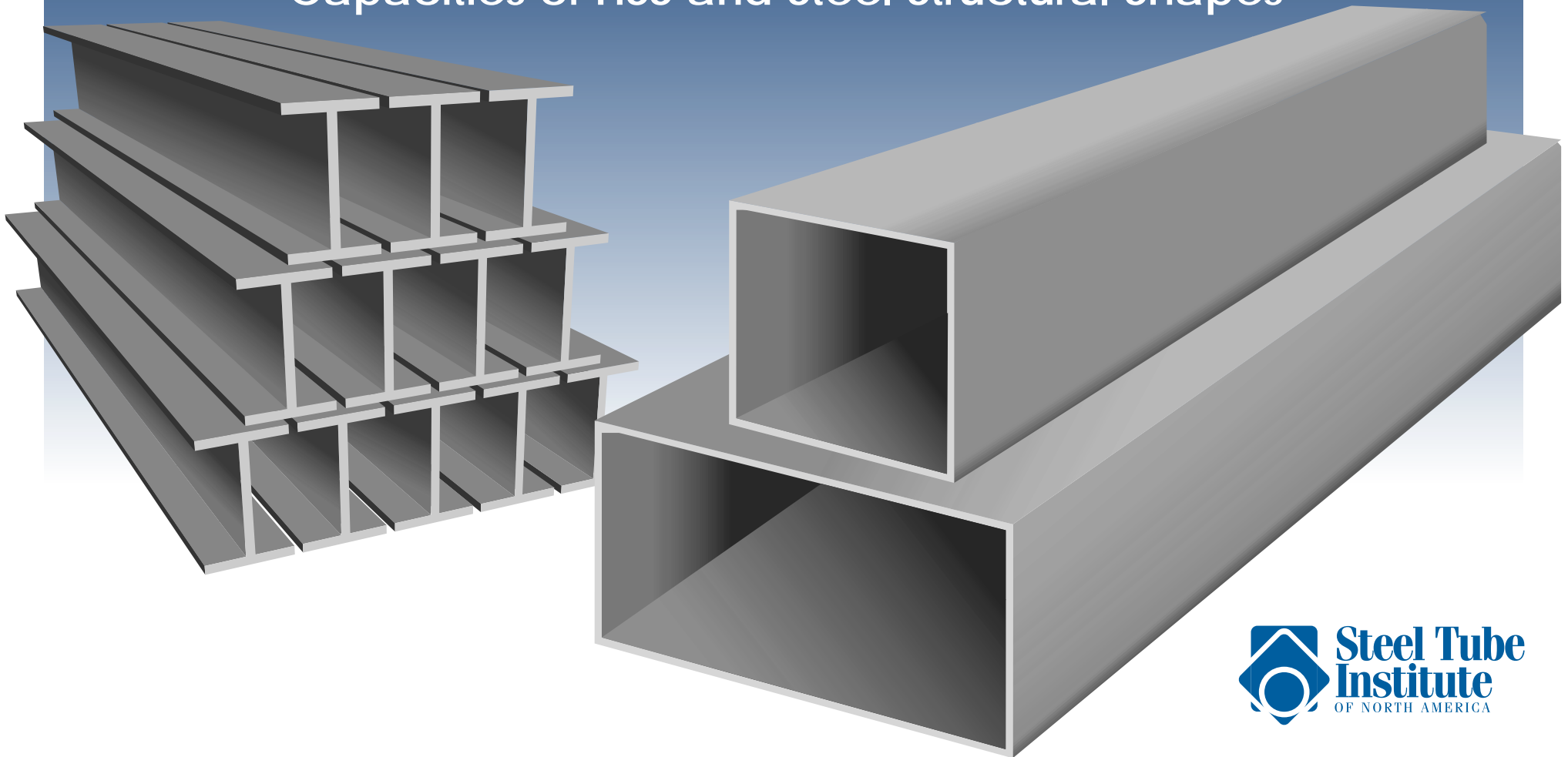


HSS: LESS WEIGHT EQUALS LESS COST

Tables that Compare the Weight and Allowable Load Capacities of HSS and Steel Structural Shapes



HSS: LESS WEIGHT EQUALS LESS COST

The following tables compare the weight and allowable load capacities of steel hollow structural sections (HSS) and steel structural shape columns for 61 W shapes and 15 HP shapes.

