F_y = 50 ksi

Table 6-1
Combined Flexure and Axial Force
W-Shapes

Shape		W44×											
		335[c]				290[c]				262[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.346	0.230	0.220	0.146	0.417	0.278	0.253	0.168	0.474	0.316	0.281	0.187
	11	0.378	0.251	0.220	0.146	0.454	0.302	0.253	0.168	0.516	0.343	0.281	0.187
	12	0.384	0.256	0.220	0.146	0.462	0.307	0.253	0.168	0.524	0.349	0.281	0.187
	13	0.392	0.261	0.222	0.148	0.470	0.313	0.255	0.170	0.533	0.355	0.284	0.189
	14	0.402	0.267	0.225	0.150	0.480	0.319	0.259	0.173	0.544	0.362	0.289	0.192
	15	0.412	0.274	0.229	0.152	0.490	0.326	0.264	0.175	0.555	0.369	0.294	0.196
	16	0.423	0.281	0.232	0.155	0.501	0.333	0.268	0.178	0.568	0.378	0.299	0.199
	17	0.435	0.290	0.236	0.157	0.514	0.342	0.273	0.181	0.582	0.387	0.304	0.203
	18	0.449	0.299	0.240	0.160	0.527	0.351	0.277	0.184	0.597	0.397	0.310	0.206
	19	0.463	0.308	0.244	0.162	0.542	0.361	0.282	0.188	0.613	0.408	0.316	0.210
	20	0.479	0.319	0.248	0.165	0.559	0.372	0.287	0.191	0.632	0.420	0.322	0.214
	22	0.515	0.343	0.256	0.171	0.597	0.397	0.298	0.198	0.674	0.448	0.335	0.223
	24	0.558	0.371	0.266	0.177	0.643	0.428	0.309	0.206	0.724	0.482	0.348	0.232
	26	0.608	0.405	0.275	0.183	0.702	0.467	0.321	0.214	0.785	0.522	0.363	0.242
	28	0.668	0.444	0.286	0.190	0.77	0.512	0.335	0.223	0.859	0.571	0.379	0.252
	30	0.738	0.491	0.297	0.198	0.851	0.567	0.349	0.232	0.950	0.632	0.397	0.264
	32	0.822	0.547	0.310	0.206	0.948	0.631	0.365	0.243	1.06	0.705	0.417	0.277
	34	0.923	0.614	0.323	0.215	1.06	0.708	0.382	0.254	1.19	0.793	0.438	0.292
	36	1.03	0.689	0.338	0.225	1.19	0.794	0.401	0.267	1.34	0.889	0.465	0.310
	38	1.15	0.767	0.354	0.235	1.33	0.885	0.429	0.286	1.49	0.990	0.507	0.337
	40	1.28	0.850	0.377	0.251	1.47	0.980	0.464	0.309	1.65	1.10	0.549	0.365
	42	1.41	0.937	0.404	0.269	1.62	1.08	0.499	0.332	1.82	1.21	0.592	0.394
	44	1.55	1.03	0.431	0.287	1.78	1.19	0.534	0.355	2.00	1.33	0.635	0.423
	46	1.69	1.12	0.459	0.305	1.95	1.30	0.570	0.379	2.18	1.45	0.679	0.452
	48	1.84	1.22	0.486	0.323	2.12	1.41	0.605	0.403	2.37	1.58	0.722	0.481
	50	2.00	1.33	0.514	0.342	2.30	1.53	0.641	0.426	2.58	1.71	0.766	0.510
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.51		1.00		1.74		1.16		1.96		1.30	
$t_y \times 10^3$, (kips)$^{-1}$		0.339		0.226		0.391		0.260		0.433		0.288	
$t_r \times 10^3$, (kips)$^{-1}$		0.417		0.278		0.480		0.320		0.531		0.354	
r_x/r_y		5.10				5.10				5.10			
r_y, in.		3.49				3.49				3.47			

[c] Shape is slender for compression with F_y = 50 ksi.

