	411	357	326	292	303	272	236	215	192	165
	24	433	387	335	306	274	279	251	217	198	177	152
	25	407	363	314	287	256	257	231	200	182	163	140
	26	381	340	294	268	238	238	214	185	168	150	129
	27	356	317	274	249	221	221	198	172	156	139	120
	28	331	295	255	232	206	205	184	160	145	130	111
	29	308	275	237	216	192	191	172	149	135	121	104
	30	288	257	222	202	179	179	161	139	127	113	97
	31	270	241	208	189	168	167	150	130	119	106	91
	32	253	226	195	177	157	157	141	122	111	99	85
	33	238	212	183	167	148	148	133	115	105	93	80
	34	224	200	173	157	139	139	125	108	99	88	76
	35	212	189	163	148	132	131	118	102	93	83	71
	36	200	178	154	140	124	124	111	97	88	78	67
	37	189	169	146	133	118	117	106	91	83	74	64
	38	179	160	138	126	112	111	100	87	79	70	60
	39	170	152	131	119	106	106	95	82	75	67	57
	40	162	145	125	113	101	100	90	78	71	64	55
PROPERTIES												
r_m (in.)		2.99	3.04	3.10	3.13	3.15	2.58	2.63	2.69	2.72	2.75	2.77
$\phi_b M_n$ (kip-ft)		154	129	101	86.6	70.7	114	96.3	76.2	65.2	53.5	41.1
P_e $(KL)^2/10^4$ (kip-ft^2)		34.8	31.0	26.8	24.3	21.6	21.6	19.4	16.8	15.3	13.6	11.7

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

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	3/8	5/16	1/4	3/16
Weight Per Foot		42.30	35.24	27.48	23.34	19.02	14.53	24.93	21.21	17.32	13.25
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	591	528	458	421	382	340	402	368	333	295
	4	569	509	442	405	367	327	385	352	318	282
	5	557	499	433	397	360	320	375	344	310	275
	6	543	486	422	387	351	312	364	334	301	266
	7	527	472	409	375	340	302	351	322	290	256
	8	509	456	395	363	328	291	337	309	278	245
	9	489	439	380	349	315	279	322	295	265	234
	10	468	420	364	334	301	267	306	280	252	221
	11	445	400	347	318	287	253	289	264	237	208
	12	422	380	329	301	272	239	271	248	222	195
	13	398	359	311	284	256	225	253	232	207	181
	14	373	337	292	267	240	211	236	215	192	168
	15	349	315	273	250	225	197	218	199	177	154
	16	324	294	254	232	209	182	200	183	163	141
	17	300	272	236	215	193	168	183	167	148	128
	18	277	251	217	198	178	154	166	152	134	116
	19	254	231	200	182	163	141	150	137	121	104
	20	232	211	182	166	149	128	135	124	109	94
	21	210	192	166	151	135	116	123	112	99	85
	22	191	175	151	138	123	106	112	102	90	78
	23	175	160	138	126	112	97	102	93	83	71
	24	161	147	127	116	103	89	94	86	76	65
	25	148	135	117	107	95	82	87	79	70	60
	26	137	125	108	99	88	76	80	73	65	56
	27	127	116	100	91	81	70	74	68	60	52
	28	118	108	93	85	76	65	69	63	56	48
	29	110	101	87	79	71	61	64	59	52	45
	30	103	94	81	74	66	57	60	55	48	42
	31	96	88	76	69	62	53	56	51	45	39
	32	90	83	71	65	58	50	53	48	43	37
	33	85	78	67	61	55	47	50	45	40	35
	34	80	73	63	58	51	44	47	43	38	33
	35	76	69	60	54	48	42		40	36	31
	36	71	65	56	51	46	40				29
	37		62	53	49	43	37				
	38			51	46	41	35				
	39					39	34				
	40										
PROPERTIES											
r_m (in.)		2.17	2.23	2.28	2.31	2.34	2.37	2.08	2.11	2.13	2.16
$\phi_b M_n$ (kip-ft)		80.0	68.3	54.5	46.9	38.6	29.8	45.2	39.0	32.2	24.8
P_e $(KL)^2/10^4$ (kip-ft^2)		12.4	11.3	9.80	8.94	7.97	6.87	7.26	6.63	5.86	5.04

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

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	403	348	318	287	253	219	344	297	271	244	214	183
	4	382	330	302	272	240	206	322	278	254	229	200	171
	5	370	320	293	264	232	200	310	268	245	220	193	164
	6	357	309	282	254	224	192	296	257	234	211	184	156
	7	342	296	270	243	214	183	280	243	222	200	174	148
	8	325	281	257	231	203	173	263	229	209	188	163	138
	9	307	266	243	219	192	163	245	213	195	175	152	128
	10	288	250	228	205	180	152	226	197	181	162	140	118
	11	269	233	213	191	167	141	207	181	166	149	128	107
	12	249	216	197	177	154	130	188	165	151	135	117	97
	13	229	199	182	163	142	119	169	149	136	122	105	87
	14	209	182	166	149	129	108	151	133	122	110	94	77
	15	190	165	151	135	117	97	133	118	109	97	83	68
	16	171	149	136	122	105	87	117	104	96	86	73	59
	17	153	133	122	109	94	77	104	92	85	76	64	53
	18	136	119	109	97	83	68	93	82	76	68	57	47
	19	122	107	98	87	75	61	83	74	68	61	52	42
	20	110	96	88	79	68	55	75	67	61	55	47	38
	21	100	87	80	71	61	50	68	61	56	50	42	34
	22	91	80	73	65	56	46	62	55	51	45	38	31
	23	83	73	67	59	51	42	57	50	46	41	35	29
	24	77	67	61	55	47	38	52	46	43	38	32	26
	25	71	62	56	50	43	35	48	43	39	35	30	24
	26	65	57	52	47	40	33	44	39	36	32	28	23
	27	61	53	48	43	37	30		37	34	30	26	21
	28	56	49	45	40	35	28			31	28	24	19
	29	52	46	42	37	32	26					22	18
	30	49	43	39	35	30	25						
	31		40	37	33	28	23						
	32				31	26	22						
	33						20						
	34												
	35												
	36												
	37												
	38												
	39												
	40												
Properties													
r_m (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
$\phi_b M_n$ (kip-ft)		45.2	36.6	31.6	26.3	20.3	14.0	35.2	28.8	25.1	20.9	16.2	11.3
P_e (KL)^2/10^4 (kip-ft^2)		5.92	5.17	4.72	4.22	3.63	2.97	4.02	3.58	3.29	2.94	2.50	2.04

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		4 x 4					
Wall Thickness		1/2	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
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116
		F_y = 46 ksi					
Effective length KL in feet	0	289	249	227	204	178	151
	4	265	229	209	187	163	139
	5	252	219	200	179	156	132
	6	238	206	189	169	147	124
	7	222	193	176	158	137	116
	8	204	178	163	146	127	106
	9	186	163	149	134	116	97
	10	168	147	135	121	105	87
	11	150	132	121	109	94	78
	12	132	117	108	97	83	69
	13	116	103	95	85	73	60
	14	100	89	82	74	63	52
	15	87	77	72	64	55	45
	16	77	68	63	56	48	40
	17	68	60	56	50	43	35
	18	60	54	50	45	38	31
	19	54	48	45	40	34	28
	20	49	44	40	36	31	25
	21	44	40	36	33	28	23
	22	40	36	33	30	26	21
	23	37	33	30	27	23	19
	24		30	28	25	22	18
	25				23	20	16
	26						15
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
PROPERTIES							
r_m (in.)		1.41	1.46	1.49	1.52	1.55	1.58
$\phi_b M_n$ (kip-ft)		26.6	22.0	19.3	16.2	12.7	8.83
P_e $(KL)^2/10^4$ (kip-ft^2)		2.63	2.34	2.16	1.94	1.67	1.36

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		20 x 12	20 x 8		18 x 6		16 x 12
Wall Thickness		1/2	5/8	1/2	5/8	1/2	1/2
Weight Per Foot		103.30	110.36	89.68	93.34	76.07	89.68
Design Wall Thickness		0.465	0.581	0.465	0.581	0.465	0.465
		F_y = 46 ksi					
Effective length KL in feet	0	2330	1930	1740	1470	1320	1930
	4	2310	1890	1710	1430	1280	1910
	5	2290	1880	1690	1410	1260	1900
	6	2280	1850	1670	1380	1230	1890
	7	2260	1830	1650	1340	1200	1870
	8	2250	1800	1620	1310	1170	1860
	9	2230	1760	1590	1260	1130	1840
	10	2200	1730	1560	1220	1090	1820
	11	2180	1690	1520	1170	1050	1800
	12	2150	1650	1480	1120	1000	1780
	13	2120	1600	1440	1070	954	1750
	14	2090	1550	1400	1020	907	1720
	15	2060	1510	1360	961	858	1700
	16	2020	1460	1310	906	809	1670
	17	1990	1400	1260	851	760	1640
	18	1950	1350	1210	796	711	1600
	19	1910	1300	1170	742	662	1570
	20	1870	1240	1120	689	615	1540
	21	1830	1190	1070	637	569	1500
	22	1790	1130	1020	587	524	1470
	23	1750	1080	967	538	480	1430
	24	1700	1030	918	494	441	1390
	25	1660	972	869	455	406	1360
	26	1610	919	821	421	376	1320
	27	1570	867	774	390	348	1280
	28	1520	816	728	363	324	1240
	29	1470	767	684	338	302	1200
	30	1430	717	639	316	282	1160
	31	1380	672	598	296	264	1120
	32	1330	630	562	278	248	1080
	33	1290	593	528	261	233	1040
	34	1240	558	497	246	220	1010
	35	1200	527	469	232	207	967
	36	1150	498	444	220	196	930
	37	1110	472	420	208	186	892
	38	1060	447	398	197	176	856
	39	1020	424	378	187	167	819
	40	977	403	359	178	159	784
PROPERTIES							
r_{my} (in.)		4.99	3.34	3.39	2.48	2.53	4.86
r_{mx}/r_{my}		1.48	2.06	2.05	2.42	2.40	1.25
$\phi_b M_{nx}$ (kip-ft)		649	638	524	466	386	466
$\phi_b M_{ny}$ (kip-ft)		455	333	274	210	175	383
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		463	369	325	223	196	262
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		211	86.6	77.1	38.2	34.1	169

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		16 x 8		14 x 10			14 x 6		
Wall Thickness		5/8	1/2	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		93.34	76.07	93.34	76.07	58.10	76.33	62.46	47.90
Design Wall Thickness		0.581	0.465	0.581	0.465	0.349	0.581	0.465	0.349
		F_y = 46 ksi							
Effective length KL in feet	0	1590	1430	1660	1500	1340	1180	1050	923
	4	1560	1410	1640	1480	1320	1140	1020	894
	5	1550	1390	1630	1470	1310	1120	1000	878
	6	1530	1370	1610	1460	1300	1100	983	859
	7	1500	1350	1600	1440	1290	1070	958	838
	8	1480	1330	1580	1430	1270	1040	930	813
	9	1450	1310	1560	1410	1250	1010	900	786
	10	1420	1280	1540	1390	1240	969	867	757
	11	1390	1250	1510	1360	1210	929	832	726
	12	1350	1210	1480	1340	1190	889	795	694
	13	1310	1180	1450	1310	1170	846	757	660
	14	1270	1140	1420	1290	1140	802	719	626
	15	1230	1110	1390	1260	1120	758	679	591
	16	1190	1070	1360	1230	1090	713	639	555
	17	1150	1030	1330	1200	1060	669	599	520
	18	1100	989	1290	1160	1030	624	559	485
	19	1060	948	1250	1130	1000	581	520	451
	20	1010	906	1220	1100	968	538	482	417
	21	966	865	1180	1060	937	496	445	385
	22	920	823	1140	1030	904	456	409	353
	23	874	782	1100	990	872	417	374	323
	24	829	741	1060	954	839	383	343	296
	25	784	701	1020	918	806	353	316	273
	26	741	661	981	882	774	326	293	252
	27	697	622	942	846	741	303	271	234
	28	655	584	902	810	709	281	252	218
	29	614	547	863	775	677	262	235	203
	30	574	511	825	739	645	245	220	190
	31	537	478	787	705	614	230	206	178
	32	504	449	749	671	583	215	193	167
	33	474	422	712	637	553	203	182	157
	34	447	398	676	605	524	191	171	148
	35	422	375	640	572	494	180	161	139
	36	398	355	605	540	467	170	153	132
	37	377	336	573	512	442	161	144	125
	38	358	318	543	485	419	153	137	118
	39	339	302	516	460	398	145	130	112
	40	323	287	490	438	378	138	124	107
PROPERTIES									
r_{my} (in.)		3.27	3.32	3.98	4.04	4.09	2.43	2.48	2.53
r_{mx}/r_{my}		1.72	1.72	1.30	1.29	1.29	1.96	1.95	1.94
$\phi_b M_{nx}$ (kip-ft)		445	366	414	341	263	306	254	198
$\phi_b M_{ny}$ (kip-ft)		273	226	328	271	209	167	139	109
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		205	182	177	157	136	114	101	86.2
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		69.3	61.7	105	94.0	81.2	29.6	26.5	22.9

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		12 x 10			12 x 8			
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16
Weight Per Foot		69.27	53.00	44.60	76.33	62.46	47.90	40.35
Design Wall Thickness		0.465	0.349	0.291	0.581	0.465	0.349	0.291
		F_y = 46 ksi						
Effective length KL in feet	0	1320	1180	1100	1250	1120	993	923
	4	1310	1160	1080	1220	1100	973	905
	5	1300	1150	1070	1210	1090	963	895
	6	1280	1140	1060	1200	1080	950	882
	7	1270	1130	1050	1180	1060	935	868
	8	1260	1120	1040	1160	1040	918	852
	9	1240	1100	1020	1130	1020	899	834
	10	1220	1080	1010	1110	997	878	814
	11	1200	1060	990	1080	972	856	793
	12	1180	1040	971	1050	945	832	771
	13	1150	1020	951	1020	918	807	747
	14	1130	1000	929	988	888	781	722
	15	1100	976	906	955	858	754	696
	16	1070	951	883	920	827	726	670
	17	1050	926	858	885	795	697	643
	18	1020	899	833	849	762	668	615
	19	987	872	807	812	729	638	587
	20	957	844	780	775	695	609	559
	21	926	815	754	738	662	579	531
	22	894	787	726	702	629	549	503
	23	862	758	699	665	596	520	476
	24	830	729	672	629	563	491	449
	25	798	699	644	593	531	462	422
	26	765	670	617	558	499	434	396
	27	733	641	589	524	469	407	370
	28	701	612	562	491	439	380	345
	29	670	584	536	458	409	354	322
	30	639	556	509	428	382	331	301
	31	608	528	483	401	358	310	281
	32	578	501	458	376	336	291	264
	33	548	475	433	354	316	274	248
	34	519	448	408	333	297	258	234
	35	490	423	385	314	281	243	221
	36	463	400	364	297	265	230	209
	37	438	379	345	281	251	218	198
	38	416	359	327	267	238	206	187
	39	395	341	310	253	226	196	178
	40	375	324	295	241	215	186	169
PROPERTIES								
r_{my} (in.)		3.96	4.01	4.04	3.16	3.21	3.27	3.29
r_{mx}/r_{my}		1.15	1.15	1.15	1.37	1.37	1.37	1.37
$\phi_b M_{nx}$ (kip-ft)		272	211	178	283	235	183	155
$\phi_b M_{ny}$ (kip-ft)		240	186	158	214	178	138	118
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		107	91.9	83.5	97.4	86.7	74.7	67.9
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		80.5	69.5	63.3	51.7	46.1	40.0	36.3

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		12 x 6				12 x 4			
Wall Thickness		5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16
Weight Per Foot		67.82	55.66	42.79	36.10	59.32	48.85	37.69	31.84
Design Wall Thickness		0.581	0.465	0.349	0.291	0.581	0.465	0.349	0.291
		F_y = 46 ksi							
Effective length KL in feet	0	1030	922	807	745	817	723	622	568
	4	1000	892	781	721	761	675	581	530
	5	982	876	767	708	731	649	559	510
	6	960	857	750	692	696	619	533	487
	7	936	835	731	674	657	585	504	461
	8	908	810	709	653	615	549	473	432
	9	877	783	685	631	570	510	440	402
	10	844	754	659	606	524	470	406	371
	11	809	723	631	581	477	429	371	339
	12	773	690	602	554	431	388	336	307
	13	735	657	573	526	386	348	302	276
	14	696	622	542	498	342	310	269	246
	15	657	587	511	469	300	273	238	217
	16	617	551	480	440	264	240	209	191
	17	577	516	449	411	233	213	185	169
	18	538	481	418	383	208	190	165	151
	19	499	447	388	355	187	170	148	135
	20	462	413	358	327	169	154	134	122
	21	425	380	329	301	153	139	121	111
	22	389	348	301	275	139	127	110	101
	23	356	319	276	251	128	116	101	92
	24	327	293	253	231	117	107	93	85
	25	301	270	233	213	108	98	86	78
	26	279	249	216	197	100	91	79	72
	27	258	231	200	182		84	73	67
	28	240	215	186	170				62
	29	224	200	173	158				
	30	209	187	162	148				
	31	196	175	152	138				
	32	184	165	142	130				
	33	173	155	134	122				
	34	163	146	126	115				
	35	154	138	119	109				
	36	145	130	113	103				
	37	138	123	107	97				
	38	130	117	101	92				
	39	124	111	96	87				
	40		105	91	83				
PROPERTIES									
r_{my} (in.)		2.39	2.44	2.49	2.52	1.57	1.62	1.67	1.70
r_{mx}/r_{my}		1.73	1.73	1.72	1.71	2.46	2.44	2.41	2.39
$\phi_b M_{nx}$ (kip-ft)		237	198	155	131	191	161	127	108
$\phi_b M_{ny}$ (kip-ft)		145	121	95.6	81.4	84.5	72.1	57.3	49.0
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		75.8	67.3	57.8	52.2	55.0	49.0	41.5	37.4
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		25.3	22.6	19.6	17.8	9.05	8.24	7.17	6.56

Note: Heavy horizontal line indicates $K\ell/r$ limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		10 x 8				10 x 6				
Wall Thickness		1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		55.66	42.79	36.10	29.23	59.32	48.85	37.69	31.84	25.82
Design Wall Thickness		0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	968	853	791	729	887	793	691	637	582
	4	949	836	775	714	858	767	668	616	562
	5	938	827	766	705	842	753	656	604	551
	6	926	815	755	695	823	736	641	590	538
	7	911	802	743	683	801	716	624	574	523
	8	894	787	729	670	776	694	605	556	507
	9	876	770	713	655	749	670	583	537	488
	10	855	752	696	639	720	644	561	516	468
	11	833	732	677	621	689	617	537	493	447
	12	810	711	657	602	657	588	511	470	426
	13	785	689	636	583	624	559	485	446	403
	14	759	666	615	562	590	528	459	421	380
	15	733	642	592	541	555	498	432	396	357
	16	705	617	569	519	521	467	405	371	334
	17	677	592	545	497	486	436	378	346	310
	18	648	566	521	475	452	406	351	321	288
	19	619	540	497	452	419	376	325	297	265
	20	590	514	473	429	386	347	299	273	244
	21	561	488	448	407	354	318	275	251	223
	22	532	463	424	384	323	291	251	228	203
	23	503	437	400	362	296	266	229	209	186
	24	475	412	377	340	272	244	211	192	171
	25	447	387	354	319	250	225	194	177	157
	26	419	363	331	298	232	208	179	164	145
	27	393	339	309	277	215	193	166	152	135
	28	366	316	288	258	200	179	155	141	125
	29	341	294	268	240	186	167	144	131	117
	30	319	275	250	225	174	156	135	123	109
	31	299	258	235	210	163	146	126	115	102
	32	280	242	220	197	153	137	118	108	96
	33	264	227	207	186	144	129	111	102	90
	34	248	214	195	175	135	122	105	96	85
	35	234	202	184	165	128	115	99	90	80
	36	222	191	174	156	121	109	94	85	76
	37	210	181	165	148	114	103	89	81	72
	38	199	171	156	140	108	97	84	77	68
	39	189	163	148	133	103	92	80	73	65
	40	179	155	141	126			76	69	61
PROPERTIES										
r_{my} (in.)		3.14	3.19	3.22	3.25	2.34	2.39	2.44	2.47	2.49
r_{mx}/r_{my}		1.19	1.19	1.19	1.18	1.50	1.49	1.49	1.48	1.48
$\phi_b M_{nx}$ (kip-ft)		179	140	119	96.9	177	148	117	99.4	81.4
$\phi_b M_{ny}$ (kip-ft)		154	120	102	83.5	124	104	81.8	69.7	57.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		54.4	46.9	42.6	38.1	47.0	42.1	36.0	32.6	28.9
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		38.5	33.2	30.2	27.1	21.0	18.9	16.3	14.8	13.2

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		10 x 5			10 x 4				
Wall Thickness		3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		35.13	29.72	24.12	50.81	42.05	32.58	27.59	22.42
Design Wall Thickness		0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi							
Effective length KL in feet	0	609	560	509	691	613	528	482	436
	4	581	534	485	642	571	492	450	406
	5	566	520	472	616	549	473	432	390
	6	549	503	457	585	522	450	412	372
	7	528	484	440	551	493	425	389	351
	8	506	464	420	515	461	398	364	328
	9	481	441	399	476	428	370	338	305
	10	456	417	377	436	393	340	311	280
	11	429	392	355	396	358	310	284	255
	12	401	366	331	356	323	280	257	231
	13	373	340	307	318	289	251	230	207
	14	345	314	283	280	256	223	204	183
	15	317	289	260	245	224	196	180	161
	16	290	264	237	215	197	172	158	142
	17	264	239	215	191	175	152	140	125
	18	238	216	193	170	156	136	125	112
	19	214	193	173	153	140	122	112	100
	20	193	175	156	138	126	110	101	91
	21	175	158	142	125	115	100	92	82
	22	159	144	129	114	104	91	83	75
	23	146	132	118	104	95	83	76	68
	24	134	121	109	96	88	76	70	63
	25	123	112	100	88	81	70	65	58
	26	114	103	93		75	65	60	54
	27	106	96	86			60	55	50
	28	98	89	80					46
	29	92	83	74					
	30	86	78	69					
	31	80	73	65					
	32	75	68	61					
	33	71	64	57					
	34	67	60	54					
	35			51					
	36								
	37								
	38								
	39								
	40								
PROPERTIES									
r_{my} (in.)		2.05	2.07	2.10	1.54	1.59	1.64	1.67	1.70
r_{mx}/r_{my}		1.72	1.72	1.71	2.12	2.10	2.08	2.06	2.05
$\phi_b M_{nx}$ (kip-ft)		105	89.7	73.5	139	118	93.2	79.7	65.6
$\phi_b M_{ny}$ (kip-ft)		64.5	55.2	45.5	71.1	60.7	48.3	41.7	34.4
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		30.7	27.7	24.7	33.1	29.9	25.6	23.0	20.4
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		10.3	9.37	8.39	7.40	6.78	5.91	5.42	4.86

Note: Heavy horizontal line indicates $K\ell/r$ limit of 200.