The tabulated capacities in these tables are based upon the AISC "Load and Resistance Factor Design Specification". The capacities for W and HP shapes are taken from tables in the AISC "Manual of Steel Construction – Load & Resistance Factor Design, Second Edition".

Each of the tables includes the HSS that may be substituted for a particular W or HP shape. The table heading shows the footweights (weight-per-foot) and percentage weight savings of HSS compared to the structural shape.

Note that these are relative comparisons; as such, the tables may also be directly used for designs based upon the AISC "Allowable Stress Design Specification".

How to Use

Go to the table for the structural shape you want to compare with an alternative HSS column. Read across the "Effective

Length" row to confirm that the allowable load capacity of the selected HSS column is equal to, or exceeds, the capacity of the structural shape (those numbers are in bold face and below the horizontal line in each column.) The "% weight savings" you will achieve by using HSS is shown at the top of the HSS column you have selected.

The selected comparison should be checked against the design requirements specified for the application and the LRFD or ASD "Specification".

Added Savings

When there's less weight involved, you also save money in transportation, handling and erection costs. The straight sides of square and rectangular HSS make fabrication easier, and if you paint or fireproof your columns or trusses, you have less area and edges to paint or fireproof. So you also save on both painting time and materials.

When you lose weight, you look smart. Specify HSS. It saves you in so many ways.

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W Shape	Page	W12 x 136	W10 x 54	W5 x 19
W14 x 193,14x176		27	60	97-98
14x159,14x145	1	28	61	99-100
W14 x 132	2	29	62-63	101-102
W14 x 120	3	30	64-65	HP Shape
W14 x 109	4	31	66-67	HP 14 x 117
W14 x 99	5	32-33	68-70	HP 14 x 102
W14 x 90	6	34	71-73	HP 14 x 89
W14 x 82	7-8	35	74-75	HP 14 x 73
W14 x 74	9-10	36-37	76-77	HP 13 x 100
W14 x 68	11-13	38-39	78-79	HP 13 x 87
W14 x 61	14	40-42	80	HP 13 x 73
W14 x 53	15-17	43-45	81-83	HP 13 x 60
W14 x 48	18-19	46-47	84-85	HP 12 x 84
W14 x 43	20-22	48-49	86-87	HP 12 x 74
W12 x 210	23	50-51	88-89	HP 12 x 63
W12 x 190	24	52-53	90-92	HP 12 x 53
W12 x 170	25	54-55	93	HP 10 x 57
W12 x 152	26	56-57	94-95	HP 10 x 42
		58-59	96	HP 8 x 36

