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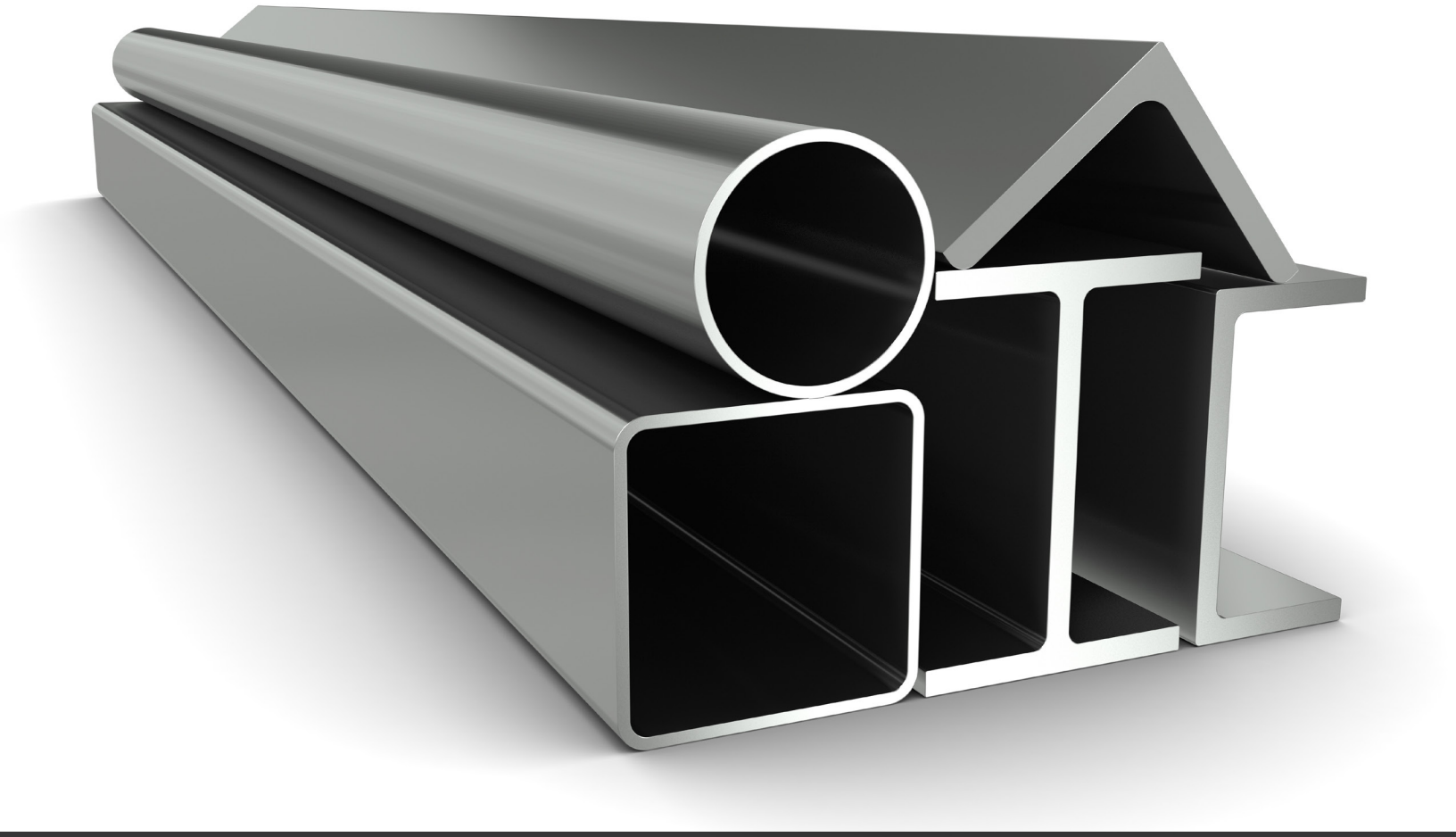

HSS AND WF COLUMN SELECTION GUIDE

ABOUT THIS GUIDE

Simplify your design process with the Steel Tube Institute's HSS and WF Column Selection Guide, offering a straightforward comparison of HSS and WF columns. Each table pairs a W-shape with a set of comparable HSS alternatives — square, rectangular, and round — so designers can quickly evaluate substitution options in axial compression.

Tailored to assist designers, this guide aids in the selection of optimal and effective column designs. Available strengths are tabulated for HSS with F_y = 50 ksi (ASTM A500 Grade C) and W-shapes with F_y = 50 ksi (ASTM A992); A500 compression strengths may conservatively be applied to ASTM A1085.

Within each table, the upper rows list section properties: slenderness ratio (h/t_{des}), nominal weight, percent weight savings versus the WF, section perimeter, percent perimeter savings, and current HSS availability. The lower rows tabulate the available compression strength $\phi_c P_n$ (LRFD) at effective lengths L_c from 8 ft through 45 or 50 ft.

To use the guide, locate the table for your selected W-shape, find the row matching your effective length, and read across to compare HSS capacities. Shaded cells indicate the HSS outperforms the WF at that length. A solid horizontal line marks the point beyond which that shape's L_c/r_y exceeds 200 and its use is not recommended. An asterisk next to a value indicates the section is slender for compression; tabulated values have been adjusted accordingly.

The HSS Availability row reflects current domestic production. "REG PROD" denotes a shape regularly produced in ASTM A500 by at least one STI member producer and typically kept on the standard rolling schedule. "ON DEMAND" denotes a shape that is not stocked and must be special ordered, generally requiring a minimum rolling quantity and longer lead time; ASTM A1085 is produced on demand only. For the most up-to-date availability, consult the HSS Capability Tool at steeltubeinstitute.org.

Detailed notes are provided on Page 17. Make efficient and informed column design decisions with this Steel Tube Institute reference.

ABOUT THE STEEL TUBE INSTITUTE

The Steel Tube Institute was formed in 1930 when a group of manufacturers joined forces to advance the steel tube industry. Today it is the leading technical resource in North America for steel tube products. STI is dedicated to advancing the growth and competitiveness of North America's steel tubular products. Our strength is bringing together resources to move the industry forward through active collaboration. We accomplish this by effective promotion, education, and problem solving; targeting all trades from engineers and architects to fabricators and field installers.

While the information in this document is believed to be accurate, it has not been prepared for conventional use as an engineering or construction document and should not be used or relied upon for any specific application without competent professional examination and verification of its accuracy, suitability, and applicability by a licensed engineer, architect, or other professional. The Steel Tube Institute and its consultants disclaim any liability arising from information provided by others or from the use of the information contained in this document.

HSS and WF Column Selection Guide

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W8x31 d=8"; bf=8"	HSS6x6x3/8	HSS7x7x5/16	HSS8x8x3/16	HSS8x8x1/4	HSS10x10x3/16	HSS8x6x5/16	HSS8.625x0.250	HSS8.625x0.313
h/t_{des} [6,7]		14.2	21.1	43.0*	31.3	54.5*	24.5	37.0	29.6
Nominal Weight (lb/ft)	31	27.48	27.59	19.63	25.82	24.73	27.59	22.38	27.77
% Weight Savings of HSS over WF [5]		11.4%	11.0%	36.7%	16.7%	20.2%	11.0%	27.8%	10.4%
Perimeter of Section (in)	47.43	22.80	27.00	31.40	31.20	39.40	27.00	27.10	27.10
% Perimeter Savings of HSS [5]		51.9%	43.1%	33.8%	34.2%	16.9%	43.1%	42.9%	42.9%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	348	300	312	197	299	212	304	256	317
10	317	279	296	193	287	209	284	245	304
12	283	255	278	187	274	205	263	233	288
14	248	229	258	180	260	201	239	219	271
16	212	203	237	173	243	196	214	204	252
18	178	177	215	165	227	191	189	188	232
20	146	152	193	156	209	185	164	171	211
22	121	128	172	146	191	178	141	155	191
24	101	107	150	133	173	172	119	139	171
26	86.5	91.4	130	120	156	164	101	123	151
28	74.5	78.8	112	107	139	157	87.5	108	133
30	64.9	68.7	97.9	94.7	123	149	76.2	94.4	116
34		53.5	76.2	73.7	95.6	133	59.3	73.5	90
38		42.8	61	59	76.5	117	47.5	58.8	72
40			55.1	53.2	69.1	106	42.9	53.1	65
45			43.5	42.1	54.6	83.8		42	51.4

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W8x35 d=8.12"; bf=8.02"	HSS7x7x5/16	HSS7x7x3/8	HSS8x8x1/4	HSS8x8x5/16	HSS10x10x1/4	HSS8x6x5/16	HSS8.625x0.313	HSS8.625x0.375
h/t_{des} [6,7]		21.1	17.1	31.3	24.5	39.9*	24.5	29.6	24.7
Nominal Weight (lb/ft)	35	27.59	32.58	25.82	31.84	32.63	27.59	27.77	33.07
% Weight Savings of HSS over WF [5]		21.2%	6.9%	26.2%	9.0%	6.8%	21.2%	20.7%	5.5%
Perimeter of Section (in)	47.70	27.00	26.80	31.20	31.00	39.20	27.00	27.10	27.10
% Perimeter Savings of HSS [5]		43.4%	43.8%	34.6%	35.0%	17.8%	43.4%	43.2%	43.2%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	394	312	368	299	368	352	304	317	377
10	359	296	349	287	354	346	284	304	361
12	321	278	327	274	338	339	263	288	342
14	281	258	303	260	319	331	239	271	321
16	241	237	278	243	299	322	214	252	298
18	203	215	252	227	278	313	189	232	274
20	166	193	226	209	256	302	164	211	250
22	138	172	200	191	234	290	141	191	225
24	116	150	175	173	212	274	119	171	201
26	98.5	130	151	156	191	257	101	151	178
28	84.9	112	130	139	170	239	87.5	133	156
30	74	97.9	113	123	150	221	76.2	116	136
34		76.2	88.1	95.6	116	186	59.3	90	106
38		61	70.5	76.5	93.2	153	47.5	72	84.6
40		55.1	63.6	69.1	84.1	138	42.9	65	76.3
45		43.5		54.6	66.5	109		51.4	60.3

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W8x40 d=8.25"; bf=8.07"	HSS7x7x5/16	HSS7x7x3/8	HSS8x8x1/4	HSS8x8x5/16	HSS8x8x3/8	HSS8x6x3/8	HSS8.625x0.313	HSS8.625x0.375
h/t_{des} [6,7]		21.1	17.1	31.3	24.5	19.9	19.9	29.6	24.7
Nominal Weight (lb/ft)	40	27.59	32.58	25.82	31.84	37.69	32.58	27.77	33.07
% Weight Savings of HSS over WF [5]		31.0%	18.6%	35.4%	20.4%	5.8%	18.6%	30.6%	17.3%
Perimeter of Section (in)	48.06	27.00	26.80	31.20	31.00	30.80	26.80	27.10	27.10
% Perimeter Savings of HSS [5]		43.8%	44.2%	35.1%	35.5%	35.9%	44.2%	43.6%	43.6%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	448	312	368	299	368	436	358	317	377
10	409	296	349	287	354	419	335	304	361
12	366	278	327	274	338	400	309	288	342
14	321	258	303	260	319	378	280	271	321
16	275	237	278	243	299	354	251	252	298
18	232	215	252	227	278	328	221	232	274
20	191	193	226	209	256	302	192	211	250
22	158	172	200	191	234	275	164	191	225
24	133	150	175	173	212	249	138	171	201
26	113	130	151	156	191	223	118	151	178
28	97.4	112	130	139	170	198	102	133	156
30	84.9	97.9	113	123	150	174	88.6	116	136
34	66.1	76.2	88.1	95.6	116	136	69	90	106
38		61	70.5	76.5	93.2	109	55.2	72	84.6
40		55.1	63.6	69.1	84.1	98		65	76.3
45		43.5		54.6	66.5	77.4		51.4	60.3

