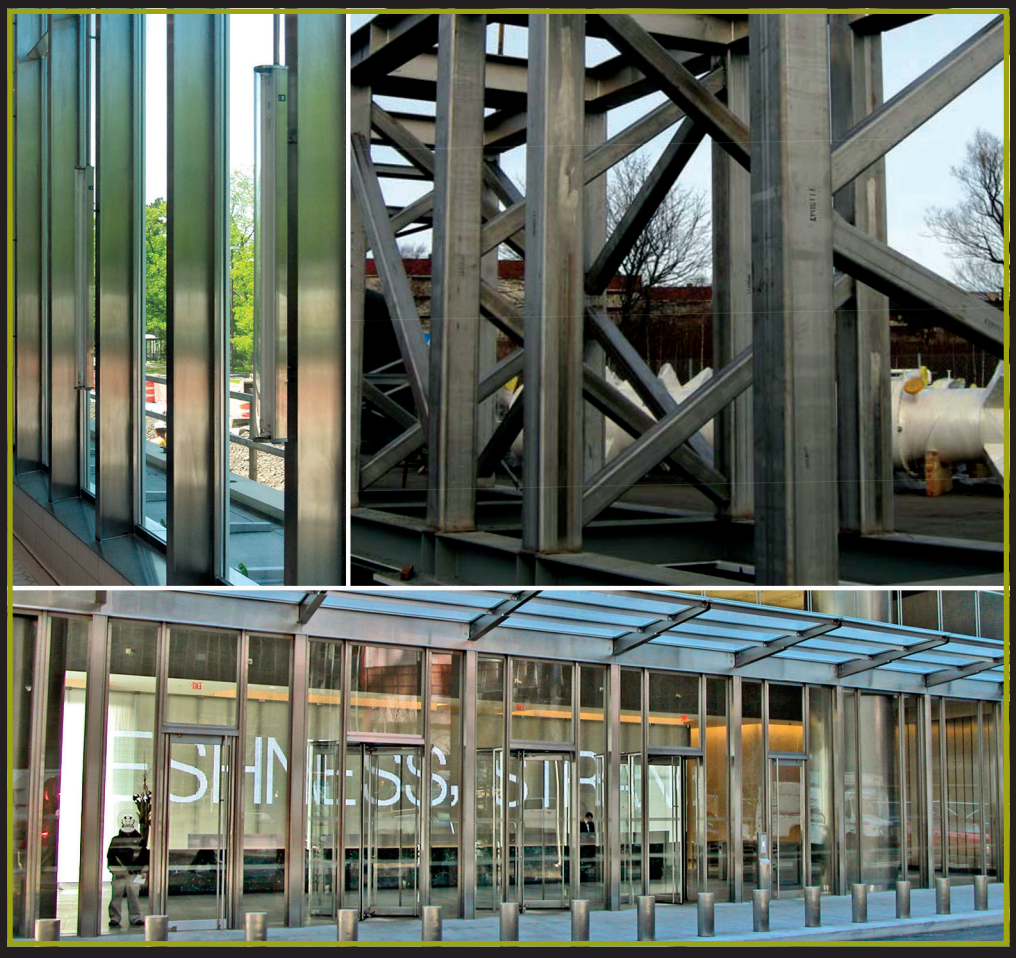
STRUCTURAL STAINLESS STEEL DESIGN TABLES

IN ACCORDANCE WITH AISC DG27: STRUCTURAL STAINLESS STEEL



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PART 5: DESIGN OF COMPRESSION MEMBERS (F_y = 65 ksi)

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W24

Table 5-1
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W24×											
lb/ft		131 [c2]		117 [c2]		104 [c2]		94 [c2]		84 [c2]		76 [c2]	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	1350	2030	1180	1770	1020	1530	908	1370	785	1180	693	1040
	6	1260	1890	1090	1640	946	1420	779	1170	673	1010	594	893
	7	1220	1840	1060	1600	921	1380	736	1110	636	955	561	843
	8	1190	1780	1030	1550	893	1340	688	1030	594	893	524	788
	9	1140	1720	995	1500	862	1300	636	956	549	826	484	728
	10	1100	1650	956	1440	828	1240	581	874	502	755	442	665
	11	1050	1580	914	1370	792	1190	524	788	453	681	399	599
	12	999	1500	870	1310	754	1130	466	700	402	605	354	532
	13	945	1420	823	1240	714	1070	407	611	351	528	309	464
	14	889	1340	775	1160	672	1010	351	528	303	456	267	401
	15	832	1250	725	1090	629	946	306	460	264	397	232	349
	16	773	1160	674	1010	586	880	269	404	232	349	204	307
	17	713	1070	623	936	541	814	238	358	206	309	181	272
	18	652	980	571	859	497	747	212	319	184	276	161	242
	19	593	892	520	781	453	680	191	287	165	248	145	218
	20	537	808	470	707	410	616	172	259	149	224	131	196
	22	444	668	389	584	338	509	142	214	123	185	108	162
	24	373	561	327	491	284	427	119	180	103	155	90.7	136
	26	318	478	278	418	242	364	102	153	88.0	132	77.3	116
	28	274	412	240	361	209	314	87.8	132	75.9	114	66.7	100
	30	239	359	209	314	182	274	76.5	115	66.1	99.3	58.1	87.3
	32	210	316	184	276	160	240	67.2	101	58.1	87.3	51.0	76.7
	34	186	279	163	245	142	213						
	36	166	249	145	218	126	190						
	38	149	224	130	196	113	171						
	40	134	202	118	177	102	154						
Properties													
P_{wo}, kips		126	189	101	152	81.3	122	97.6	146	78.4	118	64.8	97.2
P_{wi}, kips/in.		26.2	39.3	23.8	35.8	21.7	32.5	22.3	33.5	20.4	30.6	19.1	28.6
P_{wb}, kips		194	291	145	218	109	164	120	180	90.8	136	74.6	112
P_{fb}, kips		224	337	176	264	137	206	186	280	144	217	112	169
A_g, in.^{2}		38.3		34.2		30.4		27.5		24.5		22.2	
I_x, in.^{4}		3990		3510		3080		2670		2340		2070	
I_y, in.^{4}		340		297		259		109		94.4		82.5	
r_y, in.		2.98		2.95		2.92		1.99		1.96		1.93	
r_x/r_y		3.42		3.42		3.46		4.95		4.99		5.01	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		114000		100000		88200		76400		67000		59200	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		9730		8500		7410		3120		2700		2360	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W24-W21

Shape		W24×						W21×					
lb/ft		68 [c2]		62 [c2]		55 [c2]		122 [c2]		111 [c2]		101 [c2]	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	603	906	529	796	450	677	1300	1960	1170	1750	1030	1550
	6	515	774	400	601	340	511	1200	1810	1080	1620	956	1440
	7	486	730	358	538	304	458	1170	1760	1050	1570	929	1400
	8	453	681	312	470	266	400	1130	1700	1010	1520	899	1350
	9	418	629	265	398	225	338	1090	1630	974	1460	865	1300
	10	381	573	217	326	184	277	1040	1560	933	1400	829	1250
	11	343	515	179	269	152	229	991	1490	888	1340	791	1190
	12	303	455	150	226	128	192	938	1410	842	1270	750	1130
	13	263	395	128	193	109	164	883	1330	793	1190	707	1060
	14	227	341	111	166	94.0	141	823	1240	743	1120	663	997
	15	198	297	96.3	145	81.9	123	762	1150	691	1040	618	929
	16	174	261	84.6	127	72.0	108	702	1050	637	958	572	860
	17	154	231	75.0	113	63.8	95.8	643	966	584	877	526	791
	18	137	206	66.9	100	56.9	85.5	586	880	531	799	479	721
	19	123	185	60.0	90.2	51.0	76.7	531	798	481	723	434	652
	20	111	167	54.2	81.4	46.1	69.2	480	721	435	654	392	589
	22	91.8	138	44.8	67.3	38.1	57.2	396	596	359	540	324	487
	24	77.2	116					333	501	302	454	272	409
	26	65.8	98.8					284	427	257	387	232	349
	28	56.7	85.2					245	368	222	333	200	301
	30	49.4	74.2					213	320	193	290	174	262
	32							187	282	170	255	153	230
	34							166	249	150	226	136	204
	36							148	222	134	202	121	182
	38							133	200	120	181	109	163
	40							120	180	109	163	98.0	147
Properties													
P_{wo}, kips		52.6	78.9	55.0	82.5	43.2	64.8	125	187	104	156	86.7	130
P_{wi}, kips/in.		18.0	27.0	18.6	28.0	17.1	25.7	26.0	39.0	23.8	35.8	21.7	32.5
P_{wb}, kips		62.6	94.1	69.7	105	53.8	80.9	215	324	166	250	125	187
P_{fb}, kips		83.3	125	84.7	127	62.0	93.2	224	337	186	280	156	234
A_g, in.^{2}		19.9		18.0		16.0		35.6		32.5		29.5	
I_x, in.^{4}		1800		1520		1320		2940		2650		2400	
I_y, in.^{4}		70.4		34.5		29.0		305		274		248	
r_y, in.		1.88		1.38		1.35		2.92		2.91		2.90	
r_x/r_y		5.07		6.67		6.73		3.11		3.11		3.11	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		51500		43500		37800		84100		75800		68700	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		2010		987		830		8730		7840		7100	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W21

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W21×											
lb/ft		93 [c2]		83 [c2]		73 [c2]		68 [c2]		62 [c2]		57 [c2]	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	966	1450	828	1250	706	1060	644	967	570	857	511	769
	6	799	1200	686	1030	587	882	536	805	474	712	375	563
	7	744	1120	639	961	548	823	500	752	442	664	332	498
	8	683	1030	588	883	504	758	461	693	407	612	285	429
	9	617	927	532	800	458	689	419	630	370	556	237	357
	10	544	818	474	713	410	616	375	564	331	497	193	290
	11	473	711	414	622	360	541	330	496	291	437	159	240
	12	406	611	354	532	309	465	284	427	250	376	134	201
	13	347	521	302	454	264	397	243	365	213	321	114	172
	14	299	449	260	391	227	342	209	314	184	276	98.4	148
	15	261	392	227	341	198	298	182	274	160	241	85.7	129
	16	229	344	199	299	174	262	160	241	141	212	75.3	113
	17	203	305	176	265	154	232	142	213	125	187	66.7	100
	18	181	272	157	237	138	207	127	190	111	167	59.5	89.5
	19	162	244	141	212	124	186	114	171	99.8	150	53.4	80.3
	20	147	220	128	192	111	168	102	154	90.1	135	48.2	72.5
	22	121	182	105	158	92.1	138	84.7	127	74.5	112	39.9	59.9
	24	102	153	88.6	133	77.4	116	71.2	107	62.6	94.1		
	26	86.7	130	75.5	113	66.0	99.1	60.6	91.1	53.3	80.1		
	28	74.8	112	65.1	97.8	56.9	85.5	52.3	78.6	46.0	69.1		
	30	65.1	97.9	56.7	85.2	49.5	74.5	45.6	68.5				
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		117	175	93.2	140	73.0	109	63.8	95.7	53.3	80.0	57.0	85.6
P_{wi}, kips/in.		25.1	37.7	22.3	33.5	19.7	29.6	18.6	28.0	17.3	26.0	17.6	26.3
P_{wb}, kips		195	293	137	205	94.2	142	79.5	120	63.9	96.0	66.2	99.5
P_{fb}, kips		210	316	170	255	133	200	114	172	92.0	138	103	154
A_g, in.^{2}		27.1		24.1		21.3		19.8		18.0		16.5	
I_x, in.^{4}		2050		1810		1580		1460		1310		1150	
I_y, in.^{4}		92.8		80.8		70.5		64.7		57.5		30.6	
r_y, in.		1.85		1.83		1.82		1.81		1.78		1.36	
r_x/r_y		4.70		4.73		4.74		4.74		4.79		6.13	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		58700		51800		45200		41800		37500		32900	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		2660		2310		2020		1850		1650		876	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W21-W18

Shape		W21×				W18×							
lb/ft		50 [c2]		44 [c2]		106 [c2]		97 [c2]		86 [c2]		76 [c2]	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	433	651	366	550	1180	1770	1050	1590	911	1370	781	1170
	6	314	472	264	396	1070	1610	956	1440	827	1240	709	1070
	7	276	415	232	348	1030	1550	923	1390	798	1200	684	1030
	8	236	355	197	296	984	1480	885	1330	766	1150	657	987
	9	194	292	161	242	933	1400	843	1270	730	1100	627	942
	10	157	236	130	196	878	1320	799	1200	692	1040	594	893
	11	130	195	108	162	821	1230	750	1130	651	979	559	841
	12	109	164	90.6	136	763	1150	697	1050	609	915	523	787
	13	93.1	140	77.2	116	705	1060	643	967	565	849	486	731
	14	80.2	121	66.6	100	647	972	590	887	519	779	448	674
	15	69.9	105	58.0	87.2	590	887	538	808	472	709	410	616
	16	61.4	92.3	51.0	76.6	535	804	487	732	427	641	371	558
	17	54.4	81.8	45.1	67.9	481	723	438	658	383	576	333	500
	18	48.5	73.0	40.3	60.5	431	648	392	589	343	515	297	447
	19	43.6	65.5	36.1	54.3	387	581	352	529	307	462	267	401
	20	39.3	59.1	32.6	49.0	349	525	317	477	277	417	241	362
	22					289	434	262	394	229	345	199	299
	24					242	364	220	331	193	290	167	251
	26					207	311	188	282	164	247	142	214
	28					178	268	162	243	142	213	123	185
	30					155	233	141	212	123	185	107	161
	32					136	205	124	186	108	163	94.1	141
	34					121	182	110	165	96.0	144	83.3	125
	36					108	162	98.0	147	85.6	129	74.3	112
	38					96.7	145	87.9	132	76.9	116	66.7	100
	40					87.3	131	79.4	119	69.4	104	60.2	90.5
Properties													
P_{wo}, kips		44.0	66.1	34.1	51.2	120	180	101	151	80.1	120	62.6	93.9
P_{wi}, kips/in.		16.5	24.7	15.2	22.8	25.6	38.4	23.2	34.8	20.8	31.2	18.4	27.6
P_{wb}, kips		54.9	82.5	42.7	64.2	241	362	179	269	129	195	89.9	135
P_{fb}, kips		69.6	105	49.3	74.0	215	323	184	277	144	217	112	169
A_g, in.^{2}		14.5		12.8		31.0		28.4		25.2		22.2	
I_x, in.^{4}		964		822		1900		1740		1520		1320	
I_y, in.^{4}		24.9		20.7		220		201		175		153	
r_y, in.		1.31		1.27		2.67		2.66		2.64		2.62	
r_x/r_y		6.22		6.32		2.93		2.94		2.94		2.95	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		27600		23500		54400		49800		43500		37800	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		713		592		6300		5750		5010		4380	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W18

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W18×											
lb/ft		71 [c2]		65 [c2]		60 [c2]		55 [c2]		50 [c2]		46 [c2]	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	741	1110	661	994	596	896	537	807	470	707	428	643
	6	591	888	529	795	477	718	430	646	377	567	299	450
	7	542	815	486	730	439	660	395	594	347	522	260	391
	8	489	735	439	660	397	597	357	537	315	473	219	329
	9	430	646	389	585	353	530	317	477	280	421	177	266
	10	371	558	338	507	307	461	276	415	244	367	143	215
	11	315	474	286	430	261	392	234	352	208	313	118	178
	12	266	399	241	362	219	330	197	296	175	264	99.4	149
	13	226	340	205	309	187	281	168	252	149	225	84.7	127
	14	195	293	177	266	161	242	145	218	129	194	73.0	110
	15	170	256	154	232	140	211	126	190	112	169	63.6	95.6
	16	149	225	136	204	123	185	111	167	98.6	148	55.9	84.0
	17	132	199	120	180	109	164	98.2	148	87.4	131	49.5	74.4
	18	118	177	107	161	97.5	147	87.6	132	77.9	117	44.2	66.4
	19	106	159	96.1	144	87.5	132	78.6	118	70.0	105	39.6	59.6
	20	95.6	144	86.8	130	79.0	119	70.9	107	63.1	94.9	35.8	53.8
	22	79.0	119	71.7	108	65.3	98.1	58.6	88.1	52.2	78.4		
	24	66.4	99.8	60.2	90.6	54.8	82.4	49.3	74.0	43.8	65.9		
	26	56.6	85.1	51.3	77.2	46.7	70.2	42.0	63.1	37.4	56.1		
	28	48.8	73.3	44.3	66.5	40.3	60.6						
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		86.9	130	73.1	110	62.5	93.7	53.2	79.9	43.8	65.8	47.2	70.8
P_{wi}, kips/in.		21.5	32.2	19.5	29.3	18.0	27.0	16.9	25.4	15.4	23.1	15.6	23.4
P_{wb}, kips		142	213	106	160	83.9	126	69.5	104	52.4	78.7	54.5	81.9
P_{fb}, kips		160	240	137	206	118	177	96.6	145	79.0	119	89.0	134
A_g, in.^{2}		20.7		19.0		17.5		16.1		14.5		13.4	
I_x, in.^{4}		1160		1060		974		881		790		702	
I_y, in.^{4}		60.3		54.8		50.1		44.9		40.1		22.5	
r_y, in.		1.71		1.70		1.69		1.67		1.66		1.30	
r_x/r_y		4.38		4.40		4.41		4.43		4.44		5.57	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		33200		30300		27900		25200		22600		20100	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1730		1570		1430		1290		1150		644	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W18-W16

Shape		W18×				W16×							
lb/ft		40 [c2]		35 [c2]		100		89 [c2]		77 [c2]		67 [c2]	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	355	534	301	452	1140	1710	990	1490	829	1250	697	1050
	6	249	375	208	313	1000	1510	883	1330	741	1110	624	937
	7	217	326	180	271	957	1440	847	1270	711	1070	599	900
	8	183	275	150	226	908	1360	802	1210	677	1020	571	858
	9	148	223	120	181	854	1280	754	1130	640	963	541	813
	10	120	181	97.5	147	798	1200	704	1060	601	904	508	764
	11	99.3	149	80.6	121	740	1110	653	981	560	842	474	713
	12	83.4	125	67.7	102	682	1030	600	902	515	774	439	660
	13	71.1	107	57.7	86.7	624	938	548	824	470	706	403	605
	14	61.3	92.1	49.8	74.8	567	852	497	747	425	639	366	550
	15	53.4	80.2	43.3	65.1	511	768	447	673	382	574	329	494
	16	46.9	70.5	38.1	57.3	457	687	400	601	341	512	293	441
	17	41.6	62.5	33.7	50.7	407	612	355	534	303	455	260	391
	18	37.1	55.7	30.1	45.2	363	546	317	476	270	406	232	349
	19	33.3	50.0	27.0	40.6	326	490	284	428	242	364	208	313
	20	30.0	45.1	24.4	36.6	294	442	257	386	219	329	188	283
	22					243	365	212	319	181	272	155	233
	24					204	307	178	268	152	228	131	196
	26					174	261	152	228	129	194	111	167
	28					150	225	131	197	112	168	95.9	144
	30					131	196	114	172	97.2	146	83.5	126
	32					115	173	100	151	85.4	128	73.4	110
	34					102	153	88.8	134	75.7	114	65.0	97.8
	36					90.7	136	79.2	119	67.5	101	58.0	87.2
	38					81.4	122	71.1	107	60.6	91.0	52.1	78.3
	40					73.5	110	64.2	96.5	54.7	82.2	47.0	70.6
Properties													
P_{wo}, kips		35.8	53.7	27.6	41.4	125	187	99.5	149	74.9	112	56.9	85.4
P_{wi}, kips/in.		13.7	20.5	13.0	19.5	25.4	38.0	22.8	34.1	19.7	29.6	17.1	25.7
P_{wb}, kips		36.6	55.0	31.6	47.5	263	395	190	285	124	186	81.2	122
P_{fb}, kips		67.0	101	43.9	66.0	236	355	186	280	141	211	108	162
A_g, in.^{2}		11.6		10.2		29.3		26.0		22.5		19.5	
I_x, in.^{4}		602		500		1480		1290		1100		947	
I_y, in.^{4}		19.1		15.3		186		163		138		119	
r_y, in.		1.28		1.23		2.52		2.50		2.48		2.47	
r_x/r_y		5.63		5.71		2.82		2.82		2.82		2.82	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		17200		14300		42400		36900		31500		27100	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		547		438		5320		4670		3950		3410	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W16

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W16×											
lb/ft		57 [c2]		50 [c2]		45 [c2]		40 [c2]		36 [c2]		31 [c2]	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	592	890	502	755	439	660	376	566	329	494	274	411
	6	458	689	390	587	341	512	293	441	255	383	179	268
	7	415	624	355	533	310	465	267	401	232	348	150	226
	8	369	554	316	475	276	415	239	359	206	310	121	182
	9	318	478	276	414	241	362	209	314	180	270	96.0	144
	10	269	405	234	352	205	308	179	269	153	230	77.8	117
	11	225	338	195	293	171	257	149	224	127	191	64.3	96.6
	12	189	284	164	247	144	216	125	189	107	161	54.0	81.2
	13	161	242	140	210	122	184	107	161	91.0	137	46.0	69.2
	14	139	209	121	181	105	158	92.2	139	78.5	118	39.7	59.6
	15	121	182	105	158	91.9	138	80.3	121	68.4	103	34.6	52.0
	16	106	160	92.3	139	80.7	121	70.6	106	60.1	90.3	30.4	45.7
	17	94.1	141	81.7	123	71.5	107	62.5	94.0	53.2	80.0	26.9	40.4
	18	83.9	126	72.9	110	63.8	95.9	55.8	83.8	47.5	71.4	24.0	36.1
	19	75.3	113	65.4	98.3	57.3	86.0	50.1	75.2	42.6	64.1	21.5	32.4
	20	68.0	102	59.1	88.8	51.7	77.7	45.2	67.9	38.5	57.8		
	22	56.2	84.4	48.8	73.4	42.7	64.2	37.3	56.1	31.8	47.8		
	24	47.2	71.0	41.0	61.6	35.9	53.9	31.4	47.2	26.7	40.1		
	26	40.2	60.5	34.9	52.5	30.6	46.0	26.7	40.2				
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		66.6	99.9	51.9	77.8	42.2	63.4	33.4	50.1	27.5	41.2	26.2	39.3
P_{wi}, kips/in.		18.6	28.0	16.5	24.7	15.0	22.4	13.2	19.8	12.8	19.2	11.9	17.9
P_{wb}, kips		105	158	72.0	108	54.1	81.3	37.3	56.1	33.7	50.6	27.3	41.1
P_{fb}, kips		124	187	96.6	145	77.7	117	62.0	93.2	45.0	67.6	47.1	70.8
A_g, in.^{2}		16.6		14.6		13.1		11.6		10.4		8.99	
I_x, in.^{4}		750		651		579		511		441		367	
I_y, in.^{4}		43.1		37.2		32.8		28.8		24.5		12.4	
r_y, in.		1.61		1.60		1.58		1.57		1.53		1.17	
r_x/r_y		4.17		4.18		4.20		4.22		4.25		5.46	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		21500		18600		16600		14600		12600		10500	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1230		1060		939		824		701		355	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W16-W14

Shape		W16x		W14×									
lb/ft		26 [c2]		120		109		99		90 [c2]		82	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	218	328	1360	2050	1230	1850	1120	1680	991	1490	922	1390
	6	141	213	1280	1920	1160	1740	1050	1580	935	1400	810	1220
	7	119	178	1260	1890	1130	1700	1030	1550	916	1380	772	1160
	8	95.2	143	1230	1850	1110	1670	1000	1510	896	1350	731	1100
	9	75.2	113	1200	1800	1080	1620	978	1470	874	1310	688	1030
	10	60.9	91.6	1160	1740	1050	1580	952	1430	851	1280	642	965
	11	50.4	75.7	1120	1690	1020	1530	920	1380	826	1240	595	894
	12	42.3	63.6	1080	1630	978	1470	887	1330	797	1200	547	822
	13	36.1	54.2	1040	1560	940	1410	851	1280	765	1150	500	751
	14	31.1	46.7	995	1500	900	1350	815	1220	732	1100	453	681
	15	27.1	40.7	950	1430	859	1290	777	1170	699	1050	408	613
	16	23.8	35.8	904	1360	817	1230	739	1110	665	999	365	548
	17	21.1	31.7	857	1290	774	1160	700	1050	630	947	324	487
	18	18.8	28.3	810	1220	732	1100	661	994	596	895	289	434
	19			764	1150	690	1040	623	936	561	843	259	390
	20			717	1080	647	973	584	878	527	792	234	352
	22			627	942	566	850	509	766	460	692	193	291
	24			541	813	488	733	439	659	397	596	163	244
	26			463	695	417	626	375	563	339	509	138	208
	28			399	600	359	540	323	485	292	439	119	179
	30			347	522	313	470	281	423	255	383	104	156
	32			305	459	275	414	247	372	224	336	91.4	137
	34			271	407	244	366	219	329	198	298	81.0	122
	36			241	363	217	327	195	294	177	266	72.2	109
	38			217	325	195	293	175	264	159	239	64.8	97.4
	40			195	294	176	265	158	238	143	215	58.5	87.9
Properties													
P_{wo}, kips		18.7	28.0	120	180	97.8	147	82.0	123	67.7	102	94.5	142
P_{wi}, kips/in.		10.8	16.3	25.6	38.4	22.8	34.1	21.0	31.5	19.1	28.6	22.1	33.2
P_{wb}, kips		20.5	30.9	321	483	227	341	178	268	134	201	208	312
P_{fb}, kips		29.0	43.5	215	323	180	270	148	222	123	184	178	267
A_g, in.^{2}		7.55		35.0		31.7		28.8		26.2		23.7	
I_x, in.^{4}		294		1360		1230		1100		987		870	
I_y, in.^{4}		9.59		495		447		402		362		148	
r_y, in.		1.13		3.76		3.75		3.73		3.72		2.50	
r_x/r_y		5.52		1.66		1.66		1.65		1.65		2.42	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		8410		38900		35200		31500		28200		24900	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		274		14200		12800		11500		10400		4240	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W14