Column Loads and Weight – HSS vs Structural Shapes

W14 x 193 • W14 x 176
W14 x 159 • W14 x 145

		W14 x 193		W14 x 176		W14 x 159			W14 x 145			
		HSS (A500 Grade B) Fy=46ksi										
Nominal Size	16 x 16	Structural Shape Fy=50 ksi	16 x 16	Structural Shape Fy=50 ksi	16 x 16	16 x 16	14 x 14	Structural Shape Fy=50 ksi	16 x 16	16 x 16	14 x 14	Structural Shape Fy=50 ksi
Wall Thickness	5/8		5/8		5/8	1/2	5/8		5/8	1/2	5/8	
Weight Per Foot	127.37		127.37		103.30	110.36	127.37		103.30	110.36		
% Weight Savings		34%	28%	20%	35%	31%	12%	29%	24%			
Effective length KL in feet	0		2410		2200				1980			1810
	2											
	3											
	4											
	5											
	6		2360		2150				1940			1770
	7		2340		2130				1920			1760
	8		2320		2110				1900			1740
	9		2290		2090				1880			1720
	10		2260		2060				1860			1700
	11		2230		2030				1830			1670
	12		2200		2000				1810			1650
	13		2170		1970				1780			1620
	14		2130		1940				1740			1590
	15		2090		1900				1710			1560
	16		2050		1860				1680			1530
	17		2010		1820				1640			1500
	18		1960		1780				1600			1460
	19		1910		1740				1570			1430
	20		1870		1700				1530			1390
	21		1820		1655				1485			1355
	22		1770		1610				1440			1320
	23		1720		1560				1400			1280
	24		1670		1510				1360			1240
	25		1615		1465				1315	<u>1170</u>		1200
	26		1560		1420				1270	1160		1160
	27		1510		1370				1225	1140		1120
	28		1460		1320				1180	1130		1080
	29		1405		1270				1140	1110		1039
	30		1350		1220		<u>1090</u>		1100	1090		998
	31		1300		1175		1080		1055	1080		959
	32		1250		1130		1060		1010	1060		919
	33		1200		1085		1040		969	1040		881
	34		1150		1040		1030		928	1030	<u>835</u>	842
	35		1100	<u>1030</u>	993	1010	1010		887	1010	821	<u>793</u>
	36		1050	992	946	992	992		846	992	807	775
	37	<u>975</u>	1003	975	903	975	<u>793</u>		807	975	793	757
	38	957	956	957	859	957	779		767	957	779	738
	39	939	910	939	817	939	764	<u>720</u>	730	939	764	720
	40	920	863	920	775	920	750	702	692	920	750	702

Note 1. Loads, shown bold face, below the horizontal line are equal to or greater than the indicated load for the wide-flange structural shape.

Note 2. Double horizontal line indicates KL/r limit of 200.

Column Loads and Weight – HSS vs Structural Shapes

W14 x 132

HSS (A500 Grade B) Fy=46ksi							Structural Shape Fy=50 ksi
Nominal Size	20 x 12	16 x 16	16 x 16	16 x 16	14 x 14	14 x 14	
Wall Thickness	1/2	5/8	1/2	3/8	5/8	1/2	W14 x 132
Weight Per Foot	103.3	127.37	103.30	78.52	110.36	89.68	
Design Wall Thickness	0.465	0.581	0.465	0.349	0.581	0.465	
% Weight Savings	22%	4%	22%	41%	16%	32%	
Effective length KL in feet	0						1650
	2						
	3						
	4						
	5						
	6						1610
	7						1590
	8						1570
	9						1550
	10						1530
	11						1510
	12						1480
	13						1450
	14						1430
	15						1390
	16						1360
	17						1330
	18						1300
	19						1260
	20						1220
	21						1185
	22						1150
	23						1110
	24						1070
	25						1034
	26						997
	27						959
	28						920
	29						882
	30						844
	31						807
	32						769
	33						733
	34						697
	35						662
	36						627
	37						595
	38						563
	39						530
	40						500
							470
						440	
						410	
						380	
						350	
						320	
						290	
						260	
						230	
						200	
						170	
						140	
						110	
						80	
						50	
						20	

Note 1. Loads, shown bold face, below the horizontal line are equal to or greater than the indicated load for the wide-flange structural shape.

Note 2. Double horizontal line indicates KL/r limit of 200.

Column Loads and Weight – HSS vs Structural Shapes

W14 x 120

HSS (A500 Grade B) Fy=46ksi							Structural Shape Fy=50 ksi
Nominal Size	20 x 12	20 x 8	16 x 16	16 x 16	14 x 14	14 x 14	
Wall Thickness	1/2	1/2	1/2	3/8	5/8	1/2	W14 x 120
Weight Per Foot	103.3	89.68	103.30	78.52	110.36	89.68	
Design Wall Thickness	0.465	0.465	0.465	0.349	0.581	0.465	
% Weight Savings	14%	25%	14%	35%	8%	25%	
Effective length KL in feet	0						1500
	2						
	3						
	4						
	5						
	6						1460
	7						1450
	8						1430
	9						1410
	10						1390
	11						1370
	12						1350
	13						1320
	14						1290
	15						1270
	16						1240
	17						1210
	18						1180
	19						1140
	20						1110
	21						1075
22						1040	
23					996	1006	
24			962		981	972	
25			950		966	937	
26			939		950	902	
27			927		933	867	
28	816		914		917	832	
29	798		902		900	797	
30	780		889		882	762	
31	761		876		865	728	
32	743		863		847	694	
33	724		849	648	829	678	
34	706		835	638	812	663	
35	687	582	821	627	793	649	
36	668	565	807	617	775	634	
37	650	549	793	606	757	619	
38	631	532	779	596	738	605	
39	612	515	764	585	720	590	
40	594	499	750	574	702	575	