See notes on Page 17

HSS and WF Column Selection Guide

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W8x48 d=8.5"; bf=8.11"	HSS7x7x3/8	HSS7x7x1/2	HSS8x8x1/4	HSS8x8x5/16	HSS8x8x3/8	HSS8x6x1/2	HSS8.625x0.375	HSS8.625x0.500
h/t_{des} [6,7]		17.1	12.1	31.3	24.5	19.9	14.2	24.7	18.5
Nominal Weight (lb/ft)	48	32.58	42.05	25.82	31.84	37.69	42.05	33.07	43.43
% Weight Savings of HSS over WF [5]		32.1%	12.4%	46.2%	33.7%	21.5%	12.4%	31.1%	9.5%
Perimeter of Section (in)	48.64	26.80	26.40	31.20	31.00	30.80	26.40	27.10	27.10
% Perimeter Savings of HSS [5]		44.9%	45.7%	35.9%	36.3%	36.7%	45.7%	44.3%	44.3%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	543	368	474	299	368	436	461	377	494
10	497	349	448	287	354	419	429	361	472
12	447	327	419	274	338	400	394	342	447
14	394	303	387	260	319	378	356	321	418
16	340	278	354	243	299	354	316	298	388
18	288	252	319	227	278	328	277	274	356
20	239	226	284	209	256	302	239	250	323
22	198	200	250	191	234	275	202	225	291
24	166	175	217	173	212	249	170	201	259
26	142	151	186	156	191	223	145	178	228
28	122	130	161	139	170	198	125	156	199
30	106	113	140	123	150	174	109	136	173
34	82.8	88.1	109	95.6	116	136	84.7	106	135
38		70.5	87.2	76.5	93.2	109	67.8	84.6	108
40		63.6	78.7	69.1	84.1	98		76.3	97.5
45				54.6	66.5	77.4		60.3	77

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W8x58 d=8.75"; bf=8.22"	HSS7x7x1/2	HSS8x8x3/8	HSS8x8x1/2	HSS9x9x5/16	HSS9x9x3/8	HSS9x7x3/8	HSS8.625x0.375	HSS8.625x0.500
h/t_{des} [6,7]		12.1	19.9	14.2	27.9	22.8	22.8	24.7	18.5
Nominal Weight (lb/ft)	58	42.05	37.69	48.85	36.10	42.79	37.69	33.07	43.43
% Weight Savings of HSS over WF [5]		27.5%	35.0%	15.8%	37.8%	26.2%	35.0%	43.0%	25.1%
Perimeter of Section (in)	49.36	26.40	30.80	30.40	35.00	34.80	30.80	27.10	27.10
% Perimeter Savings of HSS [5]		46.5%	37.6%	38.4%	29.1%	29.5%	37.6%	45.1%	45.1%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	660	474	436	565	423	503	429	377	494
10	606	448	419	542	410	488	408	361	472
12	546	419	400	516	396	470	385	342	447
14	482	387	378	486	379	449	358	321	418
16	418	354	354	454	360	427	330	298	388
18	355	319	328	420	340	403	301	274	356
20	296	284	302	385	319	377	271	250	323
22	244	250	275	350	297	351	242	225	291
24	205	217	249	315	275	325	214	201	259
26	175	186	223	281	253	298	186	178	228
28	151	161	198	249	231	272	161	156	199
30	131	140	174	217	210	246	140	136	173
34	102	109	136	169	169	197	109	106	135
38		87.2	109	136	135	158	87.3	84.6	108
40		78.7	98	122	122	143	78.8	76.3	97.5
45			77.4	96.7	96.3	113	62.3	60.3	77

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W8x67 d=9"; bf=8.28"	HSS8x8x3/8	HSS8x8x1/2	HSS8x8x5/8	HSS9x9x5/16	HSS9x9x3/8	HSS9x7x1/2	HSS10.75x0.375	HSS10.75x0.500
h/t_{des} [6,7]		19.9	14.2	10.8	27.9	22.8	16.4	30.8	23.1
Nominal Weight (lb/ft)	67	37.69	48.85	59.32	36.10	42.79	48.85	41.59	54.79
% Weight Savings of HSS over WF [5]		43.7%	27.1%	11.5%	46.1%	36.1%	27.1%	37.9%	18.2%
Perimeter of Section (in)	49.98	30.80	30.40	30.01	35.00	34.80	30.40	33.77	33.77
% Perimeter Savings of HSS [5]		38.4%	39.2%	40.0%	30.0%	30.4%	39.2%	32.4%	32.4%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	763	436	565	684	423	503	555	488	642
10	701	419	542	656	410	488	527	475	623
12	633	400	516	623	396	470	496	459	602
14	560	378	486	586	379	449	461	440	578
16	487	354	454	546	360	427	423	420	551
18	415	328	420	504	340	403	384	399	522
20	347	302	385	461	319	377	345	376	491
22	287	275	350	417	297	351	307	352	459
24	241	249	315	374	275	325	269	328	427
26	205	223	281	333	253	298	234	303	394
28	177	198	249	293	231	272	201	279	362
30	154	174	217	256	210	246	175	255	330
34	120	136	169	199	169	197	137	209	269
38		109	136	159	135	158	109	168	216
40		98	122	144	122	143	98.7	151	195
45		77.4	96.7	114	96.3	113	77.9	120	154

See notes on Page 17

HSS and WF Column Selection Guide

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W10x33 d=9.73"; bf=7.96"	HSS7x7x1/4	HSS7x7x5/16	HSS8x8x1/4	HSS8x8x5/16	HSS9x9x1/4	HSS8x6x5/16	HSS8.625x0.250	HSS8.625x0.313
h/t_{des}[6,7]		27.0	21.1	31.3	24.5	35.6*	24.5	37.0	29.6
Nominal Weight (lb/ft)	33	22.42	27.59	25.82	31.84	29.23	27.59	22.38	27.77
% Weight Savings of HSS over WF [5]		32.1%	16.4%	21.8%	3.5%	11.4%	16.4%	32.2%	15.8%
Perimeter of Section (in)	50.72	27.20	27.00	31.20	31.00	35.20	27.00	27.10	27.10
% Perimeter Savings of HSS [5]		46.4%	46.8%	38.5%	38.9%	30.6%	46.8%	46.6%	46.6%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	365	254	312	299	368	337	304	256	317
10	330	242	296	287	354	330	284	245	304
12	292	227	278	274	338	321	263	233	288
14	253	211	258	260	319	307	239	219	271
16	214	194	237	243	299	292	214	204	252
18	177	177	215	227	278	276	189	188	232
20	143	159	193	209	256	259	164	171	211
22	118	142	172	191	234	242	141	155	191
24	99.5	125	150	173	212	224	119	139	171
26	84.8	108	130	156	191	206	101	123	151
28	73.1	93.4	112	139	170	188	87.5	108	133
30	63.7	81.3	97.9	123	150	171	76.2	94.4	116
34		63.3	76.2	95.6	116	138	59.3	73.5	90
38		50.7	61	76.5	93.2	111	47.5	58.8	72
40		45.8	55.1	69.1	84.1	99.8	42.9	53.1	65
45		36.1	43.5	54.6	66.5	78.8		42	51.4

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W10x39 d=9.92"; bf=7.99"	HSS7x7x5/16	HSS7x7x3/8	HSS8x8x1/4	HSS8x8x5/16	HSS9x9x1/4	HSS8x6x3/8	HSS8.625x0.250	HSS8.625x0.313
h/t_{des}[6,7]		21.1	17.1	31.3	24.5	35.6*	19.9	37.0	29.6
Nominal Weight (lb/ft)	39	27.59	32.58	25.82	31.84	29.23	32.58	22.38	27.77
% Weight Savings of HSS over WF [5]		29.3%	16.5%	33.8%	18.4%	25.1%	16.5%	42.6%	28.8%
Perimeter of Section (in)	51.17	27.00	26.80	31.20	31.00	35.20	26.80	27.10	27.10
% Perimeter Savings of HSS [5]		47.2%	47.6%	39.0%	39.4%	31.2%	47.6%	47.0%	47.0%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	436	312	368	299	368	337	358	256	317
10	396	296	349	287	354	330	335	245	304
12	352	278	327	274	338	321	309	233	288
14	306	258	303	260	319	307	280	219	271
16	260	237	278	243	299	292	251	204	252
18	217	215	252	227	278	276	221	188	232
20	177	193	226	209	256	259	192	171	211
22	146	172	200	191	234	242	164	155	191
24	123	150	175	173	212	224	138	139	171
26	105	130	151	156	191	206	118	123	151
28	90.2	112	130	139	170	188	102	108	133
30	78.6	97.9	113	123	150	171	88.6	94.4	116
34		76.2	88.1	95.6	116	138	69	73.5	90
38		61	70.5	76.5	93.2	111	55.2	58.8	72
40		55.1	63.6	69.1	84.1	99.8		53.1	65
45		43.5		54.6	66.5	78.8		42	51.4

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W10x45 d=10.1"; bf=8.02"	HSS7x7x3/8	HSS8x8x5/16	HSS8x8x3/8	HSS9x9x5/16	HSS9x9x3/8	HSS8x6x1/2	HSS8.625x0.313	HSS8.625x0.375
h/t_{des}[6,7]		17.1	24.5	19.9	27.9	22.8	14.2	29.6	24.7
Nominal Weight (lb/ft)	45	32.58	31.84	37.69	36.10	42.79	42.05	27.77	33.07
% Weight Savings of HSS over WF [5]		27.6%	29.2%	16.2%	19.8%	4.9%	6.6%	38.3%	26.5%
Perimeter of Section (in)	51.58	26.80	31.00	30.80	35.00	34.80	26.40	27.10	27.10
% Perimeter Savings of HSS [5]		48.0%	39.9%	40.3%	32.1%	32.5%	48.8%	47.5%	47.5%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	507	368	368	436	423	503	461	317	377
10	461	349	354	419	410	488	429	304	361
12	411	327	338	400	396	470	394	288	342
14	359	303	319	378	379	449	356	271	321
16	307	278	299	354	360	427	316	252	298
18	257	252	278	328	340	403	277	232	274
20	211	226	256	302	319	377	239	211	250
22	174	200	234	275	297	351	202	191	225
24	146	175	212	249	275	325	170	171	201
26	125	151	191	223	253	298	145	151	178
28	108	130	170	198	231	272	125	133	156
30	93.7	113	150	174	210	246	109	116	136
34		88.1	116	136	169	197	84.7	90	106
38		70.5	93.2	109	135	158	67.8	72	84.6
40		63.6	84.1	98	122	143		65	76.3
45			66.5	77.4	96.3	113		51.4	60.3

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HSS and WF Column Selection Guide

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W10x49 d=10"; bf=10"	HSS8x8x3/8	HSS9x9x5/16	HSS9x9x3/8	HSS10x10x5/16	HSS10x10x3/8	HSS10x8x3/8	HSS8.625x0.500	HSS10.75x0.313
h/t_{des} [6,7]		19.9	27.9	22.8	31.4	25.7	25.7	18.5	36.9
Nominal Weight (lb/ft)	49	37.69	36.10	42.79	40.35	47.90	42.79	43.43	34.87
% Weight Savings of HSS over WF [5]		23.1%	26.3%	12.7%	17.7%	2.2%	12.7%	11.4%	28.8%
Perimeter of Section (in)	59.32	30.80	35.00	34.80	39.00	38.80	34.80	27.10	33.77
% Perimeter Savings of HSS [5]		48.1%	41.0%	41.3%	34.3%	34.6%	41.3%	54.3%	43.1%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	584	436	423	503	478	569	497	494	410
10	550	419	410	488	467	555	479	472	398
12	512	400	396	470	453	538	457	447	385
14	471	378	379	449	437	519	434	418	370
16	427	354	360	427	420	498	407	388	353
18	382	328	340	403	401	476	380	356	335
20	337	302	319	377	381	452	351	323	316
22	294	275	297	351	360	426	322	291	296
24	253	249	275	325	338	400	293	259	276
26	216	223	253	298	316	374	264	228	256
28	186	198	231	272	293	347	236	199	235
30	162	174	210	246	271	321	209	173	215
34	126	136	169	197	228	269	163	135	177
38	101	109	135	158	187	220	130	108	142
40	91.1	98	122	143	169	199	118	97.5	128
45		77.4	96.3	113	133	157	93	77	101