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W14×											
lb/ft		74 [c2]		68 [c2]		61 [c2]		53 [c2]		48 [c2]		43 [c2]	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	824	1240	744	1120	650	977	560	841	494	743	430	646
	6	733	1100	662	994	579	870	465	699	412	619	358	538
	7	700	1050	634	952	555	834	434	653	385	578	334	503
	8	662	995	603	906	528	794	401	602	355	534	309	464
	9	622	935	569	855	499	750	365	548	324	486	281	423
	10	581	873	530	797	468	703	326	490	291	437	253	381
	11	538	808	491	738	436	655	287	432	257	387	224	337
	12	494	743	451	678	401	603	250	376	224	336	196	294
	13	451	678	411	618	366	550	215	324	192	289	168	252
	14	409	614	372	560	331	497	186	279	166	249	145	217
	15	368	553	335	503	297	446	162	243	144	217	126	189
	16	328	493	298	449	265	398	142	214	127	191	111	166
	17	292	438	265	398	235	353	126	189	112	169	98.1	147
	18	260	391	236	355	209	315	112	169	100	151	87.5	132
	19	233	351	212	319	188	283	101	152	90.0	135	78.6	118
	20	211	317	191	288	170	255	91.0	137	81.2	122	70.9	107
	22	174	262	158	238	140	211	75.2	113	67.1	101	58.6	88.1
	24	146	220	133	200	118	177	63.2	95.0	56.4	84.8	49.2	74.0
	26	125	187	113	170	100	151	53.8	80.9	48.1	72.2	42.0	63.1
	28	107	162	97.7	147	86.6	130	46.4	69.8	41.4	62.3	36.2	54.4
	30	93.6	141	85.1	128	75.4	113	40.4	60.8	36.1	54.3	31.5	47.4
	32	82.3	124	74.8	112	66.3	99.6	35.5	53.4	31.7	47.7		
	34	72.9	110	66.2	99.6	58.7	88.2						
	36	65.0	97.7	59.1	88.8	52.4	78.7						
	38	58.3	87.7	53.0	79.7	47.0	70.6						
	40	52.7	79.1	47.9	71.9	42.4	63.7						
Properties													
P_{wo}, kips		76.5	115	64.7	97.1	52.4	78.6	52.9	79.4	43.8	65.7	35.0	52.5
P_{wi}, kips/in.		19.5	29.3	18.0	27.0	16.3	24.4	16.0	24.1	14.7	22.1	13.2	19.8
P_{wb}, kips		142	214	112	169	82.5	124	79.4	119	61.5	92.4	44.3	66.6
P_{fb}, kips		150	225	126	190	101	152	106	159	86.1	129	68.3	103
A_g, in.^{2}		21.5		19.7		17.6		15.3		13.8		12.3	
I_x, in.^{4}		784		711		628		530		473		416	
I_y, in.^{4}		134		121		107		57.6		51.4		45.2	
r_y, in.		2.49		2.48		2.47		1.94		1.93		1.91	
r_x/r_y		2.43		2.42		2.42		3.03		3.03		3.04	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		22400		20400		18000		15200		13500		11900	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		3840		3460		3060		1650		1470		1290	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W14-W12

Shape		W14×										W12×	
lb/ft		38 [c2]		34 [c2]		30 [c2]		26 [c2]		22 [c2]		106	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	375	564	328	493	283	425	236	355	190	286	1200	1810
	6	287	432	251	377	215	323	141	212	112	168	1110	1660
	7	260	391	227	341	194	291	114	172	89.8	135	1070	1610
	8	230	346	201	302	171	257	88.6	133	69.2	104	1040	1560
	9	200	300	174	262	148	222	70.0	105	54.7	82.2	997	1500
	10	169	253	147	221	124	186	56.7	85.2	44.3	66.6	954	1430
	11	140	210	122	184	102	154	46.9	70.4	36.6	55.0	909	1370
	12	117	177	103	154	86.0	129	39.4	59.2	30.8	46.3	862	1300
	13	100	150	87.4	131	73.3	110	33.5	50.4	26.2	39.4	813	1220
	14	86.3	130	75.4	113	63.2	95.0	28.9	43.5	22.6	34.0	764	1150
	15	75.2	113	65.7	98.7	55.0	82.7	25.2	37.9	19.7	29.6	715	1070
	16	66.1	99.3	57.7	86.8	48.4	72.7	22.1	33.3	17.3	26.0	665	1000
	17	58.5	88.0	51.1	76.9	42.9	64.4	19.6	29.5	15.3	23.0	616	926
	18	52.2	78.5	45.6	68.6	38.2	57.5	17.5	26.3			568	854
	19	46.9	70.4	40.9	61.5	34.3	51.6					522	784
	20	42.3	63.6	36.9	55.5	31.0	46.5					477	716
	22	35.0	52.5	30.5	45.9	25.6	38.5					395	594
	24	29.4	44.1	25.7	38.6	21.5	32.3					332	499
	26	25.0	37.6									283	425
	28											244	367
	30											213	320
	32											187	281
	34											166	249
	36											148	222
	38											132	199
	40											120	180
Properties													
P_{wo}, kips		34.6	51.9	28.1	42.1	22.5	33.8	23.2	34.8	16.7	25.0	131	196
P_{wi}, kips/in.		13.4	20.2	12.4	18.5	11.7	17.6	11.1	16.6	9.97	15.0	26.4	39.7
P_{wb}, kips		45.0	67.6	34.9	52.4	29.8	44.8	25.1	37.7	18.4	27.7	410	616
P_{fb}, kips		64.5	97.0	50.4	75.7	36.1	54.2	42.9	64.5	27.3	41.0	238	358
A_g, in.^{2}		11.0		9.86		8.71		7.55		6.36		30.9	
I_x, in.^{4}		380		334		285		240		193		925	
I_y, in.^{4}		26.7		23.3		19.6		8.90		6.99		301	
r_y, in.		1.56		1.54		1.50		1.09		1.05		3.13	
r_x/r_y		3.76		3.78		3.81		5.17		5.25		1.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		10900		9560		8160		6870		5520		26500	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		764		667		561		255		200		8620	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W12

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W12×											
lb/ft		96		87		79		72		65 [c2]		58 [c2]	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	1090	1630	985	1480	891	1340	810	1220	723	1090	632	950
	6	998	1500	904	1360	816	1230	740	1110	665	1000	564	848
	7	968	1460	877	1320	792	1190	718	1080	647	972	541	813
	8	935	1400	846	1270	764	1150	693	1040	626	941	515	775
	9	898	1350	812	1220	734	1100	665	1000	601	903	488	733
	10	859	1290	777	1170	701	1050	636	955	573	862	456	686
	11	818	1230	739	1110	666	1000	604	908	545	819	423	636
	12	775	1160	700	1050	630	948	571	859	515	774	390	587
	13	731	1100	659	991	594	892	538	808	485	729	357	537
	14	686	1030	618	929	556	836	504	757	454	682	325	488
	15	641	963	577	868	519	780	470	706	423	636	293	440
	16	596	896	536	806	482	724	436	655	392	589	263	395
	17	552	829	496	745	445	669	402	604	362	544	234	351
	18	508	764	456	686	409	615	370	555	332	499	209	313
	19	466	700	418	628	374	562	338	508	304	456	187	281
	20	425	639	381	573	341	512	307	462	276	415	169	254
	22	352	530	315	474	282	424	254	382	228	343	140	210
	24	296	445	265	398	237	356	214	321	192	288	117	176
	26	252	379	226	339	202	303	182	274	164	246	99.9	150
	28	218	327	195	293	174	261	157	236	141	212	86.2	130
	30	189	285	170	255	152	228	137	206	123	185	75.1	113
	32	167	250	149	224	133	200	120	181	108	162	66.0	99.2
	34	148	222	132	198	118	177	106	160	95.6	144	58.4	87.8
	36	132	198	118	177	105	158	95.0	143	85.3	128	52.1	78.3
	38	118	178	106	159	94.5	142	85.2	128	76.5	115	46.8	70.3
	40	107	160	95.4	143	85.3	128	76.9	116	69.1	104	42.2	63.5
Properties													
P_{wo}, kips		107	161	90.4	136	74.8	112	62.4	93.6	51.1	76.7	49.9	74.9
P_{wi}, kips/in.		23.8	35.8	22.3	33.5	20.4	30.6	18.6	28.0	16.9	25.4	15.6	23.4
P_{wb}, kips		301	453	248	372	187	282	143	215	107	162	84.3	127
P_{fb}, kips		197	296	160	240	131	198	109	164	89.0	134	99.6	150
A_g, in.^{2}		27.9		25.3		22.9		20.8		18.8		16.7	
I_x, in.^{4}		824		731		654		588		524		467	
I_y, in.^{4}		270		241		216		195		174		107	
r_y, in.		3.11		3.09		3.07		3.06		3.05		2.53	
r_x/r_y		1.75		1.74		1.74		1.74		1.73		2.09	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		23600		20900		18700		16800		15000		13400	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		7730		6900		6180		5580		4980		3060	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W12

Shape		W12×											
lb/ft		53 [c2]		50 [c2]		45 [c2]		40 [c2]		35 [c2]		30 [c2]	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	574	862	546	820	478	718	416	625	364	547	298	448
	6	511	768	454	682	398	598	348	523	274	411	225	338
	7	490	736	422	635	372	559	325	489	245	369	202	304
	8	466	701	387	582	344	516	301	453	216	324	178	268
	9	441	663	351	527	313	470	275	414	185	278	154	231
	10	414	622	314	473	280	421	248	373	154	232	129	194
	11	384	577	278	418	248	372	221	332	128	192	107	160
	12	353	531	244	366	217	325	193	290	107	161	89.6	135
	13	323	485	211	317	187	281	167	251	91.3	137	76.3	115
	14	293	440	182	274	161	243	144	216	78.8	118	65.8	98.9
	15	263	396	159	238	141	211	125	188	68.6	103	57.3	86.2
	16	235	354	139	209	124	186	110	166	60.3	90.6	50.4	75.7
	17	209	314	123	186	109	165	97.6	147	53.4	80.3	44.6	67.1
	18	187	280	110	166	97.7	147	87.1	131	47.6	71.6	39.8	59.8
	19	167	252	98.8	149	87.6	132	78.1	117	42.8	64.3	35.7	53.7
	20	151	227	89.2	134	79.1	119	70.5	106	38.6	58.0	32.3	48.5
	22	125	188	73.7	111	65.4	98.3	58.3	87.6	31.9	47.9	26.7	40.1
	24	105	158	61.9	93.1	54.9	82.6	49.0	73.6	26.8	40.3	22.4	33.7
	26	89.4	134	52.8	79.3	46.8	70.3	41.7	62.7				
	28	77.1	116	45.5	68.4	40.4	60.7	36.0	54.1				
	30	67.1	101	39.6	59.6	35.2	52.8	31.3	47.1				
	32	59.0	88.7	34.8	52.4	30.9	46.4	27.5	41.4				
	34	52.3	78.6										
	36	46.6	70.1										
	38	41.9	62.9										
	40	37.8	56.8										
Properties													
P_{wo}, kips		43.0	64.5	51.3	77.0	41.7	62.6	32.9	49.4	33.8	50.7	24.8	37.2
P_{wi}, kips/in.		15.0	22.4	16.0	24.1	14.5	21.8	12.8	19.2	13.0	19.5	11.3	16.9
P_{wb}, kips		74.0	111	91.5	138	67.7	102	46.6	70.0	46.5	69.9	30.4	45.6
P_{fb}, kips		80.4	121	99.6	150	80.4	121	64.5	97.0	65.8	98.9	47.1	70.8
A_g, in.^{2}		15.3		14.4		12.9		11.5		10.3		8.72	
I_x, in.^{4}		417		385		342		303		283		236	
I_y, in.^{4}		95.7		56.3		49.9		44.8		24.5		20.3	
r_y, in.		2.50		1.98		1.97		1.97		1.54		1.53	
r_x/r_y		2.09		2.62		2.61		2.60		3.41		3.40	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		11900		11000		9790		8670		8100		6750	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		2740		1610		1430		1280		701		581	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W12-W10

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W12×										W10×	
lb/ft		26 [c2]		22 [c2]		19 [c2]		16 [c2]		14 [c2]		88	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	251	377	208	312	170	255	136	205	114	172	1000	1500
	6	189	285	81.7	123	66.0	99.3	49.4	74.3	41.4	62.2	890	1340
	7	170	256	60.0	90.2	48.5	72.9	36.3	54.6	30.4	45.7	853	1280
	8	150	226	45.9	69.1	37.1	55.8	27.8	41.8	23.3	35.0	812	1220
	9	130	195	36.3	54.6	29.3	44.1	22.0	33.0	18.4	27.6	769	1160
	10	109	164	29.4	44.2	23.8	35.7	17.8	26.7	14.9	22.4	723	1090
	11	90.2	135	24.3	36.5	19.6	29.5	14.7	22.1	12.3	18.5	675	1010
	12	75.8	114	20.4	30.7	16.5	24.8	12.4	18.6	10.3	15.5	626	941
	13	64.5	97.0	17.4	26.2	14.1	21.1					577	868
	14	55.7	83.7	15.0	22.6							529	795
	15	48.5	72.9									481	723
	16	42.6	64.0									435	654
	17	37.7	56.7									391	587
	18	33.7	50.6									349	525
	19	30.2	45.4									314	471
	20	27.3	41.0									283	425
	22	22.5	33.9									234	352
	24	18.9	28.5									197	295
	26											167	252
	28											144	217
	30											126	189
	32											111	166
	34											97.9	147
	36											87.3	131
	38											78.4	118
	40											70.8	106
Properties													
P_{wo}, kips		18.9	28.4	23.9	35.9	17.8	26.7	12.6	18.9	9.75	14.6	130	195
P_{wi}, kips/in.		9.97	15.0	11.3	16.9	10.2	15.3	9.53	14.3	8.67	13.0	26.2	39.3
P_{wb}, kips		21.0	31.5	30.3	45.5	22.3	33.5	18.3	27.5	13.8	20.7	495	745
P_{fb}, kips		35.1	52.8	43.9	66.0	29.8	44.8	17.1	25.7	12.3	18.5	238	358
A_g, in.^{2}		7.57		6.41		5.50		4.64		4.08		25.7	
I_x, in.^{4}		202		154		127		100		86.1		530	
I_y, in.^{4}		17.3		4.65		3.76		2.82		2.35		179	
r_y, in.		1.51		0.852		0.827		0.779		0.760		2.64	
r_x/r_y		3.42		5.75		5.82		5.97		6.04		1.72	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		5780		4410		3630		2860		2460		15200	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		495		133		108		80.7		67.3		5120	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W10

Shape		W10×											
lb/ft		77		68		60		54		49		45	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	872	1310	771	1160	677	1020	607	913	553	831	506	761
	6	774	1160	683	1030	599	900	537	807	487	732	414	623
	7	742	1110	654	983	573	861	513	771	467	701	385	579
	8	706	1060	622	935	545	819	487	733	443	666	355	533
	9	667	1000	587	883	514	773	460	691	418	628	323	485
	10	627	942	551	828	482	724	431	647	391	588	290	436
	11	585	879	514	772	449	674	401	602	364	547	258	388
	12	542	814	476	715	415	623	370	557	336	505	227	342
	13	499	750	437	657	381	572	340	511	308	463	198	297
	14	456	686	399	600	347	522	310	466	281	422	171	257
	15	415	623	362	545	315	473	281	422	254	381	149	224
	16	374	563	327	491	283	426	252	379	228	343	131	197
	17	336	505	292	440	253	380	225	338	204	306	116	174
	18	300	451	261	392	226	340	201	302	182	273	103	156
	19	269	405	234	352	203	305	180	271	163	245	92.9	140
	20	243	365	211	318	183	275	163	245	147	221	83.8	126
	22	201	302	175	263	151	227	135	202	122	183	69.3	104
	24	169	254	147	221	127	191	113	170	102	153	58.2	87.5
	26	144	216	125	188	108	163	96.3	145	87.0	131	49.6	74.5
	28	124	186	108	162	93.4	140	83.1	125	75.0	113	42.8	64.3
	30	108	162	94.0	141	81.3	122	72.4	109	65.3	98.2	37.2	56.0
	32	94.9	143	82.6	124	71.5	107	63.6	95.6	57.4	86.3	32.7	49.2
	34	84.1	126	73.2	110	63.3	95.2	56.3	84.7	50.9	76.5		
	36	75.0	113	65.3	98.1	56.5	84.9	50.2	75.5	45.4	68.2		
	38	67.3	101	58.6	88.0	50.7	76.2	45.1	67.8	40.7	61.2		
	40	60.7	91.3	52.9	79.5	45.7	68.8	40.7	61.2	36.8	55.2		
Properties													
P_{wo}, kips		99.9	150	78.4	118	61.9	92.8	49.3	74.0	41.3	61.9	47.0	70.5
P_{wi}, kips/in.		23.0	34.5	20.4	30.6	18.2	27.3	16.0	24.1	14.7	22.1	15.2	22.8
P_{wb}, kips		332	498	231	348	165	249	113	169	87.5	132	95.5	144
P_{fb}, kips		184	277	144	217	112	169	92.0	138	76.3	115	93.5	141
A_g, in.^{2}		22.4		19.8		17.4		15.6		14.2		13.0	
I_x, in.^{4}		451		390		337		299		268		244	
I_y, in.^{4}		154		133		116		103		93.4		53.3	
r_y, in.		2.62		2.60		2.58		2.57		2.56		2.02	
r_x/r_y		1.71		1.71		1.71		1.70		1.70		2.14	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		12900		11200		9650		8560		7670		6980	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		4410		3810		3320		2950		2670		1530	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W10

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W10×											
lb/ft		39 [c2]		33 [c2]		30 [c2]		26 [c2]		22 [c2]		19 [c2]	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	433	652	357	537	325	488	270	406	223	336	191	287
	6	359	539	296	445	222	334	187	280	153	229	75.3	113
	7	333	501	276	415	190	286	162	243	132	198	55.3	83.2
	8	306	460	253	381	159	239	135	203	110	165	42.4	63.7
	9	278	418	229	344	130	195	110	166	88.5	133	33.5	50.3
	10	250	375	205	308	105	158	89.3	134	71.7	108	27.1	40.8
	11	222	333	181	272	87.1	131	73.8	111	59.2	89.0	22.4	33.7
	12	194	292	158	237	73.2	110	62.0	93.2	49.8	74.8	18.8	28.3
	13	169	254	136	205	62.4	93.8	52.9	79.4	42.4	63.7	16.0	24.1
	14	146	219	118	177	53.8	80.8	45.6	68.5	36.6	55.0	13.8	20.8
	15	127	191	102	154	46.9	70.4	39.7	59.7	31.8	47.9		
	16	112	168	90.0	135	41.2	61.9	34.9	52.4	28.0	42.1		
	17	98.8	149	79.7	120	36.5	54.8	30.9	46.5	24.8	37.3		
	18	88.2	133	71.1	107	32.5	48.9	27.6	41.4	22.1	33.2		
	19	79.1	119	63.8	95.9	29.2	43.9	24.7	37.2	19.9	29.8		
	20	71.4	107	57.6	86.6	26.4	39.6	22.3	33.6	17.9	26.9		
	22	59.0	88.7	47.6	71.5	21.8	32.7	18.5	27.7	14.8	22.3		
	24	49.6	74.5	40.0	60.1								
	26	42.3	63.5	34.1	51.2								
	28	36.4	54.8	29.4	44.2								
	30	31.7	47.7	25.6	38.5								
	32	27.9	41.9	22.5	33.8								
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		36.2	54.3	27.3	41.0	33.2	49.7	24.8	37.2	18.7	28.1	21.4	32.1
P_{wi}, kips/in.		13.7	20.5	12.6	18.9	13.0	19.5	11.3	16.9	10.4	15.6	10.8	16.3
P_{wb}, kips		69.6	105	54.3	81.6	56.2	84.5	36.8	55.3	28.8	43.2	32.8	49.2
P_{fb}, kips		68.3	103	46.0	69.2	63.3	95.1	47.1	70.8	31.5	47.4	38.0	57.0
A_g, in.^{2}		11.3		9.49		8.76		7.53		6.41		5.54	
I_x, in.^{4}		205		166		168		143		117		94.6	
I_y, in.^{4}		45.0		36.6		16.7		14.1		11.4		4.29	
r_y, in.		2.00		1.96		1.38		1.37		1.33		0.880	
r_x/r_y		2.14		2.14		3.17		3.18		3.20		4.69	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		5870		4750		4810		4090		3350		2710	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1290		1050		478		404		326		123	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W10-W8

Shape		W10×						W8×					
lb/ft		17 [c2]		15 [c2]		12 [c2]		67		58		48	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	165	248	141	213	105	157	759	1140	662	995	545	819
	6	62.4	93.8	50.7	76.3	38.3	57.6	634	953	550	826	452	679
	7	45.9	68.9	37.3	56.0	28.1	42.3	594	893	514	773	423	635
	8	35.1	52.8	28.5	42.9	21.5	32.4	551	829	476	716	391	588
	9	27.7	41.7	22.6	33.9	17.0	25.6	506	761	436	656	358	538
	10	22.5	33.8	18.3	27.5	13.8	20.7	461	692	396	595	324	487
	11	18.6	27.9	15.1	22.7	11.4	17.1	415	623	355	534	291	437
	12	15.6	23.5	12.7	19.1	9.57	14.4	370	556	316	474	258	388
	13	13.3	20.0	10.8	16.2	8.16	12.3	326	490	278	417	227	341
	14	11.5	17.2					285	428	242	363	197	296
	15							248	373	211	317	172	258
	16							218	328	185	278	151	227
	17							193	291	164	246	134	201
	18							173	259	146	220	119	179
	19							155	233	131	197	107	161
	20							140	210	118	178	96.6	145
	22							116	174	97.9	147	79.9	120
	24							97.1	146	82.3	124	67.1	101
	26							82.7	124	70.1	105	57.2	85.9
	28							71.3	107	60.4	90.8	49.3	74.1
	30							62.1	93.4	52.6	79.1	42.9	64.5
	32							54.6	82.1	46.3	69.5	37.7	56.7
	34							48.4	72.7	41.0	61.6	33.4	50.2
	36												
	38												
	40												
Properties													
P_{wo}, kips		17.2	25.7	13.5	20.2	8.7	13.0	115	173	89.5	134	59.4	89.1
P_{wi}, kips/in.		10.4	15.6	9.97	15.0	8.23	12.4	24.7	37.1	22.1	33.2	17.3	26.0
P_{wb}, kips		28.9	43.4	25.4	38.2	14.3	21.5	512	770	367	552	177	266
P_{fb}, kips		26.5	39.8	17.7	26.7	10.7	16.1	213	320	160	240	114	172
A_g, in.^{2}		4.91		4.33		3.46		19.5		17.0		14.0	
I_x, in.^{4}		80.2		67.2		52.2		270		226		182	
I_y, in.^{4}		3.56		2.89		2.18		88.6		75.1		60.9	
r_y, in.		0.851		0.817		0.794		2.13		2.10		2.09	
r_x/r_y		4.75		4.82		4.89		1.75		1.74		1.73	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		2300		1920		1490		7730		6470		5210	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		102		82.7		62.4		2540		2150		1740	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W8