LRFD Composite Columns
Rectangular HSS

ERW

f'c = 8.0

Axial Design Strength in Kips

Nominal Size		9 x 7					9 x 5				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	50.81	42.05	32.58	27.59	22.42
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi									
Effective length KL in feet	0	904	810	708	654	600	720	642	557	511	465
	4	881	789	690	637	584	686	613	531	488	443
	5	869	778	680	628	575	667	596	517	475	431
	6	853	765	668	617	564	646	577	501	459	417
	7	836	749	654	604	552	621	555	482	442	401
	8	816	731	638	589	538	593	531	461	423	383
	9	794	711	621	572	523	564	505	439	402	364
	10	770	690	602	555	506	532	477	415	380	343
	11	745	667	582	536	489	500	449	390	357	322
	12	718	643	560	516	470	466	419	365	333	301
	13	690	618	538	495	451	432	389	339	309	279
	14	661	592	515	473	431	398	359	313	285	257
	15	631	565	491	451	410	365	330	287	262	235
	16	600	538	467	429	389	332	301	262	239	214
	17	569	510	443	406	368	301	273	238	216	194
	18	538	482	418	383	347	270	245	215	194	174
	19	508	455	394	361	326	243	220	193	175	156
	20	477	427	370	338	305	219	199	174	158	141
	21	447	400	346	316	285	199	180	158	143	128
	22	417	373	322	294	265	181	164	144	130	117
	23	388	347	300	273	245	166	150	132	119	107
	24	360	322	278	253	226	152	138	121	109	98
	25	332	297	256	233	208	140	127	111	101	90
	26	307	275	236	215	193	130	118	103	93	83
	27	285	255	219	200	179	120	109	95	86	77
	28	265	237	204	186	166	112	101	89	80	72
	29	247	221	190	173	155	104	95	83	75	67
	30	231	206	178	162	145	97	88	77	70	63
	31	216	193	166	151	135	91	83	72	66	59
	32	203	181	156	142	127	86	78	68	62	55
	33	191	171	147	134	120			64	58	52
	34	179	161	138	126	113				55	49
	35	169	152	130	119	106					
	36	160	143	123	112	100					
	37	152	136	117	106	95					
	38	144	129	111	101	90					
	39	136	122	105	96	86					
	40	130	116	100	91	81					
PROPERTIES											
r_{my} (in.)		2.68	2.73	2.78	2.81	2.84	1.92	1.97	2.03	2.05	2.08
r_{mx}/r_{my}		1.22	1.22	1.22	1.21	1.21	1.60	1.59	1.58	1.58	1.57
$\phi_b M_{nx}$ (kip-ft)		167	140	110	93.5	76.6	133	112	88.7	75.9	62.4
$\phi_b M_{ny}$ (kip-ft)		140	117	92.1	78.7	64.5	87.3	74.2	59.0	50.4	41.4
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		41.2	36.9	31.7	28.7	25.6	30.2	27.1	23.3	21.1	18.7
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		27.8	24.9	21.4	19.5	17.5	11.7	10.7	9.33	8.45	7.57

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		8 x 6					8 x 4				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	42.30	35.24	27.48	23.34	19.02
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.581	0.465	0.349	0.291	0.233
		F_y = 46 ksi									
Effective length KL in feet	0	737	660	574	529	482	568	505	435	398	359
	4	712	637	554	510	465	526	469	405	370	333
	5	698	625	544	500	456	504	450	389	355	320
	6	681	610	531	488	445	479	428	370	338	304
	7	662	593	516	475	432	450	403	349	318	287
	8	641	574	500	459	417	419	377	326	297	268
	9	618	554	482	442	402	387	348	302	275	248
	10	592	531	462	424	385	353	319	277	252	227
	11	566	508	442	405	367	320	290	252	229	206
	12	538	483	420	385	349	287	261	227	207	186
	13	510	458	398	364	330	255	233	203	184	166
	14	480	432	376	343	310	224	205	180	163	146
	15	451	405	353	322	291	195	180	157	143	128
	16	421	379	330	301	271	172	158	138	125	112
	17	392	353	307	280	252	152	140	122	111	100
	18	363	327	285	259	233	136	125	109	99	89
	19	335	302	263	239	214	122	112	98	89	80
	20	308	278	242	219	196	110	101	88	80	72
	21	281	254	221	200	179	100	92	80	73	65
	22	256	231	201	182	163	91	83	73	66	59
	23	234	211	184	167	149	83	76	67	61	54
	24	215	194	169	153	137	76	70	61	56	50
	25	198	179	156	141	126	70	65	57	51	46
	26	183	166	144	130	117		60	52	47	43
	27	170	153	134	121	108				44	39
	28	158	143	124	112	101					
	29	147	133	116	105	94					
	30	138	124	108	98	88					
	31	129	116	101	92	82					
	32	121	109	95	86	77					
	33	114	103	89	81	72					
	34	107	97	84	76	68					
	35	101	91	79	72	64					
	36	96	86	75	68	61					
	37	91	82	71	64	58					
	38		77	67	61	55					
	39			64	58	52					
	40				55	49					
PROPERTIES											
r_{my} (in.)		2.27	2.32	2.38	2.40	2.43	1.51	1.56	1.61	1.63	1.66
r_{mx}/r_{my}		1.26	1.25	1.25	1.25	1.25	1.75	1.74	1.73	1.73	1.72
$\phi_b M_{nx}$ (kip-ft)		125	105	83.1	71.1	58.3	94.5	81.1	64.9	55.5	45.9
$\phi_b M_{ny}$ (kip-ft)		102	85.9	68.3	58.3	48.0	57.3	49.3	39.7	34.2	28.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		26.2	23.6	20.3	18.5	16.4	18.0	16.4	14.2	12.9	11.4
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		16.6	15.0	13.1	11.8	10.6	5.89	5.42	4.75	4.31	3.86

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		7 x 5						7 x 4				
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		42.30	35.24	27.48	23.34	19.02	14.53	31.84	24.93	21.21	17.32	13.25
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	585	523	452	415	376	334	451	389	355	320	282
	4	556	497	431	395	357	317	418	361	330	297	261
	5	541	483	419	384	347	308	401	346	316	285	250
	6	522	467	405	371	336	297	380	329	301	270	237
	7	501	449	389	356	322	285	358	309	283	255	223
	8	478	428	371	340	307	271	333	289	264	237	208
	9	453	406	352	323	291	257	307	267	244	219	191
	10	426	383	332	304	274	242	281	244	224	201	175
	11	399	359	311	285	257	226	254	221	203	182	158
	12	371	334	290	265	239	209	228	199	182	164	141
	13	342	309	268	245	221	193	202	177	163	146	125
	14	314	284	247	226	203	177	178	156	143	129	110
	15	287	260	225	206	185	161	155	136	125	112	96
	16	260	236	205	187	168	146	136	120	110	99	84
	17	234	213	185	169	151	131	121	106	98	87	75
	18	209	190	165	151	135	117	108	95	87	78	67
	19	188	171	149	136	121	105	97	85	78	70	60
	20	169	154	134	123	110	95	87	77	70	63	54
	21	154	140	122	111	99	86	79	70	64	57	49
	22	140	127	111	101	91	78	72	63	58	52	45
	23	128	117	101	93	83	72	66	58	53	48	41
	24	118	107	93	85	76	66	61	53	49	44	37
	25	108	99	86	78	70	61	56	49	45	40	35
	26	100	91	79	73	65	56		45	42	37	32
	27	93	85	74	67	60	52				35	30
	28	86	79	68	63	56	48					
	29	80	73	64	58	52	45					
	30	75	69	60	54	49	42					
	31	70	64	56	51	46	39					
	32			52	48	43	37					
	33				45	40	35					
	34						33					
	35											
	36											
	37											
	38											
	39											
	40											
PROPERTIES												
r_{my} (in.)		1.86	1.91	1.96	1.99	2.02	2.05	1.53	1.58	1.61	1.64	1.66
r_{mx}/r_{my}		1.31	1.30	1.31	1.30	1.30	1.29	1.57	1.56	1.55	1.54	1.54
$\phi_b M_{nx}$ (kip-ft)		88.3	75.6	60.4	51.8	42.8	32.8	64.9	52.1	45.2	37.3	28.7
$\phi_b M_{ny}$ (kip-ft)		69.7	59.7	47.6	41.1	33.9	26.1	43.5	35.2	30.5	25.3	19.6
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		15.5	14.1	12.3	11.1	9.90	8.49	11.5	9.97	9.12	8.07	6.88
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		9.08	8.27	7.19	6.58	5.88	5.08	4.68	4.11	3.78	3.39	2.89

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		6 x 5				6 x 4				
Wall Thickness		3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		24.93	21.21	17.32	13.25	28.43	22.37	19.08	15.62	11.97
Design Wall Thickness		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	400	367	331	294	397	342	312	281	247
	4	380	348	315	279	367	317	289	260	229
	5	370	339	306	270	351	304	277	249	219
	6	357	327	295	261	333	288	263	237	207
	7	342	314	283	250	312	271	247	222	194
	8	326	299	269	237	290	252	230	207	181
	9	309	283	255	224	267	232	212	191	166
	10	291	266	240	211	243	212	194	174	151
	11	272	249	224	196	220	192	176	158	136
	12	253	231	208	182	196	172	157	141	122
	13	233	214	192	168	174	152	140	125	108
	14	214	196	176	153	152	134	123	110	94
	15	195	179	160	139	132	117	107	96	82
	16	177	162	145	125	116	102	94	84	72
	17	159	146	130	112	103	91	83	75	64
	18	142	130	116	100	92	81	74	67	57
	19	127	117	104	90	82	73	67	60	51
	20	115	105	94	81	74	66	60	54	46
	21	104	96	85	74	67	59	55	49	42
	22	95	87	78	67	61	54	50	45	38
	23	87	80	71	61	56	50	46	41	35
	24	80	73	65	56	52	46	42	38	32
	25	74	67	60	52	48	42	39	35	30
	26	68	62	56	48			36	32	27
	27	63	58	52	44					25
	28	59	54	48	41					
	29	55	50	45	39					
	30	51	47	42	36					
	31	48	44	39	34					
	32	45	41	37	32					
	33			35	30					
	34									
	35									
	36									
	37									
	38									
	39									
	40									
PROPERTIES										
r_{my} (in.)		1.92	1.95	1.98	2.01	1.50	1.55	1.58	1.61	1.63
r_{mx}/r_{my}		1.16	1.15	1.15	1.15	1.39	1.38	1.37	1.37	1.37
$\phi_b M_{nx}$ (kip-ft)		47.6	41.1	34.1	26.3	50.4	41.1	35.5	29.4	22.8
$\phi_b M_{ny}$ (kip-ft)		42.1	36.2	30.1	23.2	38.0	30.8	26.7	22.3	17.3
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		8.25	7.52	6.69	5.75	7.68	6.70	6.10	5.42	4.63
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		6.17	5.65	5.05	4.35	3.99	3.52	3.23	2.90	2.47

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		5 x 4				
Wall Thickness		1/2	3/8	5/16	1/4	3/16
Weight Per Foot		25.03	19.82	16.96	13.91	10.70
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi				
Effective length KL in feet	0	343	296	270	242	213
	4	316	273	249	224	196
	5	302	262	238	214	187
	6	285	248	226	203	177
	7	267	232	212	190	166
	8	247	216	197	177	154
	9	227	198	181	162	141
	10	206	181	165	148	128
	11	185	163	148	133	116
	12	164	146	132	119	103
	13	144	129	117	105	91
	14	126	112	102	92	79
	15	109	98	89	80	69
	16	96	86	78	70	61
	17	85	76	69	62	54
	18	76	68	62	56	48
	19	68	61	56	50	43
	20	61	55	50	45	39
	21	56	50	45	41	35
	22	51	46	41	37	32
	23	47	42	38	34	29
	24	43	38	35	31	27
	25		35	32	29	25
	26				27	23
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
PROPERTIES						
r_{my} (in.)		1.46	1.52	1.54	1.57	1.60
r_{mx}/r_{my}		1.20	1.19	1.19	1.19	1.19
$\phi_b M_{nx}$ (kip-ft)		37.6	30.9	26.9	22.4	17.4
$\phi_b M_{ny}$ (kip-ft)		32.3	26.5	23.0	19.2	15.0
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		4.74	4.19	3.84	3.43	2.93
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		3.30	2.96	2.69	2.41	2.08

Note: Heavy horizontal line indicates KL/r limit of 200.

Notes

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		26 x 26	24 x 24	22 x 22	20 x 20		18 x 18	
Wall Thickness		5/8	5/8	5/8	5/8	1/2	5/8	1/2
Weight Per Foot		208.79	191.78	174.76	157.75	129.06	140.73	115.45
Design Wall Thickness		0.625	0.625	0.625	0.625	0.500	0.625	0.500
		F_y = 46 ksi						
Effective length KL in feet	0	3940	3510	3090	2700	2390	2320	2050
	6	3930	3490	3080	2680	2380	2300	2040
	7	3920	3490	3070	2670	2370	2300	2030
	8	3920	3480	3060	2670	2370	2290	2030
	9	3910	3470	3060	2660	2360	2280	2020
	10	3900	3470	3050	2650	2350	2270	2010
	11	3890	3460	3040	2640	2340	2260	2000
	12	3890	3450	3030	2630	2330	2250	1990
	13	3880	3440	3020	2620	2320	2240	1980
	14	3860	3430	3010	2610	2310	2230	1970
	15	3850	3410	2990	2590	2300	2210	1960
	16	3840	3400	2980	2580	2290	2200	1940
	17	3830	3390	2970	2560	2270	2180	1930
	18	3810	3370	2950	2550	2260	2160	1910
	19	3800	3360	2930	2530	2250	2150	1900
	20	3780	3340	2920	2510	2230	2130	1880
	21	3770	3320	2900	2500	2210	2110	1870
	22	3750	3310	2880	2480	2200	2090	1850
	23	3730	3290	2860	2460	2180	2070	1830
	24	3720	3270	2840	2440	2160	2050	1810
	25	3700	3250	2820	2420	2140	2030	1790
	26	3680	3230	2800	2390	2120	2000	1770
	27	3660	3210	2780	2370	2110	1980	1750
	28	3640	3190	2760	2350	2090	1960	1730
	29	3610	3160	2740	2330	2060	1930	1710
	30	3590	3140	2710	2300	2040	1910	1690
	31	3570	3120	2690	2280	2020	1880	1670
	32	3550	3090	2660	2250	2000	1860	1650
	33	3520	3070	2640	2230	1980	1830	1620
	34	3500	3050	2610	2200	1950	1800	1600
	35	3470	3020	2590	2170	1930	1780	1580
	36	3450	2990	2560	2150	1910	1750	1550
	37	3420	2970	2530	2120	1880	1720	1530
	38	3400	2940	2510	2090	1860	1690	1500
	39	3370	2910	2480	2060	1830	1670	1480
	40	3340	2880	2450	2030	1810	1640	1450
PROPERTIES								
r_m (in.)		10.3	9.44	8.62	7.81	7.90	6.99	7.08
$\phi_b M_n$ (kip-ft)		1990	1680	1400	1140	949	911	759
P_e $(KL)^2/10^4$ (kip-ft^2)		1870	1410	1040	753	671	524	467

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		26 x 24	24 x 22	22 x 20	20 x 18		20 x 16	
Wall Thickness		5/8	5/8	5/8	5/8	1/2	5/8	1/2
Weight Per Foot		200.28	183.27	166.25	149.24	122.25	140.73	115.45
Design Wall Thickness		0.625	0.625	0.625	0.625	0.500	0.625	0.500
		F_y = 46 ksi						
Effective length KL in feet	0	3720	3300	2890	2500	2220	2310	2040
	6	3710	3280	2870	2490	2200	2290	2020
	7	3700	3270	2870	2480	2200	2280	2020
	8	3690	3270	2860	2470	2190	2270	2010
	9	3690	3260	2850	2460	2180	2260	2000
	10	3680	3250	2840	2450	2170	2250	1990
	11	3670	3240	2830	2440	2160	2240	1980
	12	3660	3230	2820	2430	2150	2230	1970
	13	3650	3220	2810	2420	2140	2210	1960
	14	3630	3200	2790	2400	2130	2200	1940
	15	3620	3190	2780	2390	2120	2180	1930
	16	3610	3180	2770	2370	2100	2160	1910
	17	3590	3160	2750	2360	2090	2140	1900
	18	3580	3150	2730	2340	2070	2120	1880
	19	3560	3130	2720	2320	2060	2100	1860
	20	3550	3110	2700	2300	2040	2080	1840
	21	3530	3090	2680	2280	2020	2060	1820
	22	3510	3080	2660	2260	2000	2040	1800
	23	3490	3060	2640	2240	1980	2010	1780
	24	3470	3040	2620	2220	1960	1990	1760
	25	3450	3010	2590	2190	1940	1960	1740
	26	3430	2990	2570	2170	1920	1940	1710
	27	3410	2970	2550	2150	1900	1910	1690
	28	3390	2950	2520	2120	1880	1880	1670
	29	3360	2920	2500	2100	1860	1850	1640
	30	3340	2900	2470	2070	1830	1830	1620
	31	3320	2870	2450	2040	1810	1800	1590
	32	3290	2850	2420	2020	1790	1770	1570
	33	3260	2820	2400	1990	1760	1740	1540
	34	3240	2790	2370	1960	1740	1710	1510
	35	3210	2770	2340	1930	1710	1680	1490
	36	3180	2740	2310	1900	1690	1650	1460
	37	3160	2710	2280	1870	1660	1610	1430
	38	3130	2680	2250	1840	1640	1580	1400
	39	3100	2650	2220	1810	1610	1550	1380
	40	3070	2620	2190	1780	1580	1520	1350
PROPERTIES								
r_{my} (in.)		9.55	8.73	7.91	7.10	7.19	6.37	6.46
r_{mx}/r_{my}		1.06	1.07	1.08	1.08	1.08	1.19	1.18
$\phi_b M_{nx}$ (kip-ft)		1880	1580	1310	1060	880	976	814
$\phi_b M_{ny}$ (kip-ft)		1780	1490	1220	987	821	838	700
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		1710	1300	955	681	607	609	543
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		1530	1140	825	581	518	434	387

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 3.5

Nominal Size		20 x 12	18 x 12		16 x 12	14 x 12	
Wall Thickness		5/8	5/8	1/2	5/8	1/2	3/8
Weight Per Foot		123.72	115.21	95.03	106.71	81.42	62.39
Design Wall Thickness		0.625	0.625	0.500	0.625	0.500	0.375
		F_y = 46 ksi					
Effective length KL in feet	0	1930	1780	1560	1620	1290	1090
	6	1900	1750	1540	1600	1270	1070
	7	1890	1740	1530	1590	1260	1070
	8	1870	1720	1520	1580	1260	1060
	9	1860	1710	1510	1560	1250	1050
	10	1840	1700	1490	1550	1230	1040
	11	1830	1680	1480	1530	1220	1030
	12	1810	1660	1460	1520	1210	1020
	13	1790	1640	1450	1500	1190	1010
	14	1770	1620	1430	1480	1180	995
	15	1740	1600	1410	1460	1160	982
	16	1720	1580	1390	1440	1150	968
	17	1700	1560	1370	1420	1130	953
	18	1670	1530	1350	1390	1110	937
	19	1640	1510	1330	1370	1090	921
	20	1610	1480	1310	1350	1070	904
	21	1580	1450	1280	1320	1050	887
	22	1550	1430	1260	1290	1030	869
	23	1520	1400	1230	1270	1010	851
	24	1490	1370	1210	1240	985	833
	25	1460	1340	1180	1210	963	814
	26	1430	1310	1160	1180	940	795
	27	1390	1280	1130	1150	917	775
	28	1360	1240	1100	1120	893	755
	29	1330	1210	1070	1100	869	735
	30	1290	1180	1050	1070	845	715
	31	1260	1150	1020	1040	821	695
	32	1220	1120	989	1010	797	675
	33	1190	1080	961	975	773	654
	34	1150	1050	933	945	749	634
	35	1120	1020	904	915	725	614
	36	1080	986	876	885	701	594
	37	1050	954	848	856	677	574
	38	1020	922	820	826	654	554
	39	982	891	793	797	630	534
	40	948	859	765	768	607	515
PROPERTIES							
r_{my} (in.)		4.87	4.81	4.89	4.73	4.73	4.80
r_{mx}/r_{my}		1.48	1.36	1.36	1.25	1.12	1.13
$\phi_b M_{nx}$ (kip-ft)		807	687	580	576	400	311
$\phi_b M_{ny}$ (kip-ft)		573	524	438	473	359	280
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		468	357	321	265	170	145
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		214	193	172	171	135	114