Note 1. Loads, shown bold face, below the horizontal line are equal to or greater than the indicated load for the wide-flange structural shape.

Note 2. Double horizontal line indicates KL/r limit of 200.

Column Loads and Weight – HSS vs Structural Shapes

W14 x 109

HSS (A500 Grade B) Fy=46ksi									Structural Shape Fy=50 ksi
Nominal Size	20 x 12	20 x 12	16 x 16	16 x 16	16 x 16	14 x 14	14 x 14	12 x 12	
Wall Thickness	1/2	3/8	1/2	3/8	5/16	1/2	3/8	5/8	W14 x 109
Weight Per Foot	103.3	78.52	103.30	78.52	65.87	89.68	68.31	93.34	
Design Wall Thickness	0.465	0.349	0.465	0.349	0.291	0.465	0.349	0.581	
% Weight Savings	5%	28%	5%	28%	40%	18%	37%	14%	
Effective length KL in feet	0								1360
	2								
	3								
	4								
	5								
	6								1320
	7								1310
	8								1300
	9								1280
	10								1260
	11								1240
	12								1220
	13								1200
	14								1170
	15								1150
	16								1120
	17								1090
	18	<u>975</u>							1060
	19	962		<u>1010</u>					1030
	20	947		1000					1000
	21	932		994					972
	22	917		984					943
	23	901		973					911
	24	884		962					879
	25	868		950					847
	26	851		939					815
	27	833		927					783
	28	816		914					751
	29	798		902			<u>748</u>		720
	30	780		889		<u>674</u>	720		688
	31	761		876		666	706		658
	32	743		863		658	692	<u>650</u>	627
	33	724		849		648	678	613	597
	34	706		835		638	663	595	567
	35	687		821		627	649	576	538
	36	668	<u>502</u>	807		617	634	558	509
	37	650	490	793		606	619	<u>475</u>	483
	38	631	478	779		596	605	464	457
	39	612	466	764		585	590	453	504
	40	594	453	750		574	575	442	486

Note 1. Loads, shown bold face, below the horizontal line are equal to or greater than the indicated load for the wide-flange structural shape.

Note 2. Double horizontal line indicates KL/r limit of 200.

Column Loads and Weight – HSS vs Structural Shapes

W14 x 99

HSS (A500 Grade B) Fy=46ksi										Structural Shape Fy=50 ksi
Nominal Size	20 x 12	16 x 16	16 x 16	16 x 12	14 x 10	14 x 14	14 x 14	12 x 12	12 x 12	
Wall Thickness	3/8	3/8	5/16	1/2	5/8	1/2	3/8	5/8	1/2	W14 x 99
Weight Per Foot	78.52	78.52	65.87	89.68	93.34	89.68	68.31	93.34	76.06	
Design Wall Thickness	0.349	0.349	0.291	0.465	0.581	0.465	0.349	0.581	0.465	
% Weight Savings	21%	21%	33%	9%	6%	9%	31%	6%	23%	
Effective length KL in feet	0									1240
	2									
	3									
	4									
	5									
	6									1200
	7									1190
	8									1180
	9									1160
	10									1150
	11									1130
	12									1110
	13									1090
	14									1060
	15									1040
	16									1020
	17									991
	18									965
	19									938
	20									911
	21									883
22									854	
23							811		825	
24							799		796	
25							787	757	767	
26				729			774	739	737	
27		696		713			761	722	708	
28		689		697			748	704	679	
29		681		681			734	686	650	
30		674		665			720	668	621	
31		666		649			706	650	593	
32		658		632			692	631	565	
33		648	514	615			678	613	538	
34		638	502	599			663	595	511	
35		627	496	582			649	576	475	
36		617	490	565	455		634	558	461	
37	490	606	484	549	435		619	540	446	
38	478	596	477	532	416		605	522	431	
39	466	585	471	515	396		590	504	417	
40	453	574	464	499	377		575	486	403	

Note 1. Loads, shown bold face, below the horizontal line are equal to or greater than the indicated load for the wide-flange structural shape.