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W8×											
lb/ft		40		35		31		28		24 [c2]		21 [c2]	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	451	679	397	597	350	526	316	474	264	397	229	345
	6	373	560	327	491	287	431	232	349	198	297	143	215
	7	348	522	305	458	267	402	208	312	177	266	119	179
	8	321	482	281	423	246	370	183	275	155	234	96.4	145
	9	293	440	256	385	224	337	158	238	134	202	76.6	115
	10	265	398	231	348	202	303	134	202	114	171	62.1	93.3
	11	237	356	207	311	180	270	113	169	95.1	143	51.3	77.1
	12	209	314	183	274	158	238	94.6	142	79.9	120	43.1	64.8
	13	183	275	160	240	138	208	80.6	121	68.1	102	36.7	55.2
	14	159	239	138	208	119	180	69.5	104	58.7	88.3	31.7	47.6
	15	138	208	120	181	104	156	60.5	91.0	51.2	76.9	27.6	41.5
	16	122	183	106	159	91.5	137	53.2	80.0	45.0	67.6	24.2	36.4
	17	108	162	93.7	141	81.0	122	47.1	70.8	39.8	59.9	21.5	32.3
	18	96.0	144	83.6	126	72.3	109	42.0	63.2	35.5	53.4	19.2	28.8
	19	86.2	130	75.0	113	64.9	97.5	37.7	56.7	31.9	47.9	17.2	25.8
	20	77.8	117	67.7	102	58.5	88.0	34.0	51.2	28.8	43.3	15.5	23.3
	22	64.3	96.6	56.0	84.1	48.4	72.7	28.1	42.3	23.8	35.7		
	24	54.0	81.2	47.0	70.7	40.6	61.1	23.6	35.5	20.0	30.0		
	26	46.0	69.2	40.1	60.2	34.6	52.1	20.1	30.3	17.0	25.6		
	28	39.7	59.6	34.6	51.9	29.9	44.9						
	30	34.6	52.0	30.1	45.2	26.0	39.1						
	32	30.4	45.7	26.5	39.8	22.9	34.4						
	34	26.9	40.4	23.4	35.2								
	36												
	38												
	40												
Properties													
P_{wo}, kips		43.7	65.5	33.2	49.9	26.9	40.3	28.7	43.1	21.2	31.9	21.7	32.5
P_{wi}, kips/in.		15.6	23.4	13.4	20.2	12.4	18.5	12.4	18.5	10.6	15.9	10.8	16.3
P_{wb}, kips		129	194	82.4	124	64.1	96.3	64.1	96.3	40.7	61.2	41.2	61.9
P_{fb}, kips		76.3	115	59.6	89.6	46.0	69.2	52.6	79.1	38.9	58.5	38.9	58.5
A_g, in.^{2}		11.6		10.2		8.99		8.11		6.94		6.09	
I_x, in.^{4}		145		125		108		96.4		81.1		74.2	
I_y, in.^{4}		49.1		42.6		37.1		21.6		18.3		9.77	
r_y, in.		2.06		2.05		2.03		1.63		1.62		1.27	
r_x/r_y		1.71		1.71		1.71		2.12		2.11		2.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		4150		3580		3090		2760		2320		2120	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1410		1220		1060		618		524		280	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W8-W6

Shape		W8×								W6×			
lb/ft		18 [c2]		15 [c2]		13 [c2]		10 [c2]		25		20	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	191	287	161	242	135	203	94.6	142	283	426	227	340
	6	119	179	59.8	89.9	47.9	72.0	36.7	55.2	200	301	158	238
	7	98.1	147	43.9	66.0	35.2	52.9	27.0	40.6	176	265	139	209
	8	78.6	118	33.6	50.6	27.0	40.5	20.7	31.1	152	229	120	180
	9	62.3	93.6	26.6	40.0	21.3	32.0	16.3	24.5	129	194	101	152
	10	50.4	75.8	21.5	32.4	17.2	25.9	13.2	19.9	108	162	83.8	126
	11	41.7	62.6	17.8	26.7	14.3	21.4	10.9	16.4	89.0	134	69.3	104
	12	35.0	52.6	15.0	22.5	12.0	18.0	9.19	13.8	74.8	112	58.2	87.5
	13	29.8	44.9	12.7	19.2	10.2	15.3	7.83	11.8	63.7	95.8	49.6	74.6
	14	25.7	38.7	11.0	16.5	8.80	13.2	6.75	10.1	55.0	82.6	42.8	64.3
	15	22.4	33.7							47.9	71.9	37.3	56.0
	16	19.7	29.6							42.1	63.2	32.8	49.2
	17	17.5	26.2							37.3	56.0	29.0	43.6
	18	15.6	23.4							33.2	50.0	25.9	38.9
	19	14.0	21.0							29.8	44.8	23.2	34.9
	20	12.6	19.0							26.9	40.5	21.0	31.5
	22									22.3	33.4	17.3	26.0
	24									18.7	28.1	14.6	21.9
	26												
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		16.4	24.7	16.7	25.1	12.7	19.1	7.55	11.3	31.5	47.3	20.6	30.8
P_{wi}, kips/in.		9.97	15.0	10.6	15.9	9.97	15.0	7.37	11.1	13.9	20.8	11.3	16.9
P_{wb}, kips		32.1	48.2	38.8	58.3	32.1	48.2	13.0	19.5	118	178	63.4	95.3
P_{fb}, kips		26.5	39.8	24.1	36.3	15.8	23.8	10.2	15.4	50.4	75.7	32.4	48.7
A_g, in.^{2}		5.19		4.36		3.76		2.89		7.28		5.82	
I_x, in.^{4}		60.9		47.0		38.5		29.8		53.0		41.0	
I_y, in.^{4}		7.97		3.41		2.73		2.09		17.1		13.3	
r_y, in.		1.24		0.884		0.852		0.851		1.53		1.51	
r_x/r_y		2.77		3.71		3.76		3.77		1.76		1.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		1740		1350		1100		853		1520		1170	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		228		97.6		78.1		59.8		489		381	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W6-W5

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W6×								W5×			
lb/ft		16		15 [c2]		12		9 [c2]		19		18.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	183	274	156	235	136	205	96.2	145	213	321	213	321
	6	77.0	116	110	165	52.5	78.9	38.4	57.7	131	196	128	192
	7	57.2	85.9	96.9	146	38.6	58.1	28.2	42.4	109	164	106	159
	8	43.8	65.8	83.7	126	29.6	44.4	21.6	32.5	89.2	134	85.5	129
	9	34.6	52.0	70.8	106	23.4	35.1	17.1	25.7	71.2	107	67.9	102
	10	28.0	42.1	58.8	88.4	18.9	28.4	13.8	20.8	57.6	86.6	55.0	82.6
	11	23.1	34.8	48.7	73.1	15.6	23.5	11.4	17.2	47.6	71.6	45.4	68.3
	12	19.4	29.2	40.9	61.4	13.1	19.8	9.61	14.4	40.0	60.2	38.2	57.4
	13	16.6	24.9	34.8	52.4	11.2	16.8	8.19	12.3	34.1	51.3	32.5	48.9
	14	14.3	21.5	30.0	45.1	9.66	14.5	7.06	10.6	29.4	44.2	28.1	42.2
	15	12.4	18.7	26.2	39.3	8.41	12.6	6.15	9.24	25.6	38.5	24.4	36.7
	16	10.9	16.4	23.0	34.6					22.5	33.8	21.5	32.3
	17			20.4	30.6					19.9	30.0	19.0	28.6
	18			18.2	27.3					17.8	26.7	17.0	25.5
	19			16.3	24.5					16.0	24.0	15.2	22.9
	20			14.7	22.1					14.4	21.7	13.7	20.7
	22			12.2	18.3								
	24			10.2	15.4								
	26												
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		22.8	34.2	13.0	19.4	14.0	20.9	7.92	11.9	25.2	37.7	28.5	42.7
P_{wi}, kips/in.		11.3	16.9	9.97	15.0	9.97	15.0	7.37	11.1	11.7	17.6	13.7	20.5
P_{wb}, kips		63.4	95.3	43.9	66.0	43.9	66.0	17.7	26.6	90.5	136	149	225
P_{fb}, kips		39.9	60.0	16.4	24.7	19.1	28.7	11.2	16.9	45.0	67.6	42.1	63.3
A_g, in.^{2}		4.69		4.37		3.50		2.62		5.48		5.48	
I_x, in.^{4}		31.8		28.7		21.7		16.0		25.9		23.8	
I_y, in.^{4}		4.43		9.32		2.99		2.19		9.13		8.69	
r_y, in.		0.972		1.46		0.925		0.914		1.29		1.26	
r_x/r_y		2.67		1.75		2.69		2.70		1.68		1.66	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		910		821		621		458		741		681	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		127		267		85.6		62.7		261		249	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W5-W4

Shape		W5×		W4×	
lb/ft		16		13	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	180	271	147	221
	6	109	163	65.9	99.1
	7	90.5	136	49.6	74.6
	8	73.3	110	38.0	57.1
	9	58.3	87.6	30.0	45.1
	10	47.2	70.9	24.3	36.5
	11	39.0	58.6	20.1	30.2
	12	32.8	49.3	16.9	25.4
	13	27.9	42.0	14.4	21.6
	14	24.1	36.2	12.4	18.6
	15	21.0	31.5	10.8	16.2
	16	18.4	27.7	9.49	14.3
	17	16.3	24.5		
	18	14.6	21.9		
	19	13.1	19.6		
	20	11.8	17.7		
	22				
	24				
	26				
	28				
	30				
	32				
	34				
	36				
	38				
	40				
Properties					
P_{wo}, kips		18.7	28.1	20.9	31.4
P_{wi}, kips/in.		10.4	15.6	12.1	18.2
P_{wb}, kips		63.6	95.6	125	188
P_{fb}, kips		31.5	47.4	29.0	43.5
A_g, in.^{2}		4.63		3.77	
I_x, in.^{4}		21.1		11.2	
I_y, in.^{4}		7.50		3.85	
r_y, in.		1.27		1.01	
r_x/r_y		1.68		1.70	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		604		321	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		215		110	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS16-HSS10

Table 5-2
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS16×8×		HSS12×8×		HSS12×4×				HSS10×6×			
		0.250 [c2]		0.250 [c2]		0.250 [c2]		0.180 [c2]		0.250 [c2]		0.180 [c2]	
t_{design}, in.		0.250		0.250		0.250		0.180		0.250		0.180	
lb/ft		40.2		33.3		26.3		19.2		26.3		19.2	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	293	440	289	434	218	328	131	197	254	382	152	228
	6	285	428	278	419	186	280	116	174	232	349	143	215
	7	282	424	275	413	175	264	110	166	225	338	140	211
	8	278	419	271	407	163	244	104	157	216	325	137	206
	9	275	413	266	399	148	223	97.4	146	206	310	133	199
	10	270	406	259	389	133	199	89.9	135	196	294	127	191
	11	264	397	251	378	115	173	81.8	123	184	277	121	182
	12	258	388	243	366	97.4	146	72.9	110	172	258	114	172
	13	251	377	235	353	83.0	125	63.4	95.4	159	239	108	162
	14	243	366	225	339	71.6	108	54.7	82.2	144	217	100	151
	15	235	354	216	324	62.3	93.7	47.7	71.6	130	195	92.7	139
	16	227	341	206	309	54.8	82.4	41.9	63.0	116	174	84.8	128
	17	218	328	195	293	48.5	72.9	37.1	55.8	103	155	76.7	115
	18	209	315	184	277	43.3	65.1	33.1	49.7	91.8	138	68.6	103
	19	200	300	173	260	38.9	58.4	29.7	44.6	82.4	124	61.6	92.6
	20	190	286	161	242	35.1	52.7	26.8	40.3	74.4	112	55.6	83.5
	21	180	270	149	224	31.8	47.8	24.3	36.5	67.4	101	50.4	75.8
	22	169	255	137	206	29.0	43.6	22.2	33.3	61.4	92.4	45.9	69.0
	23	159	238	126	189	26.5	39.9	20.3	30.5	56.2	84.5	42.0	63.2
	24	148	222	115	173	24.4	36.6	18.6	28.0	51.6	77.6	38.6	58.0
	25	136	205	106	160	22.4	33.7	17.2	25.8	47.6	71.5	35.6	53.5
	26	126	190	98.2	148	20.7	31.2	15.9	23.8	44.0	66.1	32.9	49.4
	27	117	176	91.1	137	19.2	28.9	14.7	22.1	40.8	61.3	30.5	45.8
	28	109	163	84.7	127	17.9	26.9	13.7	20.6	37.9	57.0	28.4	42.6
	29	101	152	79.0	119			12.7	19.2	35.4	53.2	26.4	39.7
	30	94.7	142	73.8	111					33.0	49.7	24.7	37.1
	32	83.2	125	64.8	97.5					29.0	43.7	21.7	32.6
	34	73.7	111	57.4	86.3					25.7	38.7	19.2	28.9
	36	65.8	98.9	51.2	77.0					22.9	34.5	17.2	25.8
	38	59.0	88.7	46.0	69.1					20.6	31.0	15.4	23.1
	40	53.3	80.1	41.5	62.4					18.6	27.9	13.9	20.9
Properties													
A_g, in.^{2}		11.6		9.59		7.59		5.54		7.59		5.54	
I_x, in.^{4}		393		196		127		94.5		103		76.8	
I_y, in.^{4}		135		105		22.3		16.9		46.9		35.1	
r_y, in.		3.41		3.31		1.71		1.75		2.49		2.52	
r_x/r_y		1.71		1.37		2.39		2.36		1.48		1.48	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS8-HSS6

Shape		HSS8×4×						HSS6×4×					
		0.250 [c2]		0.180 [c2]		0.120 [c2]		0.250		0.180 [c2]		0.120 [c2]	
t_{design}, in.		0.250		0.180		0.120		0.250		0.180		0.120	
lb/ft		19.4		14.2		9.67		15.9		11.7		8.01	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	210	316	128	193	67.1	101	179	269	125	188	66.3	99.7
	6	161	242	106	160	60.2	90.4	130	195	96.8	145	57.4	86.3
	7	145	217	99.0	149	57.5	86.4	116	174	86.6	130	53.5	80.4
	8	128	192	90.6	136	53.8	80.8	101	152	76.2	115	48.9	73.5
	9	111	167	81.3	122	49.7	74.7	87.2	131	65.9	99.1	44.0	66.1
	10	94.6	142	71.2	107	45.3	68.0	73.7	111	56.1	84.2	38.7	58.2
	11	79.5	119	60.4	90.8	40.6	61.0	61.4	92.2	46.9	70.5	33.2	49.9
	12	66.8	100	50.8	76.3	35.6	53.5	51.6	77.5	39.4	59.2	27.9	42.0
	13	56.9	85.5	43.3	65.0	30.5	45.9	43.9	66.0	33.6	50.5	23.8	35.8
	14	49.1	73.8	37.3	56.1	26.3	39.5	37.9	56.9	29.0	43.5	20.5	30.8
	15	42.7	64.2	32.5	48.9	22.9	34.4	33.0	49.6	25.2	37.9	17.9	26.9
	16	37.6	56.5	28.6	42.9	20.1	30.3	29.0	43.6	22.2	33.3	15.7	23.6
	17	33.3	50.0	25.3	38.0	17.8	26.8	25.7	38.6	19.6	29.5	13.9	20.9
	18	29.7	44.6	22.6	33.9	15.9	23.9	22.9	34.4	17.5	26.3	12.4	18.7
	19	26.6	40.0	20.3	30.4	14.3	21.5	20.6	30.9	15.7	23.6	11.1	16.7
	20	24.0	36.1	18.3	27.5	12.9	19.4	18.6	27.9	14.2	21.3	10.1	15.1
	21	21.8	32.8	16.6	24.9	11.7	17.6	16.8	25.3	12.9	19.3	9.12	13.7
	22	19.9	29.9	15.1	22.7	10.7	16.0	15.3	23.1	11.7	17.6	8.31	12.5
	23	18.2	27.3	13.8	20.8	9.75	14.6	14.0	21.1	10.7	16.1	7.60	11.4
	24	16.7	25.1	12.7	19.1	8.95	13.5	12.9	19.4	9.85	14.8	6.98	10.5
	25	15.4	23.1	11.7	17.6	8.25	12.4	11.9	17.9	9.08	13.6	6.44	9.67
	26	14.2	21.4	10.8	16.3	7.63	11.5	11.0	16.5	8.40	12.6	5.95	8.94
	27	13.2	19.8	10.0	15.1	7.07	10.6			7.79	11.7	5.52	8.29
	28			9.33	14.0	6.58	9.88						
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		5.59		4.10		2.79		4.59		3.38		2.31	
I_x, in.^{4}		45.1		34.0		23.7		22.1		16.8		11.8	
I_y, in.^{4}		15.3		11.6		8.16		11.7		8.99		6.36	
r_y, in.		1.65		1.68		1.71		1.60		1.63		1.66	
r_x/r_y		1.72		1.71		1.70		1.37		1.37		1.36	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS4-HSS3

Table 5-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS4×3×				HSS4×2×				HSS3×2×			
		0.120 [c2]		0.080 [c2]		0.120 [c2]		0.080 [c2]		0.120		0.080 [c2]	
t_{design}, in.		0.120		0.080		0.120		0.080		0.120		0.080	
lb/ft		5.51		3.75		4.68		3.19		3.85		2.64	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	58.6	88.0	29.6	44.5	49.2	74.0	26.8	40.2	43.2	64.9	26.3	39.5
	6	35.4	53.3	22.6	34.0	16.3	24.5	11.6	17.4	12.6	18.9	8.98	13.5
	7	29.0	43.6	19.5	29.3	12.0	18.0	8.52	12.8	9.23	13.9	6.60	9.92
	8	23.0	34.5	16.1	24.1	9.16	13.8	6.52	9.81	7.07	10.6	5.05	7.59
	9	18.2	27.3	12.7	19.2	7.24	10.9	5.16	7.75	5.58	8.39	3.99	6.00
	10	14.7	22.1	10.3	15.5	5.86	8.81	4.18	6.28	4.52	6.80	3.23	4.86
	11	12.2	18.3	8.53	12.8	4.85	7.28	3.45	5.19	3.74	5.62	2.67	4.02
	12	10.2	15.4	7.17	10.8	4.07	6.12	2.90	4.36	3.14	4.72	2.25	3.38
	13	8.71	13.1	6.11	9.18	3.47	5.21	2.47	3.71	2.68	4.02	1.91	2.88
	14	7.51	11.3	5.27	7.92			2.13	3.20				
	15	6.54	9.83	4.59	6.90								
	16	5.75	8.64	4.03	6.06								
	17	5.09	7.65	3.57	5.37								
	18	4.54	6.82	3.19	4.79								
	19	4.08	6.13	2.86	4.30								
	20	3.68	5.53	2.58	3.88								
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.59		1.08		1.35		0.921		1.11		0.761	
I_x, in.^{4}		3.65		2.54		2.74		1.93		1.35		0.957	
I_y, in.^{4}		2.34		1.64		0.927		0.660		0.715		0.512	
r_y, in.		1.21		1.23		0.829		0.847		0.803		0.820	
r_x/r_y		1.26		1.24		1.71		1.71		1.37		1.37	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS3-HSS2

Shape		HSS3×1×				HSS2×1.5×				HSS2×1×			
		0.080 [c2]		0.060 [c2]		0.080		0.060 [c2]		0.080		0.060 [c2]	
t_{design}, in.		0.080		0.060		0.080		0.060		0.080		0.060	
lb/ft		2.08		1.58		1.81		1.37		1.53		1.16	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	20.0	30.1	12.8	19.3	20.3	30.5	14.7	22.1	17.2	25.8	12.4	18.6
	1	18.5	27.8	12.0	18.0	19.0	28.6	14.0	21.1	15.0	22.5	11.2	16.9
	2	14.0	21.1	9.64	14.5	15.7	23.6	12.0	18.1	9.90	14.9	7.71	11.6
	3	7.52	11.3	5.89	8.86	11.4	17.2	8.83	13.3	5.10	7.67	4.04	6.08
	4	4.23	6.35	3.31	4.98	7.33	11.0	5.72	8.60	2.87	4.32	2.27	3.42
	5	2.71	4.07	2.12	3.19	4.69	7.06	3.66	5.51	1.84	2.76	1.46	2.19
	6	1.88	2.82	1.47	2.21	3.26	4.90	2.54	3.82	1.28	1.92	1.01	1.52
	7	1.38	2.07	1.08	1.63	2.39	3.60	1.87	2.81				
	8					1.83	2.76	1.43	2.15				
	9					1.45	2.18	1.13	1.70				
	10							0.916	1.38				
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.601		0.456		0.521		0.396		0.441		0.336	
I_x, in.^{4}		0.616		0.477		0.291		0.226		0.217		0.170	
I_y, in.^{4}		0.107		0.084		0.186		0.145		0.073		0.058	
r_y, in.		0.422		0.429		0.597		0.605		0.406		0.414	
r_x/r_y		2.39		2.38		1.25		1.25		1.73		1.72	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS1.5

Table 5-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS1.5×1×			
		0.080		0.060	
t_{design}, in.		0.080		0.060	
lb/ft		1.25		0.957	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	14.1	21.1	10.7	16.1
	1	12.1	18.2	9.33	14.0
	2	7.79	11.7	6.11	9.19
	3	3.90	5.85	3.12	4.68
	4	2.19	3.29	1.75	2.63
	5	1.40	2.11	1.12	1.69
	6	0.974	1.46	0.779	1.17
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				

Properties		
A_g, in.^{2}	0.361	0.276
I_x, in.^{4}	0.105	0.083
I_y, in.^{4}	0.056	0.044
r_y, in.	0.392	0.401
r_x/r_y	1.38	1.37

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS20

Table 5-3
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 65 ksi

Shape		HSS20×16×						HSS20×12×					
		0.500 [c2]		0.375 [c2]		0.312 [c2]		0.500 [c2]		0.375 [c2]		0.312 [c2]	
t_{design}, in.		0.500		0.375		0.312		0.500		0.375		0.312	
lb/ft		118		90		75.4		105		79.6		66.7	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	1170	1750	684	1030	479	720	1020	1540	669	1010	471	708
	6	1150	1730	678	1020	476	715	1000	1500	659	991	465	699
	7	1150	1730	676	1020	475	714	992	1490	656	985	463	696
	8	1140	1720	674	1010	474	712	983	1480	651	979	461	692
	9	1140	1710	672	1010	472	710	972	1460	647	972	458	688
	10	1130	1700	669	1010	470	707	960	1440	641	963	455	684
	11	1120	1690	666	1000	469	704	947	1420	633	952	452	679
	12	1110	1680	662	996	467	702	933	1400	625	940	448	673
	13	1100	1660	659	990	465	698	918	1380	617	927	444	667
	14	1090	1640	655	984	462	695	902	1360	607	913	440	661
	15	1080	1620	650	977	460	691	884	1330	597	898	435	654
	16	1070	1600	646	970	457	687	866	1300	587	882	430	646
	17	1050	1580	641	963	454	683	846	1270	576	865	425	638
	18	1040	1560	635	955	451	679	826	1240	564	848	419	630
	19	1020	1530	630	947	448	674	805	1210	552	829	413	621
	20	1000	1510	624	938	445	669	782	1180	539	810	406	611
	21	988	1480	618	928	441	663	759	1140	526	790	400	601
	22	970	1460	611	918	438	658	735	1100	512	770	392	590
	23	952	1430	604	908	434	652	710	1070	498	748	385	578
	24	933	1400	597	897	430	646	685	1030	483	726	377	566
	25	913	1370	589	886	425	639	658	989	468	704	368	554
	26	893	1340	581	874	421	633	628	945	453	680	359	540
	27	872	1310	573	861	416	626	598	900	437	657	350	525
	28	851	1280	564	848	411	618	569	855	421	632	338	508
	29	829	1250	555	835	406	611	540	811	404	607	327	491
	30	807	1210	546	820	401	603	511	768	387	582	315	473
	32	761	1140	526	790	390	586	456	685	352	530	290	437
	34	711	1070	504	757	377	567	405	608	317	476	265	399
	36	659	991	480	721	364	548	361	543	283	425	240	360
	38	609	915	454	682	350	526	324	487	254	381	215	323
	40	560	841	425	638	335	503	292	440	229	344	194	292
Properties													
A_g, in.^{2}		34.1		26.0		21.7		30.1		23.0		19.2	
I_x, in.^{4}		2010		1550		1310		1630		1260		1070	
I_y, in.^{4}		1430		1110		936		742		579		491	
r_y, in.		6.48		6.53		6.57		4.96		5.02		5.06	
r_x/r_y		1.19		1.18		1.18		1.48		1.47		1.48	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