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		**26 x 26**	**24 x 24**	**22 x 22**	**20 x 20**		**18 x 18**	
Wall Thickness		5/8	5/8	5/8	5/8	1/2	5/8	1/2
Weight Per Foot		208.79	191.78	174.76	157.75	129.06	140.73	115.45
Design Wall Thickness		0.625	0.625	0.625	0.625	0.500	0.625	0.500
		F_y = 46 ksi						
Effective length KL in feet	0	4610	4070	3560	3080	2780	2620	2370
	6	4590	4050	3540	3050	2760	2600	2350
	7	4580	4040	3530	3050	2760	2590	2340
	8	4570	4030	3520	3040	2750	2580	2330
	9	4560	4020	3510	3030	2740	2570	2320
	10	4550	4010	3500	3020	2730	2560	2310
	11	4540	4000	3490	3010	2720	2550	2300
	12	4530	3990	3480	2990	2710	2540	2290
	13	4520	3980	3460	2980	2690	2520	2270
	14	4500	3960	3450	2960	2680	2510	2260
	15	4490	3950	3430	2950	2660	2490	2240
	16	4470	3930	3410	2930	2650	2470	2230
	17	4460	3910	3400	2910	2630	2450	2210
	18	4440	3890	3380	2890	2610	2430	2190
	19	4420	3870	3360	2870	2600	2410	2170
	20	4400	3850	3340	2850	2580	2390	2150
	21	4380	3830	3320	2830	2560	2360	2130
	22	4360	3810	3290	2800	2530	2340	2110
	23	4340	3790	3270	2780	2510	2320	2090
	24	4310	3760	3250	2750	2490	2290	2060
	25	4290	3740	3220	2730	2470	2260	2040
	26	4260	3710	3190	2700	2440	2240	2020
	27	4240	3690	3170	2680	2420	2210	1990
	28	4210	3660	3140	2650	2390	2180	1970
	29	4180	3630	3110	2620	2370	2150	1940
	30	4160	3600	3080	2590	2340	2120	1910
	31	4130	3570	3050	2560	2310	2090	1890
	32	4100	3540	3020	2530	2280	2060	1860
	33	4070	3510	2990	2500	2260	2030	1830
	34	4040	3480	2960	2460	2230	2000	1800
	35	4000	3450	2930	2430	2200	1970	1770
	36	3970	3420	2890	2400	2170	1930	1740
	37	3940	3380	2860	2370	2140	1900	1710
	38	3910	3350	2830	2330	2110	1870	1680
	39	3870	3320	2790	2300	2080	1830	1650
	40	3840	3280	2760	2260	2040	1800	1620
PROPERTIES								
r_m (in.)		10.3	9.44	8.62	7.81	7.90	6.99	7.08
$\phi_b M_n$ (kip-ft)		1990	1680	1400	1140	949	911	759
P_e $(KL)^2/10^4$ (kip-ft^2)		1990	1490	1100	791	711	548	492

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		26 x 24	24 x 22	22 x 20	20 x 18		20 x 16	
Wall Thickness		5/8	5/8	5/8	5/8	1/2	5/8	1/2
Weight Per Foot		200.28	183.27	166.25	149.24	122.25	140.73	115.45
Design Wall Thickness		0.625	0.625	0.625	0.625	0.500	0.625	0.500
		F_y = 46 ksi						
Effective length KL in feet	0	4330	3800	3310	2840	2570	2610	2350
	6	4310	3780	3290	2820	2550	2580	2330
	7	4300	3780	3280	2810	2540	2570	2320
	8	4290	3770	3270	2800	2530	2560	2310
	9	4280	3760	3260	2790	2520	2550	2300
	10	4270	3750	3250	2780	2510	2540	2290
	11	4260	3730	3230	2760	2500	2520	2270
	12	4250	3720	3220	2750	2480	2510	2260
	13	4230	3710	3210	2730	2470	2490	2240
	14	4220	3690	3190	2720	2450	2470	2220
	15	4200	3670	3170	2700	2440	2450	2210
	16	4190	3660	3150	2680	2420	2430	2190
	17	4170	3640	3130	2660	2400	2400	2170
	18	4150	3620	3110	2640	2380	2380	2150
	19	4130	3600	3090	2620	2360	2360	2120
	20	4110	3570	3070	2590	2340	2330	2100
	21	4080	3550	3050	2570	2320	2300	2080
	22	4060	3530	3020	2540	2300	2270	2050
	23	4040	3500	3000	2520	2270	2250	2020
	24	4010	3480	2970	2490	2250	2220	2000
	25	3990	3450	2940	2460	2220	2190	1970
	26	3960	3420	2910	2430	2200	2150	1940
	27	3930	3400	2890	2400	2170	2120	1910
	28	3900	3370	2860	2370	2140	2090	1880
	29	3870	3340	2830	2340	2110	2060	1850
	30	3840	3310	2790	2310	2090	2020	1820
	31	3810	3270	2760	2280	2060	1990	1790
	32	3780	3240	2730	2250	2030	1950	1760
	33	3750	3210	2700	2210	2000	1920	1730
	34	3720	3180	2660	2180	1970	1880	1690
	35	3680	3140	2630	2140	1930	1840	1660
	36	3650	3110	2590	2110	1900	1810	1630
	37	3610	3070	2560	2070	1870	1770	1590
	38	3580	3040	2520	2040	1840	1730	1560
	39	3540	3000	2490	2000	1810	1700	1530
	40	3500	2960	2450	1970	1770	1660	1490
PROPERTIES								
r_{my} (in.)		9.55	8.73	7.91	7.10	7.19	6.37	6.46
r_{mx}/r_{my}		1.06	1.07	1.08	1.08	1.08	1.19	1.18
$\phi_b M_{nx}$ (kip-ft)		1880	1580	1310	1060	880	976	814
$\phi_b M_{ny}$ (kip-ft)		1780	1490	1220	987	821	838	700
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		1810	1370	1000	713	641	636	572
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		1620	1200	867	608	547	453	408

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 5.0

Nominal Size		20 x 12	18 x 12		16 x 12	14 x 12	
Wall Thickness		5/8	5/8	1/2	5/8	1/2	3/8
Weight Per Foot		123.72	115.21	95.03	106.71	81.42	62.39
Design Wall Thickness		0.625	0.625	0.500	0.625	0.500	0.375
		F_y = 46 ksi					
Effective length KL in feet	0	2140	1970	1760	1790	1450	1250
	6	2110	1930	1730	1760	1420	1230
	7	2090	1920	1720	1750	1410	1220
	8	2080	1910	1710	1740	1400	1210
	9	2060	1890	1700	1720	1390	1200
	10	2040	1870	1680	1710	1380	1190
	11	2020	1860	1660	1690	1360	1180
	12	2000	1840	1650	1670	1350	1160
	13	1980	1810	1630	1650	1330	1150
	14	1950	1790	1600	1630	1310	1130
	15	1930	1760	1580	1600	1290	1120
	16	1900	1740	1560	1580	1270	1100
	17	1870	1710	1530	1550	1250	1080
	18	1840	1680	1510	1530	1230	1060
	19	1810	1650	1480	1500	1210	1040
	20	1770	1620	1450	1470	1180	1020
	21	1740	1590	1430	1440	1160	999
	22	1700	1560	1400	1410	1130	977
	23	1670	1520	1370	1380	1110	955
	24	1630	1490	1340	1350	1080	932
	25	1590	1450	1300	1310	1050	909
	26	1550	1420	1270	1280	1030	886
	27	1520	1380	1240	1250	1000	862
	28	1480	1350	1210	1210	972	838
	29	1440	1310	1180	1180	944	814
	30	1400	1270	1140	1140	917	790
	31	1360	1240	1110	1110	889	766
	32	1320	1200	1080	1080	861	741
	33	1280	1160	1040	1040	833	717
	34	1240	1120	1010	1010	805	693
	35	1200	1090	977	973	777	669
	36	1160	1050	944	939	749	645
	37	1120	1010	912	906	722	621
	38	1080	977	880	873	695	598
	39	1040	942	847	840	669	575
	40	1000	906	816	807	642	552
PROPERTIES							
r_{my} (in.)		4.87	4.81	4.89	4.73	4.73	4.80
r_{mx}/r_{my}		1.48	1.36	1.36	1.25	1.12	1.13
$\phi_b M_{nx}$ (kip-ft)		807	687	580	576	400	311
$\phi_b M_{ny}$ (kip-ft)		573	524	438	473	359	280
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		486	371	335	275	178	152
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		222	200	180	177	140	120

LRFD Composite Columns
Square HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		**26 x 26**	**24 x 24**	**22 x 22**	**20 x 20**		**18 x 18**	
Wall Thickness		5/8	5/8	5/8	5/8	1/2	5/8	1/2
Weight Per Foot		208.79	191.78	174.76	157.75	129.06	140.73	115.45
Design Wall Thickness		0.625	0.625	0.625	0.625	0.500	0.625	0.500
		F_y = 46 ksi						
Effective length KL in feet	0	5930	5180	4490	3830	3560	3230	2990
	6	5900	5150	4460	3800	3530	3200	2960
	7	5890	5140	4440	3790	3520	3180	2950
	8	5880	5130	4430	3780	3510	3170	2940
	9	5860	5120	4420	3760	3500	3160	2920
	10	5850	5100	4400	3750	3480	3140	2910
	11	5830	5090	4390	3730	3470	3120	2890
	12	5810	5070	4370	3710	3450	3100	2870
	13	5800	5050	4350	3690	3430	3080	2850
	14	5770	5030	4330	3670	3410	3060	2830
	15	5750	5000	4300	3650	3390	3040	2810
	16	5730	4980	4280	3620	3360	3010	2790
	17	5700	4950	4250	3600	3340	2980	2760
	18	5680	4930	4220	3570	3310	2960	2730
	19	5650	4900	4190	3540	3280	2930	2710
	20	5620	4870	4160	3510	3250	2900	2680
	21	5590	4840	4130	3480	3220	2860	2650
	22	5550	4800	4100	3440	3190	2830	2620
	23	5520	4770	4070	3410	3160	2800	2580
	24	5490	4730	4030	3370	3130	2760	2550
	25	5450	4700	3990	3340	3090	2720	2520
	26	5410	4660	3960	3300	3060	2690	2480
	27	5370	4620	3920	3260	3020	2650	2450
	28	5340	4580	3880	3220	2980	2610	2410
	29	5290	4540	3840	3180	2950	2570	2370
	30	5250	4500	3800	3140	2910	2530	2330
	31	5210	4460	3750	3100	2870	2490	2290
	32	5170	4410	3710	3050	2830	2440	2250
	33	5120	4370	3660	3010	2780	2400	2210
	34	5070	4320	3620	2970	2740	2360	2170
	35	5030	4270	3570	2920	2700	2320	2130
	36	4980	4230	3530	2880	2660	2270	2090
	37	4930	4180	3480	2830	2610	2230	2050
	38	4880	4130	3430	2780	2570	2180	2010
	39	4830	4080	3380	2740	2520	2140	1970
	40	4780	4030	3330	2690	2480	2090	1920
PROPERTIES								
r_m (in.)		10.3	9.44	8.62	7.81	7.90	6.99	7.08
$\phi_b M_n$ (kip-ft)		1990	1680	1400	1140	949	911	759
P_e $(KL)^2/10^4$ (kip-ft^2)		2170	1620	1190	851	774	586	533

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

f'c = 8.0

Nominal Size		26 x 24	24 x 22	22 x 20	20 x 18		20 x 16	
Wall Thickness		5/8	5/8	5/8	5/8	1/2	5/8	1/2
Weight Per Foot		200.28	183.27	166.25	149.24	122.25	140.73	115.45
Design Wall Thickness		0.625	0.625	0.625	0.625	0.500	0.625	0.500
		F_y = 46 ksi						
Effective length KL in feet	0	5540	4820	4150	3520	3270	3200	2970
	6	5510	4790	4120	3490	3230	3170	2930
	7	5500	4780	4100	3470	3220	3150	2920
	8	5490	4770	4090	3460	3210	3140	2910
	9	5480	4750	4070	3440	3190	3120	2890
	10	5460	4740	4060	3430	3180	3100	2870
	11	5440	4720	4040	3410	3160	3080	2850
	12	5420	4700	4020	3390	3140	3060	2830
	13	5400	4680	4000	3360	3120	3030	2810
	14	5380	4650	3970	3340	3100	3010	2780
	15	5350	4630	3950	3310	3070	2980	2750
	16	5330	4600	3920	3290	3050	2950	2730
	17	5300	4580	3890	3260	3020	2920	2700
	18	5270	4550	3860	3230	2990	2880	2670
	19	5240	4520	3830	3200	2960	2850	2630
	20	5210	4480	3800	3160	2930	2810	2600
	21	5180	4450	3770	3130	2900	2780	2560
	22	5140	4420	3730	3090	2860	2740	2530
	23	5110	4380	3700	3060	2830	2700	2490
	24	5070	4340	3660	3020	2790	2660	2450
	25	5030	4300	3620	2980	2760	2610	2410
	26	4990	4260	3580	2940	2720	2570	2370
	27	4950	4220	3540	2900	2680	2530	2330
	28	4910	4180	3500	2860	2640	2480	2290
	29	4870	4140	3450	2810	2600	2440	2250
	30	4820	4090	3410	2770	2560	2390	2200
	31	4780	4050	3360	2730	2520	2340	2160
	32	4730	4000	3320	2680	2480	2300	2120
	33	4680	3950	3270	2640	2430	2250	2070
	34	4630	3910	3220	2590	2390	2200	2020
	35	4580	3860	3170	2540	2340	2150	1980
	36	4530	3810	3130	2490	2300	2100	1930
	37	4480	3760	3080	2450	2250	2050	1890
	38	4430	3710	3030	2400	2210	2000	1840
	39	4380	3650	2980	2350	2160	1950	1790
	40	4330	3600	2930	2300	2120	1900	1750
PROPERTIES								
r_{my} (in.)		9.55	8.73	7.91	7.10	7.19	6.37	6.46
r_{mx}/r_{my}		1.06	1.07	1.08	1.08	1.08	1.19	1.18
$\phi_b M_{nx}$ (kip-ft)		1880	1580	1310	1060	880	976	814
$\phi_b M_{ny}$ (kip-ft)		1780	1490	1220	987	821	838	700
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		1970	1490	1080	766	696	681	619
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		1760	1300	936	653	594	485	442

LRFD Composite Columns
Rectangular HSS

Axial Design Strength in Kips

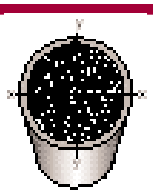
f'c = 8.0

Nominal Size		20 x 12	18 x 12		16 x 12	14 x 12	
Wall Thickness		5/8	5/8	1/2	5/8	1/2	3/8
Weight Per Foot		123.72	115.21	95.03	106.71	81.42	62.39
Design Wall Thickness		0.625	0.625	0.500	0.625	0.500	0.375
		F_y = 46 ksi					
Effective length KL in feet	0	2580	2350	2170	2130	1760	1570
	6	2530	2310	2120	2090	1720	1540
	7	2510	2290	2110	2070	1710	1530
	8	2490	2270	2090	2060	1690	1520
	9	2470	2250	2070	2040	1680	1500
	10	2440	2230	2050	2010	1660	1480
	11	2410	2200	2030	1990	1640	1460
	12	2380	2170	2000	1970	1620	1440
	13	2350	2150	1970	1940	1590	1420
	14	2320	2110	1940	1910	1570	1400
	15	2280	2080	1910	1880	1540	1380
	16	2240	2050	1880	1850	1510	1350
	17	2200	2010	1850	1810	1490	1330
	18	2160	1970	1810	1780	1460	1300
	19	2120	1930	1770	1740	1420	1270
	20	2080	1890	1740	1700	1390	1240
	21	2030	1850	1700	1660	1360	1210
	22	1980	1810	1660	1620	1330	1180
	23	1940	1760	1620	1580	1290	1150
	24	1890	1720	1580	1540	1260	1120
	25	1840	1670	1530	1500	1220	1080
	26	1790	1630	1490	1460	1190	1050
	27	1740	1580	1450	1420	1150	1020
	28	1690	1530	1400	1370	1120	987
	29	1640	1480	1360	1330	1080	954
	30	1590	1440	1320	1290	1040	921
	31	1540	1390	1270	1240	1010	888
	32	1480	1340	1230	1200	971	855
	33	1430	1300	1190	1160	935	823
	34	1380	1250	1140	1110	899	791
	35	1330	1200	1100	1070	864	759
	36	1280	1160	1060	1030	829	728
	37	1230	1110	1020	988	795	697
	38	1180	1070	975	948	761	666
	39	1140	1020	934	908	728	636
	40	1090	980	894	868	695	606
PROPERTIES							
r_{my} (in.)		4.87	4.81	4.89	4.73	4.73	4.80
r_{mx}/r_{my}		1.48	1.36	1.36	1.25	1.12	1.13
$\phi_b M_{nx}$ (kip-ft)		807	687	580	576	400	311
$\phi_b M_{ny}$ (kip-ft)		573	524	438	473	359	280
P_{ex} $(K_xL_x)^2/10^4$ (kip-ft^2)		515	392	359	290	189	165
P_{ey} $(K_yL_y)^2/10^4$ (kip-ft^2)		236	212	193	187	149	130

Notes

LRFD Composite Columns
Round HSS

ERW



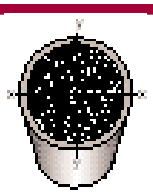
f'c = 3.5

Axial Design Strength in Kips

Nominal Outside Diameter		20.000		18.000		16.000				14.000		
Wall Thickness		0.500	0.375	0.500	0.375	0.500	0.438	0.375	0.312	0.500	0.375	0.312
Weight Per Foot		104.13	78.60	93.45	70.59	82.77	72.80	62.58	52.28	72.09	54.57	45.61
Design Wall Thickness		0.465	0.349	0.465	0.349	0.465	0.407	0.349	0.291	0.465	0.349	0.291
		F_y = 46 ksi										
Effective length KL in feet	0	1840	1580	1580	1350	1340	1240	1140	1040	1110	938	846
	4	1830	1570	1570	1350	1330	1230	1130	1030	1110	931	840
	5	1830	1570	1570	1340	1330	1230	1130	1030	1100	927	836
	6	1820	1570	1560	1340	1320	1220	1120	1020	1090	922	832
	7	1820	1560	1560	1330	1320	1210	1120	1020	1090	917	827
	8	1810	1560	1550	1330	1310	1210	1110	1010	1080	910	821
	9	1800	1550	1540	1320	1300	1200	1100	1010	1070	903	815
	10	1790	1540	1540	1310	1290	1190	1100	998	1060	895	807
	11	1790	1540	1530	1310	1280	1180	1090	990	1050	886	799
	12	1780	1530	1520	1300	1270	1170	1080	982	1040	877	791
	13	1770	1520	1510	1290	1260	1160	1070	973	1030	867	781
	14	1760	1510	1490	1280	1250	1150	1060	964	1020	856	771
	15	1740	1500	1480	1270	1240	1140	1050	954	1000	844	761
	16	1730	1490	1470	1260	1220	1130	1040	943	988	832	750
	17	1720	1480	1460	1250	1210	1110	1020	932	973	819	738
	18	1700	1470	1440	1230	1190	1100	1010	920	958	806	726
	19	1690	1450	1430	1220	1180	1090	998	907	941	792	714
	20	1670	1440	1410	1210	1160	1070	984	895	924	778	701
	21	1660	1430	1390	1190	1140	1050	970	881	907	763	687
	22	1640	1410	1380	1180	1130	1040	955	868	889	748	673
	23	1630	1400	1360	1160	1110	1020	940	853	871	732	659
	24	1610	1380	1340	1150	1090	1000	924	839	852	716	645
	25	1590	1370	1320	1130	1070	987	907	824	833	700	630
	26	1570	1350	1300	1110	1050	969	891	809	813	683	615
	27	1550	1330	1280	1100	1030	951	874	793	793	667	600
	28	1530	1320	1260	1080	1010	933	857	778	773	650	584
	29	1510	1300	1240	1060	991	914	839	762	753	633	569
	30	1490	1280	1220	1050	970	894	822	745	733	615	553
	31	1470	1260	1200	1030	949	875	804	729	712	598	538
	32	1450	1240	1180	1010	928	855	786	712	692	581	522
	33	1430	1230	1160	990	906	836	767	696	671	563	506
	34	1410	1210	1140	971	885	816	749	679	650	546	490
	35	1390	1190	1120	952	863	796	730	662	630	528	475
	36	1360	1170	1090	933	842	776	712	645	609	511	459
	37	1340	1150	1070	913	820	756	693	628	589	494	443
	38	1320	1130	1050	894	798	736	675	611	569	477	428
	39	1290	1110	1030	874	777	716	656	594	549	460	413
	40	1270	1090	1000	855	755	695	638	577	529	443	397
PROPERTIES												
r_m (in.)		6.91	6.95	6.20	6.24	5.49	5.51	5.53	5.55	4.79	4.83	4.85
$\phi_b M_n$ (kip-ft)		611	466	493	376	386	342	295	248	294	225	189
P_e $(KL)^2/10^4$ (kip-ft^2)		393	333	274	232	184	169	155	140	118	98.6	88.2