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W10x54 d=10.1"; bf=10"	HSS8x8x1/2	HSS9x9x3/8	HSS10x10x5/16	HSS10x10x3/8	HSS12x12x5/16	HSS10x8x3/8	HSS10.75x0.375	HSS12.75x0.313
h/t_{des} [6,7]		14.2	22.8	31.4	25.7	38.2*	25.7	30.8	43.8
Nominal Weight (lb/ft)	54	48.85	42.79	40.35	47.90	48.86	42.79	41.59	41.55
% Weight Savings of HSS over WF [5]		9.5%	20.8%	25.3%	11.3%	9.5%	20.8%	23.0%	23.1%
Perimeter of Section (in)	59.46	30.40	34.80	39.00	38.80	47.00	34.80	33.77	40.06
% Perimeter Savings of HSS [5]		48.9%	41.5%	34.4%	34.7%	21.0%	41.5%	43.2%	32.6%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	642	565	503	478	569	546	497	488	496
10	605	542	488	467	555	540	479	475	486
12	564	516	470	453	538	532	457	459	475
14	519	486	449	437	519	523	434	440	461
16	471	454	427	420	498	514	407	420	447
18	422	420	403	401	476	503	380	399	430
20	374	385	377	381	452	490	351	376	413
22	327	350	351	360	426	477	322	352	395
24	282	315	325	338	400	461	293	328	376
26	240	281	298	316	374	440	264	303	356
28	207	249	272	293	347	419	236	279	336
30	180	217	246	271	321	397	209	255	315
34	141	169	197	228	269	352	163	209	274
38	112	136	158	187	220	308	130	168	235
40	102	122	143	169	199	287	118	151	216
45		96.7	113	133	157	235	93	120	172

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W10x60 d=10.2"; bf=10.1"	HSS8x8x5/8	HSS9x9x1/2	HSS10x10x5/16	HSS10x10x3/8	HSS12x12x5/16	HSS10x8x1/2	HSS10.75x0.375	HSS10.75x0.500
h/t_{des} [6,7]		10.8	16.4	31.4	25.7	38.2*	18.5	30.8	23.1
Nominal Weight (lb/ft)	60	59.32	55.66	40.35	47.90	48.86	55.66	41.59	54.79
% Weight Savings of HSS over WF [5]		1.1%	7.2%	32.7%	20.2%	18.6%	7.2%	30.7%	8.7%
Perimeter of Section (in)	59.96	30.01	34.40	39.00	38.80	47.00	34.40	33.77	33.77
% Perimeter Savings of HSS [5]		50.0%	42.6%	35.0%	35.3%	21.6%	42.6%	43.7%	43.7%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	719	684	651	478	569	546	643	488	642
10	679	656	630	467	555	540	619	475	623
12	633	623	606	453	538	532	590	459	602
14	583	586	579	437	519	523	558	440	578
16	530	546	549	420	498	514	524	420	551
18	475	504	517	401	476	503	487	399	522
20	421	461	483	381	452	490	449	376	491
22	368	417	449	360	426	477	411	352	459
24	318	374	414	338	400	461	372	328	427
26	271	333	379	316	374	440	334	303	394
28	234	293	344	293	347	419	298	279	362
30	204	256	311	271	321	397	263	255	330
34	159	199	247	228	269	352	205	209	269
38	127	159	198	187	220	308	164	168	216
40	115	144	179	169	199	287	148	151	195
45		114	141	133	157	235	117	120	154

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HSS and WF Column Selection Guide

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x40 d=11.9"; bf=8.01"	HSS7x7x3/8	HSS8x8x1/4	HSS8x8x5/16	HSS8x8x3/8	HSS9x9x1/4	HSS10x6x5/16	HSS9.625x0.250	HSS9.625x0.313
h/t_{des} [6,7]		17.1	31.3	24.5	19.9	35.6*	31.4	41.3	33.1
Nominal Weight (lb/ft)	40	32.58	25.82	31.84	37.69	29.23	31.84	25.06	31.11
% Weight Savings of HSS over WF [5]		18.6%	35.4%	20.4%	5.8%	26.9%	20.4%	37.4%	22.2%
Perimeter of Section (in)	55.25	26.80	31.20	31.00	30.80	35.20	31.00	30.24	30.24
% Perimeter Savings of HSS [5]		51.5%	43.5%	43.9%	44.3%	36.3%	43.9%	45.3%	45.3%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	440	368	299	368	436	337	353	291	361
10	398	349	287	354	419	330	332	281	348
12	352	327	274	338	400	321	307	269	334
14	304	303	260	319	378	307	281	256	318
16	257	278	243	299	354	292	253	242	300
18	213	252	227	278	328	276	225	227	281
20	173	226	209	256	302	259	198	211	261
22	143	200	191	234	275	242	171	195	240
24	120	175	173	212	249	224	146	178	220
26	102	151	156	191	223	206	124	162	200
28	88.1	130	139	170	198	188	107	146	180
30	76.8	113	123	150	174	171	93.2	131	161
34		88.1	95.6	116	136	138	72.5	103	126
38		70.5	76.5	93.2	109	111	58.1	82.3	101
40		63.6	69.1	84.1	98	99.8	52.4	74.2	91.1
45			54.6	66.5	77.4	78.8		58.7	72

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x45 d=12.1"; bf=8.05"	HSS8x8x5/16	HSS8x8x3/8	HSS9x9x1/4	HSS9x9x3/8	HSS10x10x1/4	HSS10x6x3/8	HSS9.625x0.313	HSS9.625x0.375
h/t_{des} [6,7]		24.5	19.9	35.6*	22.8	39.9*	25.7	33.1	27.6
Nominal Weight (lb/ft)	45	31.84	37.69	29.23	42.79	32.63	37.69	31.11	37.08
% Weight Savings of HSS over WF [5]		29.2%	16.2%	35.0%	4.9%	27.5%	16.2%	30.9%	17.6%
Perimeter of Section (in)	55.73	31.00	30.80	35.20	34.80	39.20	30.80	30.24	30.24
% Perimeter Savings of HSS [5]		44.4%	44.7%	36.8%	37.6%	29.7%	44.7%	45.7%	45.7%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	494	368	436	337	503	352	418	361	431
10	447	354	419	330	488	346	392	348	416
12	396	338	400	321	470	339	363	334	399
14	343	319	378	307	449	331	331	318	379
16	290	299	354	292	427	322	298	300	357
18	240	278	328	276	403	313	264	281	334
20	195	256	302	259	377	302	231	261	310
22	161	234	275	242	351	290	199	240	286
24	136	212	249	224	325	274	169	220	261
26	116	191	223	206	298	257	144	200	237
28	99.7	170	198	188	272	239	124	180	213
30	86.8	150	174	171	246	221	108	161	190
34		116	136	138	197	186	84	126	149
38		93.2	109	111	158	153	67.3	101	119
40		84.1	98	99.8	143	138	60.7	91.1	108
45		66.5	77.4	78.8	113	109		72	85

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x50 d=12.2"; bf=8.08"	HSS8x8x5/16	HSS8x8x3/8	HSS9x9x5/16	HSS10x10x1/4	HSS10x10x5/16	HSS10x8x5/16	HSS9.625x0.375	HSS10.75x0.313
h/t_{des} [6,7]		24.5	19.9	27.9	39.9*	31.4	31.4	27.6	36.9
Nominal Weight (lb/ft)	50	31.84	37.69	36.10	32.63	40.35	36.10	37.08	34.87
% Weight Savings of HSS over WF [5]		36.3%	24.6%	27.8%	34.7%	19.3%	27.8%	25.8%	30.3%
Perimeter of Section (in)	55.98	31.00	30.80	35.00	39.20	39.00	35.00	30.24	33.77
% Perimeter Savings of HSS [5]		44.6%	45.0%	37.5%	30.0%	30.3%	37.5%	46.0%	39.7%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	551	368	436	423	352	478	418	431	410
10	500	354	419	410	346	467	403	416	398
12	443	338	400	396	339	453	386	399	385
14	384	319	378	379	331	437	366	379	370
16	326	299	354	360	322	420	344	357	353
18	270	278	328	340	313	401	321	334	335
20	220	256	302	319	302	381	297	310	316
22	182	234	275	297	290	360	273	286	296
24	153	212	249	275	274	338	249	261	276
26	130	191	223	253	257	316	225	237	256
28	112	170	198	231	239	293	201	213	235
30	97.8	150	174	210	221	271	179	190	215
34		116	136	169	186	228	140	149	177
38		93.2	109	135	153	187	112	119	142
40		84.1	98	122	138	169	101	108	128
45		66.5	77.4	96.3	109	133	79.7	85	101

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HSS and WF Column Selection Guide

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x53 d=12.1"; bf=10"	HSS8x8x1/2	HSS9x9x5/16	HSS9x9x3/8	HSS10x10x5/16	HSS10x10x3/8	HSS12x8x3/8	HSS10.75x0.375	HSS12.75x0.313
h/t_{des} [6,7]		14.2	27.9	22.8	31.4	25.7	31.4	30.8	43.8
Nominal Weight (lb/ft)	53	48.85	36.10	42.79	40.35	47.90	47.90	41.59	41.55
% Weight Savings of HSS over WF [5]		7.8%	31.9%	19.3%	23.9%	9.6%	9.6%	21.5%	21.6%
Perimeter of Section (in)	63.51	30.40	35.00	34.80	39.00	38.80	38.80	33.77	40.06
% Perimeter Savings of HSS [5]		52.1%	44.9%	45.2%	38.6%	38.9%	38.9%	46.8%	36.9%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	629	565	423	503	478	569	558	488	496
10	592	542	410	488	467	555	538	475	486
12	549	516	396	470	453	538	515	459	475
14	502	486	379	449	437	519	490	440	461
16	453	454	360	427	420	498	462	420	447
18	403	420	340	403	401	476	432	399	430
20	354	385	319	377	381	452	401	376	413
22	307	350	297	351	360	426	369	352	395
24	261	315	275	325	338	400	337	328	376
26	223	281	253	298	316	374	305	303	356
28	192	249	231	272	293	347	274	279	336
30	167	217	210	246	271	321	245	255	315
34	130	169	169	197	228	269	192	209	274
38	104	136	135	158	187	220	153	168	235
40	94.1	122	122	143	169	199	138	151	216
45		96.7	96.3	113	133	157	109	120	172

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x58 d=12.2"; bf=10"	HSS9x9x3/8	HSS9x9x1/2	HSS10x10x5/16	HSS10x10x3/8	HSS12x12x5/16	HSS12x10x3/8	HSS10.75x0.500	HSS12.75x0.375
h/t_{des} [6,7]		22.8	16.4	31.4	25.7	38.2*	31.4	23.1	36.5
Nominal Weight (lb/ft)	58	42.79	55.66	40.35	47.90	48.86	53	54.79	49.61
% Weight Savings of HSS over WF [5]		26.2%	4.0%	30.4%	17.4%	15.8%	8.6%	5.5%	14.5%
Perimeter of Section (in)	63.68	34.80	34.40	39.00	38.80	47.00	42.80	33.77	40.06
% Perimeter Savings of HSS [5]		45.3%	46.0%	38.8%	39.1%	26.2%	32.8%	47.0%	37.1%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	687	503	651	478	569	546	630	642	591
10	647	488	630	467	555	540	615	623	579
12	601	470	606	453	538	532	598	602	566
14	551	449	579	437	519	523	578	578	550
16	499	427	549	420	498	514	556	551	532
18	445	403	517	401	476	503	531	522	513
20	392	377	483	381	452	490	506	491	492
22	341	351	449	360	426	477	479	459	470
24	292	325	414	338	400	461	451	427	447
26	249	298	379	316	374	440	422	394	423
28	214	272	344	293	347	419	393	362	399
30	187	246	311	271	321	397	364	330	374
34	145	197	247	228	269	352	308	269	325
38	116	158	198	187	220	308	255	216	278
40	105	143	179	169	199	287	230	195	255
45		113	141	133	157	235	182	154	203