HSS20-HSS18

Shape		HSS20×12×		HSS20×8×								HSS18×16×	
		0.250 [c2]		0.500 [c2]		0.375 [c2]		0.312 [c2]		0.250 [c2]		0.500 [c2]	
t_{design}, in.		0.250		0.500		0.375		0.312		0.250		0.500	
lb/ft		53.9		90.7		69.2		58.1		46.9		76.8	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	308	463	868	1300	560	842	421	632	300	451	781	1170
	6	305	459	829	1250	539	810	407	611	293	440	716	1080
	7	304	457	815	1220	532	799	402	604	290	436	693	1040
	8	303	456	799	1200	523	786	396	595	287	432	667	1000
	9	302	454	781	1170	513	772	390	586	283	425	637	957
	10	300	451	761	1140	503	756	382	575	278	418	602	905
	11	298	449	739	1110	491	738	375	563	273	411	558	839
	12	297	446	716	1080	478	719	366	550	268	402	514	773
	13	295	443	690	1040	465	698	357	536	262	394	471	707
	14	292	439	663	996	450	676	347	522	256	384	427	642
	15	290	436	633	952	434	653	337	506	249	374	385	579
	16	287	432	603	906	418	628	326	489	242	363	345	518
	17	285	428	570	857	400	602	314	472	234	352	307	461
	18	282	423	532	800	382	574	302	454	226	340	274	411
	19	279	419	494	743	363	546	289	434	218	328	246	369
	20	275	414	457	687	343	516	276	415	210	315	222	333
	21	272	409	421	633	323	485	262	394	201	302	201	302
	22	268	403	387	581	301	453	248	372	192	289	183	275
	23	264	397	354	532	279	419	233	350	183	275	168	252
	24	260	391	325	489	257	386	218	327	173	260	154	231
	25	256	385	300	450	237	356	202	304	163	245	142	213
	26	252	378	277	417	219	329	187	281	153	230	131	197
	27	247	371	257	386	203	305	173	261	143	214	122	183
	28	242	364	239	359	189	283	161	242	133	199	113	170
	29	237	356	223	335	176	264	150	226	124	186	105	159
	30	232	348	208	313	164	247	140	211	115	174	98.6	148
	32	220	330	183	275	144	217	123	185	101	153	86.6	130
	34	207	311	162	244	128	192	109	164	89.9	135	76.7	115
	36	192	289	145	217	114	171	97.5	147	80.2	121	68.4	103
	38	176	264	130	195	102	154	87.5	132	72.0	108	61.4	92.3
	40	159	238	117	176	92.4	139	79.0	119	64.9	97.6	55.4	83.3
Properties													
A_g, in.^{2}		15.5		26.1		20.0		16.7		13.5		22.1	
I_x, in.^{4}		873		1250		976		829		678		800	
I_y, in.^{4}		401		297		234		200		164		140	
r_y, in.		5.09		3.37		3.42		3.46		3.49		2.52	
r_x/r_y		1.47		2.05		2.04		2.04		2.03		2.39	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS18-HSS16

Table 5-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 65 ksi

Shape		HSS18×16×						HSS16×12×					
		0.375 [c2]		0.312 [c2]		0.250 [c2]		0.500 [c2]		0.375 [c2]		0.312 [c2]	
t_{design}, in.		0.375		0.312		0.250		0.500		0.375		0.312	
lb/ft		58.8		49.4		40.0		90.7		69.2		58.1	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	498	749	374	562	263	396	1000	1510	661	993	466	701
	6	465	699	352	529	250	375	975	1470	649	975	459	690
	7	453	681	344	517	245	368	965	1450	645	969	457	687
	8	439	660	335	503	239	360	955	1430	640	961	454	682
	9	424	638	325	488	233	351	939	1410	634	952	451	678
	10	407	612	313	471	226	340	922	1390	626	940	447	672
	11	389	584	301	452	219	329	903	1360	617	927	443	666
	12	369	554	288	432	211	317	883	1330	607	913	439	659
	13	347	522	273	411	202	304	862	1300	597	897	434	652
	14	324	487	258	388	193	290	840	1260	586	880	429	644
	15	299	450	242	363	183	275	816	1230	574	863	423	636
	16	273	411	224	337	173	259	792	1190	562	844	417	627
	17	245	369	206	310	162	243	767	1150	548	824	411	617
	18	219	329	187	281	150	226	742	1110	535	804	404	607
	19	197	295	168	252	138	208	715	1080	520	782	396	596
	20	177	267	152	228	126	189	689	1040	506	760	389	584
	21	161	242	137	207	114	171	662	995	490	737	380	572
	22	147	220	125	188	104	156	635	954	474	713	372	558
	23	134	202	115	172	95.0	143	608	913	458	688	362	544
	24	123	185	105	158	87.3	131	580	872	441	663	352	530
	25	114	171	97.0	146	80.4	121	553	832	424	637	341	513
	26	105	158	89.7	135	74.4	112	527	792	406	610	329	494
	27	97.3	146	83.2	125	69.0	104	500	752	388	583	316	475
	28	90.5	136	77.3	116	64.1	96.4	474	713	369	555	303	456
	29	84.4	127	72.1	108	59.8	89.8	449	674	350	525	290	436
	30	78.8	119	67.4	101	55.9	84.0	424	637	331	497	277	416
	32	69.3	104	59.2	89.0	49.1	73.8	376	565	294	441	249	375
	34	61.4	92.3	52.4	78.8	43.5	65.4	333	500	260	391	222	334
	36	54.8	82.3	46.8	70.3	38.8	58.3	297	446	232	349	198	297
	38	49.1	73.9	42.0	63.1	34.8	52.3	266	401	208	313	178	267
	40	44.4	66.7	37.9	56.9	31.4	47.2	241	361	188	283	160	241
Properties													
A_g, in.^{2}		17.0		14.3		11.5		26.1		20.0		16.7	
I_x, in.^{4}		632		539		442		948		741		629	
I_y, in.^{4}		112		96.1		79.5		610		477		406	
r_y, in.		2.57		2.59		2.63		4.83		4.88		4.93	
r_x/r_y		2.37		2.37		2.36		1.25		1.25		1.25	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

HSS16-HSS12

Shape		HSS16×12×		HSS14×10×								HSS12×8×	
		0.250 [c2]		0.500		0.375 [c2]		0.312 [c2]		0.250 [c2]		0.500	
t_{design}, in.		0.250		0.500		0.375		0.312		0.250		0.500	
lb/ft		46.9		76.8		58.8		49.4		40.0		62.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	306	460	860	1290	604	908	460	691	301	453	704	1060
	6	303	455	818	1230	583	876	448	674	295	444	650	977
	7	301	453	803	1210	575	865	444	667	293	441	632	949
	8	300	451	786	1180	567	852	439	660	291	437	611	918
	9	298	448	767	1150	557	837	432	649	288	433	588	884
	10	296	445	747	1120	546	821	424	638	285	428	564	847
	11	294	442	725	1090	534	803	416	625	282	423	538	809
	12	292	439	702	1060	521	783	407	612	278	417	511	768
	13	290	435	678	1020	507	763	397	597	274	411	483	727
	14	287	431	653	981	493	741	387	582	269	404	455	684
	15	284	427	626	941	477	717	376	565	264	397	427	641
	16	281	422	600	901	461	693	364	548	259	389	398	599
	17	278	417	572	860	444	667	352	530	253	381	370	556
	18	274	412	545	819	425	638	340	511	247	372	342	515
	19	270	406	517	777	404	607	327	491	241	362	315	474
	20	266	400	489	736	383	575	313	471	234	352	289	434
	21	262	394	462	694	362	544	299	450	227	341	264	396
	22	258	387	435	653	341	513	285	428	219	329	241	361
	23	253	380	408	613	321	482	270	406	210	316	220	331
	24	248	373	382	574	301	452	255	383	200	301	202	304
	25	243	365	356	536	281	423	240	360	190	286	186	280
	26	237	357	332	499	262	394	224	336	180	270	172	259
	27	232	348	308	463	244	367	208	313	169	254	160	240
	28	225	339	286	431	227	341	194	291	159	238	148	223
	29	219	329	267	401	212	318	181	272	148	223	138	208
	30	212	319	250	375	198	297	169	254	138	208	129	194
	32	197	297	219	330	174	261	148	223	122	183	114	171
	34	180	271	194	292	154	231	131	198	108	162	101	151
	36	162	243	173	260	137	206	117	176	96.1	144	89.8	135
	38	145	218	156	234	123	185	105	158	86.3	130	80.6	121
	40	131	197	140	211	111	167	95.0	143	77.9	117	72.8	109
Properties													
A_g, in.^{2}		13.5		22.1		17.0		14.3		11.5		18.1	
I_x, in.^{4}		514		598		470		401		328		345	
I_y, in.^{4}		332		356		281		240		197		184	
r_y, in.		4.96		4.01		4.07		4.10		4.14		3.19	
r_x/r_y		1.24		1.30		1.29		1.29		1.29		1.37	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS12-HSS10

Table 5-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 65 ksi

Shape		HSS12×8×						HSS10×6×					
		0.375 [c2]		0.312 [c2]		0.250 [c2]		0.500		0.375		0.312 [c2]	
t_{design}, in.		0.375		0.312		0.250		0.500		0.375		0.312	
lb/ft		48.4		40.8		33.1		49.0		38.0		32.1	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	537	808	412	619	295	444	549	825	428	644	355	533
	6	504	758	390	586	284	428	475	713	372	560	315	473
	7	490	737	382	575	279	420	450	677	354	532	300	450
	8	475	713	373	561	274	411	424	637	334	502	283	425
	9	457	688	364	546	267	402	396	595	313	470	265	399
	10	439	660	353	530	260	391	367	551	291	437	247	371
	11	420	631	341	512	253	380	337	506	268	403	228	343
	12	399	600	328	493	244	367	307	461	245	369	209	314
	13	378	569	314	472	235	354	277	417	223	335	190	286
	14	357	536	300	450	226	340	249	374	201	301	172	258
	15	335	504	284	428	216	325	221	333	179	269	154	232
	16	314	471	267	401	206	309	196	294	159	239	137	206
	17	292	439	249	374	195	293	173	260	141	212	122	183
	18	271	407	231	347	184	276	154	232	126	189	108	163
	19	250	376	214	321	172	259	139	208	113	170	97.3	146
	20	230	345	197	296	160	241	125	188	102	153	87.8	132
	21	210	316	180	271	148	222	113	171	92.3	139	79.7	120
	22	192	288	165	248	136	204	103	155	84.1	126	72.6	109
	23	176	264	151	227	124	187	94.6	142	77.0	116	66.4	100
	24	161	242	138	208	114	171	86.9	131	70.7	106	61.0	91.7
	25	149	223	128	192	105	158	80.1	120	65.1	97.9	56.2	84.5
	26	137	207	118	177	97.1	146	74.0	111	60.2	90.5	52.0	78.1
	27	127	191	109	164	90.1	135	68.7	103	55.8	83.9	48.2	72.4
	28	118	178	102	153	83.7	126	63.8	96.0	51.9	78.1	44.8	67.3
	29	110	166	94.8	143	78.1	117	59.5	89.5	48.4	72.8	41.8	62.8
	30	103	155	88.6	133	73.0	110	55.6	83.6	45.2	68.0	39.0	58.7
	32	90.7	136	77.9	117	64.1	96.4	48.9	73.5	39.8	59.8	34.3	51.6
	34	80.3	121	69.0	104	56.8	85.4	43.3	65.1	35.2	52.9	30.4	45.7
	36	71.7	108	61.5	92.5	50.7	76.1	38.6	58.0	31.4	47.2	27.1	40.7
	38	64.3	96.7	55.2	83.0	45.5	68.3	34.7	52.1	28.2	42.4	24.3	36.6
	40	58.1	87.3	49.8	74.9	41.0	61.7			25.4	38.2	22.0	33.0
Properties													
A_g, in.^{2}		14.0		11.8		9.54		14.1		11.0		9.26	
I_x, in.^{4}		275		235		194		175		142		123	
I_y, in.^{4}		147		126		104		78.9		64.3		55.7	
r_y, in.		3.24		3.27		3.30		2.37		2.42		2.45	
r_x/r_y		1.37		1.36		1.37		1.49		1.48		1.49	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

HSS10

Shape		HSS10×6×	
		0.250 [c2]	
t_{design}, in.		0.250	
lb/ft		26.1	
Design		P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	256	385
	6	234	351
	7	226	340
	8	217	326
	9	207	311
	10	196	295
	11	184	277
	12	171	258
	13	157	237
	14	143	214
	15	128	192
	16	114	172
	17	101	152
	18	90.5	136
	19	81.2	122
	20	73.3	110
	21	66.5	100
	22	60.6	91.0
	23	55.4	83.3
	24	50.9	76.5
	25	46.9	70.5
	26	43.4	65.2
	27	40.2	60.4
	28	37.4	56.2
	29	34.8	52.4
	30	32.6	48.9
	32	28.6	43.0
	34	25.4	38.1
	36	22.6	34.0
	38	20.3	30.5
	40	18.3	27.5

Properties

A_g, in.^{2}	7.54
I_x, in.^{4}	102
I_y, in.^{4}	46.4
r_y, in.	2.48
r_x/r_y	1.48

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS12-HSS6

Table 5-4
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS12×12×		HSS10×10×		HSS8×8×				HSS6×6×			
		0.250 [c2]		0.250 [c2]		0.250 [c2]		0.180 [c2]		0.250		0.180 [c2]	
t_{design}, in.		0.250		0.250		0.250		0.180		0.250		0.180	
lb/ft		40.2		33.3		26.3		19.2		19.4		14.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	297	446	290	436	281	422	153	230	218	327	147	221
	6	293	440	283	426	267	401	148	222	187	281	134	202
	7	291	438	281	422	262	394	146	219	177	267	130	195
	8	290	435	278	418	255	384	144	216	167	250	123	185
	9	288	432	274	412	246	369	141	212	155	233	115	172
	10	286	429	271	407	235	353	138	208	143	215	106	160
	11	283	425	266	400	224	337	135	203	131	197	97.5	147
	12	280	421	262	393	213	320	132	198	119	179	88.8	133
	13	277	417	257	386	201	302	128	192	107	161	80.2	121
	14	274	412	251	377	189	284	123	186	96.0	144	71.9	108
	15	271	407	245	368	177	266	119	179	85.0	128	63.9	96.0
	16	267	402	239	359	165	247	114	171	74.9	113	56.4	84.7
	17	263	396	232	348	153	229	108	163	66.4	100	49.9	75.1
	18	259	389	224	337	141	212	102	153	59.2	89.0	44.5	66.9
	19	255	383	216	325	130	195	95.4	143	53.1	79.9	40.0	60.1
	20	250	375	207	311	118	178	88.0	132	47.9	72.1	36.1	54.2
	21	245	368	198	297	108	162	80.2	121	43.5	65.4	32.7	49.2
	22	239	360	186	280	98.3	148	73.2	110	39.6	59.6	29.8	44.8
	23	234	351	174	262	90.0	135	66.9	101	36.3	54.5	27.3	41.0
	24	228	342	163	245	82.6	124	61.5	92.4	33.3	50.0	25.1	37.7
	25	221	332	152	228	76.2	114	56.6	85.1	30.7	46.1	23.1	34.7
	26	214	322	141	212	70.4	106	52.4	78.7	28.4	42.6	21.3	32.1
	27	207	311	131	197	65.3	98.1	48.6	73.0	26.3	39.5	19.8	29.8
	28	200	300	122	183	60.7	91.2	45.2	67.9	24.5	36.8	18.4	27.7
	29	191	288	114	171	56.6	85.1	42.1	63.3	22.8	34.3	17.2	25.8
	30	183	275	106	160	52.9	79.5	39.3	59.1	21.3	32.0	16.0	24.1
	32	164	246	93.3	140	46.5	69.9	34.6	52.0	18.7	28.2	14.1	21.2
	34	145	218	82.6	124	41.2	61.9	30.6	46.0	16.6	24.9	12.5	18.8
	36	129	194	73.7	111	36.7	55.2	27.3	41.1	14.8	22.2	11.1	16.7
	38	116	174	66.2	99.4	33.0	49.5	24.5	36.9	13.3	20.0	10.0	15.0
	40	105	157	59.7	89.7	29.7	44.7	22.1	33.3				
Properties													
A_g, in.^{2}		11.6		9.59		7.59		5.54		5.59		4.10	
$I_x = I_y$, in.^{4}		265		151		75.1		56.0		30.3		22.9	
$r_x = r_y$, in.		4.78		3.97		3.15		3.18		2.33		2.36	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS6-HSS4

Shape		HSS6×6×		HSS5×5×						HSS4×4×			
		0.120 [c2]		0.250		0.180		0.120 [c2]		0.250		0.180	
t_{design}, in.		0.120		0.250		0.180		0.120		0.250		0.180	
lb/ft		9.67		15.9		11.7		8.01		12.4		9.23	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	68.0	102	179	269	132	198	66.7	100	140	210	104	156
	6	64.5	96.9	143	215	106	160	60.5	90.9	97.7	147	73.7	111
	7	63.2	94.9	132	199	98.2	148	58.2	87.4	85.8	129	65.2	98.0
	8	61.6	92.6	121	181	89.8	135	55.4	83.3	74.0	111	56.6	85.1
	9	59.9	90.0	109	163	81.2	122	52.3	78.5	62.5	93.9	48.2	72.5
	10	57.9	87.0	96.6	145	72.5	109	48.6	73.0	51.7	77.7	40.3	60.6
	11	55.6	83.6	84.9	128	64.0	96.1	44.3	66.6	42.8	64.3	33.4	50.2
	12	53.1	79.8	73.7	111	55.8	83.8	39.1	58.8	35.9	54.0	28.0	42.2
	13	50.2	75.5	63.3	95.1	48.1	72.2	33.8	50.9	30.6	46.0	23.9	35.9
	14	47.0	70.7	54.6	82.0	41.4	62.3	29.2	43.9	26.4	39.7	20.6	31.0
	15	43.4	65.2	47.5	71.4	36.1	54.3	25.4	38.2	23.0	34.6	18.0	27.0
	16	39.2	59.0	41.8	62.8	31.7	47.7	22.4	33.6	20.2	30.4	15.8	23.7
	17	34.9	52.4	37.0	55.6	28.1	42.2	19.8	29.8	17.9	26.9	14.0	21.0
	18	31.1	46.7	33.0	49.6	25.1	37.7	17.7	26.6	16.0	24.0	12.5	18.7
	19	27.9	41.9	29.6	44.5	22.5	33.8	15.9	23.8	14.3	21.5	11.2	16.8
	20	25.2	37.8	26.7	40.2	20.3	30.5	14.3	21.5	12.9	19.4	10.1	15.2
	21	22.8	34.3	24.2	36.4	18.4	27.7	13.0	19.5	11.7	17.6	9.16	13.8
	22	20.8	31.3	22.1	33.2	16.8	25.2	11.8	17.8	10.7	16.1	8.34	12.5
	23	19.0	28.6	20.2	30.4	15.4	23.1	10.8	16.3	9.78	14.7	7.63	11.5
	24	17.5	26.3	18.6	27.9	14.1	21.2	9.94	14.9	8.98	13.5	7.01	10.5
	25	16.1	24.2	17.1	25.7	13.0	19.5	9.16	13.8	8.28	12.4	6.46	9.71
	26	14.9	22.4	15.8	23.8	12.0	18.1	8.47	12.7				
	27	13.8	20.8	14.7	22.0	11.1	16.7	7.85	11.8				
	28	12.8	19.3	13.6	20.5	10.4	15.6	7.30	11.0				
	29	12.0	18.0	12.7	19.1	9.66	14.5	6.81	10.2				
	30	11.2	16.8	11.9	17.9	9.03	13.6	6.36	9.56				
	32	9.84	14.8			7.93	11.9	5.59	8.40				
	34	8.71	13.1										
	36	7.77	11.7										
	38	6.98	10.5										
	40												
Properties													
A_g, in.^{2}		2.79		4.59		3.38		2.31		3.59		2.66	
$I_x = I_y$, in.^{4}		16.0		16.9		12.9		9.10		8.22		6.36	
$r_x = r_y$, in.		2.39		1.92		1.95		1.98		1.51		1.55	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS4-HSS2.5

Table 5-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS4×4×		HSS3.5×3.5×				HSS3×3×				HSS2.5×2.5×	
		0.120 [c2]		0.180		0.120		0.120		0.080 [c2]		0.120	
t_{design}, in.		0.120		0.180		0.120		0.120		0.080		0.120	
lb/ft		6.35		7.98		5.51		4.68		3.19		3.85	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	64.6	97.1	89.5	135	61.9	93.0	52.5	79.0	29.2	43.8	43.2	64.9
	6	51.4	77.2	56.8	85.4	40.1	60.2	28.9	43.5	20.1	30.3	17.9	26.9
	7	45.6	68.6	48.2	72.5	34.2	51.5	23.3	35.1	16.4	24.6	13.3	20.0
	8	39.8	59.9	39.9	60.0	28.6	42.9	18.2	27.4	12.9	19.4	10.2	15.3
	9	34.1	51.3	32.2	48.4	23.3	35.0	14.4	21.7	10.2	15.3	8.03	12.1
	10	28.7	43.2	26.1	39.2	18.9	28.3	11.7	17.6	8.24	12.4	6.51	9.78
	11	23.9	35.9	21.6	32.4	15.6	23.4	9.65	14.5	6.81	10.2	5.38	8.08
	12	20.1	30.1	18.1	27.2	13.1	19.7	8.11	12.2	5.72	8.60	4.52	6.79
	13	17.1	25.7	15.4	23.2	11.2	16.8	6.91	10.4	4.88	7.33	3.85	5.79
	14	14.7	22.1	13.3	20.0	9.62	14.5	5.96	8.96	4.21	6.32	3.32	4.99
	15	12.8	19.3	11.6	17.4	8.38	12.6	5.19	7.80	3.66	5.51	2.89	4.35
	16	11.3	17.0	10.2	15.3	7.37	11.1	4.56	6.86	3.22	4.84	2.54	3.82
	17	10.0	15.0	9.03	13.6	6.53	9.81	4.04	6.07	2.85	4.29		
	18	8.91	13.4	8.06	12.1	5.82	8.75	3.60	5.42	2.54	3.82		
	19	8.00	12.0	7.23	10.9	5.22	7.85	3.24	4.86	2.28	3.43		
	20	7.22	10.8	6.53	9.81	4.72	7.09						
	21	6.55	9.84	5.92	8.90	4.28	6.43						
	22	5.97	8.97	5.39	8.11	3.90	5.86						
	23	5.46	8.20										
	24	5.01	7.53										
	25	4.62	6.94										
	26	4.27	6.42										
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.83		2.30		1.59		1.35		0.921		1.11	
$I_x = I_y$, in.^{4}		4.55		4.14		3.00		1.84		1.30		1.03	
$r_x = r_y$, in.		1.58		1.34		1.37		1.17		1.19		0.963	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS2.5-HSS1.25

Shape		HSS2.5×2.5×		HSS2×2×				HSS1.5×1.5×				HSS1.25×1.25×	
		0.080 [c2]		0.080		0.060 [c2]		0.080		0.060		0.080	
t_{design}, in.		0.080		0.080		0.060		0.080		0.060		0.080	
lb/ft		2.64		2.08		1.58		1.53		1.16		1.25	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	28.3	42.6	23.4	35.2	16.3	24.6	17.2	25.8	13.1	19.7	14.1	21.1
	1	27.9	42.0	22.5	33.9	16.0	24.0	16.0	24.1	12.2	18.4	12.7	19.1
	2	26.7	40.2	20.1	30.3	15.0	22.5	13.0	19.6	10.0	15.0	9.37	14.1
	3	24.0	36.0	16.7	25.1	12.8	19.2	9.26	13.9	7.16	10.8	5.65	8.5
	4	20.4	30.6	12.9	19.3	9.90	14.9	5.76	8.66	4.50	6.76	3.19	4.79
	5	16.5	24.8	9.19	13.8	7.13	10.7	3.69	5.54	2.88	4.32	2.04	3.07
	6	12.7	19.1	6.40	9.62	4.97	7.47	2.56	3.85	2.00	3.00	1.42	2.13
	7	9.48	14.3	4.70	7.07	3.65	5.49	1.88	2.83	1.47	2.21	1.04	1.57
	8	7.26	10.9	3.60	5.41	2.80	4.20	1.44	2.16	1.12	1.69		
	9	5.74	8.62	2.85	4.28	2.21	3.32	1.14	1.71	0.888	1.33		
	10	4.65	6.98	2.30	3.46	1.79	2.69						
	11	3.84	5.77	1.90	2.86	1.48	2.22						
	12	3.23	4.85	1.60	2.41	1.24	1.87						
	13	2.75	4.13			1.06	1.59						
	14	2.37	3.56										
	15	2.07	3.10										
	16	1.82	2.73										
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.761		0.601		0.456		0.441		0.336		0.361	
$I_x = I_y$, in.^{4}		0.736		0.365		0.283		0.146		0.114		0.081	
$r_x = r_y$, in.		0.983		0.779		0.788		0.575		0.582		0.473	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS1.25-HSS1