LRFD Composite Columns
Round HSS

ERW



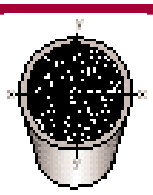
f'c = 3.5

Axial Design Strength in Kips

Nominal Outside Diameter		12.750			12.500					
Wall Thickness		0.500	0.375	0.250	0.625	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		65.42	49.56	33.38	79.27	64.08	48.56	40.61	32.71	24.72
Design Wall Thickness		0.465	0.349	0.233	0.581	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi								
Effective length KL in feet	0	977	820	658	1110	954	797	720	639	557
	4	969	813	652	1100	945	789	713	633	551
	5	964	809	648	1090	940	785	709	629	548
	6	958	804	644	1080	934	780	705	625	545
	7	951	798	640	1080	927	774	700	620	541
	8	943	791	634	1070	919	767	693	615	536
	9	934	784	628	1060	910	760	686	609	530
	10	924	775	621	1040	900	751	679	602	524
	11	913	766	614	1030	889	742	670	594	517
	12	902	756	606	1020	877	732	661	586	510
	13	889	746	597	1000	865	722	652	578	503
	14	876	735	588	988	851	710	642	568	494
	15	862	723	578	971	837	698	631	559	486
	16	847	710	568	954	822	686	619	548	477
	17	831	697	557	935	806	673	607	538	467
	18	815	684	546	916	790	659	595	527	457
	19	798	669	535	897	773	645	582	515	447
	20	781	655	523	877	756	630	569	503	437
	21	763	640	511	856	738	615	555	491	426
	22	745	625	499	835	719	600	541	479	415
	23	727	609	486	813	701	584	527	466	404
	24	708	593	473	791	682	569	513	453	393
	25	689	577	460	769	663	553	498	440	381
	26	669	561	447	746	643	536	484	427	370
	27	650	544	433	723	624	520	469	414	358
	28	630	528	420	700	604	503	454	400	346
	29	610	511	406	677	584	487	439	387	334
	30	590	494	393	654	565	470	424	374	323
	31	571	478	379	631	545	454	409	360	311
	32	551	461	366	609	525	437	394	347	299
	33	531	444	353	586	506	421	379	334	288
	34	511	428	339	563	486	405	364	321	276
	35	492	412	326	541	467	389	350	308	265
	36	473	396	313	519	448	373	336	295	254
	37	454	380	300	497	429	357	321	283	243
	38	435	364	288	476	411	342	308	270	232
	39	417	349	275	455	393	327	294	258	221
	40	399	333	263	435	375	312	280	246	211
PROPERTIES										
r_m (in.)		4.35	4.39	4.43	4.22	4.26	4.30	4.32	4.34	4.36
$\phi_b M_n$ (kip-ft)		242	185	126	285	233	178	150	121	91.1
P_e $(KL)^2/10^4$ (kip-ft^2)		85.9	71.8	56.6	93.3	80.6	67.0	60.2	52.8	45.2

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

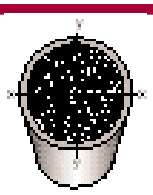


f'c = 3.5

Nominal Outside Diameter		12.313						12.250					
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.625	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		78.02	63.08	47.81	39.99	32.21	24.35	77.60	62.75	47.56	39.78	32.04	24.22
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	1080	934	780	703	624	544	1080	927	773	697	620	539
	4	1070	925	773	697	618	539	1070	918	766	690	614	534
	5	1070	920	768	693	615	536	1060	913	762	686	610	531
	6	1060	914	763	688	611	532	1050	907	757	681	606	527
	7	1050	907	757	683	606	528	1050	900	751	676	601	523
	8	1040	898	751	677	600	523	1040	892	744	670	596	518
	9	1030	889	743	670	594	517	1030	882	736	663	590	513
	10	1020	879	734	662	587	511	1010	872	728	655	583	506
	11	1010	868	725	654	580	504	1000	861	718	647	575	500
	12	993	856	715	644	572	497	986	849	708	638	567	493
	13	979	843	704	635	563	489	972	837	698	628	558	485
	14	963	830	693	624	554	481	956	823	686	618	549	477
	15	946	815	681	613	544	473	939	809	674	607	539	468
	16	928	800	668	602	534	463	921	793	662	595	529	459
	17	910	785	655	590	523	454	903	778	648	583	518	449
	18	891	768	641	578	512	444	884	761	635	571	507	440
	19	871	751	627	565	500	434	864	744	621	558	496	430
	20	851	734	613	552	488	424	844	727	606	545	484	419
	21	830	716	598	538	476	413	823	709	591	531	472	408
	22	809	698	582	524	464	402	802	691	576	518	459	397
	23	787	679	567	510	451	391	780	672	560	503	447	386
	24	765	660	551	496	438	379	758	653	544	489	434	375
	25	743	641	535	481	425	368	736	634	528	475	421	364
	26	720	622	519	466	412	356	713	615	512	460	408	352
	27	698	602	502	452	399	345	690	595	496	445	394	340
	28	675	582	486	437	386	333	668	576	479	431	381	329
	29	652	563	469	422	372	321	645	556	463	416	368	317
	30	629	543	453	407	359	310	622	537	447	401	355	306
	31	606	524	436	392	346	298	599	517	430	386	342	294
	32	584	504	420	377	333	287	577	498	414	372	329	283
	33	561	485	404	363	320	275	554	478	398	357	316	271
	34	539	466	388	348	307	264	532	459	382	343	303	260
	35	517	447	372	334	294	253	510	440	366	328	290	249
	36	495	428	356	320	282	242	489	422	351	314	278	238
	37	474	410	341	306	269	231	467	403	336	301	265	227
	38	453	391	326	292	257	220	446	385	321	287	253	217
	39	432	374	311	279	245	210	426	368	306	274	241	206
	40	411	356	296	265	233	200	405	350	291	260	229	196
PROPERTIES													
r_m (in.)		4.15	4.19	4.23	4.25	4.27	4.29	4.13	4.17	4.21	4.23	4.25	4.27
$\phi_b M_n$ (kip-ft)		276	225	173	145	117	88.3	273	223	170	144	116	87.6
P_e $(KL)^2/10^4$ (kip-ft^2)		88.3	76.4	63.6	57.0	50.0	42.8	87.0	75.1	62.4	55.9	49.2	42.1

LRFD Composite Columns
Round HSS

ERW



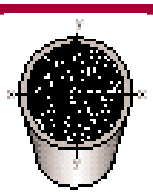
f'c = 3.5

Axial Design Strength in Kips

Nominal Outside Diameter		11.250						10.750		
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.500	0.365	0.250
Weight Per Foot		70.92	57.41	43.56	36.45	29.37	22.21	54.74	40.48	28.04
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.465	0.340	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	965	829	690	617	546	473	778	635	511
	4	953	820	682	610	540	467	768	627	505
	5	947	815	678	606	536	464	763	623	501
	6	940	808	673	601	532	460	756	618	497
	7	931	801	666	596	527	456	748	611	491
	8	921	792	659	589	521	451	740	604	486
	9	910	782	651	582	515	445	730	596	479
	10	897	772	642	574	508	439	719	587	472
	11	884	760	633	565	500	432	707	577	464
	12	869	748	622	556	492	425	694	567	456
	13	853	734	611	546	483	417	681	556	447
	14	837	720	599	535	473	409	666	544	437
	15	820	705	587	524	463	400	651	532	427
	16	801	690	574	513	453	391	636	519	417
	17	782	674	561	501	442	381	619	506	406
	18	763	657	547	488	431	372	602	492	394
	19	743	640	532	475	420	361	585	478	383
	20	722	622	518	462	408	351	567	463	371
	21	701	604	503	448	396	341	549	448	359
	22	679	585	487	435	383	330	531	433	347
	23	658	567	472	421	371	319	512	418	335
	24	636	548	456	407	359	308	494	403	322
	25	614	529	440	392	346	297	475	387	310
	26	591	510	424	378	333	286	456	372	298
	27	569	491	408	364	321	275	437	357	285
	28	547	472	393	350	308	264	419	342	273
	29	525	453	377	336	295	253	400	327	261
	30	503	434	361	322	283	242	382	312	249
	31	481	415	346	308	271	231	364	297	237
	32	460	397	330	294	258	221	346	283	225
	33	438	379	315	281	246	210	329	268	214
	34	418	361	300	267	235	200	312	255	203
	35	397	344	286	254	223	190	295	241	192
	36	377	326	271	241	212	180	279	227	181
	37	357	309	257	229	200	171	264	215	171
	38	339	293	244	217	190	162	250	204	162
	39	322	278	231	206	180	154	238	194	154
	40	306	264	220	196	171	146	226	184	147
PROPERTIES										
r_m (in.)		3.78	3.82	3.86	3.88	3.90	3.92	3.64	3.68	3.72
$\phi_b M_n$ (kip-ft)		228	187	143	121	97.6	73.5	170	127	89.0
P_e $(KL)^2/10^4$ (kip-ft^2)		65.6	56.8	47.2	42.0	36.8	31.3	48.5	39.5	31.5

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

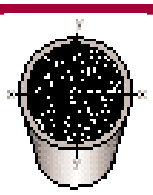


f'c = 3.5

Nominal Outside Diameter		10.000						9.625				
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		62.58	50.73	38.55	32.28	26.03	19.70	48.73	37.05	31.03	25.03	18.95
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	828	707	586	523	460	395	674	557	496	435	373
	4	816	697	578	516	453	389	664	548	488	428	367
	5	809	691	573	512	450	386	658	544	484	425	364
	6	801	684	567	506	445	382	651	538	479	420	360
	7	791	676	561	500	440	377	642	531	473	415	355
	8	780	667	553	494	434	372	633	523	466	408	350
	9	768	657	544	486	427	366	622	514	458	402	344
	10	755	645	535	478	419	360	611	505	449	394	337
	11	740	633	525	468	411	353	598	494	440	386	330
	12	725	620	514	459	403	345	585	483	430	377	323
	13	708	606	502	448	394	337	570	472	420	368	315
	14	691	591	490	437	384	329	555	459	409	358	306
	15	673	576	477	426	374	320	540	446	397	348	297
	16	654	560	464	414	363	311	523	433	385	337	288
	17	634	543	450	402	352	301	506	419	373	327	279
	18	614	526	436	389	341	292	489	405	360	315	269
	19	594	509	421	376	330	282	472	390	347	304	259
	20	573	491	407	363	318	271	454	376	334	292	249
	21	551	473	392	349	306	261	436	361	321	281	239
	22	530	455	377	336	294	251	418	346	307	269	229
	23	509	436	361	322	282	241	399	331	294	257	219
	24	487	418	346	309	270	230	381	316	281	245	209
	25	466	400	331	295	258	220	363	301	268	234	199
	26	444	382	316	282	246	210	345	286	254	222	189
	27	423	364	301	268	235	199	328	272	241	211	179
	28	402	346	286	255	223	189	310	257	229	200	169
	29	382	328	272	242	212	180	293	243	216	189	160
	30	361	311	257	229	200	170	277	230	204	178	151
	31	342	294	244	217	189	160	260	216	192	167	141
	32	322	278	230	205	179	151	244	203	180	157	133
	33	303	261	216	192	168	142	230	191	169	148	125
	34	285	246	204	181	158	134	216	180	159	139	117
	35	269	232	192	171	149	126	204	169	150	131	111
	36	255	220	182	162	141	119	193	160	142	124	105
	37	241	208	172	153	134	113	183	152	135	117	99
	38	229	197	163	145	127	107	173	144	128	111	94
	39	217	187	155	138	120	102	164	136	121	106	89
	40	206	178	147	131	114	97	156	130	115	100	85
PROPERTIES												
r_m (in.)		3.34	3.38	3.41	3.43	3.45	3.47	3.24	3.28	3.30	3.32	3.34
$\phi_b M_n$ (kip-ft)		178	146	112	94.5	76.6	58.0	135	104	87.6	71.1	53.5
P_e $(KL)^2/10^4$ (kip-ft^2)		44.3	38.2	31.6	28.1	24.5	20.7	33.5	27.8	24.7	21.6	18.2

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

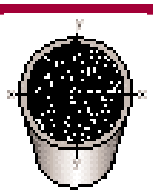


f'c = 3.5

Nominal Outside Diameter		8.750					8.625				
Wall Thickness		0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.322	0.250	0.188
Weight Per Foot		44.06	33.54	28.12	22.70	17.19	43.39	33.04	28.55	22.36	16.94
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.465	0.349	0.300	0.233	0.174
		F_y = 46 ksi									
Effective length KL in feet	0	595	489	435	380	324	583	479	435	372	317
	4	583	480	427	373	317	571	470	426	365	310
	5	577	475	422	369	314	565	465	422	361	307
	6	569	468	416	364	310	558	459	416	356	303
	7	561	461	410	358	305	549	452	410	350	298
	8	551	453	403	352	299	539	443	402	344	292
	9	539	444	395	345	293	527	434	394	337	286
	10	527	434	386	337	287	515	424	385	329	280
	11	514	423	376	329	279	502	413	375	321	272
	12	500	412	366	320	272	488	402	365	312	265
	13	485	400	355	310	264	473	390	354	302	257
	14	470	387	344	300	255	458	377	342	292	248
	15	454	374	332	290	246	441	364	330	282	239
	16	437	360	320	279	237	425	350	318	272	230
	17	420	346	308	269	228	408	336	305	261	221
	18	403	332	295	258	218	391	322	293	250	212
	19	385	318	283	246	209	373	308	280	239	202
	20	367	303	270	235	199	356	294	267	228	192
	21	350	289	257	224	189	338	279	254	216	183
	22	332	274	244	213	180	321	265	241	205	173
	23	315	260	231	201	170	303	251	228	194	164
	24	297	246	219	190	161	286	237	215	183	155
	25	280	232	206	179	151	269	223	203	173	145
	26	264	218	194	169	142	253	209	190	162	136
	27	247	205	182	158	133	237	196	178	152	128
	28	231	192	171	148	125	221	183	167	142	119
	29	216	179	159	138	116	206	171	155	132	111
	30	202	167	149	129	109	192	160	145	123	104
	31	189	156	139	121	102	180	149	136	116	97
	32	177	147	131	114	95	169	140	128	108	91
	33	167	138	123	107	90	159	132	120	102	86
	34	157	130	116	101	85	150	124	113	96	81
	35	148	123	109	95	80	141	117	107	91	76
	36	140	116	103	90	75	134	111	101	86	72
	37	133	110	98	85	71	127	105	95	81	68
	38	126	104	93	80	68	120	99	90	77	65
	39	119	99	88	76	64	114	94	86	73	61
	40	113	94	84	73	61	108	90	82	69	58
PROPERTIES											
r_m (in.)		2.93	2.97	2.99	3.01	3.03	2.89	2.93	2.95	2.97	2.99
$\phi_b M_n$ (kip-ft)		110	84.9	71.8	58.3	44.2	107	82.5	71.8	56.6	42.8
P_e $(KL)^2/10^4$ (kip-ft^2)		24.3	20.2	17.9	15.6	13.1	23.2	19.3	17.5	14.9	12.5

LRFD Composite Columns
Round HSS

ERW



f'c = 3.5

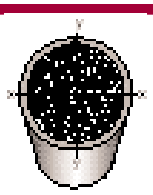
Axial Design Strength in Kips

Nominal Outside Diameter		7.625			7.500				
Wall Thickness		0.375	0.328	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		29.04	25.56	10.01	37.38	28.54	23.95	19.36	14.68
Design Wall Thickness		0.349	0.305	0.116	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi							
Effective length KL in feet	0	407	372	216	488	398	353	306	258
	4	397	363	210	476	388	344	298	251
	5	392	358	207	469	383	339	294	248
	6	385	351	203	460	376	333	289	243
	7	377	344	199	451	368	326	283	238
	8	368	336	194	440	359	318	276	232
	9	359	327	189	427	349	309	269	226
	10	348	318	184	414	339	300	260	219
	11	337	308	177	400	327	290	252	212
	12	325	297	171	385	315	279	242	204
	13	313	285	164	370	303	268	233	196
	14	300	273	157	353	290	257	223	187
	15	286	261	150	337	276	245	212	178
	16	273	249	143	320	263	233	202	170
	17	259	236	135	303	249	221	192	161
	18	245	224	128	286	235	209	181	152
	19	231	211	120	269	221	196	170	143
	20	218	198	113	252	208	184	160	134
	21	204	186	106	236	194	172	150	125
	22	191	174	99	220	181	161	140	117
	23	178	162	92	204	168	150	130	108
	24	165	151	85	189	156	139	120	100
	25	153	139	78	174	144	128	111	92
	26	141	129	72	161	133	118	102	85
	27	131	119	67	149	123	109	95	79
	28	122	111	63	139	115	102	88	74
	29	113	103	58	129	107	95	82	69
	30	106	97	54	121	100	89	77	64
	31	99	91	51	113	94	83	72	60
	32	93	85	48	106	88	78	68	56
	33	88	80	45	100	83	73	64	53
	34	83	75	42	94	78	69	60	50
	35	78	71	40	89	73	65	56	47
	36	74	67	38	84	69	62	53	45
	37	70	64	36	79	66	58	51	42
	38	66	60	34	75	62	55	48	40
	39	63	57	32	71	59	52	45	38
	40	60	54	31	68	56	50	43	36
PROPERTIES									
r_m (in.)		2.58	2.59	2.66	2.49	2.53	2.55	2.57	2.59
$\phi_b M_n$ (kip-ft)		63.8	56.6	22.6	79.3	61.8	52.1	42.4	32.2
P_e $(KL)^2/10^4$ (kip-ft^2)		12.8	11.7	6.57	14.6	12.1	10.7	9.28	7.75

ERW

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



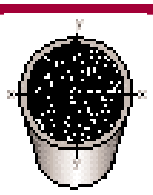
f'c = 3.5

Nominal Outside Diameter		7.000						6.875				
Wall Thickness		0.500	0.375	0.312	0.250	0.188	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		34.71	26.53	22.29	18.02	13.68	9.18	34.04	26.03	21.87	17.69	13.43
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
		F_y = 46 ksi										
Effective length KL in feet	0	447	364	321	278	234	189	436	356	314	272	228
	4	433	353	312	270	227	183	423	345	304	263	221
	5	426	347	307	266	223	180	415	339	299	259	217
	6	417	340	301	260	218	176	406	332	293	253	212
	7	407	332	293	254	213	172	396	323	286	247	207
	8	396	323	285	247	207	167	384	314	278	240	201
	9	383	313	276	239	201	162	372	304	269	232	195
	10	370	302	267	231	194	156	358	293	259	224	187
	11	355	290	256	222	186	150	343	281	249	215	180
	12	340	278	246	213	178	143	328	269	238	206	172
	13	324	265	234	203	170	137	312	256	227	196	164
	14	308	252	223	193	162	130	296	243	215	186	156
	15	292	239	211	183	153	123	280	230	203	176	147
	16	275	225	199	173	144	116	263	216	192	166	138
	17	258	212	187	162	136	109	246	203	180	155	130
	18	242	198	175	152	127	101	230	190	168	145	121
	19	225	185	164	142	118	95	214	177	156	135	113
	20	209	172	152	132	110	88	198	164	145	126	105
	21	194	159	141	122	102	81	182	151	134	116	97
	22	179	147	130	113	94	75	167	139	123	107	89
	23	164	135	119	103	86	68	153	127	113	98	81
	24	150	124	110	95	79	63	141	117	104	90	75
	25	138	114	101	87	73	58	130	108	96	83	69
	26	128	105	93	81	67	53	120	100	88	76	64
	27	119	98	87	75	63	50	111	92	82	71	59
	28	110	91	81	70	58	46	103	86	76	66	55
	29	103	85	75	65	54	43	96	80	71	61	51
	30	96	79	70	61	51	40	90	75	66	57	48
	31	90	74	66	57	47	38	84	70	62	54	45
	32	85	69	62	53	45	35	79	66	58	50	42
	33	79	65	58	50	42	33	74	62	55	47	39
	34	75	62	55	47	39	31	70	58	52	45	37
	35	71	58	52	45	37	30	66	55	49	42	35
	36	67	55	49	42	35	28	63	52	46	40	33
	37	63	52	46	40	33	26	59	49	44	38	31
	38	60	49	44	38	32	25		47	41	36	30
	39		47	42	36	30	24				34	28
	40					28	23					
PROPERTIES												
r_m (in.)		2.32	2.35	2.37	2.39	2.41	2.43	2.27	2.31	2.33	2.35	2.37
$\phi_b M_n$ (kip-ft)		68.7	53.5	45.2	36.9	28.0	19.0	65.9	51.4	43.5	35.5	26.9
P_e $(KL)^2/10^4$ (kip-ft^2)		11.6	9.54	8.47	7.34	6.11	4.85	10.9	9.03	8.01	6.93	5.77