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x65 d=12.1"; bf=12"	HSS9x9x1/2	HSS10x10x3/8	HSS10x10x1/2	HSS12x12x5/16	HSS12x12x3/8	HSS12x10x3/8	HSS12.75x0.375	HSS14x0.375
h/t_{des} [6,7]		16.4	25.7	18.5	38.2*	31.4	31.4	36.5	40.1
Nominal Weight (lb/ft)	65	55.66	47.90	62.46	48.86	58.10	53	49.61	54.62
% Weight Savings of HSS over WF [5]		14.4%	26.3%	3.9%	24.8%	10.6%	18.5%	23.7%	16.0%
Perimeter of Section (in)	71.42	34.40	38.80	38.40	47.00	46.80	42.80	40.06	43.98
% Perimeter Savings of HSS [5]		51.8%	45.7%	46.2%	34.2%	34.5%	40.1%	43.9%	38.4%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	798	651	569	740	546	699	630	591	656
10	766	630	555	721	540	687	615	579	645
12	728	606	538	699	532	673	598	566	633
14	685	579	519	674	523	657	578	550	618
16	640	549	498	646	514	638	556	532	601
18	591	517	476	616	503	618	531	513	583
20	542	483	452	583	490	596	506	492	564
22	492	449	426	550	477	573	479	470	543
24	442	414	400	515	461	549	451	447	520
26	394	379	374	480	440	524	422	423	498
28	348	344	347	445	419	498	393	399	474
30	304	311	321	410	397	471	364	374	450
34	236	247	269	342	352	418	308	325	401
38	189	198	220	278	308	365	255	278	352
40	171	179	199	251	287	339	230	255	328
45	135	141	157	199	235	277	182	203	271

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HSS and WF Column Selection Guide

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x72 d=12.3"; bf=12"	HSS10x10x3/8	HSS10x10x1/2	HSS12x12x5/16	HSS12x12x3/8	HSS14x14x3/8	HSS12x10x1/2	HSS12.75x0.500	HSS14x0.375
h/t_{des} [6,7]		25.7	18.5	38.2*	31.4	37.1*	22.8	27.4	40.1
Nominal Weight (lb/ft)	72	47.90	62.46	48.86	58.10	68.31	69.27	65.48	54.62
% Weight Savings of HSS over WF [5]		33.5%	13.2%	32.1%	19.3%	5.1%	3.8%	9.1%	24.1%
Perimeter of Section (in)	71.74	38.80	38.40	47.00	46.80	54.80	42.40	40.06	43.98
% Perimeter Savings of HSS [5]		45.9%	46.5%	34.5%	34.8%	23.6%	40.9%	44.2%	38.7%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	883	569	740	546	699	780	819	777	656
10	847	555	721	540	687	774	799	762	645
12	806	538	699	532	673	766	776	743	633
14	759	519	674	523	657	757	750	722	618
16	709	498	646	514	638	746	720	699	601
18	656	476	616	503	618	734	688	673	583
20	602	452	583	490	596	721	654	645	564
22	547	426	550	477	573	707	618	615	543
24	493	400	515	461	549	691	581	585	520
26	440	374	480	440	524	668	543	553	498
28	389	347	445	419	498	644	505	521	474
30	340	321	410	397	471	619	467	488	450
34	265	269	342	352	418	567	393	423	401
38	212	220	278	308	365	514	324	361	352
40	191	199	251	287	339	487	292	331	328
45	151	157	199	235	277	421	231	262	271

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x79 d=12.4"; bf=12.1"	HSS10x10x5/8	HSS12x12x5/16	HSS12x12x3/8	HSS14x14x5/16	HSS14x14x3/8	HSS12x10x1/2	HSS14x0.375	HSS14x0.500
h/t_{des} [6,7]		14.2	38.2*	31.4	45.1*	37.1*	22.8	40.1	30.1
Nominal Weight (lb/ft)	79	76.33	48.86	58.10	57.36	68.31	69.27	54.62	72.16
% Weight Savings of HSS over WF [5]		3.4%	38.2%	26.5%	27.4%	13.5%	12.3%	30.9%	8.7%
Perimeter of Section (in)	72.26	38.01	47.00	46.80	55.00	54.80	42.40	43.98	43.98
% Perimeter Savings of HSS [5]		47.4%	35.0%	35.2%	23.9%	24.2%	41.3%	39.1%	39.1%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	971	902	546	699	574	780	819	656	865
10	932	879	540	687	569	774	799	645	851
12	887	851	532	673	564	766	776	633	834
14	836	819	523	657	557	757	750	618	814
16	781	784	514	638	550	746	720	601	792
18	724	746	503	618	542	734	688	583	768
20	664	706	490	596	533	721	654	564	742
22	604	664	477	573	523	707	618	543	714
24	544	621	461	549	513	691	581	520	684
26	486	577	440	524	501	668	543	498	653
28	430	534	419	498	489	644	505	474	622
30	376	490	397	471	477	619	467	450	590
34	293	407	352	418	450	567	393	401	524
38	234	329	308	365	421	514	324	352	459
40	212	297	287	339	406	487	292	328	428
45	167	235	235	277	356	421	231	271	352

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x87 d=12.5"; bf=12.1"	HSS10x10x5/8	HSS12x12x3/8	HSS12x12x1/2	HSS14x14x5/16	HSS14x14x3/8	HSS12x10x5/8	HSS14x0.500	HSS16x0.500
h/t_{des} [6,7]		14.2	31.4	22.8	45.1*	37.1*	17.7	30.1	34.4
Nominal Weight (lb/ft)	87	76.33	58.10	76.07	57.36	68.31	84.84	72.16	82.85
% Weight Savings of HSS over WF [5]		12.3%	33.2%	12.6%	34.1%	21.5%	2.5%	17.1%	4.8%
Perimeter of Section (in)	72.37	38.01	46.80	46.40	55.00	54.80	42.01	43.98	50.27
% Perimeter Savings of HSS [5]		47.5%	35.3%	35.9%	24.0%	24.3%	42.0%	39.2%	30.5%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	1070	902	699	912	574	780	1000	865	999
10	1030	879	687	896	569	774	978	851	986
12	981	851	673	878	564	766	949	834	971
14	925	819	657	856	557	757	915	814	954
16	865	784	638	832	550	746	878	792	934
18	802	746	618	805	542	734	838	768	912
20	737	706	596	776	533	721	795	742	888
22	671	664	573	745	523	707	750	714	863
24	605	621	549	713	513	691	704	684	835
26	541	577	524	680	501	668	657	653	807
28	480	534	498	645	489	644	609	622	777
30	421	490	471	610	477	619	562	590	746
34	327	407	418	540	450	567	471	524	682
38	262	329	365	470	421	514	385	459	617
40	237	297	339	436	406	487	347	428	584
45	187	235	277	355	356	421	275	352	504

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Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W12x96 d=12.7"; bf=12.2"	HSS12x12x3/8	HSS12x12x1/2	HSS12x12x5/8	HSS14x14x3/8	HSS14x14x1/2	HSS12x10x5/8	HSS14x0.500	HSS16x0.500
h/t_{des} [6,7]		31.4	22.8	17.7	37.1*	27.1	17.7	30.1	34.4
Nominal Weight (lb/ft)	96	58.10	76.07	93.34	68.31	89.68	84.84	72.16	82.85
% Weight Savings of HSS over WF [5]		39.5%	20.8%	2.8%	28.8%	6.6%	11.6%	24.8%	13.7%
Perimeter of Section (in)	73.10	46.80	46.40	46.01	54.80	54.40	42.01	43.98	50.27
% Perimeter Savings of HSS [5]		36.0%	36.5%	37.1%	25.0%	25.6%	42.5%	39.8%	31.2%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	1180	699	912	1120	780	1080	1000	865	999
10	1140	687	896	1100	774	1070	978	851	986
12	1080	673	878	1080	766	1050	949	834	971
14	1020	657	856	1050	757	1030	915	814	954
16	957	638	832	1020	746	1010	878	792	934
18	888	618	805	986	734	989	838	768	912
20	816	596	776	949	721	963	795	742	888
22	744	573	745	911	707	935	750	714	863
24	672	549	713	870	691	905	704	684	835
26	602	524	680	829	668	874	657	653	807
28	535	498	645	786	644	842	609	622	777
30	469	471	610	742	619	808	562	590	746
34	365	418	540	654	567	739	471	524	682
38	293	365	470	567	514	668	385	459	617
40	264	339	436	525	487	633	347	428	584
45	209	277	355	425	421	546	275	352	504

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W14x43 d=13.7"; bf=8"	HSS8x8x1/4	HSS8x8x5/16	HSS8x8x3/8	HSS9x9x1/4	HSS9x9x5/16	HSS10x6x3/8	HSS10.75x0.250	HSS10.75x0.313
h/t_{des} [6,7]		31.3	24.5	19.9	35.6*	27.9	25.7	46.1	36.9
Nominal Weight (lb/ft)	43	25.82	31.84	37.69	29.23	36.10	37.69	28.06	34.87
% Weight Savings of HSS over WF [5]		40.0%	26.0%	12.3%	32.0%	16.0%	12.3%	34.7%	18.9%
Perimeter of Section (in)	58.79	31.20	31.00	30.80	35.20	35.00	30.80	33.77	33.77
% Perimeter Savings of HSS [5]		46.9%	47.3%	47.6%	40.1%	40.5%	47.6%	42.6%	42.6%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	470	299	368	436	337	423	418	330	410
10	422	287	354	419	330	410	392	321	398
12	371	274	338	400	321	396	363	311	385
14	318	260	319	378	307	379	331	298	370
16	267	243	299	354	292	360	298	285	353
18	218	227	278	328	276	340	264	271	335
20	177	209	256	302	259	319	231	256	316
22	146	191	234	275	242	297	199	240	296
24	123	173	212	249	224	275	169	224	276
26	104	156	191	223	206	253	144	207	256
28	90.1	139	170	198	188	231	124	191	235
30	78.5	123	150	174	171	210	108	175	215
34		95.6	116	136	138	169	84	144	177
38		76.5	93.2	109	111	135	67.3	116	142
40		69.1	84.1	98	99.8	122	60.7	104	128
45		54.6	66.5	77.4	78.8	96.3		82.6	101

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W14x48 d=13.8"; bf=8.03"	HSS8x8x5/16	HSS8x8x3/8	HSS9x9x5/16	HSS9x9x3/8	HSS10x10x5/16	HSS10x8x5/16	HSS10.75x0.313	HSS10.75x0.375
h/t_{des} [6,7]		24.5	19.9	27.9	22.8	31.4	31.4	36.9	30.8
Nominal Weight (lb/ft)	48	31.84	37.69	36.10	42.79	40.35	36.10	34.87	41.59
% Weight Savings of HSS over WF [5]		33.7%	21.5%	24.8%	10.9%	15.9%	24.8%	27.4%	13.4%
Perimeter of Section (in)	59.04	31.00	30.80	35.00	34.80	39.00	35.00	33.77	33.77
% Perimeter Savings of HSS [5]		47.5%	47.8%	40.7%	41.1%	33.9%	40.7%	42.8%	42.8%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	527	368	436	423	503	478	418	410	488
10	475	354	419	410	488	467	403	398	475
12	419	338	400	396	470	453	386	385	459
14	360	319	378	379	449	437	366	370	440
16	303	299	354	360	427	420	344	353	420
18	249	278	328	340	403	401	321	335	399
20	202	256	302	319	377	381	297	316	376
22	167	234	275	297	351	360	273	296	352
24	140	212	249	275	325	338	249	276	328
26	119	191	223	253	298	316	225	256	303
28	103	170	198	231	272	293	201	235	279
30	89.7	150	174	210	246	271	179	215	255
34		116	136	169	197	228	140	177	209
38		93.2	109	135	158	187	112	142	168
40		84.1	98	122	143	169	101	128	151
45		66.5	77.4	96.3	113	133	79.7	101	120