Table 5-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS1.25×1.25×		HSS1×1×	
		0.060		0.060	
t_{design}, in.		0.060		0.060	
lb/ft		0.957		0.748	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	10.7	16.1	8.41	12.6
	1	9.74	14.6	7.18	10.8
	2	7.26	10.9	4.47	6.72
	3	4.45	6.69	2.18	3.27
	4	2.52	3.79	1.23	1.84
	5	1.61	2.43	0.784	1.18
	6	1.12	1.68	0.545	0.819
	7	0.824	1.24		
	8	0.631	0.948		
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				

Properties		
A_g, in.^{2}	0.276	0.216
$I_x = I_y$, in.^{4}	0.064	0.031
$r_x = r_y$, in.	0.481	0.379

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS20-HSS14

Table 5-5
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

F_y = 65 ksi

Shape		HSS20×20×				HSS16×16×						HSS14×14×	
		0.500 [c2]		0.375 [c2]		0.500 [c2]		0.375 [c2]		0.312 [c2]		0.500	
t_{design}, in.		0.500		0.375		0.500		0.375		0.312		0.500	
lb/ft		132		100		105		79.6		66.7		90.7	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	1190	1780	692	1040	1140	1720	676	1020	474	713	1020	1530
	6	1180	1770	689	1040	1130	1700	669	1010	471	707	989	1490
	7	1180	1770	687	1030	1120	1690	667	1000	469	705	979	1470
	8	1170	1760	686	1030	1120	1680	664	999	468	703	968	1450
	9	1170	1760	685	1030	1110	1670	661	994	466	701	955	1440
	10	1170	1750	683	1030	1100	1660	658	989	464	698	942	1420
	11	1160	1740	681	1020	1090	1640	654	983	462	695	927	1390
	12	1160	1740	679	1020	1080	1620	650	977	460	691	911	1370
	13	1150	1730	677	1020	1060	1600	646	971	457	687	894	1340
	14	1140	1720	674	1010	1050	1570	641	964	455	683	876	1320
	15	1140	1710	672	1010	1030	1550	636	956	452	679	857	1290
	16	1130	1700	669	1010	1010	1520	630	947	449	674	837	1260
	17	1130	1690	666	1000	993	1490	624	939	445	669	816	1230
	18	1120	1680	663	996	973	1460	618	929	442	664	795	1190
	19	1110	1670	659	991	953	1430	612	919	438	658	773	1160
	20	1100	1660	656	985	932	1400	604	909	434	652	750	1130
	21	1090	1640	652	980	910	1370	597	897	430	646	727	1090
	22	1080	1630	648	974	888	1330	589	886	425	639	704	1060
	23	1070	1610	644	968	865	1300	581	873	420	632	680	1020
	24	1060	1600	639	961	842	1270	572	860	416	625	657	987
	25	1050	1580	635	954	819	1230	563	846	410	617	633	951
	26	1040	1570	630	947	795	1200	554	832	405	609	609	915
	27	1030	1550	625	940	772	1160	544	817	399	600	585	879
	28	1020	1530	620	932	748	1120	533	801	394	592	561	843
	29	1010	1510	615	924	724	1090	522	785	387	582	537	807
	30	992	1490	609	916	700	1050	511	768	381	573	514	772
	32	965	1450	598	898	652	979	487	731	367	552	468	703
	34	935	1400	585	879	604	908	460	691	353	530	423	636
	36	903	1360	571	859	558	838	431	648	336	506	381	572
	38	868	1300	557	837	512	770	397	596	319	479	342	514
	40	831	1250	542	814	468	704	363	546	299	450	308	464
Properties													
A_g, in.^{2}		38.1		29.0		30.1		23.0		19.2		26.1	
$I_x = I_y$, in.^{4}		2390		1840		1190		924		782		780	
$r_x = r_y$, in.		7.92		7.97		6.29		6.34		6.38		5.47	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

HSS14-HSS12

Shape		HSS14×14×				HSS12×12×							
		0.375 [c2]		0.312 [c2]		0.500		0.375 [c2]		0.312 [c2]		0.250 [c2]	
t_{design}, in.		0.375		0.312		0.500		0.375		0.312		0.250	
lb/ft		69.2		58.1		76.8		58.8		49.4		40.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	663	997	467	702	860	1290	646	972	462	694	302	454
	6	654	983	462	694	828	1240	632	949	453	681	298	448
	7	651	978	460	692	817	1230	626	941	450	676	296	445
	8	647	972	458	688	804	1210	620	931	446	671	294	442
	9	642	965	455	684	790	1190	609	915	442	665	292	439
	10	637	958	453	680	775	1160	597	898	438	658	290	436
	11	632	949	449	675	758	1140	584	878	433	650	287	432
	12	626	940	446	670	740	1110	571	858	427	642	285	428
	13	619	930	442	665	721	1080	556	836	421	633	282	423
	14	612	920	438	659	700	1050	541	813	414	623	278	418
	15	604	908	434	652	679	1020	525	789	407	612	275	413
	16	596	895	429	645	658	989	509	765	399	600	271	407
	17	587	882	424	637	635	955	492	739	391	588	266	401
	18	577	868	419	629	612	921	475	713	382	574	262	394
	19	567	853	413	621	589	886	457	687	373	560	257	387
	20	557	837	407	612	566	850	439	660	363	545	252	379
	21	545	820	401	602	542	814	421	633	352	529	247	371
	22	534	802	394	592	518	778	403	605	341	512	241	363
	23	521	783	387	581	494	743	385	578	326	489	235	354
	24	507	762	379	570	470	707	366	551	311	467	229	344
	25	489	735	371	558	447	671	348	524	295	444	222	334
	26	471	708	363	546	423	636	331	497	281	422	215	323
	27	453	680	354	532	401	602	313	471	266	400	208	312
	28	434	653	345	519	378	568	296	445	252	378	199	300
	29	416	626	335	504	356	535	279	420	237	357	191	287
	30	399	599	325	489	335	503	263	395	224	336	182	273
	32	363	546	304	456	295	443	232	348	197	297	162	244
	34	329	495	279	420	261	393	205	309	175	263	144	216
	36	297	446	252	379	233	350	183	275	156	234	128	193
	38	267	401	227	341	209	314	164	247	140	210	115	173
	40	241	362	205	308	189	284	148	223	126	190	104	156
Properties													
A_g, in.^{2}		20.0		16.7		22.1		17.0		14.3		11.5	
$I_x = I_y$, in.^{4}		609		518		478		376		320		263	
$r_x = r_y$, in.		5.52		5.57		4.65		4.70		4.73		4.78	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS10-HSS8

Table 5-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

F_y = 65 ksi

Shape		HSS10×10×								HSS8×8×			
		0.500		0.375		0.312 [c2]		0.250 [c2]		0.500		0.375	
t_{design}, in.		0.500		0.375		0.312		0.250		0.500		0.375	
lb/ft		62.9		48.4		40.8		33.1		49.0		38.0	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	704	1060	545	819	448	673	297	447	549	825	428	644
	6	666	1000	516	776	433	651	290	435	502	754	393	590
	7	653	982	506	761	427	642	287	431	485	730	381	572
	8	638	959	495	744	418	628	284	426	468	703	367	552
	9	622	934	482	725	408	613	280	421	448	674	352	530
	10	604	907	469	705	396	596	276	415	427	642	337	506
	11	584	878	454	683	384	577	271	408	405	609	320	481
	12	564	848	439	659	371	558	266	400	383	575	303	455
	13	543	815	422	635	358	538	261	392	360	540	285	429
	14	520	782	406	610	344	517	255	383	336	505	267	402
	15	498	748	388	584	330	495	248	373	313	470	249	375
	16	474	713	371	557	315	473	241	363	289	435	231	348
	17	451	677	353	530	300	451	234	351	266	400	214	321
	18	427	642	335	503	285	428	226	339	244	367	196	295
	19	403	606	316	476	270	405	217	326	222	334	180	270
	20	380	571	298	448	255	383	208	312	202	303	164	246
	21	356	536	281	422	240	360	196	294	183	275	149	223
	22	333	501	263	395	225	338	184	276	167	251	135	203
	23	311	468	246	369	210	316	172	259	153	229	124	186
	24	289	435	229	344	196	295	161	242	140	211	114	171
	25	268	403	213	320	183	275	150	225	129	194	105	158
	26	248	373	197	296	169	255	139	209	119	180	96.9	146
	27	230	346	183	275	157	236	129	194	111	166	89.9	135
	28	214	322	170	255	146	220	120	180	103	155	83.6	126
	29	200	300	158	238	136	205	112	168	96.0	144	77.9	117
	30	186	280	148	222	127	191	105	157	89.7	135	72.8	109
	32	164	246	130	196	112	168	91.9	138	78.8	119	64.0	96.2
	34	145	218	115	173	99.1	149	81.4	122	69.8	105	56.7	85.2
	36	129	195	103	154	88.4	133	72.6	109	62.3	93.6	50.6	76.0
	38	116	175	92.2	139	79.4	119	65.1	97.9	55.9	84.0	45.4	68.2
	40	105	158	83.3	125	71.6	108	58.8	88.4	50.5	75.8	41.0	61.5
Properties													
A_g, in.^{2}		18.1		14.0		11.8		9.54		14.1		11.0	
$I_x = I_y$, in.^{4}		266		211		181		149		128		104	
$r_x = r_y$, in.		3.83		3.88		3.92		3.95		3.01		3.07	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

HSS8-HSS7

Shape		HSS8×8×				HSS7×7×							
		0.312		0.250 [c2]		0.500		0.375		0.312		0.250	
t_{design}, in.		0.312		0.250		0.500		0.375		0.312		0.250	
lb/ft		32.1		26.1		42.1		32.8		27.8		22.7	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	360	542	287	431	471	708	368	553	312	469	255	383
	6	331	498	270	406	417	627	328	493	279	419	228	343
	7	321	483	262	394	400	601	315	473	268	402	219	330
	8	310	466	253	381	380	571	300	451	256	384	210	315
	9	298	448	244	366	359	539	284	427	242	364	199	299
	10	285	429	233	350	337	506	268	402	228	343	188	282
	11	271	408	222	334	314	472	250	376	214	322	176	265
	12	257	387	211	317	291	437	233	350	199	299	164	247
	13	243	365	199	299	267	402	215	323	184	277	152	229
	14	228	342	187	281	244	367	197	296	169	255	140	211
	15	213	320	175	263	221	333	180	270	155	233	128	193
	16	198	297	163	245	200	300	163	245	141	211	117	176
	17	183	275	151	227	179	269	147	221	127	191	106	159
	18	169	254	139	209	160	240	131	198	114	171	95.0	143
	19	155	232	128	192	143	215	118	177	102	154	85.3	128
	20	141	212	117	176	129	194	106	160	92.3	139	77.0	116
	21	128	193	107	160	117	176	96.5	145	83.7	126	69.9	105
	22	117	176	97.1	146	107	161	88.0	132	76.2	115	63.6	95.7
	23	107	161	88.8	133	97.7	147	80.5	121	69.8	105	58.2	87.5
	24	98.3	148	81.6	123	89.7	135	73.9	111	64.1	96.3	53.5	80.4
	25	90.6	136	75.2	113	82.7	124	68.1	102	59.0	88.7	49.3	74.1
	26	83.7	126	69.5	104	76.5	115	63.0	94.7	54.6	82.1	45.6	68.5
	27	77.6	117	64.4	96.9	70.9	107	58.4	87.8	50.6	76.1	42.3	63.5
	28	72.2	109	59.9	90.1	65.9	99.1	54.3	81.6	47.1	70.7	39.3	59.1
	29	67.3	101	55.9	84.0	61.5	92.4	50.6	76.1	43.9	66.0	36.6	55.1
	30	62.9	94.5	52.2	78.5	57.4	86.3	47.3	71.1	41.0	61.6	34.2	51.4
	32	55.3	83.1	45.9	69.0	50.5	75.9	41.6	62.5	36.0	54.2	30.1	45.2
	34	49.0	73.6	40.6	61.1	44.7	67.2	36.8	55.4	31.9	48.0	26.6	40.1
	36	43.7	65.6	36.3	54.5	39.9	60.0	32.9	49.4	28.5	42.8	23.8	35.7
	38	39.2	58.9	32.5	48.9	35.8	53.8	29.5	44.3	25.6	38.4	21.3	32.1
	40	35.4	53.2	29.4	44.1	32.3	48.6	26.6	40.0	23.1	34.7	19.3	28.9
Properties													
A_g, in.^{2}		9.26		7.54		12.1		9.45		8.01		6.54	
$I_x = I_y$, in.^{4}		89.4		74.3		82.0		67.2		58.4		48.7	
$r_x = r_y$, in.		3.11		3.14		2.60		2.67		2.70		2.73	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS6

Table 5-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

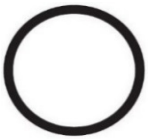
F_y = 65 ksi

Shape		HSS6×6×							
		0.500		0.375		0.312		0.250	
t_{design}, in.		0.500		0.375		0.312		0.250	
lb/ft		35.2		27.6		23.5		19.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	393	591	309	465	263	395	216	324
	6	332	498	264	396	225	338	185	278
	7	312	469	249	374	213	320	175	264
	8	291	437	233	350	200	300	165	248
	9	268	403	216	325	185	279	153	230
	10	245	368	199	298	171	257	142	213
	11	222	334	181	272	156	234	130	195
	12	199	299	163	245	141	212	118	177
	13	177	266	146	220	127	190	106	159
	14	156	234	130	195	113	169	94.5	142
	15	136	205	114	171	100	150	83.6	126
	16	120	180	100	151	87.5	132	73.6	111
	17	106	159	88.8	133	77.5	117	65.2	98.0
	18	94.5	142	79.2	119	69.1	104	58.2	87.4
	19	84.8	127	71.1	107	62.1	93.3	52.2	78.5
	20	76.5	115	64.2	96.4	56.0	84.2	47.1	70.8
	21	69.4	104	58.2	87.5	50.8	76.4	42.7	64.2
	22	63.3	95.1	53.0	79.7	46.3	69.6	38.9	58.5
	23	57.9	87.0	48.5	72.9	42.4	63.7	35.6	53.5
	24	53.1	79.9	44.6	67.0	38.9	58.5	32.7	49.2
	25	49.0	73.6	41.1	61.7	35.8	53.9	30.2	45.3
	26	45.3	68.1	38.0	57.1	33.1	49.8	27.9	41.9
	27	42.0	63.1	35.2	52.9	30.7	46.2	25.9	38.9
	28	39.0	58.7	32.7	49.2	28.6	43.0	24.0	36.1
	29	36.4	54.7	30.5	45.9	26.6	40.0	22.4	33.7
	30	34.0	51.1	28.5	42.9	24.9	37.4	20.9	31.5
	32	29.9	44.9	25.1	37.7	21.9	32.9	18.4	27.7
	34	26.5	39.8	22.2	33.4	19.4	29.1	16.3	24.5
	36	23.6	35.5	19.8	29.8	17.3	26.0	14.5	21.9
	38					15.5	23.3	13.1	19.6
	40								
Properties									
A_g, in.^{2}		10.1		7.95		6.76		5.54	
$I_x = I_y$, in.^{4}		48.6		40.5		35.5		29.9	
$r_x = r_y$, in.		2.19		2.26		2.29		2.32	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.



HSS7.5-HSS6.25

Table 5-6
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS7.5×								HSS6.25×			
		0.375		0.250		0.180		0.120 [c2]		0.375		0.250	
t_{design}, in.		0.375		0.250		0.180		0.120		0.375		0.250	
lb/ft		29.1		19.7		14.4		9.65		24.0		16.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	310	464	210	314	153	229	-S-	-S-	256	382	174	260
	6	272	408	186	278	135	203	-S-	-S-	212	317	145	217
	7	260	389	178	266	130	194	-S-	-S-	198	296	136	203
	8	247	369	169	252	123	184	-S-	-S-	183	273	126	188
	9	232	347	159	238	116	174	-S-	-S-	167	250	116	173
	10	217	324	149	223	109	163	-S-	-S-	151	226	105	157
	11	201	301	139	208	102	152	-S-	-S-	136	203	94.5	141
	12	185	277	128	192	94.0	141	-S-	-S-	120	180	84.1	126
	13	170	254	118	176	86.4	129	-S-	-S-	105	158	74.2	111
	14	154	230	107	160	78.8	118	-S-	-S-	91.6	137	64.7	96.8
	15	139	208	97.1	145	71.5	107	-S-	-S-	79.8	119	56.4	84.4
	16	124	186	87.3	131	64.4	96.3	-S-	-S-	70.1	105	49.6	74.2
	17	111	165	77.9	117	57.6	86.1	-S-	-S-	62.1	92.9	43.9	65.7
	18	98.6	148	69.6	104	51.4	76.9	-S-	-S-	55.4	82.9	39.2	58.6
	19	88.5	132	62.4	93.4	46.1	69.0	-S-	-S-	49.7	74.4	35.2	52.6
	20	79.9	119	56.3	84.3	41.6	62.3	-S-	-S-	44.9	67.1	31.7	47.5
	21	72.5	108	51.1	76.5	37.8	56.5	-S-	-S-	40.7	60.9	28.8	43.1
	22	66.0	98.8	46.6	69.7	34.4	51.5	-S-	-S-	37.1	55.5	26.2	39.2
	23	60.4	90.4	42.6	63.7	31.5	47.1	-S-	-S-	33.9	50.8	24.0	35.9
	24	55.5	83.0	39.1	58.5	28.9	43.3	-S-	-S-	31.2	46.6	22.0	33.0
	25	51.1	76.5	36.1	53.9	26.6	39.9	-S-	-S-	28.7	43.0	20.3	30.4
	26	47.3	70.7	33.3	49.9	24.6	36.9	-S-	-S-	26.6	39.7	18.8	28.1
	27	43.8	65.6	30.9	46.2	22.8	34.2	-S-	-S-	24.6	36.8	17.4	26.1
	28	40.8	61.0	28.7	43.0	21.2	31.8	-S-	-S-	22.9	34.3	16.2	24.2
	29	38.0	56.8	26.8	40.1	19.8	29.6	-S-	-S-	21.3	31.9	15.1	22.6
	30	35.5	53.1	25.0	37.5	18.5	27.7	-S-	-S-	19.9	29.8	14.1	21.1
	32	31.2	46.7	22.0	32.9	16.3	24.3	-S-	-S-	17.5	26.2	12.4	18.5
	34	27.6	41.3	19.5	29.2	14.4	21.6	-S-	-S-	15.5	23.2	11.0	16.4
	36	24.7	36.9	17.4	26.0	12.9	19.2	-S-	-S-				
	38	22.1	33.1	15.6	23.3	11.5	17.3	-S-	-S-				
	40	20.0	29.9	14.1	21.1	10.4	15.6	-S-	-S-				
Properties													
A_g, in.^{2}		8.39		5.69		4.14		2.78		6.92		4.71	
I, in.^{4}		53.4		37.5		27.7		18.9		30.0		21.2	
r, in.		2.52		2.57		2.59		2.61		2.08		2.12	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

HSS6.25-HSS5

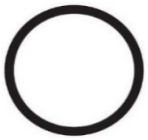
Shape		HSS6.25×				HSS5×							
		0.180		0.120 [c2]		0.250		0.180		0.120		0.109 [c2]	
t_{design}, in.		0.180		0.120		0.250		0.180		0.120		0.109	
lb/ft		11.9		8.01		12.9		9.45		6.38		5.81	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	127	190	-S-	-S-	138	206	101	151	68.0	102	-S-	-S-
	6	106	159	-S-	-S-	104	155	76.0	114	51.7	77.4	-S-	-S-
	7	99.6	149	-S-	-S-	93.4	140	68.7	103	46.9	70.1	-S-	-S-
	8	92.6	138	-S-	-S-	82.9	124	61.0	91.3	41.9	62.6	-S-	-S-
	9	85.2	127	-S-	-S-	72.4	108	53.4	79.9	36.8	55.0	-S-	-S-
	10	77.6	116	-S-	-S-	62.3	93.2	46.0	68.8	31.9	47.7	-S-	-S-
	11	70.0	105	-S-	-S-	52.7	78.9	39.0	58.4	27.2	40.7	-S-	-S-
	12	62.5	93.5	-S-	-S-	44.4	66.4	32.9	49.2	22.9	34.3	-S-	-S-
	13	55.3	82.7	-S-	-S-	37.8	56.6	28.0	41.9	19.5	29.2	-S-	-S-
	14	48.4	72.5	-S-	-S-	32.6	48.8	24.1	36.1	16.8	25.2	-S-	-S-
	15	42.3	63.2	-S-	-S-	28.4	42.5	21.0	31.5	14.7	22.0	-S-	-S-
	16	37.1	55.6	-S-	-S-	25.0	37.3	18.5	27.6	12.9	19.3	-S-	-S-
	17	32.9	49.2	-S-	-S-	22.1	33.1	16.4	24.5	11.4	17.1	-S-	-S-
	18	29.3	43.9	-S-	-S-	19.7	29.5	14.6	21.8	10.2	15.2	-S-	-S-
	19	26.3	39.4	-S-	-S-	17.7	26.5	13.1	19.6	9.15	13.7	-S-	-S-
	20	23.8	35.6	-S-	-S-	16.0	23.9	11.8	17.7	8.26	12.4	-S-	-S-
	21	21.6	32.3	-S-	-S-	14.5	21.7	10.7	16.0	7.49	11.2	-S-	-S-
	22	19.6	29.4	-S-	-S-	13.2	19.7	9.78	14.6	6.82	10.2	-S-	-S-
	23	18.0	26.9	-S-	-S-	12.1	18.1	8.94	13.4	6.24	9.34	-S-	-S-
	24	16.5	24.7	-S-	-S-	11.1	16.6	8.21	12.3	5.73	8.58	-S-	-S-
	25	15.2	22.8	-S-	-S-	10.2	15.3	7.57	11.3	5.28	7.90	-S-	-S-
	26	14.1	21.0	-S-	-S-	9.45	14.1	7.00	10.5	4.89	7.31	-S-	-S-
	27	13.0	19.5	-S-	-S-	8.76	13.1	6.49	9.71	4.53	6.78	-S-	-S-
	28	12.1	18.1	-S-	-S-	8.15	12.2	6.03	9.03	4.21	6.30	-S-	-S-
	29	11.3	16.9	-S-	-S-								
	30	10.6	15.8	-S-	-S-								
	32	9.29	13.9	-S-	-S-								
	34	8.22	12.3	-S-	-S-								
	36			-S-	-S-								
	38												
	40												
Properties													
A_g, in.^{2}		3.43		2.31		3.73		2.73		1.84		1.67	
I, in.^{4}		15.8		10.9		10.6		7.93		5.48		5.01	
r, in.		2.15		2.17		1.69		1.70		1.73		1.73	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS5-HSS4.5

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS5×		HSS4.5×									
		0.083 [c2]		0.250		0.180		0.148		0.120		0.109	
t_{design}, in.		0.083		0.250		0.180		0.148		0.120		0.109	
lb/ft		4.45		11.6		8.47		7.02		5.73		5.21	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	-S-	-S-	123	185	90.1	135	74.6	112	60.9	91.2	55.4	82.9
	6	-S-	-S-	85.8	128.0	63.6	95.1	52.9	79.1	43.4	64.9	39.6	59.3
	7	-S-	-S-	75.3	113.0	56.1	83.9	46.7	69.9	38.4	57.4	35.1	52.5
	8	-S-	-S-	64.7	96.8	48.5	72.5	40.5	60.5	33.3	49.8	30.5	45.7
	9	-S-	-S-	54.5	81.6	41.1	61.5	34.4	51.5	28.4	42.5	26.1	39.0
	10	-S-	-S-	45.1	67.4	34.2	51.2	28.7	42.9	23.7	35.5	21.8	32.7
	11	-S-	-S-	37.2	55.7	28.3	42.3	23.7	35.5	19.6	29.4	18.1	27.1
	12	-S-	-S-	31.3	46.8	23.8	35.6	20.0	29.8	16.5	24.7	15.2	22.7
	13	-S-	-S-	26.7	39.9	20.3	30.3	17.0	25.4	14.1	21.0	13.0	19.4
	14	-S-	-S-	23.0	34.4	17.5	26.1	14.7	21.9	12.1	18.1	11.2	16.7
	15	-S-	-S-	20.0	30.0	15.2	22.8	12.8	19.1	10.6	15.8	9.73	14.6
	16	-S-	-S-	17.6	26.3	13.4	20.0	11.2	16.8	9.29	13.9	8.55	12.8
	17	-S-	-S-	15.6	23.3	11.9	17.7	9.94	14.9	8.23	12.3	7.57	11.3
	18	-S-	-S-	13.9	20.8	10.6	15.8	8.87	13.3	7.34	11.0	6.76	10.1
	19	-S-	-S-	12.5	18.7	9.49	14.2	7.96	11.9	6.59	9.85	6.06	9.07
	20	-S-	-S-	11.3	16.9	8.56	12.8	7.18	10.7	5.94	8.89	5.47	8.19
	21	-S-	-S-	10.2	15.3	7.77	11.6	6.51	9.75	5.39	8.06	4.96	7.43
	22	-S-	-S-	9.31	13.9	7.08	10.6	5.94	8.88	4.91	7.35	4.52	6.77
	23	-S-	-S-	8.52	12.7	6.47	9.69	5.43	8.12	4.49	6.72	4.14	6.19
	24	-S-	-S-	7.82	11.7	5.95	8.90	4.99	7.46	4.13	6.17	3.80	5.69
	25	-S-	-S-	7.21	10.8	5.48	8.20	4.60	6.88	3.80	5.69	3.50	5.24
	26	-S-	-S-									3.24	4.84
	27	-S-	-S-										
	28	-S-	-S-										
	29	-S-	-S-										
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.28		3.34		2.44		2.02		1.65		1.50	
I, in.^{4}		3.88		7.56		5.71		4.80		3.96		3.63	
r, in.		1.74		1.50		1.53		1.54		1.55		1.56	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