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

ERW



f'c = 3.5

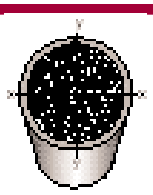
Axial Design Strength in Kips

Nominal Outside Diameter		6.625								6.125				
Wall Thickness		0.500	0.432	0.375	0.312	0.280	0.250	0.188	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		32.71	28.57	25.03	21.04	18.97	17.02	12.92	8.68	30.04	23.03	19.37	15.69	11.92
Design Wall Thickness		0.465	0.403	0.349	0.291	0.261	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	416	375	339	299	278	258	216	174	377	306	269	232	193
	4	402	363	328	289	269	250	209	168	362	294	259	223	186
	5	395	356	321	284	264	245	205	165	354	288	254	218	182
	6	385	348	314	277	258	240	201	161	344	280	247	213	177
	7	375	338	306	270	251	233	195	157	333	271	239	206	171
	8	363	328	296	262	243	226	189	152	321	262	231	199	165
	9	350	316	286	252	235	218	183	146	308	251	221	190	159
	10	336	304	275	243	226	210	175	140	293	240	211	182	151
	11	321	291	263	232	216	201	168	134	278	228	201	173	144
	12	306	277	250	221	206	191	160	128	263	215	190	163	136
	13	290	262	238	210	196	182	152	121	247	202	179	154	128
	14	274	248	225	199	185	172	143	114	231	189	167	144	120
	15	257	233	211	187	174	162	135	108	215	176	156	134	111
	16	241	218	198	175	163	152	127	101	198	164	145	124	103
	17	224	204	185	164	152	142	118	94	183	151	134	115	95
	18	208	189	172	152	142	132	110	87	167	138	123	105	87
	19	192	175	159	141	131	122	102	80	153	127	112	96	80
	20	177	161	146	130	121	112	94	74	138	115	102	87	72
	21	162	148	134	119	111	103	86	68	125	104	92	79	66
	22	148	135	123	109	101	94	78	62	114	95	84	72	60
	23	135	123	112	100	93	86	72	57	104	87	77	66	55
	24	124	113	103	91	85	79	66	52	96	80	71	61	50
	25	114	104	95	84	78	73	61	48	88	73	65	56	46
	26	106	96	88	78	73	67	56	44	82	68	60	52	43
	27	98	89	81	72	67	63	52	41	76	63	56	48	40
	28	91	83	76	67	63	58	48	38	70	59	52	45	37
	29	85	77	71	63	58	54	45	36	66	55	48	41	34
	30	79	72	66	59	54	51	42	33	61	51	45	39	32
	31	74	68	62	55	51	47	39	31	57	48	42	36	30
	32	70	64	58	51	48	45	37	29	54	45	40	34	28
	33	66	60	54	48	45	42	35	27	51	42	37	32	27
	34	62	56	51	46	42	39	33	26		40	35	30	25
	35	58	53	48	43	40	37	31	24					24
	36	55	50	46	41	38	35	29	23					
	37			43	38	36	33	28	22					
	38							26	21					
	39													
	40													
PROPERTIES														
r_m (in.)		2.18	2.20	2.22	2.24	2.25	2.26	2.28	2.30	2.01	2.05	2.07	2.08	2.10
$\phi_b M_n$ (kip-ft)		61.1	53.8	47.6	40.4	36.6	32.8	25.0	17.0	51.4	40.4	34.2	27.9	21.3
P_e $(KL)^2/10^4$ (kip-ft^2)		9.59	8.73	7.96	7.06	6.58	6.11	5.09	4.01	7.41	6.16	5.47	4.68	3.88

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



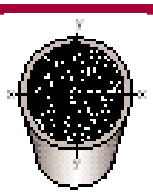
f'c = 3.5

Nominal Outside Diameter		6.000							5.563			
Wall Thickness		0.500	0.375	0.312	0.280	0.250	0.188	0.125	0.375	0.258	0.188	0.134
Weight Per Foot		29.37	22.53	18.95	17.11	15.35	11.67	7.84	20.78	14.62	10.79	7.77
Design Wall Thickness		0.465	0.349	0.291	0.261	0.233	0.174	0.116	0.349	0.241	0.174	0.125
		F_y = 46 ksi										
Effective length KL in feet	0	367	298	262	244	226	188	150	271	209	169	140
	4	352	286	252	234	217	180	144	258	199	162	133
	5	344	280	246	229	212	176	140	251	194	157	130
	6	334	272	239	222	206	171	136	243	188	152	125
	7	323	263	232	215	199	166	132	234	181	147	121
	8	310	253	223	207	192	160	127	224	173	140	115
	9	297	242	214	198	184	153	121	212	164	133	110
	10	282	231	203	189	175	146	116	201	155	126	104
	11	267	219	193	179	166	138	110	189	146	119	97
	12	251	206	182	169	157	130	103	176	136	111	91
	13	235	193	171	159	147	122	97	163	127	103	84
	14	219	180	159	148	137	114	90	151	117	95	78
	15	203	167	148	138	128	106	84	138	107	87	71
	16	187	155	137	127	118	98	77	126	98	80	65
	17	172	142	126	117	109	90	71	114	89	72	59
	18	157	130	115	107	99	82	65	103	80	65	53
	19	142	118	105	97	90	75	59	92	72	59	47
	20	128	107	95	88	82	68	53	83	65	53	43
	21	116	97	86	80	74	61	48	75	59	48	39
	22	106	88	78	73	68	56	44	69	53	44	35
	23	97	81	72	67	62	51	40	63	49	40	32
	24	89	74	66	61	57	47	37	58	45	37	30
	25	82	68	61	56	52	43	34	53	41	34	27
	26	76	63	56	52	48	40	31	49	38	31	25
	27	70	58	52	48	45	37	29	46	36	29	24
	28	65	54	48	45	42	35	27	42	33	27	22
	29	61	51	45	42	39	32	25	40	31	25	20
	30	57	47	42	39	36	30	24	37	29	23	19
	31	53	44	39	37	34	28	22		27	22	18
	32	50	42	37	34	32	26	21				17
	33		39	35	32	30	25	20				
	34					28	23	18				
	35											
	36											
	37											
	38											
	39											
	40											
PROPERTIES												
r_m (in.)		1.96	2.00	2.02	2.03	2.04	2.06	2.08	1.85	1.88	1.91	1.92
$\phi_b M_n$ (kip-ft)		49.3	38.6	32.7	29.7	26.7	20.4	13.9	32.8	23.6	17.4	12.8
P_e (KL)^2/10^4 (kip-ft^2)		6.87	5.72	5.08	4.73	4.39	3.64	2.85	4.46	3.47	2.84	2.30

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



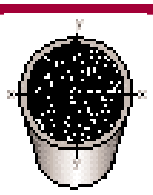
f'c = 3.5

Nominal Outside Diameter		5.500			5.000						
Wall Thickness		0.500	0.375	0.258	0.500	0.375	0.312	0.258	0.250	0.188	0.125
Weight Per Foot		26.70	20.53	14.44	24.03	18.52	15.62	13.07	12.68	9.66	6.51
Design Wall Thickness		0.465	0.349	0.241	0.465	0.349	0.291	0.241	0.233	0.174	0.116
		F_y = 46 ksi									
Effective length KL in feet	0	329	267	206	292	236	207	181	177	146	115
	4	313	254	196	274	222	195	171	167	138	108
	5	304	247	191	265	215	189	165	162	133	105
	6	294	239	184	254	206	181	159	155	128	101
	7	282	230	177	241	197	173	151	148	122	96
	8	269	219	169	228	186	163	143	140	116	91
	9	255	208	161	213	175	154	135	132	109	85
	10	240	197	152	198	163	143	125	123	102	79
	11	225	184	143	183	150	133	116	114	94	74
	12	209	172	133	167	138	122	107	105	87	68
	13	194	159	123	152	126	111	97	96	79	62
	14	178	147	114	137	114	101	88	87	72	56
	15	162	134	104	122	102	90	79	78	65	50
	16	147	122	95	108	91	81	71	70	58	45
	17	133	110	86	96	80	71	63	62	51	40
	18	119	99	77	85	72	64	56	55	46	35
	19	107	89	69	77	64	57	50	49	41	32
	20	96	80	62	69	58	52	45	45	37	29
	21	87	73	57	63	53	47	41	40	33	26
	22	79	66	52	57	48	43	37	37	30	24
	23	73	61	47	52	44	39	34	34	28	22
	24	67	56	43	48	40	36	31	31	26	20
	25	62	51	40	44	37	33	29	29	24	18
	26	57	47	37	41	34	31	27	26	22	17
	27	53	44	34		32	28	25	24	20	16
	28	49	41	32				23	23	19	15
	29	46	38	30							
	30		36	28							
	31			26							
	32										
	33										
	34										
	35										
	36										
	37										
	38										
	39										
	40										
PROPERTIES											
r_m (in.)		1.79	1.83	1.86	1.61	1.65	1.67	1.68	1.69	1.71	1.73
$\phi_b M_n$ (kip-ft)		40.7	32.0	23.0	33.1	26.1	22.3	18.8	18.3	14.0	9.56
P_e $(KL)^2/10^4$ (kip-ft^2)		5.16	4.30	3.35	3.71	3.11	2.77	2.42	2.39	1.98	1.54

Note: Heavy horizontal line indicates Kl/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



f'c = 3.5

Nominal Outside Diameter		4.500				4.000							
Wall Thickness		0.337	0.237	0.188	0.125	0.337	0.313	0.250	0.237	0.226	0.220	0.188	0.125
Weight Per Foot		14.98	10.79	8.66	5.84	13.18	12.33	10.01	9.52	9.11	8.88	7.65	5.17
Design Wall Thickness		0.315	0.221	0.174	0.116	0.315	0.291	0.233	0.221	0.211	0.205	0.174	0.116
		F_y = 46 ksi											
Effective length KL in feet	0	192	149	127	99	165	156	133	128	124	121	108	84
	4	178	138	118	92	150	142	121	116	113	110	99	76
	5	171	133	113	88	143	135	115	111	107	105	94	73
	6	162	126	108	84	134	126	108	104	100	98	88	68
	7	153	119	101	79	124	117	100	96	93	91	82	63
	8	142	111	95	74	113	107	92	88	86	84	75	58
	9	132	103	88	68	103	97	83	80	78	76	68	53
	10	120	94	81	63	92	87	74	72	70	68	61	47
	11	109	86	73	57	81	77	66	64	62	60	54	42
	12	98	77	66	51	71	67	58	56	54	53	47	37
	13	87	69	59	46	61	58	50	48	47	46	41	32
	14	77	61	52	41	53	50	43	42	40	39	35	27
	15	67	53	46	36	46	44	37	36	35	34	31	24
	16	59	47	40	31	40	38	33	32	31	30	27	21
	17	52	42	36	28	36	34	29	28	27	27	24	18
	18	47	37	32	25	32	30	26	25	24	24	21	17
	19	42	33	29	22	29	27	23	23	22	21	19	15
	20	38	30	26	20	26	25	21	20	20	19	17	13
	21	34	27	23	18	23	22	19	19	18	17	16	12
	22	31	25	21	17		20	17	17	16	16	14	11
	23	29	23	19	15								
	24	26	21	18	14								
	25		19	16	13								
	26												
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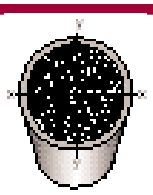
	34												
	35												
	36												
	37												
	38												
	39												
	40												
PROPERTIES													
r_m (in.)		1.48	1.51	1.53	1.55	1.31	1.32	1.33	1.34	1.34	1.34	1.35	1.37
$\phi_b M_n$ (kip-ft)		19.1	14.0	11.2	7.69	14.8	13.8	11.4	10.9	10.5	10.2	8.80	6.04
P_e (KL)^2/10^4 (kip-ft^2)		2.03	1.61	1.38	1.07	1.38	1.32	1.13	1.09	1.06	1.03	0.928	0.717

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

ERW



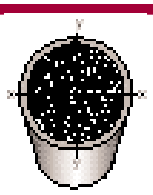
f'c = 5.0

Axial Design Strength in Kips

Nominal Outside Diameter		20.000		18.000		16.000				14.000		
Wall Thickness		0.500	0.375	0.500	0.375	0.500	0.438	0.375	0.312	0.500	0.375	0.312
Weight Per Foot		104.13	78.60	93.45	70.59	82.77	72.80	62.58	52.28	72.09	54.57	45.61
Design Wall Thickness		0.465	0.349	0.465	0.349	0.465	0.407	0.349	0.291	0.465	0.349	0.291
		F_y = 46 ksi										
Effective length KL in feet	0	2150	1900	1830	1610	1530	1430	1340	1240	1260	1090	1000
	4	2140	1890	1820	1600	1520	1420	1330	1230	1250	1080	991
	5	2130	1890	1810	1600	1520	1420	1320	1220	1240	1070	987
	6	2130	1880	1810	1590	1510	1410	1320	1220	1240	1070	981
	7	2120	1870	1800	1580	1500	1410	1310	1210	1230	1060	974
	8	2110	1870	1790	1580	1490	1400	1300	1210	1220	1050	967
	9	2100	1860	1780	1570	1480	1390	1290	1200	1210	1040	958
	10	2090	1850	1770	1560	1470	1380	1280	1190	1200	1030	949
	11	2080	1840	1760	1550	1460	1370	1270	1180	1180	1020	938
	12	2070	1830	1750	1540	1450	1350	1260	1170	1170	1010	927
	13	2060	1820	1730	1520	1430	1340	1250	1160	1160	998	915
	14	2040	1800	1720	1510	1420	1330	1240	1140	1140	984	902
	15	2030	1790	1700	1500	1400	1310	1220	1130	1120	970	889
	16	2010	1770	1690	1480	1390	1290	1210	1120	1110	954	874
	17	1990	1760	1670	1470	1370	1280	1190	1100	1090	938	859
	18	1980	1740	1650	1450	1350	1260	1170	1080	1070	922	844
	19	1960	1730	1630	1430	1330	1240	1160	1070	1050	904	827
	20	1940	1710	1610	1420	1310	1220	1140	1050	1030	886	811
	21	1920	1690	1590	1400	1290	1200	1120	1030	1010	868	794
	22	1900	1670	1570	1380	1270	1180	1100	1020	987	849	776
	23	1880	1650	1550	1360	1250	1160	1080	998	965	829	758
	24	1850	1630	1530	1340	1220	1140	1060	979	942	810	739
	25	1830	1610	1510	1320	1200	1120	1040	960	919	789	721
	26	1810	1590	1480	1300	1180	1100	1020	940	896	769	702
	27	1780	1570	1460	1270	1150	1070	999	920	872	748	683
	28	1760	1550	1430	1250	1130	1050	977	899	849	727	663
	29	1730	1520	1410	1230	1100	1030	955	879	825	706	644
	30	1710	1500	1380	1210	1080	1000	933	858	801	685	624
	31	1680	1480	1360	1180	1050	981	911	837	776	664	604
	32	1660	1450	1330	1160	1030	957	888	816	752	643	585
	33	1630	1430	1300	1140	1000	932	865	794	728	622	565
	34	1600	1400	1280	1110	976	908	842	773	704	601	546
	35	1570	1380	1250	1090	950	884	819	752	680	580	526
	36	1540	1350	1220	1060	924	859	796	730	656	559	507
	37	1520	1330	1190	1040	898	835	774	709	632	538	488
	38	1490	1300	1170	1010	873	811	751	688	609	518	469
	39	1460	1280	1140	990	847	786	728	666	586	498	451
	40	1430	1250	1110	965	820	762	705	645	563	478	433
PROPERTIES												
r_m (in.)		6.91	6.95	6.20	6.24	5.49	5.51	5.53	5.55	4.79	4.83	4.85
$\phi_b M_n$ (kip-ft)		611	466	493	376	386	342	295	248	294	225	189
P_e $(KL)^2/10^4$ (kip-ft^2)		416	358	290	248	194	179	165	150	123	104	94.0

LRFD Composite Columns
Round HSS

ERW



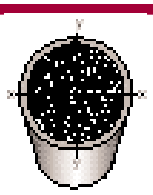
f'c = 5.0

Axial Design Strength in Kips

Nominal Outside Diameter		12.750			12.500					
Wall Thickness		0.500	0.375	0.250	0.625	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		65.42	49.56	33.38	79.27	64.08	48.56	40.61	32.71	24.72
Design Wall Thickness		0.465	0.349	0.233	0.581	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi								
Effective length KL in feet	0	1100	944	786	1220	1070	915	841	762	683
	4	1090	935	778	1210	1060	906	832	754	675
	5	1080	929	774	1200	1050	901	827	749	671
	6	1070	923	768	1190	1040	894	822	744	666
	7	1060	916	762	1180	1040	887	815	738	660
	8	1050	907	755	1170	1030	879	807	730	653
	9	1040	898	747	1160	1020	869	798	722	646
	10	1030	888	738	1140	1000	859	788	713	637
	11	1020	876	728	1130	990	847	777	703	628
	12	1010	864	717	1110	976	835	766	693	618
	13	990	851	706	1100	961	822	754	681	608
	14	974	837	694	1080	945	807	741	669	597
	15	957	822	681	1060	928	793	727	656	585
	16	940	806	668	1040	910	777	712	643	573
	17	921	790	654	1020	891	761	697	629	560
	18	902	773	639	995	872	744	682	615	547
	19	882	756	624	972	852	727	665	600	533
	20	861	738	609	949	831	709	649	584	519
	21	840	720	593	925	810	690	632	569	505
	22	819	701	577	901	789	672	614	553	490
	23	797	682	561	876	767	653	597	536	475
	24	775	662	544	851	744	633	579	520	460
	25	752	643	528	825	722	614	561	503	445
	26	729	623	511	800	699	594	542	487	430
	27	706	603	494	774	676	574	524	470	414
	28	683	583	477	748	653	555	506	453	399
	29	660	563	460	722	630	535	487	436	384
	30	637	543	443	696	608	515	469	419	368
	31	614	523	426	670	585	495	451	403	353
	32	591	503	409	644	562	476	433	386	338
	33	569	483	392	618	540	456	415	370	324
	34	546	464	376	593	517	437	397	354	309
	35	524	445	360	568	496	418	380	338	295
	36	502	426	344	544	474	400	363	322	281
	37	480	407	328	520	453	382	346	307	267
	38	459	389	313	496	432	364	330	292	253
	39	438	371	297	473	411	346	313	277	240
	40	417	352	282	449	391	329	297	263	229
Properties										
r_m (in.)		4.35	4.39	4.43	4.22	4.26	4.30	4.32	4.34	4.36
$\phi_b M_n$ (kip-ft)		242	185	126	285	233	178	150	121	91.1
P_e $(KL)^2/10^4$ (kip-ft^2)		89.5	75.6	60.6	96.4	83.9	70.5	63.8	56.6	49.1

LRFD Composite Columns
Round HSS

ERW



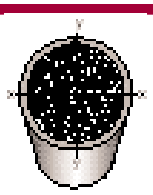
f'c = 5.0

Axial Design Strength in Kips

Nominal Outside Diameter		12.313						12.250					
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.625	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		78.02	63.08	47.81	39.99	32.21	24.35	77.60	62.75	47.56	39.78	32.04	24.22
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	1190	1040	895	821	744	666	1180	1040	887	812	738	660
	4	1180	1030	886	812	736	658	1170	1030	878	804	730	653
	5	1170	1030	880	807	731	654	1160	1020	872	799	725	648
	6	1160	1020	874	801	726	649	1150	1010	866	793	720	643
	7	1150	1010	867	794	719	643	1140	1000	858	786	714	637
	8	1140	1000	858	786	712	636	1130	994	850	778	706	631
	9	1130	991	848	777	704	629	1120	983	840	769	698	623
	10	1120	979	838	767	695	620	1110	971	830	759	689	615
	11	1100	965	826	757	685	611	1090	957	818	749	679	605
	12	1080	951	814	745	674	601	1080	943	806	737	668	596
	13	1070	936	801	733	663	591	1060	928	793	725	657	585
	14	1050	920	787	720	651	580	1040	912	779	712	645	574
	15	1030	903	772	706	638	568	1020	895	764	698	632	562
	16	1010	885	756	691	624	556	1000	877	748	683	619	550
	17	988	866	740	676	610	543	980	858	732	668	605	537
	18	966	847	723	661	596	530	958	839	715	653	590	524
	19	944	827	706	644	581	516	935	819	698	637	575	510
	20	920	806	688	628	566	502	912	798	680	620	560	496
	21	896	785	669	611	550	488	888	777	662	603	544	482
	22	872	763	651	594	534	473	864	755	643	586	529	468
	23	847	742	632	576	518	458	839	734	624	568	512	453
	24	822	719	612	558	502	443	814	711	605	551	496	438
	25	796	697	593	540	485	428	788	689	585	533	480	423
	26	771	674	573	522	468	413	763	667	566	515	463	408
	27	745	652	554	504	452	398	737	644	546	497	446	393
	28	719	629	534	486	435	383	711	621	527	478	430	378
	29	693	606	514	467	418	368	685	598	507	460	413	363
	30	668	583	495	449	402	353	660	576	488	442	397	348
	31	642	561	475	431	385	338	634	553	468	425	380	333
	32	617	538	456	414	369	323	609	531	449	407	364	318
	33	591	516	437	396	353	309	584	509	430	389	348	304
	34	566	494	418	379	337	294	559	487	411	372	332	290
	35	542	473	399	362	322	280	534	466	393	355	317	276
	36	518	452	381	345	307	267	510	445	375	339	302	262
	37	494	431	363	328	292	253	487	424	357	322	287	248
	38	471	410	345	312	276	240	464	404	339	306	272	236
	39	447	390	328	296	262	228	440	383	322	290	258	224
	40	425	370	312	281	249	216	419	364	306	276	245	213
PROPERTIES													
r_m (in.)		4.15	4.19	4.23	4.25	4.27	4.29	4.13	4.17	4.21	4.23	4.25	4.27
$\phi_b M_n$ (kip-ft)		276	225	173	145	117	88.3	273	223	170	144	116	87.6
P_e $(KL)^2/10^4$ (kip-ft^2)		91.3	79.5	66.9	60.4	53.5	46.4	89.8	78.2	65.7	59.2	52.7	45.6