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Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W14x53 d=13.9"; bf=8.06"	HSS8x8x3/8	HSS8x8x1/2	HSS9x9x3/8	HSS10x10x5/16	HSS10x10x3/8	HSS10x8x3/8	HSS10.75x0.375	HSS12.75x0.313
h/t_{des} [6,7]		19.9	14.2	22.8	31.4	25.7	25.7	30.8	43.8
Nominal Weight (lb/ft)	53	37.69	48.85	42.79	40.35	47.90	42.79	41.59	41.55
% Weight Savings of HSS over WF [5]		28.9%	7.8%	19.3%	23.9%	9.6%	19.3%	21.5%	21.6%
Perimeter of Section (in)	59.30	30.80	30.40	34.80	39.00	38.80	34.80	33.77	40.06
% Perimeter Savings of HSS [5]		48.1%	48.7%	41.3%	34.2%	34.6%	41.3%	43.0%	32.5%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	585	436	565	503	478	569	497	488	496
10	528	419	542	488	467	555	479	475	486
12	465	400	516	470	453	538	457	459	475
14	401	378	486	449	437	519	434	440	461
16	338	354	454	427	420	498	407	420	447
18	278	328	420	403	401	476	380	399	430
20	226	302	385	377	381	452	351	376	413
22	186	275	350	351	360	426	322	352	395
24	157	249	315	325	338	400	293	328	376
26	133	223	281	298	316	374	264	303	356
28	115	198	249	272	293	347	236	279	336
30	100	174	217	246	271	321	209	255	315
34		136	169	197	228	269	163	209	274
38		109	136	158	187	220	130	168	235
40		98	122	143	169	199	118	151	216
45		77.4	96.7	113	133	157	93	120	172

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W14x61 d=13.9"; bf=10"	HSS10x10x5/16	HSS10x10x3/8	HSS12x12x5/16	HSS12x12x3/8	HSS14x14x5/16	HSS12x10x3/8	HSS12.75x0.375	HSS14x0.375
h/t_{des} [6,7]		31.4	25.7	38.2*	31.4	45.1*	31.4	36.5	40.1
Nominal Weight (lb/ft)	61	40.35	47.90	48.86	58.10	57.36	53	49.61	54.62
% Weight Savings of HSS over WF [5]		33.9%	21.5%	19.9%	4.8%	6.0%	13.1%	18.7%	10.5%
Perimeter of Section (in)	67.05	39.00	38.80	47.00	46.80	55.00	42.80	40.06	43.98
% Perimeter Savings of HSS [5]		41.8%	42.1%	29.9%	30.2%	18.0%	36.2%	40.3%	34.4%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	720	478	569	546	699	574	630	591	656
10	676	467	555	540	687	569	615	579	645
12	626	453	538	532	673	564	598	566	633
14	571	437	519	523	657	557	578	550	618
16	514	420	498	514	638	550	556	532	601
18	456	401	476	503	618	542	531	513	583
20	399	381	452	490	596	533	506	492	564
22	345	360	426	477	573	523	479	470	543
24	293	338	400	461	549	513	451	447	520
26	249	316	374	440	524	501	422	423	498
28	215	293	347	419	498	489	393	399	474
30	187	271	321	397	471	477	364	374	450
34	146	228	269	352	418	450	308	325	401
38	117	187	220	308	365	421	255	278	352
40	105	169	199	287	339	406	230	255	328
45		133	157	235	277	356	182	203	271

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W14x68 d=14"; bf=10"	HSS10x10x3/8	HSS10x10x1/2	HSS12x12x5/16	HSS12x12x3/8	HSS14x14x5/16	HSS12x10x3/8	HSS14x0.313	HSS14x0.375
h/t_{des} [6,7]		25.7	18.5	38.2*	31.4	45.1*	31.4	48.1	40.1
Nominal Weight (lb/ft)	68	47.90	62.46	48.86	58.10	57.36	53	45.73	54.62
% Weight Savings of HSS over WF [5]		29.6%	8.1%	28.1%	14.6%	15.6%	22.1%	32.8%	19.7%
Perimeter of Section (in)	67.17	38.80	38.40	47.00	46.80	55.00	42.80	43.98	43.98
% Perimeter Savings of HSS [5]		42.2%	42.8%	30.0%	30.3%	18.1%	36.3%	34.5%	34.5%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	805	569	740	546	699	574	630	547	656
10	756	555	721	540	687	569	615	538	645
12	701	538	699	532	673	564	598	527	633
14	640	519	674	523	657	557	578	515	618
16	577	498	646	514	638	550	556	502	601
18	512	476	616	503	618	542	531	487	583
20	449	452	583	490	596	533	506	470	564
22	388	426	550	477	573	523	479	453	543
24	330	400	515	461	549	513	451	435	520
26	281	374	480	440	524	501	422	416	498
28	242	347	445	419	498	489	393	396	474
30	211	321	410	397	471	477	364	376	450
34	164	269	342	352	418	450	308	335	401
38	131	220	278	308	365	421	255	295	352
40	119	199	251	287	339	406	230	275	328
45		157	199	235	277	356	182	227	271

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Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W14x74 d=14.2"; bf=10.1"	HSS10x10x1/2	HSS12x12x5/16	HSS12x12x3/8	HSS14x14x5/16	HSS14x14x3/8	HSS14x10x3/8	HSS14x0.313	HSS14x0.375
h/t_{des}[6,7]		18.5	38.2*	31.4	45.1*	37.1*	37.1*	48.1	40.1
Nominal Weight (lb/ft)	74	62.46	48.86	58.10	57.36	68.31	58.10	45.73	54.62
% Weight Savings of HSS over WF [5]		15.6%	34.0%	21.5%	22.5%	7.7%	21.5%	38.2%	26.2%
Perimeter of Section (in)	67.90	38.40	47.00	46.80	55.00	54.80	46.80	43.98	43.98
% Perimeter Savings of HSS [5]		43.4%	30.8%	31.1%	19.0%	19.3%	31.1%	35.2%	35.2%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	879	740	546	699	574	780	673	547	656
10	827	721	540	687	569	774	660	538	645
12	767	699	532	673	564	766	646	527	633
14	701	674	523	657	557	757	628	515	618
16	633	646	514	638	550	746	609	502	601
18	563	616	503	618	542	734	587	487	583
20	495	583	490	596	533	721	560	470	564
22	428	550	477	573	523	707	531	453	543
24	365	515	461	549	513	691	501	435	520
26	311	480	440	524	501	668	470	416	498
28	268	445	419	498	489	644	440	396	474
30	234	410	397	471	477	619	409	376	450
34	182	342	352	418	450	567	348	335	401
38	146	278	308	365	421	514	290	295	352
40	131	251	287	339	406	487	262	275	328
45		199	235	277	356	421	207	227	271

Shape	WF	Square HSS					Rectangular HSS	Round HSS	
	W14x82 d=14.3"; bf=10.1"	HSS10x10x1/2	HSS10x10x5/8	HSS12x12x3/8	HSS12x12x1/2	HSS14x14x3/8	HSS14x10x1/2	HSS14x0.375	HSS14x0.500
h/t_{des}[6,7]		18.5	14.2	31.4	22.8	37.1*	27.1	40.1	30.1
Nominal Weight (lb/ft)	82	62.46	76.33	58.10	76.07	68.31	76.07	54.62	72.16
% Weight Savings of HSS over WF [5]		23.8%	6.9%	29.1%	7.2%	16.7%	7.2%	33.4%	12.0%
Perimeter of Section (in)	67.98	38.40	38.01	46.80	46.40	54.80	46.40	43.98	43.98
% Perimeter Savings of HSS [5]		43.5%	44.1%	31.2%	31.7%	19.4%	31.7%	35.3%	35.3%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	968	740	902	699	912	780	902	656	865
10	910	721	879	687	896	774	882	645	851
12	844	699	851	673	878	766	857	633	834
14	772	674	819	657	856	757	829	618	814
16	697	646	784	638	832	746	797	601	792
18	620	616	746	618	805	734	763	583	768
20	545	583	706	596	776	721	727	564	742
22	472	550	664	573	745	707	688	543	714
24	402	515	621	549	713	691	649	520	684
26	343	480	577	524	680	668	608	498	653
28	295	445	534	498	645	644	567	474	622
30	257	410	490	471	610	619	526	450	590
34	200	342	407	418	540	567	446	401	524
38	160	278	329	365	470	514	371	352	459
40	145	251	297	339	436	487	334	328	428
45		199	235	277	355	421	264	271	352

Shape	WF	Square HSS				Rectangular HSS	Round HSS		
	W14x90 d=14"; bf=14.5"	HSS12x12x1/2	HSS14x14x3/8	HSS14x14x1/2	HSS16x16x3/8	HSS16x12x1/2	HSS14x0.500	HSS14x0.625	HSS16x0.500
h/t_{des}[6,7]		22.8	37.1*	27.1	42.8*	31.4	30.1	24.1	34.4
Nominal Weight (lb/ft)	90	76.07	68.31	89.68	78.52	89.68	72.16	89.36	82.85
% Weight Savings of HSS over WF [5]		15.5%	24.1%	0.4%	12.8%	0.4%	19.8%	0.7%	7.9%
Perimeter of Section (in)	85.12	46.40	54.80	54.40	62.80	54.40	43.98	43.98	50.27
% Perimeter Savings of HSS [5]		45.5%	35.6%	36.1%	26.2%	36.1%	48.3%	48.3%	40.9%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
8	1140	912	780	1080	818	1080	865	1070	999
10	1100	896	774	1070	813	1060	851	1050	986
12	1070	878	766	1050	807	1040	834	1030	971
14	1030	856	757	1030	800	1010	814	1010	954
16	979	832	746	1010	792	988	792	978	934
18	929	805	734	989	782	958	768	948	912
20	877	776	721	963	772	926	742	915	888
22	822	745	707	935	761	892	714	880	863
24	766	713	691	905	749	856	684	843	835
26	709	680	668	874	737	819	653	804	807
28	653	645	644	842	723	780	622	765	777
30	597	610	619	808	708	741	590	724	746
34	490	540	567	739	677	661	524	643	682
38	394	470	514	668	644	582	459	562	617
40	356	436	487	633	626	542	428	523	584
45	281	355	421	546	572	449	352	428	504

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HSS and WF Column Selection Guide

Shape	WF	Square HSS				Rectangular HSS	Round HSS		
	W14x99 d=14.2"; bf=14.6"	HSS12x12x1/2	HSS12x12x5/8	HSS14x14x3/8	HSS14x14x1/2	HSS16x12x1/2	HSS14x0.625	HSS16x0.500	HSS18x0.500
h/t_{des} [6,7]		22.8	17.7	37.1*	27.1	31.4	24.1	34.4	38.7
Nominal Weight (lb/ft)	99	76.07	93.34	68.31	89.68	89.68	89.36	82.85	93.54
% Weight Savings of HSS over WF [5]		23.2%	5.7%	31.0%	9.4%	9.4%	9.7%	16.3%	5.5%
Perimeter of Section (in)	85.83	46.40	46.01	54.80	54.40	54.40	43.98	50.27	56.55
% Perimeter Savings of HSS [5]		45.9%	46.4%	36.2%	36.6%	36.6%	48.8%	41.4%	34.1%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	1170	878	1080	766	1050	1040	1030	971	1110
14	1130	856	1050	757	1030	1010	1010	954	1090
16	1080	832	1020	746	1010	988	978	934	1070
18	1020	805	986	734	989	958	948	912	1050
20	964	776	949	721	963	926	915	888	1030
22	904	745	911	707	935	892	880	863	1010
24	843	713	870	691	905	856	843	835	984
26	781	680	829	668	874	819	804	807	957
28	719	645	786	644	842	780	765	777	929
30	658	610	742	619	808	741	724	746	900
32	598	575	698	593	774	701	684	714	870
34	541	540	654	567	739	661	643	682	839
36	485	504	610	540	704	621	602	650	808
38	435	470	567	514	668	582	562	617	776
40	393	436	525	487	633	542	523	584	743
45	310	355	425	421	546	449	428	504	662