Note 2. Double horizontal line indicates KL/r limit of 200.

Column Loads and Weight – HSS vs Structural Shapes

W14 x 82

HSS (A500 Grade B) Fy=46ksi																		Structural Shape Fy=50 ksi	
Nominal Size	20 x 12	20 x 12	20 x 8	20 x 8	16 x 16	16 x 16	16 x 12	16 x 12	16 x 8	16 x 8	16 x 8	14 x 14	14 x 14	14 x 10	14 x 10	14 x 10	14 x 10		
Wall Thickness	3/8	5/16	3/8	5/16	3/8	5/16	3/8	5/16	1/2	3/8	5/16	3/8	5/16	1/2	3/8	5/16	1/4	W14 x 82	
Weight Per Foot	78.52	65.87	68.31	57.36	78.52	65.87	68.31	57.36	76.07	58.10	48.86	68.31	57.36	76.07	58.10	48.86	39.43		
Design Wall Thickness	0.349	0.291	0.349	0.291	0.349	0.291	0.349	0.291	0.465	0.349	0.291	0.349	0.291	0.465	0.349	0.291	0.233		
% Weight Savings	4%	20%	17%	30%	4%	20%	17%	30%	7%	29%	40%	17%	30%	7%	29%	40%	52%		
Effective length KL in feet	0																	1020	
	2																		
	3																		
	4																		
	5																		
	6																	963	
	7																	942	
	8																	918	
	9																	892	
	10																	863	
	11																	833	
	12						773											800	
	13					770												766	
	14	704				766									727			732	
	15	698				762							681		715			697	
	16	692				758		647			653		675		702			661	
	17	685				754		639			634		668		688			625	
	18	679				749		632			615		660		674			588	
	19	671	533			744	576	624			595		653	521	660			552	
	20	664	527	499		739	569	616	491	575			645	516	645	496		516	
	21	656	522	486		733	565	607	485	555			636	511	629	485		482	
	22	647	516	473		728	561	598	478	534			628	506	613	473		447	
	23	639	509	458		722	557	589	472	513	398		619	501	597	461		414	
	24	630	503	444		716	553	579	464	493	383		610	495	581	448	376	381	
	25	621	496	429	347	709	549	569	457	472	367		601	490	564	436	367	353	
	26	611	489	414	336	703	544	557	450	451	351		591	484	547	423	356	325	
	27	601	482	398	325	696	540	546	442	431	336		581	478	530	410	346	303	
	28	591	474	383	314	689	535	534	434	410	321		571	471	513	397	335	280	
	29	581	467	366	302	681	530	522	426	390	305	259	561	465	496	384	324	254	262
	30	570	459	350	290	674	524	509	417	371	290	246	551	458	479	372	313	247	244
	31	560	451	333	278	666	519	497	409	351	276	234	540	451	462	359	303	240	229
	32	549	443	316	266	658	514	485	400	332	261	222	530	444	445	346	292	233	214
	33	537	435	300	254	648	508	472	391	313	247	210	519	437	428	333	281	225	202
	34	526	426	284	241	638	502	460	382	295	233	199	508	428	411	320	271	217	190
	35	514	418	268	229	627	496	447	373	279	220	187	497	419	395	308	260	210	180
	36	502	409	253	216	617	490	434	363	263	208	177	486	410	379	295	250	202	169
	37	490	400	240	205	606	484	422	354	249	197	168	475	401	363	283	240	194	161
	38	478	391	227	194	596	477	409	345	236	186	159	464	392	347	271	230	187	152
	39	466	382	216	184	585	471	397	335	224	177	151	453	382	331	259	220	179	
	40	453	372	205	175	574	464	384	325	213	168	143	442	373	316	248	210	171	

Note 1. Loads, shown bold face, below the horizontal line are equal to or greater than the indicated load for the wide-flange structural shape.