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

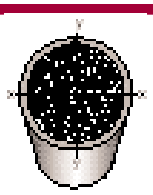


f'c = 5.0

Nominal Outside Diameter		11.250						10.750		
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.500	0.365	0.250
Weight Per Foot		70.92	57.41	43.56	36.45	29.37	22.21	54.74	40.48	28.04
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.465	0.340	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	1050	920	785	714	645	574	860	722	601
	4	1040	909	775	705	637	566	849	712	593
	5	1030	902	770	700	632	562	842	706	588
	6	1020	895	763	694	627	557	834	700	582
	7	1010	886	756	687	620	551	825	692	576
	8	1000	876	747	679	613	544	815	683	568
	9	988	864	737	669	604	536	803	673	560
	10	974	852	726	659	595	528	791	662	550
	11	958	838	714	649	585	519	777	651	540
	12	941	823	702	637	574	509	762	638	529
	13	924	808	688	624	563	498	746	624	518
	14	905	791	674	611	550	487	729	610	506
	15	885	774	659	597	538	475	712	595	493
	16	864	756	643	583	524	463	693	579	479
	17	843	737	626	568	511	451	674	563	466
	18	820	717	610	552	496	438	655	547	451
	19	797	697	592	536	482	424	634	529	437
	20	774	676	574	520	467	411	614	512	422
	21	750	655	556	503	451	397	593	494	407
	22	726	634	538	486	436	383	572	476	392
	23	701	612	519	469	420	369	551	458	377
	24	676	591	501	452	405	355	529	440	361
	25	651	569	482	435	389	340	508	422	346
	26	626	547	463	418	373	326	486	404	331
	27	602	525	444	400	358	312	465	386	316
	28	577	503	426	383	342	298	444	368	301
	29	552	482	407	366	327	284	423	351	286
	30	528	460	389	350	311	271	403	333	271
	31	504	439	371	333	296	257	383	316	257
	32	480	418	353	317	282	244	363	300	243
	33	457	398	335	301	267	231	343	284	229
	34	434	378	318	285	253	218	324	267	216
	35	411	358	301	270	239	206	306	252	204
	36	389	339	285	255	226	195	289	238	193
	37	368	321	269	241	214	184	274	226	182
	38	349	304	255	229	203	175	259	214	173
	39	331	289	243	217	192	166	246	203	164
	40	315	274	231	207	183	158	234	193	156
PROPERTIES										
r_m (in.)		3.78	3.82	3.86	3.88	3.90	3.92	3.64	3.68	3.72
$\phi_b M_n$ (kip-ft)		228	187	143	121	97.6	73.5	170	127	89.0
P_e $(KL)^2/10^4$ (kip-ft^2)		67.6	58.9	49.5	44.3	39.2	33.8	50.2	41.4	33.5

LRFD Composite Columns
Round HSS

ERW



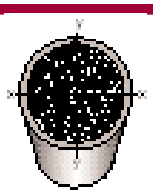
f'c = 5.0

Axial Design Strength in Kips

Nominal Outside Diameter		10.000						9.625				
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		62.58	50.73	38.55	32.28	26.03	19.70	48.73	37.05	31.03	25.03	18.95
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	894	777	660	599	537	474	738	625	566	507	446
	4	880	765	650	589	529	466	726	614	556	498	438
	5	873	758	644	584	524	462	719	609	551	493	434
	6	864	750	637	578	518	457	711	602	544	487	429
	7	853	741	629	570	511	451	701	593	537	480	422
	8	840	730	620	562	504	444	690	584	528	472	415
	9	827	718	609	552	495	436	678	573	518	464	407
	10	812	705	598	542	485	427	665	562	508	454	399
	11	795	691	586	531	475	418	650	550	497	444	390
	12	778	676	573	519	464	408	635	536	485	433	380
	13	759	660	559	506	453	397	618	522	472	421	369
	14	740	642	544	492	440	386	601	508	458	409	358
	15	719	625	529	478	427	375	583	492	444	396	347
	16	698	606	513	464	414	363	564	476	430	383	335
	17	676	587	496	449	401	350	545	460	415	369	322
	18	653	567	479	433	387	338	526	443	399	356	310
	19	630	548	462	418	372	325	505	426	384	341	297
	20	607	527	445	402	358	312	485	409	368	327	285
	21	583	507	427	386	343	299	465	392	352	313	272
	22	560	486	410	369	328	286	444	374	336	298	259
	23	536	465	392	353	314	272	424	357	321	284	246
	24	512	445	374	337	299	259	403	339	305	270	233
	25	488	424	356	321	285	246	383	322	289	256	221
	26	465	403	339	305	270	234	363	305	274	242	209
	27	441	383	322	289	256	221	343	288	259	228	197
	28	418	363	305	274	242	209	324	272	244	215	185
	29	396	344	288	259	228	196	305	256	229	202	173
	30	374	325	272	244	215	185	287	240	215	189	162
	31	353	306	256	229	202	173	269	225	201	177	152
	32	331	287	240	215	189	162	252	211	189	166	142
	33	311	270	226	202	178	153	237	199	178	156	134
	34	293	254	213	190	168	144	223	187	167	147	126
	35	277	240	201	180	158	136	211	177	158	139	119
	36	262	227	190	170	150	128	199	167	149	131	112
	37	248	215	179	161	142	121	189	158	141	124	106
	38	235	204	170	152	134	115	179	150	134	118	101
	39	223	193	162	145	127	109	170	142	127	112	96
	40	212	184	154	138	121	104	161	135	121	106	91
PROPERTIES												
r_m (in.)		3.34	3.38	3.41	3.43	3.45	3.47	3.24	3.28	3.30	3.32	3.34
$\phi_b M_n$ (kip-ft)		178	146	112	94.5	76.6	58.0	135	104	87.6	71.1	53.5
P_e $(KL)^2/10^4$ (kip-ft^2)		45.5	39.5	33.0	29.5	26.0	22.3	34.6	29.0	25.9	22.8	19.5

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

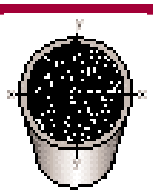


f'c = 5.0

Nominal Outside Diameter		8.750					8.625				
Wall Thickness		0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.322	0.250	0.188
Weight Per Foot		44.06	33.54	28.12	22.70	17.19	43.39	33.04	28.55	22.36	16.94
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.465	0.349	0.300	0.233	0.174
		F_y = 46 ksi									
Effective length KL in feet	0	647	544	492	438	384	633	533	490	429	375
	4	634	533	481	429	375	620	522	479	420	367
	5	626	527	476	424	371	613	516	474	415	362
	6	618	520	469	418	365	604	508	467	409	357
	7	608	511	461	411	359	594	500	459	402	350
	8	596	501	453	403	352	583	490	450	394	343
	9	583	491	443	394	344	570	479	440	385	335
	10	569	479	432	384	335	556	467	429	375	327
	11	554	466	420	374	326	541	455	417	365	317
	12	539	453	408	363	316	525	441	405	353	307
	13	522	438	395	351	305	508	427	392	342	297
	14	504	423	382	339	295	490	412	378	330	286
	15	486	408	368	326	283	472	397	364	317	275
	16	467	392	353	313	272	454	381	349	304	263
	17	448	376	338	300	260	434	365	335	291	252
	18	428	360	324	286	248	415	348	319	277	240
	19	409	343	308	273	236	396	332	304	264	228
	20	389	326	293	259	224	376	315	289	250	216
	21	369	310	278	246	212	356	299	274	237	204
	22	350	293	263	232	200	337	283	259	224	192
	23	330	277	248	219	188	318	266	244	211	180
	24	311	261	234	206	176	299	250	229	198	169
	25	292	245	219	193	165	280	235	215	185	158
	26	274	229	205	181	154	262	220	201	173	147
	27	256	214	192	168	143	245	205	187	161	137
	28	238	199	178	156	133	227	190	174	149	127
	29	222	186	166	146	124	212	177	162	139	118
	30	208	174	155	136	116	198	166	151	130	111
	31	194	163	145	128	109	185	155	142	122	104
	32	182	153	136	120	102	174	146	133	114	97
	33	172	143	128	113	96	164	137	125	107	91
	34	162	135	121	106	90	154	129	118	101	86
	35	152	128	114	100	85	146	122	111	96	81
	36	144	121	108	95	81	138	115	105	90	77
	37	136	114	102	90	76	130	109	100	85	73
	38	129	108	97	85	72	123	103	94	81	69
	39	123	103	92	81	69	117	98	90	77	65
	40	117	98	87	77	65	111	93	85	73	62
PROPERTIES											
r_m (in.)		2.93	2.97	2.99	3.01	3.03	2.89	2.93	2.95	2.97	2.99
$\phi_b M_n$ (kip-ft)		110	84.9	71.8	58.3	44.2	107	82.5	71.8	56.6	42.8
P_e $(KL)^2/10^4$ (kip-ft^2)		25.1	21.0	18.8	16.4	14.0	23.9	20.0	18.3	15.7	13.4

LRFD Composite Columns
Round HSS

ERW



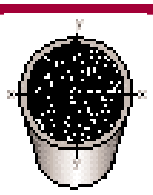
f'c = 5.0

Axial Design Strength in Kips

Nominal Outside Diameter		7.625			7.500				
Wall Thickness		0.375	0.328	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		29.04	25.56	10.01	37.38	28.54	23.95	19.36	14.68
Design Wall Thickness		0.349	0.305	0.116	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi							
Effective length KL in feet	0	448	414	262	525	438	393	348	302
	4	436	403	255	511	426	383	339	293
	5	430	397	251	503	419	377	333	288
	6	422	389	246	493	411	370	327	283
	7	413	381	240	482	402	361	320	276
	8	403	372	233	470	392	352	311	269
	9	392	361	226	457	381	342	302	260
	10	379	350	219	442	368	331	292	252
	11	366	338	210	426	355	319	281	242
	12	353	325	202	409	341	306	270	232
	13	338	311	193	392	327	293	259	222
	14	323	298	184	374	312	280	247	212
	15	308	283	174	356	297	266	234	201
	16	293	269	165	337	281	252	222	190
	17	277	255	155	318	266	238	209	179
	18	261	240	146	300	250	224	197	168
	19	246	226	136	281	234	210	184	157
	20	230	211	127	263	219	196	172	146
	21	215	197	118	245	204	183	160	136
	22	200	183	109	227	190	169	148	126
	23	186	170	100	210	175	157	137	116
	24	171	157	92	193	161	144	126	106
	25	158	145	85	178	149	133	116	98
	26	146	134	78	165	137	123	107	91
	27	135	124	73	153	127	114	100	84
	28	126	115	68	142	119	106	93	78
	29	117	107	63	132	110	99	86	73
	30	110	100	59	124	103	92	81	68
	31	103	94	55	116	97	86	75	64
	32	96	88	52	109	91	81	71	60
	33	91	83	49	102	85	76	67	56
	34	85	78	46	96	80	72	63	53
	35	81	74	43	91	76	68	59	50
	36	76	70	41	86	72	64	56	47
	37	72	66	39	81	68	61	53	45
	38	68	63	37	77	64	57	50	42
	39	65	59	35	73	61	55	48	40
	40	62	56	33	70	58	52	45	38
PROPERTIES									
r_m (in.)		2.58	2.59	2.66	2.49	2.53	2.55	2.57	2.59
$\phi_b M_n$ (kip-ft)		63.8	56.6	22.6	79.4	61.8	52.1	42.4	32.2
P_e $(KL)^2/10^4$ (kip-ft^2)		13.2	12.1	7.10	14.9	12.5	11.1	9.73	8.22

LRFD Composite Columns
Round HSS

ERW



f'c = 5.0

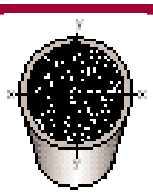
Axial Design Strength in Kips

Nominal Outside Diameter		7.000						6.875				
Wall Thickness		0.500	0.375	0.312	0.250	0.188	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		34.71	26.53	22.29	18.02	13.68	9.18	34.04	26.03	21.87	17.69	13.43
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
		F_y = 46 ksi										
Effective length KL in feet	0	478	398	357	315	271	228	466	388	348	307	264
	4	463	385	345	305	263	220	451	376	336	297	255
	5	455	378	339	299	258	216	443	369	330	291	250
	6	445	370	332	293	252	211	433	361	323	284	244
	7	434	361	323	285	245	205	421	351	314	277	238
	8	421	350	314	277	238	199	409	340	305	268	230
	9	407	339	303	267	230	192	394	329	294	259	222
	10	392	326	292	257	221	184	379	316	283	249	213
	11	376	313	280	246	211	176	363	303	271	238	204
	12	359	299	267	235	202	167	346	289	258	227	194
	13	342	284	254	224	191	159	329	274	245	216	184
	14	324	269	241	212	181	150	311	260	232	204	174
	15	306	254	227	200	170	141	293	245	219	192	163
	16	288	239	214	188	160	131	275	229	205	180	153
	17	270	224	200	176	149	122	257	214	192	168	143
	18	252	209	187	164	139	114	239	200	178	156	132
	19	234	194	173	152	129	105	221	185	165	144	122
	20	216	179	160	140	119	96	204	171	152	133	113
	21	200	165	148	129	109	88	188	157	140	122	103
	22	183	152	135	118	100	80	171	143	128	112	94
	23	167	139	124	108	91	74	157	131	117	102	86
	24	154	127	114	99	84	68	144	120	107	94	79
	25	142	117	105	91	77	62	133	111	99	86	73
	26	131	109	97	85	71	58	123	103	92	80	67
	27	122	101	90	78	66	53	114	95	85	74	62
	28	113	94	84	73	61	50	106	88	79	69	58
	29	105	87	78	68	57	46	99	82	74	64	54
	30	98	82	73	64	54	43	92	77	69	60	51
	31	92	76	68	59	50	40	86	72	64	56	47
	32	87	72	64	56	47	38	81	68	60	53	44
	33	81	67	60	53	44	36	76	64	57	50	42
	34	77	63	57	49	42	34	72	60	54	47	39
	35	72	60	53	47	39	32	68	57	51	44	37
	36	68	57	51	44	37	30	64	54	48	42	35
	37	65	54	48	42	35	28	61	51	45	39	33
	38	61	51	45	40	33	27		48	43	37	31
	39		48	43	38	32	26				35	30
	40					30	24					
PROPERTIES												
r_m (in.)		2.32	2.35	2.37	2.39	2.41	2.43	2.27	2.31	2.33	2.35	2.37
$\phi_b M_n$ (kip-ft)		68.7	53.5	45.2	36.9	28.0	19.0	65.9	51.4	43.5	35.5	26.9
P_e $(KL)^2/10^4$ (kip-ft^2)		11.9	9.85	8.79	7.67	6.47	5.22	11.1	9.31	8.30	7.24	6.10

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

ERW



f'c = 5.0

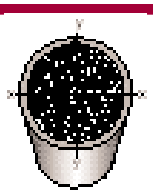
Axial Design Strength in Kips

Nominal Outside Diameter		6.625								6.125				
Wall Thickness		0.500	0.432	0.375	0.312	0.280	0.250	0.188	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		32.71	28.57	25.03	21.04	18.97	17.02	12.92	8.68	30.04	23.03	19.37	15.69	11.92
Design Wall Thickness		0.465	0.403	0.349	0.291	0.261	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	444	404	369	330	310	291	250	209	400	331	296	259	222
	4	428	390	356	318	299	280	241	201	384	318	284	249	212
	5	420	382	349	312	293	275	236	197	375	310	277	243	207
	6	410	373	340	305	286	268	230	191	364	302	269	236	201
	7	398	362	331	296	278	260	223	186	352	292	261	228	195
	8	385	351	320	286	269	252	216	179	338	281	251	219	187
	9	371	338	308	276	259	242	208	172	324	269	240	210	179
	10	355	324	295	264	248	232	199	164	308	256	228	200	170
	11	339	309	282	252	236	222	189	156	292	242	216	189	160
	12	322	294	268	240	225	210	180	148	275	228	204	178	151
	13	304	278	254	227	212	199	170	139	257	214	191	167	141
	14	287	261	239	214	200	187	159	131	240	200	178	155	131
	15	269	245	224	200	188	175	149	122	223	185	165	144	122
	16	251	229	209	187	175	164	139	113	205	171	153	133	112
	17	233	213	194	174	163	152	129	105	188	157	140	122	102
	18	215	197	180	161	150	141	119	96	172	144	128	111	93
	19	198	181	166	148	138	129	109	88	156	131	117	101	84
	20	182	166	152	136	127	118	100	80	141	118	105	91	76
	21	166	151	139	124	116	108	91	73	128	107	95	82	69
	22	151	138	126	113	105	98	83	66	116	97	87	75	63
	23	138	126	115	103	96	90	76	61	106	89	80	69	58
	24	127	116	106	95	88	83	69	56	98	82	73	63	53
	25	117	107	98	87	82	76	64	51	90	75	67	58	49
	26	108	99	90	81	75	70	59	48	83	70	62	54	45
	27	100	92	84	75	70	65	55	44	77	65	58	50	42
	28	93	85	78	70	65	61	51	41	72	60	54	46	39
	29	87	79	73	65	61	57	48	38	67	56	50	43	36
	30	81	74	68	61	57	53	44	36	63	52	47	40	34
	31	76	69	64	57	53	49	42	33	59	49	44	38	32
	32	71	65	60	53	50	46	39	31	55	46	41	35	30
	33	67	61	56	50	47	44	37	29	52	43	39	33	28
	34	63	58	53	47	44	41	35	28		41	36	31	26
	35	60	55	50	45	42	39	33	26					25
	36	56	52	47	42	39	37	31	25					
	37			45	40	37	35	29	23					
	38							28	22					
	39													
	40													
PROPERTIES														
r_m (in.)		2.18	2.20	2.22	2.24	2.25	2.26	2.28	2.30	2.01	2.05	2.07	2.08	2.10
$\phi_b M_n$ (kip-ft)		61.1	53.8	47.6	40.4	36.6	32.8	25.0	17.0	51.4	40.4	34.2	27.9	21.3
P_e $(KL)^2/10^4$ (kip-ft^2)		9.80	8.96	8.19	7.31	6.84	6.38	5.37	4.31	7.56	6.33	5.65	4.87	4.09

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



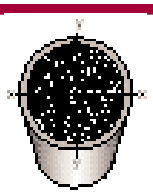
f'c = 5.0

Nominal Outside Diameter		6.000							5.563			
Wall Thickness		0.500	0.375	0.312	0.280	0.250	0.188	0.125	0.375	0.258	0.188	0.134
Weight Per Foot		29.37	22.53	18.95	17.11	15.35	11.67	7.84	20.78	14.62	10.79	7.77
Design Wall Thickness		0.465	0.349	0.291	0.261	0.233	0.174	0.116	0.349	0.241	0.174	0.125
		F_y = 46 ksi										
Effective length KL in feet	0	389	322	287	269	252	215	178	291	231	193	164
	4	373	309	275	258	241	206	170	277	219	183	155
	5	364	301	269	252	235	201	166	269	213	178	151
	6	353	292	261	244	228	195	161	260	206	172	145
	7	340	282	252	236	220	188	155	249	198	165	139
	8	327	271	242	226	212	180	148	238	189	157	133
	9	312	259	231	216	202	172	141	226	179	149	125
	10	296	246	219	205	192	163	134	213	168	140	118
	11	280	232	207	194	181	154	126	199	158	131	110
	12	263	218	195	182	170	144	118	185	146	122	102
	13	245	204	182	170	159	135	110	171	135	112	94
	14	228	190	169	158	148	125	101	157	124	103	86
	15	210	175	157	146	137	115	93	144	113	94	78
	16	193	161	144	135	126	106	85	130	103	85	70
	17	177	148	132	123	115	97	78	118	93	77	63
	18	160	134	120	112	104	88	70	105	83	68	56
	19	145	121	108	101	94	79	63	94	74	61	50
	20	131	109	98	91	85	71	57	85	67	55	46
	21	118	99	89	83	77	65	52	77	61	50	41
	22	108	90	81	75	70	59	47	70	55	46	38
	23	99	83	74	69	64	54	43	64	51	42	34
	24	91	76	68	63	59	49	39	59	47	38	32
	25	84	70	63	58	54	46	36	55	43	35	29
	26	77	65	58	54	50	42	34	50	40	33	27
	27	72	60	54	50	47	39	31	47	37	30	25
	28	67	56	50	47	43	36	29	43	34	28	23
	29	62	52	46	43	40	34	27	41	32	26	22
	30	58	49	43	41	38	32	25	38	30	25	20
	31	54	46	41	38	35	30	24		28	23	19
	32	51	43	38	36	33	28	22				18
	33		40	36	34	31	26	21				
	34					29	25	20				
	35											
	36											
	37											
	38											
	39											
	40											
PROPERTIES												
r_m (in.)		1.96	2.00	2.02	2.03	2.04	2.06	2.08	1.85	1.88	1.91	1.92
$\phi_b M_n$ (kip-ft)		49.3	38.6	32.7	29.7	26.7	20.4	13.9	32.8	23.6	17.4	12.8
P_e (KL)^2/10^4 (kip-ft^2)		7.01	5.87	5.24	4.90	4.56	3.82	3.05	4.57	3.60	2.97	2.44