Shape	WF	Square HSS				Rectangular HSS	Round HSS		
	W14x109 d=14.3"; bf=14.6"	HSS12x12x5/8	HSS14x14x3/8	HSS14x14x1/2	HSS14x14x5/8	HSS16x12x1/2	HSS14x0.750	HSS16x0.625	HSS18x0.500
h/t_{des} [6,7]		17.7	37.1*	27.1	21.1	31.4	20.1	27.5	38.7
Nominal Weight (lb/ft)	109	93.34	68.31	89.68	110.36	89.68	106.23	102.73	93.54
% Weight Savings of HSS over WF [5]		14.4%	37.3%	17.7%	-1.2%	17.7%	2.5%	5.8%	14.2%
Perimeter of Section (in)	85.95	46.01	54.80	54.40	54.01	54.40	43.98	50.27	56.55
% Perimeter Savings of HSS [5]		46.5%	36.2%	36.7%	37.2%	36.7%	48.8%	41.5%	34.2%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	1290	1080	766	1050	1300	1040	1230	1200	1110
14	1240	1050	757	1030	1270	1010	1200	1180	1090
16	1190	1020	746	1010	1240	988	1160	1160	1070
18	1130	986	734	989	1220	958	1130	1130	1050
20	1060	949	721	963	1180	926	1090	1100	1030
22	998	911	707	935	1150	892	1040	1070	1010
24	931	870	691	905	1110	856	1000	1030	984
26	863	829	668	874	1070	819	953	996	957
28	796	786	644	842	1030	780	906	959	929
30	729	742	619	808	990	741	857	920	900
32	663	698	593	774	947	701	808	881	870
34	600	654	567	739	904	661	759	841	839
36	539	610	540	704	860	621	710	800	808
38	484	567	514	668	816	582	662	759	776
40	437	525	487	633	772	542	615	719	743
45	345	425	421	546	663	449	502	618	662

Shape	WF	Square HSS				Rectangular HSS	Round HSS		
	W14x120 d=14.5"; bf=14.7"	HSS12x12x3/4	HSS14x14x1/2	HSS14x14x5/8	HSS16x16x1/2	HSS16x12x5/8	HSS14x0.750	HSS16x0.625	HSS18x0.500
h/t_{des} [6,7]		14.2	27.1	21.1	31.4	24.5	20.1	27.5	38.7
Nominal Weight (lb/ft)	120	109.91	89.68	110.36	103.30	110.36	106.23	102.73	93.54
% Weight Savings of HSS over WF [5]		8.4%	25.3%	8.0%	13.9%	8.0%	11.5%	14.4%	22.0%
Perimeter of Section (in)	86.62	45.60	54.40	54.01	62.40	54.01	43.98	50.27	56.55
% Perimeter Savings of HSS [5]		47.4%	37.2%	37.7%	28.0%	37.7%	49.2%	42.0%	34.7%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	REG PROD	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	1430	1270	1050	1300	1230	1280	1230	1200	1110
14	1370	1230	1030	1270	1210	1250	1200	1180	1090
16	1310	1200	1010	1240	1190	1210	1160	1160	1070
18	1240	1160	989	1220	1170	1180	1130	1130	1050
20	1180	1110	963	1180	1150	1140	1090	1100	1030
22	1100	1070	935	1150	1120	1090	1040	1070	1010
24	1030	1020	905	1110	1090	1050	1000	1030	984
26	955	968	874	1070	1070	1000	953	996	957
28	880	917	842	1030	1040	953	906	959	929
30	807	864	808	990	1000	904	857	920	900
32	735	812	774	947	971	854	808	881	870
34	665	759	739	904	938	804	759	841	839
36	598	707	704	860	904	754	710	800	808
38	536	656	668	816	869	705	662	759	776
40	484	606	633	772	834	656	615	719	743
45	383	488	546	663	745	540	502	618	662

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Shape	WF	Square HSS				Rectangular HSS	Round HSS		
	W14x132 d=14.7"; bf=14.7"	HSS12x12x7/8	HSS14x14x5/8	HSS14x14x3/4	HSS16x16x5/8	HSS16x12x3/4	HSS14x0.875	HSS16x0.750	HSS18x0.625
h/t_{des} [6,7]		11.7	21.1	17.1	24.5	19.9	17.2	22.9	31.0
Nominal Weight (lb/ft)	132	125.79	110.36	130.33	127.37	130.33	122.77	122.27	116.09
% Weight Savings of HSS over WF [5]		4.7%	16.4%	1.3%	3.5%	1.3%	7.0%	7.4%	12.1%
Perimeter of Section (in)	86.91	45.21	54.01	53.60	62.01	53.60	43.98	50.27	56.55
% Perimeter Savings of HSS [5]		48.0%	37.9%	38.3%	28.7%	38.3%	49.4%	42.2%	34.9%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	REG PROD
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	1570	1450	1300	1530	1520	1510	1410	1440	1370
14	1510	1410	1270	1500	1490	1470	1380	1410	1360
16	1440	1370	1240	1470	1470	1430	1340	1380	1330
18	1370	1320	1220	1440	1440	1390	1300	1350	1310
20	1300	1270	1180	1400	1410	1340	1250	1310	1280
22	1220	1220	1150	1350	1380	1290	1200	1270	1250
24	1140	1160	1110	1310	1350	1230	1150	1230	1220
26	1060	1100	1070	1260	1310	1180	1090	1190	1190
28	974	1040	1030	1210	1270	1120	1040	1140	1150
30	893	980	990	1160	1240	1060	982	1100	1110
32	814	919	947	1110	1200	1000	925	1050	1080
34	738	858	904	1060	1150	942	868	999	1040
36	664	798	860	1010	1110	882	811	950	999
38	596	739	816	955	1070	823	755	901	959
40	538	682	772	903	1020	766	700	852	918
45	425	547	663	773	913	628	569	732	816

Shape	WF	Square HSS				Rectangular HSS	Round HSS		
	W14x145 d=14.8"; bf=15.5"	HSS12x12x1	HSS14x14x5/8	HSS14x14x3/4	HSS16x16x5/8	HSS16x12x3/4	HSS14x1.000	HSS16x0.875	HSS18x0.750
h/t_{des} [6,7]		9.90	21.1	17.1	24.5	19.9	15.1	19.7	25.8
Nominal Weight (lb/ft)	145	140.96	110.36	130.33	127.37	130.33	138.97	141.48	138.30
% Weight Savings of HSS over WF [5]		2.8%	23.9%	10.1%	12.2%	10.1%	4.2%	2.4%	4.6%
Perimeter of Section (in)	90.24	44.81	54.01	53.60	62.01	53.60	43.98	50.27	56.55
% Perimeter Savings of HSS [5]		50.3%	40.2%	40.6%	31.3%	40.6%	51.3%	44.3%	37.3%
HSS Availability[8]		ON DEMAND	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	1750	1630	1300	1530	1520	1510	1600	1660	1640
14	1690	1580	1270	1500	1490	1470	1560	1630	1610
16	1620	1530	1240	1470	1470	1430	1520	1590	1590
18	1550	1480	1220	1440	1440	1390	1470	1550	1560
20	1470	1420	1180	1400	1410	1340	1410	1510	1520
22	1390	1360	1150	1350	1380	1290	1360	1460	1490
24	1310	1290	1110	1310	1350	1230	1300	1420	1450
26	1230	1230	1070	1260	1310	1180	1230	1370	1410
28	1140	1160	1030	1210	1270	1120	1170	1310	1370
30	1060	1090	990	1160	1240	1060	1100	1260	1320
32	973	1020	947	1110	1200	1000	1040	1200	1280
34	891	949	904	1060	1150	942	974	1150	1230
36	812	881	860	1010	1110	882	910	1090	1180
38	735	814	816	955	1070	823	846	1030	1140
40	663	750	772	903	1020	766	783	976	1090
45	524	598	663	773	913	628	634	836	965

Shape	WF	Square HSS				Rectangular HSS	Round HSS		
	W14x159 d=15"; bf=15.6"	HSS14x14x3/4	HSS14x14x7/8	HSS16x16x5/8	HSS18x18x5/8	HSS16x12x7/8	HSS16x0.875	HSS16x1.000	HSS18x0.750
h/t_{des} [6,7]		17.1	14.2	24.5	28.0	16.7	19.7	17.2	25.8
Nominal Weight (lb/ft)	159	130.33	149.61	127.37	144.39	149.61	141.48	160.35	138.30
% Weight Savings of HSS over WF [5]		18.0%	5.9%	19.9%	9.2%	5.9%	11.0%	-0.8%	13.0%
Perimeter of Section (in)	90.91	53.60	53.21	62.01	70.01	53.21	50.27	50.27	56.55
% Perimeter Savings of HSS [5]		41.0%	41.5%	31.8%	23.0%	41.5%	44.7%	44.7%	37.8%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	1910	1530	1760	1520	1730	1730	1660	1880	1640
14	1850	1500	1720	1490	1710	1690	1630	1840	1610
16	1780	1470	1690	1470	1690	1640	1590	1800	1590
18	1700	1440	1640	1440	1660	1590	1550	1760	1560
20	1620	1400	1600	1410	1640	1530	1510	1710	1520
22	1530	1350	1550	1380	1610	1470	1460	1660	1490
24	1440	1310	1500	1350	1580	1410	1420	1600	1450
26	1350	1260	1440	1310	1550	1340	1370	1540	1410
28	1250	1210	1390	1270	1510	1280	1310	1480	1370
30	1160	1160	1330	1240	1470	1210	1260	1420	1320
32	1070	1110	1270	1200	1440	1140	1200	1360	1280
34	982	1060	1210	1150	1400	1070	1150	1290	1230
36	896	1010	1150	1110	1360	1000	1090	1230	1180
38	812	955	1090	1070	1310	932	1030	1160	1140
40	733	903	1020	1020	1270	865	976	1100	1090
45	579	773	875	913	1160	705	836	937	965

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Shape	WF	Square HSS					Round HSS		
	W14x176 d=15.2"; bf=15.7"	HSS14x14x1	HSS16x16x3/4	HSS16x16x7/8	HSS18x18x5/8	HSS18x18x3/4	HSS16x1.000	HSS18x0.750	HSS18x0.875
h/t_{des} [6,7]		12.1	19.9	16.7	28.0	22.8	17.2	25.8	22.1
Nominal Weight (lb/ft)	176	168.18	150.75	173.43	144.39	171.16	160.35	138.30	160.19
% Weight Savings of HSS over WF [5]		4.4%	14.3%	1.5%	18.0%	2.8%	8.9%	21.4%	9.0%
Perimeter of Section (in)	91.54	52.81	61.60	61.21	70.01	69.60	50.27	56.55	56.55
% Perimeter Savings of HSS [5]		42.3%	32.7%	33.1%	23.5%	24.0%	45.1%	38.2%	38.2%
HSS Availability[8]		ON DEMAND	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	2120	1980	1800	2060	1730	2060	1880	1640	1900
14	2050	1940	1770	2030	1710	2030	1840	1610	1870
16	1970	1890	1740	2000	1690	2010	1800	1590	1840
18	1890	1850	1710	1960	1660	1980	1760	1560	1800
20	1800	1790	1670	1920	1640	1950	1710	1520	1760
22	1700	1740	1640	1880	1610	1910	1660	1490	1720
24	1600	1680	1590	1830	1580	1870	1600	1450	1680
26	1500	1620	1550	1780	1550	1830	1540	1410	1630
28	1400	1550	1510	1720	1510	1790	1480	1370	1580
30	1300	1480	1460	1670	1470	1750	1420	1320	1530
32	1200	1420	1410	1610	1440	1700	1360	1280	1480
34	1100	1350	1360	1550	1400	1660	1290	1230	1420
36	1000	1280	1310	1490	1360	1610	1230	1180	1370
38	910	1210	1260	1430	1310	1560	1160	1140	1310
40	821	1140	1200	1370	1270	1510	1100	1090	1250
45	649	969	1070	1220	1160	1380	937	965	1110