HSS4.5-HSS3.75

Shape		HSS4.5×		HSS4×						HSS3.75×			
		0.083 [c2]		0.120		0.109		0.083 [c2]		0.250		0.180	
t_{design}, in.		0.083		0.120		0.109		0.083		0.250		0.180	
lb/ft		3.99		5.07		4.62		3.54		9.53		7.00	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	-S-	-S-	53.9	80.7	49.1	73.5	-S-	-S-	102	152	74.6	112
	6	-S-	-S-	34.9	52.2	32.0	47.9	-S-	-S-	59.7	89.4	44.6	66.8
	7	-S-	-S-	29.8	44.6	27.4	41.0	-S-	-S-	49.3	73.8	37.1	55.4
	8	-S-	-S-	24.9	37.2	22.9	34.3	-S-	-S-	39.5	59.1	29.9	44.8
	9	-S-	-S-	20.3	30.3	18.7	28.0	-S-	-S-	31.3	46.8	23.7	35.5
	10	-S-	-S-	16.4	24.6	15.2	22.7	-S-	-S-	25.4	37.9	19.2	28.8
	11	-S-	-S-	13.6	20.3	12.6	18.8	-S-	-S-	21.0	31.4	15.9	23.8
	12	-S-	-S-	11.4	17.1	10.5	15.8	-S-	-S-	17.6	26.3	13.4	20.0
	13	-S-	-S-	9.72	14.5	8.99	13.4	-S-	-S-	15.0	22.4	11.4	17.0
	14	-S-	-S-	8.38	12.5	7.75	11.6	-S-	-S-	12.9	19.4	9.81	14.7
	15	-S-	-S-	7.30	10.9	6.75	10.1	-S-	-S-	11.3	16.9	8.55	12.8
	16	-S-	-S-	6.42	9.60	5.93	8.88	-S-	-S-	9.90	14.8	7.51	11.2
	17	-S-	-S-	5.69	8.51	5.26	7.86	-S-	-S-	8.77	13.1	6.65	10.0
	18	-S-	-S-	5.07	7.59	4.69	7.01	-S-	-S-	7.83	11.7	5.94	8.88
	19	-S-	-S-	4.55	6.81	4.21	6.29	-S-	-S-	7.02	10.5	5.33	7.97
	20	-S-	-S-	4.11	6.15	3.80	5.68	-S-	-S-	6.34	9.48	4.81	7.19
	21	-S-	-S-	3.73	5.57	3.44	5.15	-S-	-S-			4.36	6.52
	22	-S-	-S-	3.40	5.08	3.14	4.69	-S-	-S-				
	23	-S-	-S-			2.87	4.30	-S-	-S-				
	24	-S-	-S-										
	25	-S-	-S-										
	26	-S-	-S-										
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

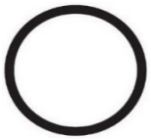
Properties						
A_g, in.^{2}	1.15	1.46	1.33	1.02	2.75	2.02
I, in.^{4}	2.81	2.76	2.52	1.96	4.23	3.22
r, in.	1.56	1.37	1.38	1.39	1.24	1.26

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS3.75-HSS3.5

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS3.75×								HSS3.5×			
		0.148		0.120		0.109		0.083 [c2]		0.180		0.148	
t_{design}, in.		0.148		0.120		0.109		0.083		0.180		0.148	
lb/ft		5.81		4.75		4.32		3.32		6.51		5.40	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	61.7	92.3	50.6	75.7	46.2	69.1	-S-	-S-	69.4	104	57.6	86.2
	6	37.5	56.1	30.7	46.0	28.3	42.3	-S-	-S-	38.3	57.2	32.1	48.0
	7	31.3	46.8	25.7	38.4	23.7	35.4	-S-	-S-	30.8	46.1	25.9	38.8
	8	25.4	38.1	20.9	31.2	19.3	28.9	-S-	-S-	24.1	36.1	20.4	30.4
	9	20.3	30.3	16.6	24.9	15.4	23.0	-S-	-S-	19.1	28.5	16.1	24.1
	10	16.4	24.5	13.5	20.1	12.5	18.7	-S-	-S-	15.4	23.1	13.0	19.5
	11	13.6	20.3	11.1	16.6	10.3	15.4	-S-	-S-	12.8	19.1	10.8	16.1
	12	11.4	17.0	9.35	14.0	8.66	13.0	-S-	-S-	10.7	16.0	9.05	13.5
	13	9.71	14.5	7.96	11.9	7.38	11.0	-S-	-S-	9.13	13.7	7.71	11.5
	14	8.37	12.5	6.87	10.3	6.36	9.52	-S-	-S-	7.87	11.8	6.65	9.94
	15	7.29	10.9	5.98	8.95	5.54	8.29	-S-	-S-	6.86	10.3	5.79	8.66
	16	6.41	9.59	5.26	7.87	4.87	7.29	-S-	-S-	6.03	9.02	5.09	7.61
	17	5.68	8.49	4.66	6.97	4.32	6.46	-S-	-S-	5.34	7.99	4.51	6.74
	18	5.06	7.58	4.15	6.22	3.85	5.76	-S-	-S-	4.76	7.13	4.02	6.01
	19	4.55	6.80	3.73	5.58	3.46	5.17	-S-	-S-	4.28	6.40	3.61	5.40
	20	4.10	6.14	3.37	5.03	3.12	4.67	-S-	-S-				
	21	3.72	5.57	3.05	4.57	2.83	4.23	-S-	-S-				
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.67		1.37		1.25		0.956		1.88		1.56	
I, in.^{4}		2.72		2.26		2.07		1.61		2.59		2.19	
r, in.		1.28		1.28		1.29		1.30		1.17		1.18	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

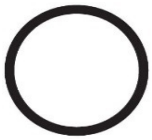
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS3.5-HSS3.125

Shape		HSS3.5×										HSS3.125×	
		0.120		0.109		0.083		0.063 [c2]		0.049 [c2]		0.250	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.250	
lb/ft		4.42		4.03		3.09		2.34		1.84		7.83	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	46.9	70.2	42.8	64.1	32.9	49.2	-S-	-S-	-S-	-S-	83.5	125
	6	26.6	39.8	24.3	36.4	18.8	28.2	-S-	-S-	-S-	-S-	38.1	57.0
	7	21.7	32.4	19.8	29.6	15.4	23.1	-S-	-S-	-S-	-S-	28.8	43.0
	8	17.1	25.6	15.7	23.4	12.2	18.3	-S-	-S-	-S-	-S-	22.0	33.0
	9	13.5	20.3	12.4	18.5	9.66	14.4	-S-	-S-	-S-	-S-	17.4	26.0
	10	11.0	16.4	10.0	15.0	7.82	11.7	-S-	-S-	-S-	-S-	14.1	21.1
	11	9.06	13.6	8.28	12.4	6.47	9.67	-S-	-S-	-S-	-S-	11.7	17.4
	12	7.62	11.4	6.96	10.4	5.43	8.13	-S-	-S-	-S-	-S-	9.79	14.6
	13	6.49	9.71	5.93	8.87	4.63	6.92	-S-	-S-	-S-	-S-	8.34	12.5
	14	5.60	8.37	5.11	7.65	3.99	5.97	-S-	-S-	-S-	-S-	7.19	10.8
	15	4.87	7.29	4.45	6.66	3.48	5.20	-S-	-S-	-S-	-S-	6.27	9.38
	16	4.28	6.41	3.91	5.85	3.06	4.57	-S-	-S-	-S-	-S-	5.51	8.24
	17	3.79	5.68	3.47	5.19	2.71	4.05	-S-	-S-	-S-	-S-	4.88	7.30
	18	3.38	5.06	3.09	4.63	2.41	3.61	-S-	-S-	-S-	-S-		
	19	3.04	4.54	2.77	4.15	2.17	3.24	-S-	-S-	-S-	-S-		
	20	2.74	4.10	2.50	3.75	1.96	2.93	-S-	-S-	-S-	-S-		
	21												
	22												
	23												
	24												
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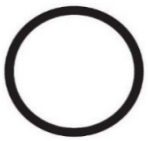
	38												
	40												
Properties													
A_g, in.^{2}		1.27		1.16		0.891		0.675		0.531		2.26	
I, in.^{4}		1.82		1.67		1.30		0.997		0.791		2.35	
r, in.		1.20		1.20		1.21		1.22		1.22		1.02	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HS3.125-HSS3

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS3.125×										HSS3×	
		0.180		0.120		0.109		0.083		0.063 [c2]		0.250	
t_{design}, in.		0.180		0.120		0.109		0.083		0.063		0.250	
lb/ft		5.78		3.93		3.58		2.75		2.09		7.49	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	61.7	92.3	41.7	62.4	38.0	56.9	29.3	43.8	-S-	-S-	79.8	119
	6	29.0	43.4	20.2	30.2	18.7	27.9	14.5	21.8	-S-	-S-	33.9	50.8
	7	22.1	33.1	15.5	23.2	14.4	21.6	11.3	16.9	-S-	-S-	25.2	37.7
	8	16.9	25.3	11.9	17.8	11.0	16.5	8.67	13.0	-S-	-S-	19.3	28.9
	9	13.4	20.0	9.40	14.1	8.73	13.1	6.85	10.2	-S-	-S-	15.3	22.8
	10	10.8	16.2	7.61	11.4	7.07	10.6	5.55	8.30	-S-	-S-	12.4	18.5
	11	8.95	13.4	6.29	9.41	5.84	8.74	4.58	6.86	-S-	-S-	10.2	15.3
	12	7.52	11.3	5.29	7.91	4.91	7.35	3.85	5.76	-S-	-S-	8.59	12.8
	13	6.41	9.59	4.51	6.74	4.18	6.26	3.28	4.91	-S-	-S-	7.32	10.9
	14	5.53	8.27	3.88	5.81	3.61	5.40	2.83	4.23	-S-	-S-	6.31	9.44
	15	4.81	7.20	3.38	5.06	3.14	4.70	2.47	3.69	-S-	-S-	5.50	8.22
	16	4.23	6.33	2.97	4.45	2.76	4.13	2.17	3.24	-S-	-S-	4.83	7.23
	17	3.75	5.61	2.63	3.94	2.45	3.66	1.92	2.87	-S-	-S-		
	18							1.71	2.56	-S-	-S-		
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.67		1.13		1.03		0.793		0.601		2.16	
I, in.^{4}		1.81		1.28		1.18		0.918		0.705		2.06	
r, in.		1.04		1.06		1.07		1.08		1.08		0.98	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

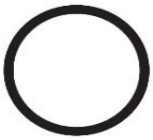
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS3

Shape		HSS3×											
		0.180		0.148		0.120		0.109		0.083		0.063 [c2]	
t_{design}, in.		0.180		0.148		0.120		0.109		0.083		0.063	
lb/ft		5.53		4.60		3.77		3.43		2.64		2.00	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	58.7	87.8	49.1	73.5	40.3	60.2	36.6	54.7	28.1	42.0	-S-	-S-
	1	57.4	85.9	48.0	71.9	39.4	58.9	35.8	53.5	27.5	41.2	-S-	-S-
	2	53.6	80.2	44.9	67.2	36.9	55.2	33.5	50.1	25.8	38.6	-S-	-S-
	3	47.9	71.6	40.2	60.2	33.1	49.5	30.1	45.0	23.2	34.7	-S-	-S-
	4	40.9	61.1	34.4	51.5	28.4	42.5	25.8	38.6	20.0	29.9	-S-	-S-
	5	33.3	49.8	28.2	42.2	23.3	34.9	21.2	31.7	16.5	24.6	-S-	-S-
	6	26.0	38.8	22.1	33.0	18.4	27.5	16.7	25.0	13.0	19.5	-S-	-S-
	7	19.5	29.1	16.6	24.8	13.9	20.8	12.6	18.9	9.88	14.8	-S-	-S-
	8	14.9	22.3	12.7	19.0	10.6	15.9	9.65	14.4	7.56	11.3	-S-	-S-
	9	11.8	17.6	10.0	15.0	8.40	12.6	7.63	11.4	5.98	8.94	-S-	-S-
	10	9.53	14.3	8.14	12.2	6.80	10.2	6.18	9.24	4.84	7.24	-S-	-S-
	11	7.88	11.8	6.72	10.1	5.62	8.41	5.10	7.64	4.00	5.99	-S-	-S-
	12	6.62	9.91	5.65	8.45	4.72	7.07	4.29	6.42	3.36	5.03	-S-	-S-
	13	5.64	8.44	4.81	7.20	4.02	6.02	3.65	5.47	2.86	4.29	-S-	-S-
	14	4.86	7.28	4.15	6.21	3.47	5.19	3.15	4.71	2.47	3.70	-S-	-S-
	15	4.24	6.34	3.62	5.41	3.02	4.52	2.75	4.11	2.15	3.22	-S-	-S-
	16	3.72	5.57	3.18	4.75	2.66	3.97	2.41	3.61	1.89	2.83	-S-	-S-
	17							2.14	3.20	1.68	2.51	-S-	-S-
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

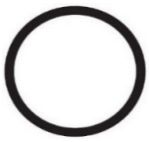
Properties						
A_g, in.^{2}	1.59	1.33	1.09	0.990	0.761	0.577
I, in.^{4}	1.59	1.35	1.13	1.04	0.810	0.622
r, in.	1.00	1.01	1.02	1.02	1.03	1.04

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS3-HSS2.75

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS3×		HSS2.875×								HSS2.75×	
		0.049 [c2]		0.180		0.120		0.109		0.083		0.250	
t_{design}, in.		0.049		0.180		0.120		0.109		0.083		0.250	
lb/ft		1.58		5.29		3.60		3.28		2.52		6.81	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	-S-	-S-	56.1	84.0	38.4	57.5	35.0	52.3	26.9	40.2	72.4	108
	1	-S-	-S-	54.8	81.9	37.5	56.1	34.2	51.1	26.3	39.3	70.3	105
	2	-S-	-S-	50.8	76.0	34.9	52.2	31.8	47.6	24.5	36.7	64.5	96.6
	3	-S-	-S-	44.9	67.2	31.0	46.3	28.3	42.3	21.8	32.6	55.9	83.7
	4	-S-	-S-	37.7	56.5	26.2	39.2	24.0	35.8	18.5	27.7	45.7	68.4
	5	-S-	-S-	30.2	45.2	21.1	31.6	19.4	29.0	15.0	22.5	35.3	52.9
	6	-S-	-S-	23.0	34.4	16.3	24.3	14.9	22.3	11.7	17.4	25.8	38.6
	7	-S-	-S-	17.0	25.4	12.1	18.1	11.1	16.6	8.70	13.0	19.0	28.4
	8	-S-	-S-	13.0	19.5	9.24	13.8	8.50	12.7	6.66	9.96	14.5	21.7
	9	-S-	-S-	10.3	15.4	7.30	10.9	6.72	10.1	5.26	7.87	11.5	17.2
	10	-S-	-S-	8.33	12.5	5.92	8.85	5.44	8.14	4.26	6.38	9.29	13.9
	11	-S-	-S-	6.88	10.3	4.89	7.32	4.50	6.73	3.52	5.27	7.68	11.5
	12	-S-	-S-	5.79	8.65	4.11	6.15	3.78	5.65	2.96	4.43	6.45	9.65
	13	-S-	-S-	4.93	7.37	3.50	5.24	3.22	4.82	2.52	3.77	5.50	8.22
	14	-S-	-S-	4.25	6.36	3.02	4.52	2.78	4.15	2.17	3.25	4.74	7.09
	15	-S-	-S-	3.70	5.54	2.63	3.93	2.42	3.62	1.89	2.83		
	16	-S-	-S-			2.31	3.46	2.13	3.18	1.66	2.49		
	17	-S-	-S-										
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.454		1.52		1.04		0.947		0.728		1.96	
I, in.^{4}		0.495		1.39		0.987		0.907		0.710		1.55	
r, in.		1.04		0.956		0.974		0.979		0.988		0.889	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

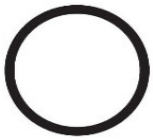
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS2.75

Shape		HSS2.75×											
		0.180		0.148		0.120		0.109		0.083		0.065	
t_{design}, in.		0.180		0.148		0.120		0.109		0.083		0.065	
lb/ft		5.04		4.20		3.44		3.14		2.41		1.90	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	53.6	80.1	44.7	66.9	36.6	54.8	33.4	49.9	25.7	38.4	20.2	30.3
	1	52.1	78.0	43.5	65.1	35.7	53.3	32.5	48.7	25.0	37.4	19.7	29.5
	2	48.0	71.9	40.2	60.1	33.0	49.3	30.1	45.0	23.2	34.7	18.3	27.4
	3	41.9	62.8	35.2	52.6	28.9	43.3	26.4	39.6	20.4	30.5	16.1	24.1
	4	34.7	51.9	29.2	43.7	24.1	36.0	22.0	33.0	17.1	25.6	13.5	20.2
	5	27.2	40.7	23.0	34.4	19.0	28.5	17.5	26.1	13.6	20.3	10.8	16.1
	6	20.2	30.2	17.1	25.7	14.3	21.4	13.1	19.6	10.3	15.4	8.18	12.2
	7	14.8	22.2	12.6	18.9	10.5	15.7	9.67	14.5	7.58	11.3	6.04	9.04
	8	11.4	17.0	9.66	14.4	8.05	12.0	7.41	11.1	5.80	8.68	4.62	6.92
	9	8.97	13.4	7.63	11.4	6.36	9.51	5.85	8.75	4.59	6.86	3.65	5.47
	10	7.26	10.9	6.18	9.25	5.15	7.71	4.74	7.09	3.71	5.56	2.96	4.43
	11	6.00	8.98	5.11	7.64	4.26	6.37	3.92	5.86	3.07	4.59	2.45	3.66
	12	5.04	7.55	4.29	6.42	3.58	5.35	3.29	4.92	2.58	3.86	2.06	3.07
	13	4.30	6.43	3.66	5.47	3.05	4.56	2.80	4.20	2.20	3.29	1.75	2.62
	14	3.71	5.54	3.15	4.72	2.63	3.93	2.42	3.62	1.89	2.83	1.51	2.26
	15	3.23	4.83	2.75	4.11	2.29	3.42	2.11	3.15	1.65	2.47	1.32	1.97
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
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	27												
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	30												

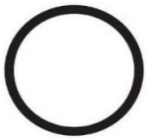
Properties						
A_g, in.^{2}	1.45	1.21	0.991	0.904	0.695	0.548
I, in.^{4}	1.21	1.03	0.859	0.790	0.619	0.494
r, in.	0.914	0.923	0.931	0.935	0.944	0.949

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS2.5

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS2.5×											
		0.250		0.180		0.148		0.120		0.109		0.083	
t_{design}, in.		0.250		0.180		0.148		0.120		0.109		0.083	
lb/ft		6.13		4.55		3.79		3.11		2.84		2.19	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	65.4	97.8	48.4	72.4	40.3	60.2	33.1	49.6	30.2	45.2	23.3	34.8
	1	63.1	94.4	46.8	70.0	39.0	58.3	32.1	48.0	29.3	43.8	22.6	33.7
	2	56.7	84.8	42.3	63.3	35.3	52.9	29.2	43.6	26.6	39.9	20.6	30.7
	3	47.5	71.0	35.8	53.6	30.0	44.9	24.9	37.2	22.7	34.0	17.6	26.3
	4	37.0	55.4	28.3	42.4	23.9	35.8	19.9	29.7	18.2	27.3	14.2	21.2
	5	26.9	40.3	21.0	31.4	17.8	26.7	14.9	22.3	13.7	20.5	10.7	16.0
	6	18.8	28.2	14.8	22.1	12.6	18.9	10.6	15.9	9.76	14.6	7.67	11.5
	7	13.8	20.7	10.9	16.2	9.28	13.9	7.80	11.7	7.17	10.7	5.64	8.43
	8	10.6	15.8	8.31	12.4	7.10	10.6	5.97	8.94	5.49	8.22	4.32	6.46
	9	8.37	12.5	6.57	9.83	5.61	8.40	4.72	7.06	4.34	6.49	3.41	5.10
	10	6.78	10.1	5.32	7.96	4.55	6.80	3.82	5.72	3.52	5.26	2.76	4.13
	11	5.60	8.38	4.40	6.58	3.76	5.62	3.16	4.73	2.91	4.35	2.28	3.41
	12	4.71	7.04	3.70	5.53	3.16	4.72	2.65	3.97	2.44	3.65	1.92	2.87
	13	4.01	6.00	3.15	4.71	2.69	4.02	2.26	3.38	2.08	3.11	1.63	2.44
	14							1.95	2.92	1.79	2.68	1.41	2.11
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties						
A_g, in.^{2}	1.77	1.31	1.09	0.897	0.819	0.630
I, in.^{4}	1.13	0.888	0.759	0.637	0.586	0.461
r, in.	0.799	0.823	0.834	0.843	0.846	0.855

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

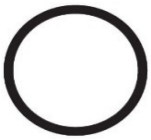
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS2.5-HSS2.375

Shape		HSS2.5×				HSS2.375×							
		0.063		0.049 [c2]		0.180		0.148		0.120		0.109	
t_{design}, in.		0.063		0.049		0.180		0.148		0.120		0.109	
lb/ft		1.66		1.31		4.30		3.59		2.95		2.69	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	17.7	26.5	-S-	-S-	45.8	68.5	38.4	57.5	31.4	47.0	28.7	42.9
	1	17.2	25.7	-S-	-S-	44.1	66.0	37.0	55.4	30.3	45.3	27.7	41.4
	2	15.7	23.4	-S-	-S-	39.4	59.0	33.2	49.7	27.2	40.7	24.9	37.2
	3	13.4	20.1	-S-	-S-	32.7	49.0	27.7	41.4	22.8	34.1	20.9	31.2
	4	10.9	16.2	-S-	-S-	25.2	37.7	21.4	32.0	17.8	26.6	16.3	24.4
	5	8.25	12.3	-S-	-S-	18.0	26.9	15.4	23.1	12.9	19.3	11.9	17.8
	6	5.93	8.9	-S-	-S-	12.5	18.8	10.8	16.1	9.04	13.5	8.31	12.4
	7	4.36	6.52	-S-	-S-	9.21	13.8	7.90	11.8	6.64	9.93	6.11	9.14
	8	3.33	4.99	-S-	-S-	7.05	10.5	6.05	9.05	5.08	7.61	4.68	7.00
	9	2.64	3.94	-S-	-S-	5.57	8.33	4.78	7.15	4.02	6.01	3.70	5.53
	10	2.13	3.19	-S-	-S-	4.51	6.75	3.87	5.79	3.25	4.87	2.99	4.48
	11	1.76	2.64	-S-	-S-	3.73	5.58	3.20	4.79	2.69	4.02	2.47	3.70
	12	1.48	2.22	-S-	-S-	3.13	4.69	2.69	4.02	2.26	3.38	2.08	3.11
	13	1.26	1.89	-S-	-S-			2.29	3.43	1.93	2.88	1.77	2.65
	14	1.09	1.63	-S-	-S-								
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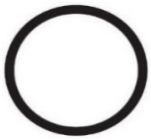
Properties													
A_g, in.^{2}		0.479		0.377		1.24		1.04		0.850		0.776	
I, in.^{4}		0.356		0.283		0.753		0.645		0.542		0.499	
r, in.		0.862		0.867		0.779		0.788		0.799		0.802	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS2.375-HSS2.25