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



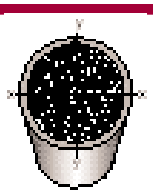
f'c = 5.0

Nominal Outside Diameter		5.500			5.000						
Wall Thickness		0.500	0.375	0.258	0.500	0.375	0.312	0.258	0.250	0.188	0.125
Weight Per Foot		26.70	20.53	14.44	24.03	18.52	15.62	13.07	12.68	9.66	6.51
Design Wall Thickness		0.465	0.349	0.241	0.465	0.349	0.291	0.241	0.233	0.174	0.116
		F_y = 46 ksi									
Effective length KL in feet	0	347	286	227	306	252	224	199	195	165	134
	4	329	272	216	287	237	210	187	183	155	126
	5	320	264	209	277	229	203	180	177	149	121
	6	309	255	202	265	219	194	173	169	143	116
	7	296	245	194	251	208	185	164	161	136	110
	8	282	233	185	237	196	174	155	152	128	103
	9	267	221	175	221	184	163	145	142	120	97
	10	251	208	165	205	171	152	134	132	111	89
	11	234	194	154	189	157	140	124	122	102	82
	12	217	181	143	172	144	128	113	111	94	75
	13	200	167	132	156	130	116	103	101	85	68
	14	183	153	121	140	117	105	92	91	76	61
	15	167	139	110	125	105	93	82	81	68	54
	16	151	126	99	110	93	83	73	72	60	47
	17	135	114	89	97	82	73	65	64	53	42
	18	121	101	80	87	73	65	58	57	48	38
	19	108	91	72	78	66	59	52	51	43	34
	20	98	82	65	70	59	53	47	46	39	30
	21	89	75	59	64	54	48	42	42	35	28
	22	81	68	53	58	49	44	39	38	32	25
	23	74	62	49	53	45	40	35	35	29	23
	24	68	57	45	49	41	37	32	32	27	21
	25	63	53	41	45	38	34	30	30	25	19
	26	58	49	38	42	35	31	28	27	23	18
	27	54	45	35		33	29	26	25	21	17
	28	50	42	33				24	24	20	16
	29	47	39	31							
	30		37	29							
	31			27							
	32										
	33										
	34										
	35										
	36										
	37										
	38										
	39										
	40										
PROPERTIES											
r_m (in.)		1.79	1.83	1.86	1.61	1.65	1.67	1.68	1.69	1.71	1.73
$\phi_b M_n$ (kip-ft)		40.7	32.0	23.0	33.1	26.1	22.3	18.8	18.3	14.0	9.56
P_e $(KL)^2/10^4$ (kip-ft^2)		5.25	4.41	3.47	3.77	3.18	2.84	2.50	2.47	2.07	1.63

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



f'c = 5.0

Nominal Outside Diameter		4.500				4.000							
Wall Thickness		0.337	0.237	0.188	0.125	0.337	0.313	0.250	0.237	0.226	0.220	0.188	0.125
Weight Per Foot		14.98	10.79	8.66	5.84	13.18	12.33	10.01	9.52	9.11	8.88	7.65	5.17
Design Wall Thickness		0.315	0.221	0.174	0.116	0.315	0.291	0.233	0.221	0.211	0.205	0.174	0.116
		F_y = 46 ksi											
Effective length KL in feet	0	204	163	141	114	175	166	143	138	134	132	120	96
	4	189	151	131	106	159	150	130	126	122	120	108	87
	5	181	144	125	101	150	142	123	119	116	113	103	82
	6	172	137	119	96	140	133	115	111	108	106	96	76
	7	161	129	111	90	130	123	106	103	100	98	89	71
	8	150	120	104	83	118	112	97	94	91	89	81	64
	9	138	110	95	76	107	101	87	85	82	81	73	58
	10	126	101	87	70	95	90	78	76	73	72	65	51
	11	114	91	79	63	83	80	68	67	64	63	57	45
	12	102	81	70	56	73	69	60	58	56	55	50	39
	13	90	72	62	49	62	59	51	50	48	47	42	33
	14	79	63	55	43	54	51	44	43	41	41	37	29
	15	69	55	48	38	47	45	38	37	36	35	32	25
	16	61	48	42	33	41	39	34	33	32	31	28	22
	17	54	43	37	29	36	35	30	29	28	27	25	19
	18	48	38	33	26	32	31	27	26	25	25	22	17
	19	43	34	30	23	29	28	24	23	22	22	20	16
	20	39	31	27	21	26	25	22	21	20	20	18	14
	21	35	28	24	19	24	23	20	19	18	18	16	13
	22	32	26	22	17		21	18	17	17	16	15	12
	23	29	23	20	16								
	24	27	22	19	15								
	25		20	17	14								
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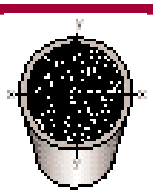
	36												
	37												
	38												
	39												
	40												
PROPERTIES													
r_m (in.)		1.48	1.51	1.53	1.55	1.31	1.32	1.33	1.34	1.34	1.34	1.35	1.37
$\phi_b M_n$ (kip-ft)		19.1	14.0	11.2	7.69	14.8	13.8	11.4	10.9	10.5	10.2	8.80	6.04
P_e (KL)^2/10^4 (kip-ft^2)		2.08	1.66	1.44	1.13	1.41	1.35	1.16	1.13	1.09	1.07	0.961	0.754

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

ERW



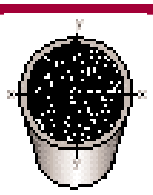
f'c = 8.0

Axial Design Strength in Kips

Nominal Outside Diameter		20.000		18.000		16.000				14.000		
Wall Thickness		0.500	0.375	0.500	0.375	0.500	0.438	0.375	0.312	0.500	0.375	0.312
Weight Per Foot		104.13	78.60	93.45	70.59	82.77	72.80	62.58	52.28	72.09	54.57	45.61
Design Wall Thickness		0.465	0.349	0.465	0.349	0.465	0.407	0.349	0.291	0.465	0.349	0.291
		F_y = 46 ksi										
Effective length KL in feet	0	2770	2530	2320	2120	1920	1820	1740	1640	1550	1390	1310
	4	2750	2520	2310	2100	1900	1810	1720	1630	1540	1380	1290
	5	2740	2510	2300	2100	1900	1800	1720	1620	1530	1370	1290
	6	2740	2500	2290	2090	1890	1790	1710	1610	1520	1360	1280
	7	2730	2490	2280	2080	1880	1780	1700	1600	1510	1350	1270
	8	2710	2480	2270	2070	1860	1770	1680	1590	1490	1340	1260
	9	2700	2470	2260	2050	1850	1760	1670	1580	1480	1320	1240
	10	2680	2450	2240	2040	1830	1740	1660	1560	1460	1310	1230
	11	2670	2440	2220	2020	1820	1730	1640	1550	1440	1290	1210
	12	2650	2420	2210	2000	1800	1710	1620	1530	1430	1270	1190
	13	2630	2400	2190	1990	1780	1690	1600	1510	1410	1260	1180
	14	2610	2380	2160	1970	1760	1670	1580	1490	1380	1230	1160
	15	2590	2360	2140	1940	1730	1640	1560	1470	1360	1210	1140
	16	2560	2340	2120	1920	1710	1620	1540	1450	1340	1190	1110
	17	2540	2310	2090	1900	1680	1600	1510	1430	1310	1170	1090
	18	2510	2290	2070	1870	1660	1570	1490	1400	1280	1140	1070
	19	2480	2260	2040	1850	1630	1540	1460	1380	1260	1120	1040
	20	2450	2230	2010	1820	1600	1520	1440	1350	1230	1090	1020
	21	2420	2210	1980	1790	1570	1490	1410	1320	1200	1070	993
	22	2390	2180	1950	1760	1540	1460	1380	1300	1170	1040	967
	23	2360	2150	1920	1730	1510	1430	1350	1270	1140	1010	940
	24	2330	2110	1880	1700	1480	1400	1320	1240	1110	982	913
	25	2290	2080	1850	1670	1450	1370	1290	1210	1080	953	886
	26	2260	2050	1820	1640	1410	1340	1260	1180	1050	924	858
	27	2220	2010	1780	1600	1380	1300	1230	1150	1020	895	830
	28	2190	1980	1750	1570	1350	1270	1200	1120	985	866	802
	29	2150	1950	1710	1540	1310	1240	1170	1090	953	837	774
	30	2110	1910	1680	1500	1280	1200	1130	1060	921	808	747
	31	2070	1870	1640	1470	1240	1170	1100	1030	889	778	719
	32	2040	1840	1600	1430	1210	1140	1070	997	857	749	691
	33	2000	1800	1560	1400	1170	1100	1040	966	826	721	664
	34	1960	1760	1530	1360	1140	1070	1000	935	794	692	637
	35	1920	1720	1490	1330	1100	1040	972	905	763	664	610
	36	1880	1690	1450	1290	1070	1000	940	874	732	636	584
	37	1840	1650	1410	1260	1030	970	908	843	702	609	558
	38	1800	1610	1370	1220	998	937	877	813	672	582	532
	39	1750	1570	1340	1190	964	904	845	783	643	555	507
	40	1710	1530	1300	1150	930	872	814	753	614	529	482
PROPERTIES												
r_m (in.)		6.91	6.95	6.20	6.24	5.49	5.51	5.53	5.55	4.79	4.83	4.85
$\phi_b M_n$ (kip-ft)		611	466	493	376	386	342	295	248	294	225	189
P_e $(KL)^2/10^4$ (kip-ft^2)		455	398	315	274	209	195	181	166	132	113	103

LRFD Composite Columns
Round HSS

ERW



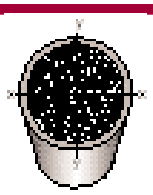
f'c = 8.0

Axial Design Strength in Kips

Nominal Outside Diameter		12.750			12.500					
Wall Thickness		0.500	0.375	0.250	0.625	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		65.42	49.56	33.38	79.27	64.08	48.56	40.61	32.71	24.72
Design Wall Thickness		0.465	0.349	0.233	0.581	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi								
Effective length KL in feet	0	1330	1190	1040	1440	1300	1150	1080	1010	934
	4	1320	1180	1030	1420	1280	1140	1070	996	922
	5	1310	1170	1020	1410	1270	1130	1060	989	915
	6	1300	1160	1010	1400	1260	1120	1050	980	906
	7	1290	1150	1000	1390	1250	1110	1040	970	897
	8	1280	1140	993	1370	1240	1100	1030	959	886
	9	1260	1120	981	1360	1220	1080	1020	946	873
	10	1250	1110	966	1340	1210	1070	1000	932	859
	11	1230	1090	951	1320	1190	1050	987	916	845
	12	1210	1070	934	1300	1170	1040	970	900	829
	13	1190	1060	917	1280	1150	1020	951	882	811
	14	1170	1040	898	1250	1130	996	932	863	793
	15	1140	1010	878	1230	1100	975	912	844	775
	16	1120	992	858	1200	1080	952	890	823	755
	17	1090	968	836	1170	1050	929	868	802	734
	18	1070	944	814	1150	1030	906	845	780	713
	19	1040	920	792	1120	1000	881	822	757	692
	20	1010	894	768	1090	974	856	797	734	670
	21	985	868	745	1060	946	830	773	711	647
	22	956	842	721	1020	917	804	748	687	625
	23	927	815	696	993	888	777	723	663	602
	24	897	788	672	961	859	751	697	639	579
	25	868	761	647	929	829	724	671	614	555
	26	838	734	622	897	799	697	646	590	532
	27	808	707	598	864	770	670	620	566	509
	28	778	679	573	832	740	643	595	542	487
	29	748	652	549	799	711	616	569	518	464
	30	718	625	524	767	681	590	544	494	442
	31	689	598	501	735	652	564	519	471	420
	32	659	572	477	704	624	538	495	448	399
	33	630	546	454	673	595	513	471	425	378
	34	602	520	431	642	567	488	447	403	357
	35	574	495	409	612	540	463	424	381	337
	36	547	471	387	582	513	439	401	360	318
	37	520	446	366	553	486	415	380	341	301
	38	493	423	347	524	461	394	360	323	286
	39	468	401	329	497	438	374	342	307	271
	40	445	381	313	473	416	355	325	292	258
PROPERTIES										
r_m (in.)		4.35	4.39	4.43	4.22	4.26	4.30	4.32	4.34	4.36
$\phi_b M_n$ (kip-ft)		242	185	126	285	233	178	150	121	91.1
P_e $(KL)^2/10^4$ (kip-ft^2)		95.4	81.9	67.2	102	89.3	76.3	69.7	62.6	55.3

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

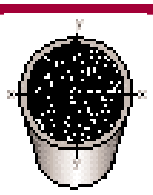


f'c = 8.0

Nominal Outside Diameter		12.313						12.250					
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.625	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		78.02	63.08	47.81	39.99	32.21	24.35	77.60	62.75	47.56	39.78	32.04	24.22
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	1400	1260	1120	1050	983	910	1390	1250	1110	1040	974	901
	4	1390	1250	1110	1040	970	897	1370	1240	1100	1030	962	889
	5	1380	1240	1100	1030	963	890	1370	1230	1090	1020	955	882
	6	1370	1230	1090	1030	954	882	1360	1220	1080	1010	946	874
	7	1350	1220	1080	1010	944	872	1340	1210	1070	1000	936	864
	8	1340	1210	1070	1000	933	861	1330	1200	1060	992	924	853
	9	1320	1190	1060	990	920	849	1310	1180	1050	979	912	840
	10	1300	1170	1040	975	906	835	1290	1160	1030	964	897	827
	11	1280	1160	1030	959	890	820	1270	1150	1010	948	882	812
	12	1260	1140	1010	942	874	804	1250	1130	997	931	865	796
	13	1240	1120	988	923	856	787	1230	1110	978	913	848	779
	14	1220	1090	968	904	837	769	1210	1080	957	894	829	761
	15	1190	1070	947	883	818	750	1180	1060	936	873	810	742
	16	1170	1050	924	862	797	730	1160	1040	914	852	789	722
	17	1140	1020	901	840	776	710	1130	1010	891	830	768	702
	18	1110	996	877	817	754	689	1100	986	867	807	746	681
	19	1080	969	853	794	732	668	1070	959	843	784	724	660
	20	1050	942	828	770	709	646	1040	932	818	760	701	638
	21	1020	914	802	745	686	623	1010	904	792	735	678	616
	22	990	885	776	720	662	601	979	875	766	711	654	593
	23	958	857	750	695	638	578	948	847	740	686	630	571
	24	926	827	723	670	614	555	916	818	714	661	606	548
	25	894	798	697	645	590	533	884	788	687	635	582	525
	26	862	769	670	619	566	510	852	759	661	610	558	503
	27	830	739	643	594	542	487	820	730	634	585	535	480
	28	798	710	617	569	518	465	788	701	608	560	511	458
	29	766	681	590	544	494	443	756	672	581	535	487	436
	30	734	652	564	519	471	421	725	643	556	511	464	414
	31	702	623	538	495	448	399	693	614	530	486	442	393
	32	671	595	513	471	426	378	662	586	505	463	419	372
	33	641	567	488	447	404	358	632	559	480	439	397	352
	34	611	540	464	424	382	337	602	531	456	416	376	331
	35	581	513	440	401	361	318	572	505	432	394	355	313
	36	552	486	416	379	341	301	544	478	408	372	335	296
	37	523	460	393	359	323	285	515	453	386	352	317	280
	38	496	437	373	340	306	270	488	429	366	334	301	265
	39	471	414	354	323	290	256	463	407	348	317	286	252
	40	447	394	337	307	276	244	440	387	331	301	271	239
PROPERTIES													
r_m (in.)		4.15	4.19	4.23	4.25	4.27	4.29	4.13	4.17	4.21	4.23	4.25	4.27
$\phi_b M_n$ (kip-ft)		276	225	173	145	117	88.3	273	223	170	144	116	87.6
P_e $(KL)^2/10^4$ (kip-ft^2)		96.0	84.6	72.3	65.9	59.2	52.3	94.5	83.1	70.9	64.7	58.3	51.4

LRFD Composite Columns
Round HSS

ERW



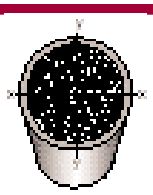
f'c = 8.0

Axial Design Strength in Kips

Nominal Outside Diameter		11.250						10.750		
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.500	0.365	0.250
Weight Per Foot		70.92	57.41	43.56	36.45	29.37	22.21	54.74	40.48	28.04
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.465	0.340	0.233
		F_y = 46 ksi								
Effective length KL in feet	0	1220	1100	975	908	843	776	1020	894	781
	4	1210	1090	961	894	830	764	1010	880	768
	5	1200	1080	953	887	823	757	1000	872	761
	6	1190	1070	944	878	814	748	990	863	752
	7	1170	1060	932	867	804	739	978	852	742
	8	1160	1040	920	855	793	728	964	839	731
	9	1140	1030	906	842	780	715	948	825	718
	10	1120	1010	891	827	766	702	931	810	704
	11	1100	991	874	811	750	687	913	793	688
	12	1080	972	856	794	734	671	893	776	672
	13	1060	951	837	776	717	654	872	757	655
	14	1040	929	817	757	698	637	850	737	636
	15	1010	906	796	737	679	619	827	716	617
	16	985	881	774	716	659	600	803	694	598
	17	957	857	751	694	639	580	778	672	577
	18	929	831	728	672	617	560	753	649	556
	19	901	805	704	649	596	539	727	626	535
	20	871	778	679	626	574	518	700	602	514
	21	841	750	655	603	552	498	674	578	492
	22	811	723	630	579	529	476	647	554	471
	23	781	695	605	555	507	455	620	530	449
	24	750	667	580	532	485	434	593	506	427
	25	719	639	554	508	462	413	566	482	406
	26	689	612	530	485	440	393	539	458	385
	27	658	584	505	461	418	372	512	435	364
	28	628	557	480	438	397	352	486	412	344
	29	599	530	456	416	376	332	461	389	324
	30	569	503	433	394	355	313	436	367	304
	31	540	477	409	372	335	294	411	345	285
	32	512	452	387	350	314	276	386	324	267
	33	485	427	364	330	296	259	363	304	252
	34	457	402	343	310	278	244	342	287	237
	35	431	379	324	293	263	231	323	271	224
	36	407	359	306	277	248	218	305	256	211
	37	386	340	290	262	235	206	289	242	200
	38	366	322	275	249	223	196	274	230	190
	39	347	306	261	236	212	186	260	218	180
	40	330	291	248	224	201	177	247	207	171
PROPERTIES										
r_m (in.)		3.78	3.82	3.86	3.88	3.90	3.92	3.64	3.68	3.72
$\phi_b M_n$ (kip-ft)		228	187	143	121	97.6	73.5	170	127	89.0
P_e $(KL)^2/10^4$ (kip-ft^2)		70.8	62.4	53.2	48.1	43.2	37.9	53.1	44.5	36.7

LRFD Composite Columns
Round HSS

ERW



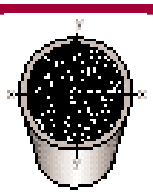
f'c = 8.0

Axial Design Strength in Kips

Nominal Outside Diameter		10.000						9.625				
Wall Thickness		0.625	0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		62.58	50.73	38.55	32.28	26.03	19.70	48.73	37.05	31.03	25.03	18.95
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	1030	917	807	750	692	633	867	761	705	649	593
	4	1010	901	793	736	679	620	851	746	691	636	580
	5	1000	892	785	728	672	613	842	738	683	629	573
	6	988	882	775	719	663	605	831	728	674	620	565
	7	975	869	764	708	653	595	819	717	663	610	555
	8	959	855	751	696	641	584	804	704	651	598	544
	9	942	840	737	683	628	572	789	690	637	585	532
	10	923	823	721	668	614	558	771	674	622	571	518
	11	903	804	704	652	599	544	752	657	606	556	504
	12	881	784	686	635	582	528	732	639	589	540	488
	13	858	763	667	616	565	512	711	620	571	523	472
	14	833	741	647	597	547	495	689	600	552	505	455
	15	808	718	626	578	528	477	666	579	533	486	438
	16	782	694	605	557	509	459	642	558	513	467	420
	17	755	670	582	536	489	440	618	536	492	448	402
	18	727	645	560	515	469	421	593	514	471	428	383
	19	699	619	537	494	449	402	568	491	450	408	365
	20	670	594	514	472	428	383	542	469	429	388	346
	21	642	568	491	450	408	363	517	446	407	368	327
	22	613	542	467	428	387	344	491	423	386	349	309
	23	584	516	444	406	367	325	466	401	365	329	291
	24	556	490	421	385	347	307	441	379	345	310	273
	25	527	465	399	363	327	288	417	357	324	291	255
	26	499	440	376	343	308	270	392	335	304	272	239
	27	472	415	354	322	289	253	369	315	285	254	222
	28	445	391	333	302	270	236	346	294	266	237	206
	29	419	368	312	282	252	220	323	274	248	221	192
	30	393	344	292	264	235	205	301	256	231	206	180
	31	368	322	273	247	220	192	282	240	217	193	168
	32	345	303	256	232	207	180	265	225	203	181	158
	33	324	284	241	218	195	170	249	212	191	170	148
	34	306	268	227	205	183	160	235	199	180	160	140
	35	288	253	214	194	173	151	221	188	170	151	132
	36	273	239	202	183	163	143	209	178	161	143	125
	37	258	226	192	173	155	135	198	168	152	135	118
	38	245	215	182	164	147	128	188	160	144	128	112
	39	232	204	173	156	139	121	178	152	137	122	106
	40	221	194	164	148	132	115	170	144	130	116	101
PROPERTIES												
r_m (in.)		3.34	3.38	3.41	3.43	3.45	3.47	3.24	3.28	3.30	3.32	3.34
$\phi_b M_n$ (kip-ft)		178	146	112	94.5	76.6	58.0	135	104	87.6	71.1	53.5
P_e $(KL)^2/10^4$ (kip-ft^2)		47.4	41.6	35.2	31.9	28.4	24.8	36.4	30.9	27.9	24.9	21.7