Shape	WF	Square HSS					Round HSS		
	W14x193 d=15.5"; bf=15.7"	HSS16x16x3/4	HSS16x16x7/8	HSS16x16x1	HSS18x18x3/4	HSS20x20x5/8	HSS18x0.875	HSS18x1.000	HSS20x0.875
h/t_{des} [6,7]		19.9	16.7	14.2	22.8	31.4	22.1	19.4	24.6
Nominal Weight (lb/ft)	193	150.75	173.43	195.40	171.16	161.40	160.19	181.73	178.89
% Weight Savings of HSS over WF [5]		21.9%	10.1%	-1.2%	11.3%	16.4%	17.0%	5.8%	7.3%
Perimeter of Section (in)	92.02	61.60	61.21	60.81	69.60	78.01	56.55	56.55	62.83
% Perimeter Savings of HSS [5]		33.1%	33.5%	33.9%	24.4%	15.2%	38.5%	38.5%	31.7%
HSS Availability[8]		REG PROD	REG PROD	ON DEMAND	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	2330	1800	2060	2320	2060	1950	1900	2150	2140
14	2250	1770	2030	2290	2030	1930	1870	2120	2110
16	2170	1740	2000	2250	2010	1910	1840	2090	2080
18	2080	1710	1960	2210	1980	1890	1800	2050	2050
20	1980	1670	1920	2160	1950	1860	1760	2000	2020
22	1870	1640	1880	2110	1910	1840	1720	1950	1980
24	1770	1590	1830	2060	1870	1810	1680	1900	1940
26	1660	1550	1780	2000	1830	1780	1630	1850	1890
28	1550	1510	1720	1940	1790	1750	1580	1790	1850
30	1430	1460	1670	1880	1750	1710	1530	1730	1800
32	1320	1410	1610	1810	1700	1680	1480	1670	1750
34	1220	1360	1550	1740	1660	1640	1420	1610	1700
36	1110	1310	1490	1680	1610	1600	1370	1540	1640
38	1010	1260	1430	1610	1560	1560	1310	1480	1590
40	914	1200	1370	1540	1510	1520	1250	1420	1530
45	722	1070	1220	1360	1380	1420	1110	1250	1390

Shape	WF	Square HSS					Round HSS		
	W14x211 d=15.7"; bf=15.8"	HSS16x16x7/8	HSS16x16x1	HSS18x18x7/8	HSS20x20x3/4	HSS22x22x5/8	HSS18x1.000	HSS20x0.875	HSS20x1.000
h/t_{des} [6,7]		16.7	14.2	19.1	25.7	34.9*	19.4	24.6	21.5
Nominal Weight (lb/ft)	211	173.43	195.40	197.24	191.58	178.41	181.73	178.89	203.11
% Weight Savings of HSS over WF [5]		17.8%	7.4%	6.5%	9.2%	15.4%	13.9%	15.2%	3.7%
Perimeter of Section (in)	92.64	61.21	60.81	69.21	77.60	86.01	56.55	62.83	62.83
% Perimeter Savings of HSS [5]		33.9%	34.4%	25.3%	16.2%	7.2%	39.0%	32.2%	32.2%
HSS Availability[8]		REG PROD	ON DEMAND	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	2550	2060	2320	2370	2310	2120	2150	2140	2420
14	2460	2030	2290	2340	2290	2110	2120	2110	2400
16	2370	2000	2250	2310	2270	2100	2090	2080	2360
18	2270	1960	2210	2280	2240	2090	2050	2050	2330
20	2160	1920	2160	2240	2210	2070	2000	2020	2290
22	2050	1880	2110	2200	2180	2060	1950	1980	2240
24	1930	1830	2060	2160	2140	2030	1900	1940	2190
26	1820	1780	2000	2110	2110	2000	1850	1890	2140
28	1700	1720	1940	2060	2070	1970	1790	1850	2090
30	1570	1670	1880	2010	2030	1940	1730	1800	2040
32	1460	1610	1810	1960	1990	1910	1670	1750	1980
34	1340	1550	1740	1900	1940	1870	1610	1700	1920
36	1220	1490	1680	1840	1890	1840	1540	1640	1860
38	1110	1430	1610	1790	1850	1800	1480	1590	1800
40	1010	1370	1540	1730	1800	1760	1420	1530	1730
45	796	1220	1360	1570	1670	1660	1250	1390	1570

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HSS and WF Column Selection Guide

Shape	WF	Square HSS					Round HSS		
	W14x233 d=16"; bf=15.9"	HSS16x16x1	HSS18x18x7/8	HSS20x20x7/8	HSS22x22x5/8	HSS22x22x3/4	HSS20x0.875	HSS20x1.000	HSS24x0.875
h/t_{des} [6,7]		14.2	19.1	21.6	34.9*	28.5	24.6	21.5	29.5
Nominal Weight (lb/ft)	233	195.40	197.24	221.06	178.41	212	178.89	203.11	216.31
% Weight Savings of HSS over WF [5]		16.1%	15.3%	5.1%	23.4%	9.0%	23.2%	12.8%	7.2%
Perimeter of Section (in)	93.46	60.81	69.21	77.21	86.01	85.60	62.83	62.83	75.40
% Perimeter Savings of HSS [5]		34.9%	26.0%	17.4%	8.0%	8.4%	32.8%	32.8%	19.3%
HSS Availability[8]		ON DEMAND	REG PROD	REG PROD	ON DEMAND	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	2820	2320	2370	2670	2120	2570	2140	2420	2610
14	2730	2290	2340	2640	2110	2550	2110	2400	2590
16	2630	2250	2310	2620	2100	2530	2080	2360	2560
18	2520	2210	2280	2590	2090	2500	2050	2330	2540
20	2400	2160	2240	2550	2070	2480	2020	2290	2510
22	2280	2110	2200	2520	2060	2450	1980	2240	2470
24	2150	2060	2160	2480	2030	2420	1940	2190	2440
26	2020	2000	2110	2430	2000	2380	1890	2140	2400
28	1890	1940	2060	2390	1970	2350	1850	2090	2360
30	1750	1880	2010	2340	1940	2310	1800	2040	2320
32	1620	1810	1960	2290	1910	2270	1750	1980	2270
34	1490	1740	1900	2240	1870	2230	1700	1920	2230
36	1370	1680	1840	2180	1840	2180	1640	1860	2180
38	1250	1610	1790	2130	1800	2140	1590	1800	2130
40	1130	1540	1730	2070	1760	2090	1530	1730	2080
45	892	1360	1570	1920	1660	1970	1390	1570	1940

Shape	WF	Square HSS					Round HSS		
	W14x257 d=16.4"; bf=16"	HSS18x18x7/8	HSS18x18x1	HSS20x20x7/8	HSS20x20x1	HSS22x22x7/8	HSS20x1.000	HSS24x0.875	HSS24x1.000
h/t_{des} [6,7]		19.1	16.4	21.6	18.5	24.0	21.5	29.5	25.8
Nominal Weight (lb/ft)	257	197.24	222.63	221.06	249.85	244.88	203.11	216.31	245.87
% Weight Savings of HSS over WF [5]		23.3%	13.4%	14.0%	2.8%	4.7%	21.0%	15.8%	4.3%
Perimeter of Section (in)	94.44	69.21	68.81	77.21	76.81	85.21	62.83	75.40	75.40
% Perimeter Savings of HSS [5]		26.7%	27.1%	18.2%	18.7%	9.8%	33.5%	20.2%	20.2%
HSS Availability[8]		REG PROD	ON DEMAND	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	3110	2370	2670	2670	3010	2970	2420	2610	2960
14	3010	2340	2640	2640	2990	2940	2400	2590	2940
16	2900	2310	2610	2620	2950	2920	2360	2560	2910
18	2790	2280	2570	2590	2920	2890	2330	2540	2880
20	2660	2240	2520	2550	2880	2860	2290	2510	2850
22	2520	2200	2480	2520	2840	2830	2240	2470	2810
24	2380	2160	2430	2480	2790	2790	2190	2440	2770
26	2240	2110	2380	2430	2740	2750	2140	2400	2730
28	2100	2060	2320	2390	2690	2710	2090	2360	2680
30	1950	2010	2260	2340	2640	2660	2040	2320	2630
32	1810	1960	2200	2290	2580	2620	1980	2270	2580
34	1670	1900	2140	2240	2520	2570	1920	2230	2530
36	1530	1840	2070	2180	2460	2520	1860	2180	2470
38	1400	1790	2000	2130	2400	2460	1800	2130	2410
40	1260	1730	1940	2070	2330	2410	1730	2080	2360
45	999	1570	1760	1920	2160	2270	1570	1940	2200

Shape	WF	Square HSS					Round HSS		
	W14x283 d=16.7"; bf=16.1"	HSS18x18x1	HSS20x20x7/8	HSS20x20x1	HSS22x22x7/8	HSS22x22x1	HSS20x1.000	HSS24x1.000	HSS28x0.625
h/t_{des} [6,7]		16.4	21.6	18.5	24.0	20.7	21.5	25.8	48.2
Nominal Weight (lb/ft)	283	222.63	221.06	249.85	244.88	277.07	203.11	245.87	182.90
% Weight Savings of HSS over WF [5]		21.3%	21.9%	11.7%	13.5%	2.1%	28.2%	13.1%	35.4%
Perimeter of Section (in)	95.22	68.81	77.21	76.81	85.21	84.81	62.83	75.40	87.96
% Perimeter Savings of HSS [5]		27.7%	18.9%	19.3%	10.5%	10.9%	34.0%	20.8%	7.6%
HSS Availability[8]		ON DEMAND	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
12	3440	2670	2670	3010	2970	3360	2420	2960	2210
14	3330	2640	2640	2990	2940	3330	2400	2940	2200
16	3210	2610	2620	2950	2920	3300	2360	2910	2190
18	3080	2570	2590	2920	2890	3270	2330	2880	2170
20	2940	2520	2550	2880	2860	3240	2290	2850	2150
22	2800	2480	2520	2840	2830	3200	2240	2810	2130
24	2640	2430	2480	2790	2790	3160	2190	2770	2110
26	2490	2380	2430	2740	2750	3110	2140	2730	2090
28	2330	2320	2390	2690	2710	3060	2090	2680	2060
30	2170	2260	2340	2640	2660	3010	2040	2630	2030
32	2020	2200	2290	2580	2620	2960	1980	2580	2010
34	1860	2140	2240	2520	2570	2900	1920	2530	1980
36	1710	2070	2180	2460	2520	2840	1860	2470	1950
38	1560	2000	2130	2400	2460	2780	1800	2410	1910
40	1420	1940	2070	2330	2410	2720	1730	2360	1880
45	1120	1760	1920	2160	2270	2560	1570	2200	1790

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Shape	WF	Square HSS					Round HSS		
	W14x311 d=17.1"; bf=16.2"	HSS18x18x1	HSS20x20x7/8	HSS20x20x1	HSS22x22x3/4	HSS22x22x7/8	HSS24x0.750	HSS24x0.875	HSS24x1.000
h/t_{des} [6,7]		16.4	21.6	18.5	28.5	24.0	34.4	29.5	25.8
Nominal Weight (lb/ft)	311	222.63	221.06	249.85	212	244.88	186.41	216.31	245.87
% Weight Savings of HSS over WF [5]		28.4%	28.9%	19.7%	31.8%	21.3%	40.1%	30.4%	20.9%
Perimeter of Section (in)	96.18	68.81	77.21	76.81	85.60	85.21	75.40	75.40	75.40
% Perimeter Savings of HSS [5]		28.5%	19.7%	20.1%	11.0%	11.4%	21.6%	21.6%	21.6%
HSS Availability[8]		ON DEMAND	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
14	3660	2640	2640	2990	2550	2940	2230	2590	2940
16	3530	2610	2620	2950	2530	2920	2210	2560	2910
18	3390	2570	2590	2920	2500	2890	2190	2540	2880
20	3240	2520	2550	2880	2480	2860	2160	2510	2850
22	3080	2480	2520	2840	2450	2830	2130	2470	2810
24	2920	2430	2480	2790	2420	2790	2100	2440	2770
26	2750	2380	2430	2740	2380	2750	2070	2400	2730
28	2580	2320	2390	2690	2350	2710	2040	2360	2680
30	2400	2260	2340	2640	2310	2660	2000	2320	2630
32	2230	2200	2290	2580	2270	2620	1960	2270	2580
34	2060	2140	2240	2520	2230	2570	1920	2230	2530
36	1900	2070	2180	2460	2180	2520	1880	2180	2470
38	1740	2000	2130	2400	2140	2460	1840	2130	2410
40	1580	1940	2070	2330	2090	2410	1790	2080	2360
45	1250	1760	1920	2160	1970	2270	1680	1940	2200
50	1010	1590	1770	1990	1840	2120	1560	1800	2040