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS2.375×						HSS2.25×					
		0.083		0.063		0.049 [c2]		0.180		0.148		0.120	
t_{design}, in.		0.083		0.063		0.049		0.180		0.148		0.120	
lb/ft		2.07		1.57		1.24		4.06		3.39		2.78	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	22.1	33.0	16.8	25.1	-S-	-S-	43.2	64.6	36.1	54.0	29.7	44.4
	1	21.3	31.9	16.2	24.2	-S-	-S-	41.4	62.0	34.6	51.8	28.5	42.6
	2	19.2	28.8	14.6	21.9	-S-	-S-	36.5	54.7	30.6	45.8	25.3	37.8
	3	16.2	24.2	12.4	18.5	-S-	-S-	29.6	44.3	25.0	37.4	20.7	31.0
	4	12.7	19.0	9.8	14.6	-S-	-S-	22.1	33.0	18.8	28.1	15.7	23.4
	5	9.33	14.0	7.19	10.8	-S-	-S-	15.2	22.7	13.0	19.5	10.9	16.4
	6	6.55	9.8	5.06	7.6	-S-	-S-	10.5	15.8	9.03	13.5	7.60	11.4
	7	4.81	7.20	3.72	5.56	-S-	-S-	7.74	11.6	6.64	9.93	5.59	8.36
	8	3.69	5.51	2.85	4.26	-S-	-S-	5.92	8.86	5.08	7.60	4.28	6.40
	9	2.91	4.36	2.25	3.36	-S-	-S-	4.68	7.00	4.01	6.01	3.38	5.06
	10	2.36	3.53	1.82	2.73	-S-	-S-	3.79	5.67	3.25	4.86	2.74	4.10
	11	1.95	2.92	1.51	2.25	-S-	-S-	3.13	4.69	2.69	4.02	2.26	3.38
	12	1.64	2.45	1.27	1.89	-S-	-S-	2.63	3.94	2.26	3.38	1.90	2.84
	13	1.40	2.09	1.08	1.61	-S-	-S-						
	14												
	15												
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Properties													
A_g, in.^{2}		0.598		0.454		0.358		1.17		0.977		0.803	
I, in.^{4}		0.393		0.304		0.242		0.632		0.542		0.457	
r, in.		0.811		0.818		0.822		0.735		0.745		0.754	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

HSS2.25-HSS2

Shape		HSS2.25×						HSS2×					
		0.109		0.083		0.063		0.180		0.148		0.120	
t_{design}, in.		0.109		0.083		0.063		0.180		0.148		0.120	
lb/ft		2.54		1.96		1.49		3.57		2.99		2.46	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	27.1	40.5	20.9	31.2	15.9	23.8	38.0	56.9	31.8	47.6	26.2	39.2
	1	26.0	38.9	20.1	30.0	15.3	22.9	36.0	53.9	30.2	45.1	24.9	37.2
	2	23.1	34.6	17.9	26.8	13.6	20.4	30.6	45.8	25.8	38.6	21.3	31.9
	3	19.0	28.4	14.8	22.1	11.3	16.9	23.3	34.9	19.8	29.7	16.5	24.7
	4	14.4	21.5	11.3	16.9	8.65	12.9	16.0	23.9	13.7	20.5	11.5	17.3
	5	10.1	15.1	7.96	11.9	6.15	9.20	10.3	15.4	8.91	13.3	7.52	11.3
	6	7.02	10.5	5.54	8.28	4.28	6.40	7.16	10.7	6.19	9.26	5.22	7.81
	7	5.15	7.71	4.07	6.09	3.14	4.70	5.26	7.87	4.55	6.80	3.84	5.74
	8	3.95	5.90	3.11	4.66	2.41	3.60	4.03	6.03	3.48	5.21	2.94	4.39
	9	3.12	4.66	2.46	3.68	1.90	2.85	3.18	4.76	2.75	4.12	2.32	3.47
	10	2.53	3.78	1.99	2.98	1.54	2.31	2.58	3.86	2.23	3.33	1.88	2.81
	11	2.09	3.12	1.65	2.46	1.27	1.90					1.55	2.32
	12	1.75	2.62	1.38	2.07	1.07	1.60						
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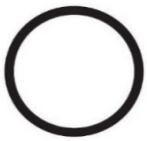
Properties						
A_g, in.^{2}	0.733	0.565	0.430	1.03	0.861	0.709
I, in.^{4}	0.421	0.332	0.257	0.430	0.372	0.314
r, in.	0.758	0.767	0.773	0.646	0.657	0.665

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS2-HSS1.9

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS2×										HSS1.9×	
		0.109		0.083		0.063		0.049		0.035 [c2]		0.148	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.148	
lb/ft		2.25		1.73		1.32		1.04		0.749		2.83	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	23.9	35.8	18.5	27.6	14.0	21.0	11.1	16.6	-S-	-S-	30.1	45.0
	1	22.7	34.0	17.6	26.3	13.4	20.0	10.6	15.8	-S-	-S-	28.4	42.5
	2	19.5	29.2	15.2	22.7	11.6	17.3	9.16	13.7	-S-	-S-	23.8	35.6
	3	15.2	22.7	11.8	17.7	9.10	13.6	7.22	10.8	-S-	-S-	17.8	26.6
	4	10.6	15.9	8.39	12.6	6.49	9.71	5.17	7.74	-S-	-S-	11.8	17.6
	5	6.96	10.4	5.51	8.25	4.29	6.42	3.43	5.13	-S-	-S-	7.56	11.3
	6	4.83	7.2	3.83	5.73	2.98	4.46	2.38	3.56	-S-	-S-	5.25	7.9
	7	3.55	5.31	2.81	4.21	2.19	3.27	1.75	2.62	-S-	-S-	3.86	5.77
	8	2.72	4.07	2.15	3.22	1.68	2.51	1.34	2.00	-S-	-S-	2.95	4.42
	9	2.15	3.21	1.70	2.55	1.32	1.98	1.06	1.58	-S-	-S-	2.33	3.49
	10	1.74	2.60	1.38	2.06	1.07	1.60	0.857	1.28	-S-	-S-	1.89	2.83
	11	1.44	2.15	1.14	1.70	0.886	1.33	0.708	1.06	-S-	-S-		
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Properties						
A_g, in.^{2}	0.648	0.500	0.380	0.300	0.216	0.815
I, in.^{4}	0.290	0.230	0.179	0.143	0.104	0.315
r, in.	0.669	0.678	0.686	0.690	0.694	0.622

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

HSS1.9

Shape		HSS1.9×											
		0.120		0.109		0.083		0.063		0.049		0.035 [c2]	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.035	
lb/ft		2.33		2.13		1.64		1.25		0.988		0.711	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	24.8	37.1	22.6	33.9	17.5	26.2	13.3	19.9	10.5	15.7	-S-	-S-
	1	23.4	35.0	21.4	32.0	16.6	24.8	12.6	18.9	10.0	14.9	-S-	-S-
	2	19.7	29.5	18.1	27.0	14.1	21.0	10.8	16.1	8.51	12.7	-S-	-S-
	3	14.8	22.2	13.7	20.4	10.7	16.0	8.21	12.3	6.53	9.77	-S-	-S-
	4	10.0	14.9	9.2	13.8	7.28	10.9	5.64	8.43	4.51	6.74	-S-	-S-
	5	6.41	9.59	5.93	8.87	4.70	7.03	3.65	5.46	2.92	4.37	-S-	-S-
	6	4.45	6.66	4.12	6.16	3.26	4.88	2.53	3.79	2.03	3.04	-S-	-S-
	7	3.27	4.89	3.03	4.53	2.40	3.59	1.86	2.78	1.49	2.23	-S-	-S-
	8	2.50	3.74	2.32	3.46	1.84	2.75	1.42	2.13	1.14	1.71	-S-	-S-
	9	1.98	2.96	1.83	2.74	1.45	2.17	1.13	1.68	0.902	1.35	-S-	-S-
	10	1.60	2.40	1.48	2.22	1.18	1.76	0.912	1.36	0.731	1.09	-S-	-S-
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	12												
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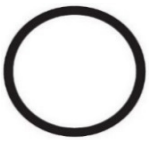
Properties						
A_g, in.^{2}	0.671	0.613	0.474	0.361	0.285	0.205
I, in.^{4}	0.267	0.247	0.196	0.152	0.122	0.089
r, in.	0.631	0.635	0.643	0.649	0.654	0.660

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS1.75

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS1.75×											
		0.120		0.109		0.083		0.063		0.049		0.035 [c2]	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.035	
lb/ft		2.13		1.95		1.51		1.15		0.908		0.654	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	22.7	33.9	20.8	31.1	16.1	24.0	12.2	18.3	9.68	14.5	-S-	-S-
	1	21.2	31.7	19.4	29.0	15.0	22.5	11.5	17.2	9.09	13.6	-S-	-S-
	2	17.3	25.9	15.9	23.7	12.4	18.5	9.48	14.2	7.53	11.3	-S-	-S-
	3	12.3	18.4	11.3	17.0	8.92	13.3	6.90	10.3	5.51	8.24	-S-	-S-
	4	7.69	11.5	7.1	10.6	5.66	8.46	4.42	6.61	3.56	5.32	-S-	-S-
	5	4.92	7.36	4.55	6.81	3.62	5.42	2.83	4.23	2.28	3.41	-S-	-S-
	6	3.42	5.11	3.16	4.73	2.51	3.76	1.97	2.94	1.58	2.37	-S-	-S-
	7	2.51	3.76	2.32	3.47	1.85	2.76	1.44	2.16	1.16	1.74	-S-	-S-
	8	1.92	2.88	1.78	2.66	1.41	2.12	1.11	1.65	0.890	1.33	-S-	-S-
	9	1.52	2.27	1.40	2.10	1.12	1.67	0.873	1.31	0.703	1.05	-S-	-S-
	10									0.569	0.852	-S-	-S-
	11												
	12												
	13												
	14												
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	27												
	28												
	29												
	30												

Properties						
A_g, in.^{2}	0.614	0.562	0.435	0.331	0.262	0.189
I, in.^{4}	0.205	0.190	0.151	0.118	0.095	0.069
r, in.	0.578	0.581	0.589	0.597	0.602	0.606

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

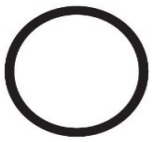
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS1.66-HSS1.5

Shape		HSS1.66×										HSS1.5×	
		0.148		0.120		0.109		0.083		0.063		0.120	
t_{design}, in.		0.148		0.120		0.109		0.083		0.063		0.120	
lb/ft		2.44		2.01		1.84		1.43		1.09		1.80	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	26.0	38.8	21.5	32.1	19.6	29.3	15.2	22.7	11.6	17.3	19.2	28.7
	1	24.0	35.9	19.9	29.7	18.2	27.2	14.1	21.1	10.8	16.2	17.5	26.1
	2	19.0	28.4	15.8	23.7	14.5	21.7	11.3	17.0	8.72	13.0	13.2	19.7
	3	12.8	19.1	10.8	16.2	10.0	14.9	7.88	11.8	6.11	9.14	8.21	12.3
	4	7.60	11.4	6.49	9.71	6.00	8.97	4.80	7.18	3.74	5.60	4.68	7.00
	5	4.86	7.27	4.15	6.22	3.84	5.74	3.07	4.59	2.40	3.58	2.99	4.48
	6	3.38	5.05	2.89	4.32	2.67	3.99	2.13	3.19	1.66	2.49	2.08	3.11
	7	2.48	3.71	2.12	3.17	1.96	2.93	1.57	2.34	1.22	1.83	1.53	2.29
	8	1.90	2.84	1.62	2.43	1.50	2.24	1.20	1.79	0.936	1.40	1.17	1.75
	9			1.28	1.92	1.18	1.77	0.947	1.42	0.739	1.11		
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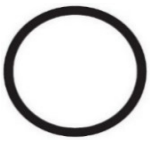
Properties													
A_g, in.^{2}		0.703		0.581		0.531		0.411		0.314		0.520	
I, in.^{4}		0.203		0.173		0.160		0.128		0.100		0.125	
r, in.		0.537		0.546		0.549		0.558		0.564		0.490	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS1.5-HSS1.25

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS1.5×										HSS1.25×	
		0.109		0.083		0.063		0.049		0.035		0.120	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.120	
lb/ft		1.65		1.28		0.979		0.775		0.559		1.48	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	17.6	26.3	13.6	20.4	10.4	15.6	8.24	12.3	5.95	8.90	15.7	23.5
	1	16.0	24.0	12.5	18.6	9.54	14.3	7.56	11.3	5.46	8.17	13.7	20.5
	2	12.1	18.1	9.51	14.2	7.34	11.0	5.84	8.74	4.24	6.34	8.98	13.4
	3	7.62	11.4	6.07	9.07	4.74	7.09	3.80	5.69	2.78	4.16	4.59	6.86
	4	4.35	6.51	3.49	5.21	2.74	4.10	2.21	3.30	1.62	2.42	2.58	3.86
	5	2.79	4.17	2.23	3.34	1.75	2.62	1.41	2.11	1.04	1.55	1.65	2.47
	6	1.93	2.89	1.55	2.32	1.22	1.82	0.981	1.47	0.720	1.08	1.15	1.72
	7	1.42	2.13	1.14	1.70	0.894	1.34	0.721	1.08	0.529	0.791		
	8	1.09	1.63	0.871	1.30	0.685	1.02	0.552	0.826	0.405	0.606		
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Properties						
A_g, in.^{2}	0.476	0.369	0.282	0.223	0.161	0.426
I, in.^{4}	0.116	0.093	0.073	0.059	0.043	0.069
r, in.	0.494	0.502	0.509	0.514	0.518	0.402

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

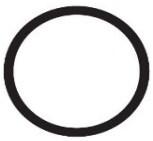
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS1.25-HSS1

Shape		HSS1.25×										HSS1×	
		0.109		0.083		0.063		0.049		0.035		0.120	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.120	
lb/ft		1.36		1.06		0.809		0.641		0.463		1.15	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	14.4	21.6	11.2	16.8	8.61	12.9	6.83	10.2	4.95	7.40	12.3	18.3
	1	12.6	18.8	9.84	14.7	7.57	11.3	6.03	9.02	4.38	6.55	9.74	14.6
	2	8.31	12.4	6.61	9.90	5.16	7.72	4.14	6.19	3.02	4.52	4.89	7.31
	3	4.27	6.39	3.47	5.19	2.75	4.12	2.23	3.33	1.64	2.46	2.18	3.26
	4	2.40	3.60	1.95	2.92	1.55	2.32	1.25	1.87	0.924	1.38	1.23	1.84
	5	1.54	2.30	1.25	1.87	0.991	1.48	0.802	1.20	0.592	0.885	0.785	1.17
	6	1.07	1.60	0.868	1.30	0.688	1.03	0.557	0.833	0.411	0.615		
	7					0.505	0.756	0.409	0.612	0.302	0.452		
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Properties						
A_g, in.^{2}	0.391	0.304	0.233	0.185	0.134	0.332
I, in.^{4}	0.064	0.052	0.041	0.033	0.025	0.033
r, in.	0.405	0.414	0.421	0.425	0.429	0.314

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

HSS1

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS1×											
		0.109		0.083		0.065		0.063		0.049		0.042	
t_{design}, in.		0.109		0.083		0.065		0.063		0.049		0.042	
lb/ft		1.06		0.829		0.662		0.638		0.508		0.438	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	11.3	16.9	8.83	13.2	7.05	10.6	6.80	10.2	5.39	8.07	4.65	6.96
	1	8.99	13.4	7.12	10.7	5.74	8.59	5.53	8.28	4.42	6.61	3.82	5.72
	2	4.57	6.84	3.74	5.60	3.10	4.64	2.99	4.47	2.43	3.63	2.11	3.16
	3	2.04	3.06	1.68	2.52	1.40	2.10	1.35	2.02	1.10	1.65	0.97	1.44
	4	1.15	1.72	0.946	1.42	0.789	1.18	0.760	1.14	0.621	0.930	0.543	0.812
	5	0.735	1.10	0.606	0.906	0.505	0.755	0.486	0.728	0.398	0.595	0.347	0.520
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Properties						
A_g, in.^{2}	0.305	0.239	0.191	0.184	0.146	0.126
I, in.^{4}	0.031	0.025	0.021	0.020	0.017	0.015
r, in.	0.317	0.325	0.332	0.332	0.337	0.339

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

HSS1

Shape		HSS1×			
		0.035		0.032	
t_{design}, in.		0.035		0.032	
lb/ft		0.368		0.337	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	3.91	5.86	3.59	5.38
	1	3.23	4.82	2.96	4.43
	2	1.80	2.70	1.66	2.48
	3	0.826	1.24	0.758	1.13
	4	0.465	0.695	0.427	0.638
	5	0.297	0.445	0.273	0.408
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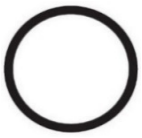
Properties		
A_g, in.^{2}	0.106	0.097
I, in.^{4}	0.012	0.011
r, in.	0.342	0.342

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 12-PIPE 8

Table 5-7
Available Strength in Axial Compression, kips
Pipe

F_y = 65 ksi

Shape		Pipe 12				Pipe 10				Pipe 8			
		Std. 40S		Std. 10S [c2]		Std. 40S		Std. 10S [c2]		Std. 80S		Std. 40S	
t_{design}, in.		0.375		0.180		0.365		0.165		0.500		0.322	
lb/ft		50.6		24.7		41.3		19.0		44.3		29.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	539	807	-S-	-S-	443	663	-S-	-S-	473	707	310	464
	6	517	773	-S-	-S-	417	624	-S-	-S-	428	641	282	422
	7	509	762	-S-	-S-	408	611	-S-	-S-	413	619	273	408
	8	500	748	-S-	-S-	398	596	-S-	-S-	397	594	262	392
	9	490	734	-S-	-S-	387	579	-S-	-S-	379	567	251	375
	10	480	718	-S-	-S-	375	561	-S-	-S-	360	538	239	357
	11	468	700	-S-	-S-	362	542	-S-	-S-	340	508	226	338
	12	456	681	-S-	-S-	349	522	-S-	-S-	319	477	213	318
	13	442	662	-S-	-S-	334	500	-S-	-S-	298	446	199	298
	14	429	641	-S-	-S-	320	478	-S-	-S-	277	414	186	278
	15	414	620	-S-	-S-	305	456	-S-	-S-	256	382	172	257
	16	400	598	-S-	-S-	289	433	-S-	-S-	235	351	159	237
	17	384	575	-S-	-S-	274	410	-S-	-S-	215	321	145	218
	18	369	552	-S-	-S-	258	387	-S-	-S-	195	292	133	198
	19	353	529	-S-	-S-	243	364	-S-	-S-	176	264	120	180
	20	338	505	-S-	-S-	228	341	-S-	-S-	159	238	109	163
	21	322	481	-S-	-S-	213	318	-S-	-S-	144	216	98.7	148
	22	306	458	-S-	-S-	198	296	-S-	-S-	132	197	90.0	135
	23	290	434	-S-	-S-	184	275	-S-	-S-	120	180	82.3	123
	24	275	411	-S-	-S-	170	254	-S-	-S-	111	165	75.6	113
	25	259	388	-S-	-S-	157	235	-S-	-S-	102	152	69.7	104
	26	244	366	-S-	-S-	145	217	-S-	-S-	94.2	141	64.4	96.4
	27	230	344	-S-	-S-	134	201	-S-	-S-	87.3	131	59.7	89.4
	28	215	322	-S-	-S-	125	187	-S-	-S-	81.2	121	55.5	83.1
	29	201	301	-S-	-S-	117	174	-S-	-S-	75.7	113	51.8	77.5
	30	188	282	-S-	-S-	109	163	-S-	-S-	70.7	106	48.4	72.4
	32	166	248	-S-	-S-	95.7	143	-S-	-S-	62.2	93.0	42.5	63.6
	34	147	219	-S-	-S-	84.8	127	-S-	-S-	55.1	82.4	37.7	56.3
	36	131	196	-S-	-S-	75.6	113	-S-	-S-	49.1	73.5	33.6	50.3
	38	117	176	-S-	-S-	67.9	102	-S-	-S-	44.1	66.0	30.2	45.1
	40	106	158	-S-	-S-	61.2	91.6	-S-	-S-	39.8	59.5	27.2	40.7
Properties													
A_g, in.^{2}		14.6		7.14		12.0		5.51		12.8		8.40	
I, in.^{4}		283		142		163		78.0		106		72.6	
r, in.		4.40		4.46		3.69		3.76		2.88		2.94	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

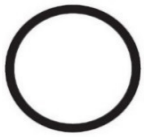
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe



PIPE 8-PIPE 6

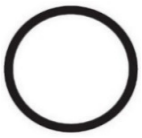
Shape		Pipe 8				Pipe 6							
		Std. 10S [c2]		Std. 5S [c2]		Std. 80S		Std. 40S		Std. 10S [c2]		Std. 5S [c2]	
t_{design}, in.		0.148		0.109		0.432		0.280		0.134		0.109	
lb/ft		13.7		10.1		29.1		19.4		9.48		7.74	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	-S-	-S-	-S-	-S-	311	465	206	309	-S-	-S-	-S-	-S-
	6	-S-	-S-	-S-	-S-	262	393	176	263	-S-	-S-	-S-	-S-
	7	-S-	-S-	-S-	-S-	247	369	166	248	-S-	-S-	-S-	-S-
	8	-S-	-S-	-S-	-S-	230	344	155	232	-S-	-S-	-S-	-S-
	9	-S-	-S-	-S-	-S-	213	318	144	215	-S-	-S-	-S-	-S-
	10	-S-	-S-	-S-	-S-	194	291	132	197	-S-	-S-	-S-	-S-
	11	-S-	-S-	-S-	-S-	176	264	120	180	-S-	-S-	-S-	-S-
	12	-S-	-S-	-S-	-S-	158	237	108	162	-S-	-S-	-S-	-S-
	13	-S-	-S-	-S-	-S-	141	211	96.9	145	-S-	-S-	-S-	-S-
	14	-S-	-S-	-S-	-S-	124	186	85.8	128	-S-	-S-	-S-	-S-
	15	-S-	-S-	-S-	-S-	108	162	75.4	113	-S-	-S-	-S-	-S-
	16	-S-	-S-	-S-	-S-	95.3	143	66.3	99.2	-S-	-S-	-S-	-S-
	17	-S-	-S-	-S-	-S-	84.5	126	58.7	87.8	-S-	-S-	-S-	-S-
	18	-S-	-S-	-S-	-S-	75.3	113	52.4	78.4	-S-	-S-	-S-	-S-
	19	-S-	-S-	-S-	-S-	67.6	101	47.0	70.3	-S-	-S-	-S-	-S-
	20	-S-	-S-	-S-	-S-	61.0	91.3	42.4	63.5	-S-	-S-	-S-	-S-
	21	-S-	-S-	-S-	-S-	55.4	82.8	38.5	57.6	-S-	-S-	-S-	-S-
	22	-S-	-S-	-S-	-S-	50.4	75.4	35.1	52.5	-S-	-S-	-S-	-S-
	23	-S-	-S-	-S-	-S-	46.1	69.0	32.1	48.0	-S-	-S-	-S-	-S-
	24	-S-	-S-	-S-	-S-	42.4	63.4	29.5	44.1	-S-	-S-	-S-	-S-
	25	-S-	-S-	-S-	-S-	39.1	58.4	27.2	40.6	-S-	-S-	-S-	-S-
	26	-S-	-S-	-S-	-S-	36.1	54.0	25.1	37.6	-S-	-S-	-S-	-S-
	27	-S-	-S-	-S-	-S-	33.5	50.1	23.3	34.8	-S-	-S-	-S-	-S-
	28	-S-	-S-	-S-	-S-	31.1	46.6	21.6	32.4	-S-	-S-	-S-	-S-
	29	-S-	-S-	-S-	-S-	29.0	43.4	20.2	30.2	-S-	-S-	-S-	-S-
	30	-S-	-S-	-S-	-S-	27.1	40.6	18.9	28.2	-S-	-S-	-S-	-S-
	32	-S-	-S-	-S-	-S-	23.8	35.7	16.6	24.8	-S-	-S-	-S-	-S-
	34	-S-	-S-	-S-	-S-	21.1	31.6	14.7	22.0	-S-	-S-	-S-	-S-
	36	-S-	-S-	-S-	-S-	18.8	28.2	13.1	19.6	-S-	-S-	-S-	-S-
	38	-S-	-S-	-S-	-S-					-S-	-S-	-S-	-S-
	40	-S-	-S-	-S-	-S-								
Properties													
A_g, in.^{2}		3.94		2.92		8.41		5.59		2.73		2.23	
I, in.^{4}		35.5		26.5		40.6		28.2		14.4		11.9	
r, in.		3.00		3.01		2.20		2.25		2.30		2.31	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 5-PIPE 4