Note 2. Double horizontal line indicates KL/r limit of 200.

Continued on next page

Column Loads and Weight – HSS vs Structural Shapes

W14 x 82

HSS (A500 Grade B) Fy=46ksi																	Structural Shape Fy=50 ksi	
Nominal Size	12 x 12	12 x 12	12 x 12	12 x 12	12 x 10	12 x 10	12 x 10	12 x 10	12 x 8	12 x 8	10 x 10	10 x 10	10 x 10	10 x 10	10 x 10	9 x 9		
Wall Thickness	1/2	3/8	5/16	1/4	1/2	3/8	5/16	1/4	5/8	1/2	5/8	1/2	3/8	5/16	1/2	1/2	W14 x 82	
Weight Per Foot	76.06	58.10	48.86	39.43	69.27	53.00	44.60	36.03	76.33	62.46	76.33	62.46	47.90	40.35	55.66	55.66		
Design Wall Thickness	0.465	0.349	0.291	0.233	0.465	0.349	0.291	0.233	0.581	0.465	0.581	0.465	0.349	0.291	0.465	0.465		
% Weight Savings	7%	29%	40%	52%	16%	35%	46%	56%	7%	24%	7%	24%	42%	51%	32%	32%		
Effective length KL in feet	0																1020	
	2																	
	3																	
	4																	
	5																	
	6																	963
	7																	942
	8																	918
	9																	892
	10																	863
	11																	833
	12																	800
	13	<u>758</u>																766
	14	<u>749</u>										<u>720</u>						732
	15	<u>740</u>										<u>706</u>						697
	16	730										692						661
	17	719				<u>621</u>				<u>620</u>		676						625
	18	708				608				600		661						588
	19	697	<u>535</u>			594				579		645	<u>532</u>					552
	20	685	<u>526</u>			580				557		628	<u>519</u>					516
	21	672	517			566				535		611	505					482
	22	660	507	<u>426</u>		551	<u>426</u>			513		593	491					447
	23	647	498	418		536	415			492	<u>409</u>	576	477					414
	24	633	488	410		520	403			470	<u>391</u>	558	462				<u>374</u>	381
	25	620	477	401		505	392			448	374	540	448	<u>348</u>			360	353
	26	606	467	392	<u>305</u>	489	380	<u>319</u>		426	356	522	433	337			345	325
	27	592	456	384	300	474	368	309		405	339	504	419	326			331	303
	28	578	446	375	295	458	356	300		384	322	485	404	315			316	280
	29	563	435	366	289	442	344	290		363	305	467	389	304	<u>257</u>	<u>277</u>	302	262
	30	549	424	357	283	426	332	280		343	289	449	375	293	<u>248</u>	247	288	244
	31	534	413	347	277	410	320	270		323	272	431	360	282	238	233	274	229
	32	520	402	338	271	395	308	260	<u>213</u>	303	256	413	346	271	229	218	260	214
	33	505	390	329	265	379	296	250	205	285	241	395	331	260	220	205	247	202
	34	490	379	320	259	364	285	240	197	269	227	378	317	249	211	193	234	190
	35	475	368	310	252	349	273	231	189	254	214	361	303	238	202	182	220	180
	36	461	357	301	244	334	262	221	181	240	203	344	290	228	193	172	208	169
	37	446	346	292	237	319	250	212	174	227	192	328	276	218	185	163	197	161
	38	431	335	283	230	304	239	202	166	215	182	311	263	208	176	155	187	152
	39	417	324	273	222	290	228	193	159	204	173	295	250	198	168	147	177	
	40	403	313	264	215	276	217	184	152	194	164	281	237	188	160	140	169	

Note 1. Loads, shown bold face, below the horizontal line are equal to or greater than the indicated load for the wide-flange structural shape.

Note 2. Double horizontal line indicates KL/r limit of 200.