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

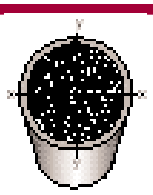


f'c = 8.0

Nominal Outside Diameter		8.750					8.625				
Wall Thickness		0.500	0.375	0.312	0.250	0.188	0.500	0.375	0.322	0.250	0.188
Weight Per Foot		44.06	33.54	28.12	22.70	17.19	43.39	33.04	28.55	22.36	16.94
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.465	0.349	0.300	0.233	0.174
		F_y = 46 ksi									
Effective length KL in feet	0	751	654	605	555	504	734	640	599	542	492
	4	734	639	591	542	491	717	625	585	529	479
	5	725	631	583	534	484	708	617	577	521	472
	6	714	621	574	525	476	697	607	568	512	463
	7	701	610	563	515	466	684	595	557	502	454
	8	686	596	550	503	455	669	582	544	490	443
	9	670	582	537	490	442	653	567	530	478	430
	10	652	566	522	476	429	635	552	515	463	417
	11	633	549	506	461	415	616	535	499	448	403
	12	613	531	489	445	400	596	517	482	433	388
	13	592	512	471	428	384	575	498	464	416	372
	14	570	493	452	411	368	553	478	446	399	356
	15	547	472	433	393	351	530	458	427	381	340
	16	523	452	414	375	334	507	437	407	363	323
	17	500	430	394	356	317	483	417	387	344	306
	18	476	409	374	338	299	460	395	367	326	289
	19	451	388	354	319	282	436	374	347	308	272
	20	427	366	334	301	265	412	353	328	289	255
	21	403	345	314	282	248	388	332	308	271	238
	22	380	324	295	264	232	365	312	289	254	222
	23	356	304	276	247	215	342	292	270	236	206
	24	333	284	257	230	200	319	272	251	220	191
	25	311	264	239	213	184	298	253	233	203	176
	26	289	245	221	197	170	276	234	215	188	162
	27	268	227	205	182	158	256	217	200	174	151
	28	249	211	191	170	147	238	202	186	162	140
	29	232	197	178	158	137	222	188	173	151	130
	30	217	184	166	148	128	207	176	162	141	122
	31	203	172	156	138	120	194	165	152	132	114
	32	191	162	146	130	112	182	154	142	124	107
	33	180	152	137	122	106	171	145	134	116	101
	34	169	143	129	115	100	161	137	126	110	95
	35	160	135	122	109	94	152	129	119	104	90
	36	151	128	115	103	89	144	122	112	98	85
	37	143	121	109	97	84	136	116	106	93	80
	38	135	115	104	92	80	129	110	101	88	76
	39	129	109	98	87	76	123	104	96	83	72
	40	122	104	94	83	72	117	99	91	79	69
PROPERTIES											
r_m (in.)		2.93	2.97	2.99	3.01	3.03	2.89	2.93	2.95	2.97	2.99
$\phi_b M_n$ (kip-ft)		110	84.9	71.8	58.3	44.2	107	82.5	71.8	56.6	42.8
P_e $(KL)^2/10^4$ (kip-ft^2)		26.2	22.2	20.1	17.8	15.5	25.0	21.2	19.5	17.0	14.7

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips

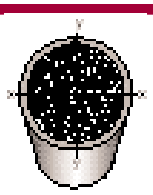


f'c = 8.0

Nominal Outside Diameter		7.625			7.500				
Wall Thickness		0.375	0.328	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		29.04	25.56	10.01	37.38	28.54	23.95	19.36	14.68
Design Wall Thickness		0.349	0.305	0.116	0.465	0.349	0.291	0.233	0.174
		F_y = 46 ksi							
Effective length KL in feet	0	530	497	355	599	517	475	433	389
	4	514	483	343	581	501	460	419	376
	5	506	474	336	571	492	452	411	368
	6	495	465	328	559	482	442	402	360
	7	483	453	319	546	470	431	392	350
	8	470	440	309	530	456	418	380	339
	9	455	426	297	513	442	405	367	327
	10	439	411	285	495	426	390	353	314
	11	423	395	272	476	409	374	338	300
	12	405	378	259	456	391	357	323	286
	13	386	361	245	434	372	340	307	271
	14	367	342	231	413	353	322	290	256
	15	348	324	217	391	334	304	274	241
	16	328	305	202	368	315	286	257	225
	17	309	287	188	346	295	268	240	210
	18	289	268	174	324	276	250	224	195
	19	270	250	161	302	257	233	207	180
	20	251	232	148	280	238	215	192	166
	21	232	215	135	259	220	199	176	152
	22	214	198	123	239	202	182	161	138
	23	197	181	112	219	185	167	147	127
	24	181	166	103	201	170	153	135	116
	25	166	153	95	185	157	141	125	107
	26	154	142	88	171	145	130	115	99
	27	143	131	81	159	134	121	107	92
	28	133	122	76	148	125	112	99	85
	29	124	114	71	138	116	105	93	80
	30	116	106	66	129	109	98	87	74
	31	108	100	62	121	102	92	81	70
	32	102	94	58	113	96	86	76	65
	33	96	88	55	106	90	81	72	61
	34	90	83	51	100	85	76	67	58
	35	85	78	48	95	80	72	64	55
	36	80	74	46	89	75	68	60	52
	37	76	70	43	85	71	64	57	49
	38	72	66	41	80	68	61	54	46
	39	68	63	39	76	64	58	51	44
	40	65	60	37	72	61	55	49	42
PROPERTIES									
r_m (in.)		2.58	2.59	2.66	2.49	2.53	2.55	2.57	2.59
$\phi_b M_n$ (kip-ft)		63.8	56.6	22.6	79.3	61.8	52.1	42.4	32.2
P_e $(KL)^2/10^4$ (kip-ft^2)		14.0	12.9	7.97	15.5	13.1	11.8	10.5	8.98

LRFD Composite Columns
Round HSS

ERW



f'c = 8.0

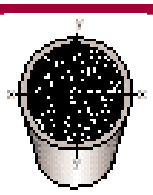
Axial Design Strength in Kips

Nominal Outside Diameter		7.000						6.875				
Wall Thickness		0.500	0.375	0.312	0.250	0.188	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		34.71	26.53	22.29	18.02	13.68	9.18	34.04	26.03	21.87	17.69	13.43
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
		F_y = 46 ksi										
Effective length KL in feet	0	541	465	427	387	347	306	526	453	415	376	337
	4	522	449	412	373	334	294	508	437	400	362	323
	5	512	440	403	366	326	287	498	428	392	355	316
	6	500	430	393	356	318	279	485	417	382	345	308
	7	486	417	382	346	308	270	471	405	370	335	298
	8	471	404	369	334	297	259	456	391	358	323	287
	9	454	389	355	321	285	248	439	377	344	310	275
	10	436	373	340	307	272	236	420	361	329	296	262
	11	416	356	325	292	259	224	401	344	313	282	249
	12	396	338	308	277	245	211	381	326	297	267	235
	13	375	320	291	262	230	198	360	308	280	251	221
	14	354	301	274	246	216	184	339	289	263	236	206
	15	333	283	257	230	201	171	317	271	246	220	192
	16	311	264	239	214	186	158	296	252	229	204	177
	17	290	245	222	198	172	145	275	234	212	189	163
	18	269	227	205	183	158	132	254	216	195	173	150
	19	248	209	189	167	144	120	234	199	179	159	137
	20	228	192	173	153	131	109	214	182	164	144	124
	21	208	175	157	139	119	98	195	165	148	131	112
	22	190	159	143	126	108	90	177	150	135	119	102
	23	174	146	131	116	99	82	162	138	124	109	93
	24	160	134	120	106	91	75	149	126	114	100	86
	25	147	123	111	98	84	69	137	116	105	92	79
	26	136	114	103	91	78	64	127	108	97	85	73
	27	126	106	95	84	72	60	118	100	90	79	68
	28	117	98	88	78	67	55	110	93	84	74	63
	29	109	92	82	73	62	52	102	87	78	69	59
	30	102	86	77	68	58	48	95	81	73	64	55
	31	96	80	72	64	55	45	89	76	68	60	51
	32	90	75	68	60	51	42	84	71	64	56	48
	33	84	71	64	56	48	40	79	67	60	53	45
	34	79	67	60	53	45	38	74	63	57	50	43
	35	75	63	57	50	43	35	70	59	53	47	40
	36	71	59	54	47	40	33	66	56	51	45	38
	37	67	56	51	45	38	32	63	53	48	42	36
	38	64	53	48	42	36	30		50	45	40	34
	39		51	46	40	34	29				38	32
	40					33	27					
PROPERTIES												
r_m (in.)		2.32	2.35	2.37	2.39	2.41	2.43	2.27	2.31	2.33	2.35	2.37
$\phi_b M_n$ (kip-ft)		68.7	53.5	45.2	36.9	28.0	19.0	65.9	51.4	43.5	35.5	26.9
P_e (KL)^2/10^4 (kip-ft^2)		12.3	10.3	9.30	8.21	7.04	5.82	11.5	9.76	8.78	7.75	6.63

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

ERW



f'c = 8.0

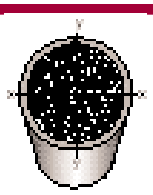
Axial Design Strength in Kips

Nominal Outside Diameter		6.625								6.125				
Wall Thickness		0.500	0.432	0.375	0.312	0.280	0.250	0.188	0.125	0.500	0.375	0.312	0.250	0.188
Weight Per Foot		32.71	28.57	25.03	21.04	18.97	17.02	12.92	8.68	30.04	23.03	19.37	15.69	11.92
Design Wall Thickness		0.465	0.403	0.349	0.291	0.261	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	499	462	428	392	373	355	317	278	446	381	348	314	279
	4	480	444	412	377	358	341	304	266	426	364	332	299	265
	5	470	435	403	368	350	333	296	259	416	355	324	291	258
	6	457	423	392	358	341	324	288	251	403	344	314	282	249
	7	443	410	380	347	330	313	278	242	388	332	302	271	239
	8	427	395	366	334	317	301	267	232	372	318	289	259	228
	9	410	379	351	320	304	288	255	221	355	303	275	246	217
	10	392	362	335	305	290	275	242	209	336	287	261	233	204
	11	372	344	318	290	275	260	229	197	317	270	245	219	191
	12	352	325	301	274	259	245	215	184	297	253	230	204	178
	13	331	306	283	257	243	230	202	172	277	236	214	190	165
	14	310	286	265	240	227	215	187	159	257	218	198	175	151
	15	289	267	246	223	211	199	173	146	237	201	182	160	138
	16	268	247	228	207	195	184	160	134	217	184	166	146	126
	17	248	228	211	190	180	169	146	122	198	168	151	133	113
	18	228	210	193	174	164	155	133	110	179	152	137	119	102
	19	208	191	176	159	150	141	120	99	161	136	123	107	91
	20	189	174	160	144	135	127	109	89	145	123	111	97	82
	21	171	158	145	131	123	115	98	81	132	112	100	88	75
	22	156	144	132	119	112	105	90	74	120	102	91	80	68
	23	143	131	121	109	102	96	82	68	110	93	84	73	62
	24	131	121	111	100	94	88	75	62	101	85	77	67	57
	25	121	111	102	92	87	81	69	57	93	79	71	62	53
	26	112	103	95	85	80	75	64	53	86	73	65	57	49
	27	104	95	88	79	74	70	60	49	80	68	61	53	45
	28	96	89	82	73	69	65	55	46	74	63	56	49	42
	29	90	83	76	68	64	60	52	42	69	59	53	46	39
	30	84	77	71	64	60	56	48	40	65	55	49	43	37
	31	79	72	67	60	56	53	45	37	61	51	46	40	34
	32	74	68	62	56	53	50	42	35	57	48	43	38	32
	33	69	64	59	53	50	47	40	33	53	45	41	35	30
	34	65	60	55	50	47	44	38	31		43	38	33	28
	35	62	57	52	47	44	41	35	29					27
	36	58	54	49	44	42	39	34	28					
	37			47	42	40	37	32	26					
	38							30	25					
	39													
	40													
PROPERTIES														
r_m (in.)		2.18	2.20	2.22	2.24	2.25	2.26	2.28	2.30	2.01	2.05	2.07	2.08	2.10
$\phi_b M_n$ (kip-ft)		61.1	53.8	47.6	40.4	36.6	32.8	25.0	17.0	51.4	40.4	34.2	27.9	21.3
P_e (KL)^2/10^4 (kip-ft^2)		10.1	9.32	8.58	7.72	7.26	6.81	5.83	4.79	7.80	6.60	5.94	5.18	4.41

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



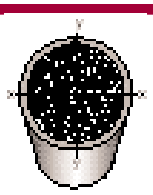
f'c = 8.0

Nominal Outside Diameter		6.000							5.563			
Wall Thickness		0.500	0.375	0.312	0.280	0.250	0.188	0.125	0.375	0.258	0.188	0.134
Weight Per Foot		29.37	22.53	18.95	17.11	15.35	11.67	7.84	20.78	14.62	10.79	7.77
Design Wall Thickness		0.465	0.349	0.291	0.261	0.233	0.174	0.116	0.349	0.241	0.174	0.125
		F_y = 46 ksi										
Effective length KL in feet	0	433	370	337	320	304	269	235	331	275	239	212
	4	413	353	321	305	289	256	222	313	260	225	199
	5	402	344	313	297	281	249	215	304	251	218	192
	6	389	332	303	287	272	240	207	293	242	209	184
	7	375	320	291	276	261	230	198	280	231	199	175
	8	359	306	278	264	249	219	188	266	219	189	165
	9	341	291	264	250	237	208	178	251	206	177	154
	10	322	275	250	236	223	195	167	235	192	165	143
	11	303	258	234	222	209	183	155	219	179	153	132
	12	283	241	219	207	195	170	143	202	165	141	121
	13	263	224	203	191	180	156	131	185	151	128	110
	14	243	207	187	176	166	143	120	169	137	116	99
	15	223	189	171	161	152	131	109	153	123	104	88
	16	203	173	156	147	138	118	98	138	110	93	78
	17	185	157	141	133	124	106	87	123	98	82	69
	18	166	141	127	119	111	95	78	109	87	73	62
	19	149	126	114	107	100	85	70	98	78	66	55
	20	135	114	103	96	90	77	63	89	71	60	50
	21	122	104	93	87	82	70	57	80	64	54	45
	22	111	94	85	80	75	64	52	73	59	49	41
	23	102	86	78	73	68	58	48	67	54	45	38
	24	94	79	71	67	63	53	44	62	49	41	35
	25	86	73	66	62	58	49	40	57	45	38	32
	26	80	68	61	57	53	45	37	52	42	35	29
	27	74	63	56	53	50	42	34	49	39	33	27
	28	69	58	52	49	46	39	32	45	36	30	25
	29	64	54	49	46	43	37	30	42	34	28	24
	30	60	51	46	43	40	34	28	39	31	26	22
	31	56	48	43	40	38	32	26		29	25	21
	32	53	45	40	38	35	30	25				19
	33		42	38	35	33	28	23				
	34					31	27	22				
	35											
	36											
	37											
	38											
	39											
	40											
PROPERTIES												
r_m (in.)		1.96	2.00	2.02	2.03	2.04	2.06	2.08	1.85	1.88	1.91	1.92
$\phi_b M_n$ (kip-ft)		49.3	38.6	32.7	29.7	26.7	20.4	13.9	32.8	23.6	17.4	12.8
P_e (KL)^2/10^4 (kip-ft^2)		7.23	6.13	5.51	5.17	4.85	4.12	3.37	4.75	3.80	3.19	2.67

Note: Heavy horizontal line indicates KL/r limit of 200.

LRFD Composite Columns
Round HSS

Axial Design Strength in Kips



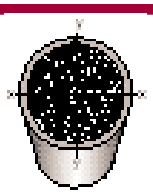
f'c = 8.0

Nominal Outside Diameter		5.500			5.000						
Wall Thickness		0.500	0.375	0.258	0.500	0.375	0.312	0.258	0.250	0.188	0.125
Weight Per Foot		26.70	20.53	14.44	24.03	18.52	15.62	13.07	12.68	9.66	6.51
Design Wall Thickness		0.465	0.349	0.241	0.465	0.349	0.291	0.241	0.233	0.174	0.116
		F_y = 46 ksi									
Effective length KL in feet	0	383	326	270	334	283	257	233	230	201	173
	4	362	308	255	312	265	240	218	214	187	160
	5	351	298	247	300	255	231	209	206	180	153
	6	337	287	237	287	243	220	199	197	171	146
	7	322	274	226	271	230	208	188	186	162	137
	8	306	260	214	254	216	195	177	174	151	127
	9	288	245	201	237	201	182	164	162	140	117
	10	270	229	188	218	186	168	151	149	129	107
	11	251	213	174	200	170	153	138	136	117	97
	12	231	197	160	181	154	139	124	123	105	87
	13	212	180	146	163	139	125	112	110	94	77
	14	193	164	133	145	124	111	99	98	83	68
	15	174	148	119	128	109	98	87	86	73	59
	16	157	133	107	113	96	86	77	76	64	52
	17	139	118	94	100	85	76	68	67	57	46
	18	124	105	84	89	76	68	61	60	51	41
	19	111	95	76	80	68	61	54	54	46	37
	20	101	85	68	72	61	55	49	49	41	33
	21	91	77	62	65	56	50	44	44	37	30
	22	83	71	56	60	51	46	41	40	34	27
	23	76	65	52	54	46	42	37	37	31	25
	24	70	59	47	50	43	38	34	34	29	23
	25	64	55	44	46	39	35	31	31	26	21
	26	60	51	40	43	36	33	29	29	24	20
	27	55	47	37		34	30	27	27	23	18
	28	51	44	35				25	25	21	17
	29	48	41	32							
	30		38	30							
	31			28							
	32										
	33										
	34										
	35										
	36										
	37										
	38										
	39										
	40										
PROPERTIES											
r_m (in.)		1.79	1.83	1.86	1.61	1.65	1.67	1.68	1.69	1.71	1.73
$\phi_b M_n$ (kip-ft)		40.7	32.0	23.0	33.1	26.1	22.3	18.8	18.3	14.0	9.56
P_e $(KL)^2/10^4$ (kip-ft^2)		5.40	4.58	3.66	3.87	3.30	2.96	2.63	2.61	2.21	1.78

Note: Heavy horizontal line indicates $K\ell/r$ limit of 200.

LRFD Composite Columns
Round HSS

ERW



f'c = 8.0

Axial Design Strength in Kips

Nominal Outside Diameter		4.500				4.000							
Wall Thickness		0.337	0.237	0.188	0.125	0.337	0.313	0.250	0.237	0.226	0.220	0.188	0.125
Weight Per Foot		14.98	10.79	8.66	5.84	13.18	12.33	10.01	9.52	9.11	8.88	7.65	5.17
Design Wall Thickness		0.315	0.221	0.174	0.116	0.315	0.291	0.233	0.221	0.211	0.205	0.174	0.116
		F_y = 46 ksi											
Effective length KL in feet	0	230	191	171	145	194	186	165	160	156	154	142	120
	4	211	175	156	132	175	167	148	144	140	138	127	107
	5	202	167	149	126	165	157	139	135	132	130	120	100
	6	190	157	140	118	153	146	129	126	123	121	111	92
	7	178	147	130	109	141	134	118	115	112	110	101	84
	8	164	135	120	100	127	122	107	104	101	100	91	75
	9	150	123	109	91	114	109	95	93	90	89	81	67
	10	136	111	98	81	101	96	84	82	80	78	71	58
	11	122	99	88	72	88	84	73	71	69	68	62	50
	12	108	88	77	63	75	72	62	61	59	58	53	42
	13	94	77	67	54	64	61	53	52	50	49	45	36
	14	82	66	58	47	55	53	46	45	43	42	39	31
	15	71	58	51	41	48	46	40	39	38	37	34	27
	16	63	51	44	36	42	40	35	34	33	33	30	24
	17	55	45	39	32	37	36	31	30	29	29	26	21
	18	49	40	35	28	33	32	28	27	26	26	23	19
	19	44	36	32	25	30	29	25	24	24	23	21	17
	20	40	33	28	23	27	26	22	22	21	21	19	15
	21	36	30	26	21	25	24	20	20	19	19	17	14
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	23	30	25	22	17								
	24	28	23	20	16								
	25		21	18	15								
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	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												
PROPERTIES													
r_m (in.)		1.48	1.51	1.53	1.55	1.31	1.32	1.33	1.34	1.34	1.34	1.35	1.37
$\phi_b M_n$ (kip-ft)		19.1	14.0	11.2	7.69	14.8	13.8	11.4	10.9	10.5	10.2	8.80	6.04
P_e (KL)^2/10^4 (kip-ft^2)		2.15	1.75	1.53	1.23	1.45	1.39	1.21	1.18	1.14	1.12	1.02	0.813

Note: Heavy horizontal line indicates KL/r limit of 200.

Notes

HSS APPLICATIONS

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American Iron and Steel Institute

DSP 3/01 5M