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe

F_y = 65 ksi

Shape		Pipe 5								Pipe 4			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S [c2]		Std. 80S		Std. 40S	
t_{design}, in.		0.375		0.258		0.134		0.109		0.337		0.237	
lb/ft		21.2		14.9		7.93		6.48		15.3		11.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	226	338	159	238	84.2	126	-S-	-S-	163	244	117	175
	6	177	265	126	188	67.5	101	-S-	-S-	112	168	81.9	122
	7	163	243	116	173	62.3	93.2	-S-	-S-	98.1	147	71.9	108
	8	147	220	105	157	56.8	85.0	-S-	-S-	84.0	126	62.0	92.7
	9	131	196	93.9	141	51.2	76.6	-S-	-S-	70.4	105	52.3	78.3
	10	116	173	83.1	124	45.5	68.1	-S-	-S-	57.9	86.7	43.3	64.8
	11	100	150	72.5	108	40.0	59.9	-S-	-S-	47.9	71.6	35.8	53.6
	12	86.0	129	62.4	93.4	34.7	52.0	-S-	-S-	40.2	60.2	30.1	45.0
	13	73.4	110	53.4	79.8	29.8	44.6	-S-	-S-	34.3	51.3	25.6	38.4
	14	63.3	94.7	46.0	68.8	25.7	38.5	-S-	-S-	29.6	44.2	22.1	33.1
	15	55.1	82.5	40.1	60.0	22.4	33.5	-S-	-S-	25.7	38.5	19.3	28.8
	16	48.5	72.5	35.2	52.7	19.7	29.5	-S-	-S-	22.6	33.9	16.9	25.3
	17	42.9	64.2	31.2	46.7	17.4	26.1	-S-	-S-	20.0	30.0	15.0	22.4
	18	38.3	57.3	27.8	41.6	15.6	23.3	-S-	-S-	17.9	26.7	13.4	20.0
	19	34.4	51.4	25.0	37.4	14.0	20.9	-S-	-S-	16.0	24.0	12.0	18.0
	20	31.0	46.4	22.5	33.7	12.6	18.9	-S-	-S-	14.5	21.7	10.8	16.2
	21	28.1	42.1	20.4	30.6	11.4	17.1	-S-	-S-	13.1	19.7	9.83	14.7
	22	25.6	38.3	18.6	27.9	10.4	15.6	-S-	-S-	12.0	17.9	8.96	13.4
	23	23.4	35.1	17.0	25.5	9.53	14.3	-S-	-S-	11.0	16.4	8.19	12.3
	24	21.5	32.2	15.7	23.4	8.75	13.1	-S-	-S-	10.1	15.0	7.53	11.3
	25	19.8	29.7	14.4	21.6	8.06	12.1	-S-	-S-			6.94	10.4
	26	18.4	27.5	13.3	20.0	7.46	11.2	-S-	-S-				
	27	17.0	25.5	12.4	18.5	6.91	10.3	-S-	-S-				
	28	15.8	23.7	11.5	17.2	6.43	9.62	-S-	-S-				
	29	14.8	22.1	10.7	16.0	5.99	8.97	-S-	-S-				
	30	13.8	20.6	10.0	15.0	5.60	8.38	-S-	-S-				
	32					4.92	7.36	-S-	-S-				
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		6.11		4.30		2.28		1.87		4.41		3.17	
I, in.^{4}		20.6		15.1		8.41		6.94		9.61		7.23	
r, in.		1.84		1.87		1.92		1.93		1.48		1.51	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

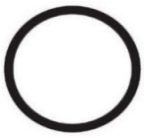
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe



PIPE 4-PIPE 3½

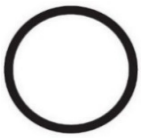
Shape		Pipe 4				Pipe 3½							
		Std. 10S		Std. 5S [c2]		Std. 80S		Std. 40S		Std. 10S		Std. 5S [c2]	
t_{design}, in.		0.120		0.083		0.318		0.226		0.120		0.083	
lb/ft		5.73		3.99		12.8		9.29		5.07		3.54	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	60.9	91.2	-S-	-S-	136	203	99.0	148	53.9	80.7	-S-	-S-
	6	43.4	64.9	-S-	-S-	84.5	126	62.8	94.0	34.9	52.2	-S-	-S-
	7	38.4	57.4	-S-	-S-	71.1	106	53.3	79.8	29.8	44.6	-S-	-S-
	8	33.3	49.8	-S-	-S-	58.4	87.3	44.1	66.0	24.9	37.2	-S-	-S-
	9	28.4	42.5	-S-	-S-	46.8	69.9	35.6	53.3	20.3	30.3	-S-	-S-
	10	23.7	35.5	-S-	-S-	37.9	56.7	28.9	43.2	16.4	24.6	-S-	-S-
	11	19.6	29.4	-S-	-S-	31.3	46.8	23.8	35.7	13.6	20.3	-S-	-S-
	12	16.5	24.7	-S-	-S-	26.3	39.3	20.0	30.0	11.4	17.1	-S-	-S-
	13	14.1	21.0	-S-	-S-	22.4	33.5	17.1	25.5	9.72	14.5	-S-	-S-
	14	12.1	18.1	-S-	-S-	19.3	28.9	14.7	22.0	8.38	12.5	-S-	-S-
	15	10.6	15.8	-S-	-S-	16.8	25.2	12.8	19.2	7.30	10.9	-S-	-S-
	16	9.29	13.9	-S-	-S-	14.8	22.1	11.3	16.9	6.42	9.60	-S-	-S-
	17	8.23	12.3	-S-	-S-	13.1	19.6	10.0	14.9	5.69	8.51	-S-	-S-
	18	7.34	11.0	-S-	-S-	11.7	17.5	8.91	13.3	5.07	7.59	-S-	-S-
	19	6.59	9.85	-S-	-S-	10.5	15.7	7.99	12.0	4.55	6.81	-S-	-S-
	20	5.94	8.89	-S-	-S-	9.47	14.2	7.21	10.8	4.11	6.15	-S-	-S-
	21	5.39	8.06	-S-	-S-	8.59	12.8	6.54	9.79	3.73	5.57	-S-	-S-
	22	4.91	7.35	-S-	-S-			5.96	8.92	3.40	5.08	-S-	-S-
	23	4.49	6.72	-S-	-S-							-S-	-S-
	24	4.13	6.17	-S-	-S-								
	25	3.80	5.69	-S-	-S-								
	26			-S-	-S-								
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.65		1.15		3.68		2.68		1.46		1.02	
I, in.^{4}		3.96		2.81		6.28		4.79		2.76		1.96	
r, in.		1.55		1.56		1.31		1.34		1.37		1.39	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 3-PIPE 2½

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe

F_y = 65 ksi

Shape		Pipe 3								Pipe 2½			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S		Std. 80S		Std. 40S	
t_{design}, in.		0.300		0.216		0.120		0.083		0.276		0.203	
lb/ft		10.5		7.73		4.42		3.09		7.82		5.91	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	112	167	82.4	123	46.9	70.2	32.9	49.2	83.5	125	63.2	94.5
	6	58.9	88.1	44.9	67.2	26.6	39.8	18.8	28.2	32.3	48.3	25.5	38.2
	7	46.7	69.9	36.1	54.0	21.7	32.4	15.4	23.1	23.8	35.6	18.8	28.2
	8	36.1	54.1	28.1	42.1	17.1	25.6	12.2	18.3	18.2	27.2	14.4	21.6
	9	28.5	42.7	22.2	33.2	13.5	20.3	9.66	14.4	14.4	21.5	11.4	17.1
	10	23.1	34.6	18.0	26.9	11.0	16.4	7.82	11.7	11.6	17.4	9.24	13.8
	11	19.1	28.6	14.9	22.2	9.06	13.6	6.47	9.67	9.62	14.4	7.63	11.4
	12	16.1	24.0	12.5	18.7	7.62	11.4	5.43	8.13	8.09	12.1	6.41	9.59
	13	13.7	20.5	10.6	15.9	6.49	9.71	4.63	6.92	6.89	10.3	5.46	8.18
	14	11.8	17.7	9.18	13.7	5.60	8.37	3.99	5.97	5.94	8.89	4.71	7.05
	15	10.3	15.4	8.00	12.0	4.87	7.29	3.48	5.20	5.18	7.74	4.10	6.14
	16	9.03	13.5	7.03	10.5	4.28	6.41	3.06	4.57				
	17	8.00	12.0	6.23	9.31	3.79	5.68	2.71	4.05				
	18	7.14	10.7	5.55	8.31	3.38	5.06	2.41	3.61				
	19			4.98	7.46	3.04	4.54	2.17	3.24				
	20					2.74	4.10	1.96	2.93				
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		3.02		2.23		1.27		0.891		2.26		1.71	
I, in.^{4}		3.89		3.02		1.82		1.30		1.94		1.54	
r, in.		1.13		1.16		1.20		1.21		0.927		0.949	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe

PIPE 2½-PIPE 2

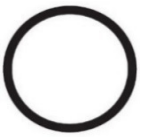
Shape		Pipe 2½				Pipe 2							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.120		0.083		0.218		0.154		0.109		0.065	
lb/ft		3.60		2.52		5.12		3.73		2.69		1.64	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	38.4	57.5	26.9	40.3	54.7	81.8	39.9	59.7	28.7	43.0	17.5	26.1
	1	37.5	56.1	26.3	39.4	52.6	78.7	38.5	57.5	27.7	41.5	16.9	25.3
	2	34.9	52.3	24.5	36.7	46.9	70.1	34.5	51.6	25.0	37.4	15.3	22.8
	3	31.0	46.4	21.9	32.7	38.7	57.9	28.7	43.0	21.0	31.4	12.9	19.3
	4	26.3	39.3	18.6	27.8	29.6	44.2	22.2	33.3	16.4	24.5	10.2	15.2
	5	21.2	31.7	15.1	22.6	20.9	31.3	16.0	24.0	12.0	17.9	7.51	11.2
	6	16.3	24.4	11.7	17.5	14.5	21.8	11.2	16.7	8.38	12.5	5.28	7.91
	7	12.1	18.2	8.74	13.1	10.7	16.0	8.21	12.3	6.15	9.21	3.88	5.81
	8	9.30	13.9	6.69	10.0	8.18	12.2	6.28	9.40	4.71	7.05	2.97	4.45
	9	7.35	11.0	5.29	7.91	6.46	9.67	4.96	7.43	3.72	5.57	2.35	3.51
	10	5.95	8.91	4.28	6.41	5.23	7.83	4.02	6.02	3.02	4.51	1.90	2.85
	11	4.92	7.36	3.54	5.30	4.33	6.47	3.32	4.97	2.49	3.73	1.57	2.35
	12	4.13	6.18	2.98	4.45	3.64	5.44	2.79	4.18	2.09	3.13	1.32	1.98
	13	3.52	5.27	2.54	3.79			2.38	3.56	1.78	2.67	1.13	1.68
	14	3.04	4.54	2.19	3.27								
	15	2.65	3.96	1.90	2.85								
	16	2.33	3.48	1.67	2.50								
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		1.04		0.729		1.48		1.08		0.778		0.473	
I, in.^{4}		0.993		0.714		0.874		0.670		0.503		0.317	
r, in.		0.977		0.990		0.768		0.788		0.804		0.819	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 1½-PIPE 1¼

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe

F_y = 65 ksi

Shape		Pipe 1½								Pipe 1¼			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S		Std. 80S		Std. 40S	
t_{design}, in.		0.200		0.145		0.109		0.065		0.191		0.140	
lb/ft		3.70		2.77		2.13		1.30		3.06		2.32	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	39.5	59.1	29.5	44.1	22.6	33.9	13.8	20.7	32.5	48.7	24.7	37.0
	1	37.1	55.6	27.8	41.6	21.4	32.0	13.1	19.6	30.0	44.8	22.9	34.2
	2	30.8	46.1	23.4	34.9	18.1	27.0	11.2	16.7	23.4	35.0	18.1	27.1
	3	22.6	33.9	17.4	26.1	13.7	20.4	8.53	12.8	15.5	23.2	12.3	18.4
	4	14.7	21.9	11.6	17.3	9.21	13.8	5.85	8.76	9.07	13.6	7.31	10.9
	5	9.39	14.1	7.44	11.1	5.93	8.87	3.79	5.67	5.80	8.68	4.68	7.00
	6	6.52	9.76	5.17	7.73	4.12	6.16	2.63	3.94	4.03	6.03	3.25	4.86
	7	4.79	7.17	3.80	5.68	3.03	4.53	1.93	2.89	2.96	4.43	2.39	3.57
	8	3.67	5.49	2.91	4.35	2.32	3.46	1.48	2.21	2.27	3.39	1.83	2.73
	9	2.90	4.34	2.30	3.43	1.83	2.74	1.17	1.75				
	10	2.35	3.51	1.86	2.78	1.48	2.22	0.947	1.42				
	11												
	12												
	13												
	14												
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Properties						
A_g, in.^{2}	1.07	0.799	0.613	0.375	0.881	0.669
I, in.^{4}	0.391	0.310	0.247	0.158	0.242	0.195
r, in.	0.605	0.623	0.635	0.649	0.524	0.540

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe

PIPE 1¼-PIPE 1

Shape		Pipe 1¼				Pipe 1							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.109		0.065		0.179		0.133		0.109		0.065	
lb/ft		1.84		1.13		2.22		1.71		1.43		0.885	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	19.6	29.3	12.0	18.0	23.7	35.5	18.3	27.4	15.3	22.9	9.45	14.1
	1	18.2	27.2	11.2	16.8	20.7	31.0	16.1	24.1	13.6	20.3	8.43	12.6
	2	14.5	21.7	9.06	13.6	13.8	20.6	11.0	16.5	9.39	14.0	5.98	8.95
	3	9.97	14.9	6.35	9.51	7.12	10.7	5.89	8.80	5.11	7.65	3.38	5.05
	4	6.00	8.97	3.90	5.84	4.01	5.99	3.31	4.95	2.88	4.30	1.90	2.84
	5	3.84	5.74	2.50	3.73	2.56	3.83	2.12	3.17	1.84	2.75	1.22	1.82
	6	2.67	3.99	1.73	2.59	1.78	2.66	1.47	2.20	1.28	1.91	0.844	1.26
	7	1.96	2.93	1.27	1.91			1.08	1.62	0.939	1.40	0.620	0.928
	8	1.50	2.24	0.975	1.46								
	9	1.18	1.77	0.770	1.15								
	10												
	11												
	12												
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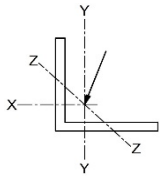
Properties													
A_g, in.^{2}		0.531		0.326		0.642		0.496		0.415		0.256	
I, in.^{4}		0.160		0.104		0.107		0.088		0.077		0.051	
r, in.		0.549		0.565		0.408		0.422		0.430		0.445	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



L8-L6

Table 5-8
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

Shape		L8×8×										L6×6×	
		¾ [c2]		⅝ [c2]		½ [c2]		⅜ [c2]		¼ [c2]		¾	
lb/ft		39.7		33.3		26.9		20.3		13.7		29.3	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	329	494
	1	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	323	486
	2	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	308	463
	3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	284	426
	4	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	253	381
	5	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	219	329
	6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	183	275
	7	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	148	222
	8	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	116	174
	9	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	91.7	138
	10	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	74.3	112
	11	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	61.4	92.3
	12	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	51.6	77.5
	13	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	43.9	66.1
	14	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	37.9	57.0
	15	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	33.0	49.6
	16	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	29.0	43.6
	17	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	25.7	38.6
	18	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	22.9	34.5
	19	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	20.6	30.9
	20	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	21	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	22	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	23	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	24	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	25	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	26	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
Properties													
A_g, in.^{2}		11.4		9.61		7.75		5.86		3.94		8.44	
r_z, in.		1.58		1.58		1.59		1.60		1.61		1.18	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

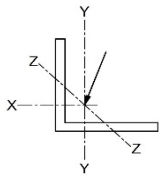
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 65 ksi

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)



L6-L5

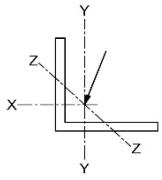
Shape		L6×6×								L5×5×			
		5/8 [c2]		1/2 [c2]		3/8 [c2]		1/4 [c2]		3/4		5/8	
lb/ft		24.7		19.9		15.1		10.2		24.1		20.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	270	406	228	343
	1	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	264	396	223	335
	2	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	245	369	207	312
	3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	218	327	184	277
	4	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	184	276	156	235
	5	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	148	223	126	190
	6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	114	171	97.3	146
	7	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	84.4	127	72.4	109
	8	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	64.6	97.1	55.5	83.4
	9	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	51.1	76.7	43.8	65.9
	10	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	41.4	62.2	35.5	53.4
	11	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	34.2	51.4	29.3	44.1
	12	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	28.7	43.2	24.6	37.0
	13	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	24.5	36.8	21.0	31.6
	14	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	21.1	31.7	18.1	27.2
	15	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	18.4	27.6	15.8	23.7
	16	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	16.2	24.3	13.9	20.8
	17	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	18	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	19	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	20							-S-	-S-				
	21												
	22												
	23												
	24												
	25												
	26												
Properties													
A_g, in.^{2}		7.11		5.75		4.36		2.94		6.94		5.86	
r_z, in.		1.18		1.18		1.19		1.21		0.971		0.979	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L5-L4

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

Shape		L5×5×								L4×4×			
		½ [c2]		⅜ [c2]		5/16 [c2]		¼ [c2]		½		⅜ [c2]	
lb/ft		16.5		12.5		10.5		8.45		13.0		9.92	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	146	219	-S-	-S-
	1	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	141	211	-S-	-S-
	2	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	126	189	-S-	-S-
	3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	104	157	-S-	-S-
	4	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	80.5	121	-S-	-S-
	5	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	57.6	86.6	-S-	-S-
	6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	40.2	60.4	-S-	-S-
	7	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	29.5	44.3	-S-	-S-
	8	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	22.6	33.9	-S-	-S-
	9	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	17.8	26.8	-S-	-S-
	10	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	14.5	21.7	-S-	-S-
	11	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	11.9	18.0	-S-	-S-
	12	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	10.0	15.1	-S-	-S-
	13	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	8.55	12.9	-S-	-S-
	14	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	15	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	16	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties						
A_g, in.^{2}	4.75	3.61	3.03	2.44	3.75	2.86
r_z, in.	0.988	0.989	0.993	1.00	0.781	0.787

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

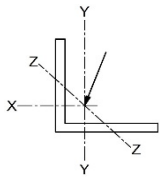
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 65 ksi

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)



L4-L3

Shape		L4×4×		L3½×3½×				L3×3×					
		¼ [c2]		⅜ [c2]		¼ [c2]		½		⅜		¼ [c2]	
lb/ft		6.72		8.62		5.85		9.54		7.32		4.99	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	107	161	82.1	123	-S-	-S-
	1	-S-	-S-	-S-	-S-	-S-	-S-	100	151	76.9	116	-S-	-S-
	2	-S-	-S-	-S-	-S-	-S-	-S-	82.1	123	63.1	94.9	-S-	-S-
	3	-S-	-S-	-S-	-S-	-S-	-S-	59.0	88.6	45.4	68.3	-S-	-S-
	4	-S-	-S-	-S-	-S-	-S-	-S-	37.2	55.9	28.7	43.2	-S-	-S-
	5	-S-	-S-	-S-	-S-	-S-	-S-	23.8	35.8	18.4	27.6	-S-	-S-
	6	-S-	-S-	-S-	-S-	-S-	-S-	16.5	24.8	12.8	19.2	-S-	-S-
	7	-S-	-S-	-S-	-S-	-S-	-S-	12.1	18.2	9.38	14.1	-S-	-S-
	8	-S-	-S-	-S-	-S-	-S-	-S-	9.29	14.0	7.18	10.8	-S-	-S-
	9	-S-	-S-	-S-	-S-	-S-	-S-	7.34	11.0	5.67	8.53	-S-	-S-
	10	-S-	-S-	-S-	-S-	-S-	-S-						
	11	-S-	-S-	-S-	-S-	-S-	-S-						
	12	-S-	-S-										
	13	-S-	-S-										
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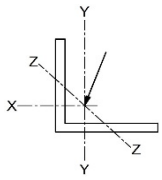
Properties													
A_g, in.^{2}		1.94		2.48		1.69		2.75		2.11		1.44	
r_z, in.		0.796		0.690		0.693		0.585		0.587		0.589	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L3-L2

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

Shape		L3×3×		L2½×2½×						L2×2×			
		3/16 [c2]		3/8		1/4 [c2]		3/16 [c2]		3/8		1/4	
lb/ft		3.78		6.01		4.12		3.13		4.71		3.25	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	67.3	101	-S-	-S-	-S-	-S-	52.9	79.6	36.5	54.9
	1	-S-	-S-	61.2	92.0	-S-	-S-	-S-	-S-	45.6	68.5	31.5	47.3
	2	-S-	-S-	46.0	69.2	-S-	-S-	-S-	-S-	29.1	43.7	20.2	30.4
	3	-S-	-S-	28.6	43.0	-S-	-S-	-S-	-S-	14.5	21.7	10.1	15.2
	4	-S-	-S-	16.3	24.5	-S-	-S-	-S-	-S-	8.13	12.2	5.69	8.56
	5	-S-	-S-	10.4	15.7	-S-	-S-	-S-	-S-	5.20	7.82	3.64	5.48
	6	-S-	-S-	7.23	10.9	-S-	-S-	-S-	-S-	3.61	5.43	2.53	3.80
	7	-S-	-S-	5.31	7.99	-S-	-S-	-S-	-S-				
	8	-S-	-S-	4.07	6.11	-S-	-S-	-S-	-S-				
	9	-S-	-S-										
	10												
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Properties													
A_g, in.^{2}		1.09		1.73		1.19		0.902		1.36		0.938	
r_z, in.		0.597		0.488		0.491		0.495		0.389		0.392	

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

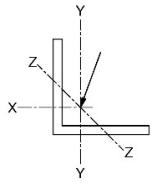
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 65 ksi

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)



L2-L1¼

Shape		L2×2×				L1½×1½×						L1¼×1¼×	
		3/16 [c2]		1/8 [c2]		¼		3/16		1/8		¼	
lb/ft		2.48		1.68		2.38		1.83		1.25		1.95	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	26.8	40.2	20.5	30.8	14.0	21.0	21.9	32.9
	1	-S-	-S-	-S-	-S-	20.6	30.9	15.8	23.7	10.8	16.2	14.9	22.4
	2	-S-	-S-	-S-	-S-	9.33	14.0	7.20	10.8	5.00	7.52	5.25	7.89
	3	-S-	-S-	-S-	-S-	4.15	6.23	3.20	4.81	2.22	3.34	2.33	3.51
	4	-S-	-S-	-S-	-S-	2.33	3.51	1.80	2.70	1.25	1.88	1.31	1.97
	5	-S-	-S-	-S-	-S-								
	6	-S-	-S-	-S-	-S-								
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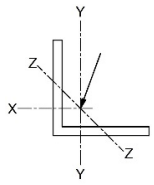
Properties													
A_g, in.^{2}		0.715		0.484		0.688		0.527		0.359		0.563	
r_z, in.		0.392		0.398		0.293		0.294		0.297		0.243	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L1¼-L¾

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

Shape		L1¼×1¼×				L1×1×						L¾×¾×	
		3/16		1/8 [c2]		1/4		3/16		1/8		1/8	
lb/ft		1.50		1.0		1.52		1.18		0.813		0.596	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	16.9	25.4	-S-	-S-	17.0	25.6	13.2	19.9	9.11	13.7	6.69	10.1
	1	11.5	17.3	-S-	-S-	9.45	14.2	7.25	10.9	5.02	7.54	2.32	3.48
	2	4.05	6.09	-S-	-S-	2.66	4.00	2.02	3.04	1.41	2.11	0.579	0.871
	3	1.80	2.70	-S-	-S-	1.18	1.78	0.899	1.4	0.625	0.939		
	4	1.01	1.52	-S-	-S-								
	5												
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Properties													
A_g, in.^{2}		0.434		0.297		0.438		0.340		0.234		0.172	
r_z, in.		0.243		0.245		0.196		0.194		0.195		0.146	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

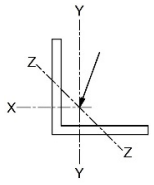
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 65 ksi

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)



L1½

Shape		L½×½×⅛	
lb/ft		0.379	
Design		P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	4.24	6.38
	1	0.658	0.988
	2		
	3		
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Properties	
A_g, in.^{2}	0.109
r_z, in.	0.098

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.