Shape	WF	Square HSS					Round HSS		
	W14x342 d=17.5"; bf=16.4"	HSS20x20x7/8	HSS20x20x1	HSS22x22x3/4	HSS22x22x7/8	HSS22x22x1	HSS24x0.875	HSS24x1.000	HSS28x0.750
h/t_{des} [6,7]		21.6	18.5	28.5	24.0	20.7	29.5	25.8	40.1
Nominal Weight (lb/ft)	342	221.06	249.85	212	244.88	277.07	216.31	245.87	218.48
% Weight Savings of HSS over WF [5]		35.4%	26.9%	38.0%	28.4%	19.0%	36.8%	28.1%	36.1%
Perimeter of Section (in)	97.52	77.21	76.81	85.60	85.21	84.81	75.40	75.40	87.96
% Perimeter Savings of HSS [5]		20.8%	21.2%	12.2%	12.6%	13.0%	22.7%	22.7%	9.8%
HSS Availability[8]		REG PROD	REG PROD	REG PROD	REG PROD	REG PROD	ON DEMAND	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)								
14	4050	2640	2990	2550	2940	3330	2590	2940	2640
16	3910	2620	2950	2530	2920	3300	2560	2910	2620
18	3760	2590	2920	2500	2890	3270	2540	2880	2600
20	3600	2550	2880	2480	2860	3240	2510	2850	2580
22	3420	2520	2840	2450	2830	3200	2470	2810	2550
24	3240	2480	2790	2420	2790	3160	2440	2770	2530
26	3060	2430	2740	2380	2750	3110	2400	2730	2500
28	2870	2390	2690	2350	2710	3060	2360	2680	2470
30	2680	2340	2640	2310	2660	3010	2320	2630	2440
32	2500	2290	2580	2270	2620	2960	2270	2580	2400
34	2310	2240	2520	2230	2570	2900	2230	2530	2370
36	2130	2180	2460	2180	2520	2840	2180	2470	2330
38	1950	2130	2400	2140	2460	2780	2130	2410	2290
40	1780	2070	2330	2090	2410	2720	2080	2360	2250
45	1410	1920	2160	1970	2270	2560	1940	2200	2140
50	1140	1770	1990	1840	2120	2390	1800	2040	2030

Shape	WF	Square HSS		Round HSS	
	W14x370 d=17.9"; bf=16.5"	HSS20x20x1	HSS22x22x7/8	HSS24x1.000	HSS28x0.750
h/t_{des} [6,7]		18.5	24.0	25.8	40.1
Nominal Weight (lb/ft)	370	249.85	244.88	245.87	218.48
% Weight Savings of HSS over WF [5]		32.5%	33.8%	33.5%	41.0%
Perimeter of Section (in)	98.48	76.81	85.21	75.40	87.96
% Perimeter Savings of HSS [5]		22.0%	13.5%	23.4%	10.7%
HSS Availability[8]		REG PROD	REG PROD	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)				
20	3890	2880	2860	2850	2580
22	3710	2840	2830	2810	2550
24	3520	2790	2790	2770	2530
26	3320	2740	2750	2730	2500
28	3120	2690	2710	2680	2470
30	2920	2640	2660	2630	2440
32	2720	2580	2620	2580	2400
34	2520	2520	2570	2530	2370
36	2320	2460	2520	2470	2330
38	2130	2400	2460	2410	2290
40	1950	2330	2410	2360	2250
42	1770	2260	2350	2290	2210
44	1610	2200	2300	2230	2170
46	1470	2130	2240	2170	2120
48	1350	2060	2180	2110	2080
50	1250	1990	2120	2040	2030

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Shape	WF	Square HSS		Round HSS	
	W14x398 d=18.3"; bf=16.6"	HSS22x22x7/8	HSS22x22x1	HSS28x0.875	HSS28x1.000
h/t_{des} [6,7]		24.0	20.7	34.4	30.1
Nominal Weight (lb/ft)	398	244.88	277.07	253.72	288.63
% Weight Savings of HSS over WF [5]		38.5%	30.4%	36.3%	27.5%
Perimeter of Section (in)	99.46	85.21	84.81	87.96	87.96
% Perimeter Savings of HSS [5]		14.3%	14.7%	11.6%	11.6%
HSS Availability[8]		REG PROD	REG PROD	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)				
20	4200	2860	3240	2990	3400
22	4000	2830	3200	2960	3370
24	3800	2790	3160	2930	3330
26	3590	2750	3110	2900	3290
28	3380	2710	3060	2860	3250
30	3160	2660	3010	2820	3210
32	2950	2620	2960	2780	3160
34	2730	2570	2900	2740	3120
36	2530	2520	2840	2700	3070
38	2320	2460	2780	2650	3020
40	2130	2410	2720	2610	2960
42	1930	2350	2660	2560	2910
44	1760	2300	2590	2510	2850
46	1610	2240	2530	2460	2790
48	1480	2180	2460	2410	2730
50	1360	2120	2390	2350	2670

Shape	WF	Square HSS		Round HSS	
	W14x426 d=18.7"; bf=16.7"	HSS22x22x7/8	HSS22x22x1	HSS28x0.875	HSS28x1.000
h/t_{des} [6,7]		24.0	20.7	34.4	30.1
Nominal Weight (lb/ft)	426	244.88	277.07	253.72	288.63
% Weight Savings of HSS over WF [5]		42.5%	35.0%	40.4%	32.2%
Perimeter of Section (in)	100.44	85.21	84.81	87.96	87.96
% Perimeter Savings of HSS [5]		15.2%	15.6%	12.4%	12.4%
HSS Availability[8]		REG PROD	REG PROD	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)				
20	4500	2860	3240	2990	3400
22	4290	2830	3200	2960	3370
24	4080	2790	3160	2930	3330
26	3850	2750	3110	2900	3290
28	3630	2710	3060	2860	3250
30	3400	2660	3010	2820	3210
32	3170	2620	2960	2780	3160
34	2950	2570	2900	2740	3120
36	2730	2520	2840	2700	3070
38	2510	2460	2780	2650	3020
40	2300	2410	2720	2610	2960
42	2090	2350	2660	2560	2910
44	1910	2300	2590	2510	2850
46	1750	2240	2530	2460	2790
48	1600	2180	2460	2410	2730
50	1480	2120	2390	2350	2670

Shape	WF	Square HSS		Round HSS	
	W14x455 d=19"; bf=16.8"	HSS22x22x7/8	HSS22x22x1	HSS28x0.875	HSS28x1.000
h/t_{des} [6,7]		24.0	20.7	34.4	30.1
Nominal Weight (lb/ft)	455	244.88	277.07	253.72	288.63
% Weight Savings of HSS over WF [5]		46.2%	39.1%	44.2%	36.6%
Perimeter of Section (in)	101.16	85.21	84.81	87.96	87.96
% Perimeter Savings of HSS [5]		15.8%	16.2%	13.0%	13.0%
HSS Availability[8]		REG PROD	REG PROD	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)				
20	4840	2860	3240	2990	3400
22	4620	2830	3200	2960	3370
24	4400	2790	3160	2930	3330
26	4160	2750	3110	2900	3290
28	3920	2710	3060	2860	3250
30	3680	2660	3010	2820	3210
32	3440	2620	2960	2780	3160
34	3200	2570	2900	2740	3120
36	2960	2520	2840	2700	3070
38	2730	2460	2780	2650	3020
40	2510	2410	2720	2610	2960
42	2290	2350	2660	2560	2910
44	2080	2300	2590	2510	2850
46	1910	2240	2530	2460	2790
48	1750	2180	2460	2410	2730
50	1610	2120	2390	2350	2670

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Shape	WF	Square HSS		Round HSS	
	W14x500 d=19.6"; bf=17"	HSS22x22x7/8	HSS22x22x1	HSS28x0.875	HSS28x1.000
h/t_{des} [6,7]		24.0	20.7	34.4	30.1
Nominal Weight (lb/ft)	500	244.88	277.07	253.72	288.63
% Weight Savings of HSS over WF [5]		51.0%	44.6%	49.3%	42.3%
Perimeter of Section (in)	102.82	85.21	84.81	87.96	87.96
% Perimeter Savings of HSS [5]		17.1%	17.5%	14.4%	14.4%
HSS Availability[8]		REG PROD	REG PROD	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)				
20	5340	2860	3240	2990	3400
22	5100	2830	3200	2960	3370
24	4860	2790	3160	2930	3330
26	4600	2750	3110	2900	3290
28	4340	2710	3060	2860	3250
30	4080	2660	3010	2820	3210
32	3820	2620	2960	2780	3160
34	3560	2570	2900	2740	3120
36	3300	2520	2840	2700	3070
38	3050	2460	2780	2650	3020
40	2800	2410	2720	2610	2960
42	2570	2350	2660	2560	2910
44	2340	2300	2590	2510	2850
46	2140	2240	2530	2460	2790
48	1960	2180	2460	2410	2730
50	1810	2120	2390	2350	2670

Shape	WF	Square HSS		Round HSS	
	W14x550 d=20.2"; bf=17.2"	HSS22x22x7/8	HSS22x22x1	HSS28x0.875	HSS28x1.000
h/t_{des} [6,7]		24.0	20.7	34.4	30.1
Nominal Weight (lb/ft)	550	244.88	277.07	253.72	288.63
% Weight Savings of HSS over WF [5]		55.5%	49.6%	53.9%	47.5%
Perimeter of Section (in)	104.44	85.21	84.81	87.96	87.96
% Perimeter Savings of HSS [5]		18.4%	18.8%	15.8%	15.8%
HSS Availability[8]		REG PROD	REG PROD	ON DEMAND	ON DEMAND
Effective Length, L_c (ft), with respect to least r_y	Design Available Strength in Axial Compression, $\phi_c P_n$ (LRFD) (kips)				
20	5920	2860	3240	2990	3400
22	5660	2830	3200	2960	3370
24	5400	2790	3160	2930	3330
26	5120	2750	3110	2900	3290
28	4840	2710	3060	2860	3250
30	4560	2660	3010	2820	3210
32	4270	2620	2960	2780	3160
34	3990	2570	2900	2740	3120
36	3700	2520	2840	2700	3070
38	3430	2460	2780	2650	3020
40	3160	2410	2720	2610	2960
42	2900	2350	2660	2560	2910
44	2650	2300	2590	2510	2850
46	2420	2240	2530	2460	2790
48	2220	2180	2460	2410	2730
50	2050	2120	2390	2350	2670

NOTES

1. WF indicates wide flange section per ASTM A992, F_y = 50 ksi.
2. HSS indicates square, rectangular, or round hollow structural section per ASTM A500 Gr. C, F_y = 50 ksi. Compression strengths provided for ASTM A500 may conservatively be applied to ASTM A1085.
3. Shaded cell indicates the available compression strength of the HSS section is higher than the WF section.
4. Line indicates L_c/r_y equal to or greater than 200. The slenderness ratio L_c/r_y of columns should preferrably not exceed 200.
5. Positive percentage indicates weight or perimeter of HSS is lower than WF.
   a. For example, the nominal weight of W12x40 is 40 plf and HSS8x8x1/4 is 25.82 plf. The % Weight Savings of HSS over WF = (40 plf - 25.82 plf) / 40 plf = 35.5%.
6. h/t_{des} indicates the width-to-thickness ratio for HSS shapes.
7. Asterisk indicates the shape is slender for compression with F_y = 50 ksi; tabluated compression values have been adjusted to account for this.
   a. Single-plate connections may not be used with slender HSS walls per AISC 16th Ed. Manual pg 10-96. Alternate shear connections may be used instead.
8. “REG PROD” indicates a shape that is regularly produced in ASTM A500 by at least one STI member producer at the time of publication; “ON DEMAND” indicates a shape can be produced on demand. ASTM A1085 is produced only on demand.
   a. Check the Capability Tool on the STI website for the most up-to-date availability of HSS sections.

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