W44-W40

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W44×				W40×							
		230[c, v]				593[h]				503[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.557	0.370	0.324	0.215	0.192	0.128	0.129	0.0859	0.226	0.150	0.154	0.102
	11	0.604	0.402	0.324	0.215	0.210	0.139	0.129	0.0859	0.247	0.165	0.154	0.102
	12	0.614	0.409	0.324	0.215	0.213	0.142	0.129	0.0859	0.252	0.168	0.154	0.102
	13	0.625	0.416	0.329	0.219	0.217	0.144	0.129	0.0859	0.257	0.171	0.154	0.102
	14	0.637	0.424	0.335	0.223	0.221	0.147	0.130	0.0863	0.262	0.174	0.155	0.103
	15	0.650	0.433	0.341	0.227	0.226	0.150	0.131	0.0870	0.268	0.178	0.156	0.104
	16	0.665	0.442	0.347	0.231	0.231	0.154	0.132	0.0877	0.274	0.182	0.158	0.105
	17	0.681	0.453	0.354	0.235	0.237	0.158	0.133	0.0884	0.281	0.187	0.159	0.106
	18	0.698	0.465	0.360	0.240	0.243	0.162	0.134	0.0892	0.289	0.192	0.161	0.107
	19	0.718	0.478	0.367	0.244	0.250	0.166	0.135	0.0899	0.297	0.198	0.163	0.108
	20	0.739	0.492	0.375	0.249	0.257	0.171	0.136	0.0907	0.306	0.204	0.164	0.109
	22	0.787	0.524	0.390	0.260	0.273	0.182	0.139	0.0923	0.326	0.217	0.168	0.112
	24	0.846	0.563	0.407	0.271	0.292	0.194	0.141	0.0939	0.350	0.233	0.171	0.114
	26	0.916	0.609	0.425	0.283	0.314	0.209	0.144	0.0956	0.377	0.251	0.175	0.117
	28	1.00	0.666	0.446	0.296	0.340	0.226	0.146	0.0973	0.410	0.273	0.179	0.119
	30	1.10	0.735	0.468	0.311	0.370	0.246	0.149	0.0991	0.448	0.298	0.183	0.122
	32	1.23	0.820	0.492	0.327	0.405	0.269	0.152	0.101	0.492	0.327	0.187	0.125
	34	1.39	0.924	0.519	0.346	0.446	0.297	0.155	0.103	0.544	0.362	0.192	0.128
	36	1.56	1.04	0.568	0.378	0.494	0.329	0.158	0.105	0.606	0.403	0.197	0.131
	38	1.73	1.15	0.621	0.413	0.551	0.366	0.161	0.107	0.675	0.449	0.201	0.134
	40	1.92	1.28	0.674	0.449	0.610	0.406	0.164	0.109	0.748	0.498	0.207	0.138
	42	2.12	1.41	0.729	0.485	0.673	0.448	0.168	0.112	0.825	0.549	0.212	0.141
	44	2.33	1.55	0.784	0.522	0.738	0.491	0.171	0.114	0.906	0.603	0.218	0.145
	46	2.54	1.69	0.840	0.559	0.807	0.537	0.175	0.116	0.990	0.659	0.224	0.149
	48	2.77	1.84	0.897	0.597	0.879	0.585	0.179	0.119	1.08	0.717	0.230	0.153
	50	3.00	2.00	0.954	0.634	0.953	0.634	0.183	0.122	1.17	0.778	0.237	0.158
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.27		1.51		0.741		0.493		0.904		0.602	
$t_y \times 10^3$, (kips)$^{-1}$		0.493		0.328		0.192		0.128		0.226		0.150	
$t_r \times 10^3$, (kips)$^{-1}$		0.605		0.403		0.236		0.157		0.277		0.185	
r_x/r_y		5.10				4.47				4.52			
r_y, in.		3.43				3.80				3.72			

[c] Shape is slender for compression with F_y = 50 ksi.
[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W40×											
		431[h]				397[h]				392[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.263	0.175	0.182	0.121	0.285	0.190	0.198	0.132	0.288	0.192	0.208	0.139
	11	0.289	0.193	0.182	0.121	0.314	0.209	0.198	0.132	0.346	0.230	0.213	0.142
	12	0.295	0.196	0.182	0.121	0.320	0.213	0.198	0.132	0.358	0.238	0.217	0.144
	13	0.301	0.200	0.182	0.121	0.327	0.217	0.198	0.132	0.372	0.247	0.220	0.146
	14	0.307	0.204	0.184	0.122	0.334	0.222	0.201	0.133	0.387	0.258	0.223	0.148
	15	0.314	0.209	0.186	0.124	0.341	0.227	0.203	0.135	0.404	0.269	0.227	0.151
	16	0.322	0.214	0.188	0.125	0.350	0.233	0.205	0.137	0.424	0.282	0.230	0.153
	17	0.330	0.220	0.190	0.127	0.359	0.239	0.208	0.138	0.446	0.296	0.234	0.156
	18	0.340	0.226	0.193	0.128	0.369	0.246	0.211	0.140	0.470	0.313	0.238	0.158
	19	0.350	0.233	0.195	0.130	0.380	0.253	0.213	0.142	0.497	0.331	0.241	0.161
	20	0.361	0.240	0.197	0.131	0.392	0.261	0.216	0.144	0.527	0.351	0.245	0.163
	22	0.386	0.257	0.202	0.134	0.419	0.279	0.221	0.147	0.598	0.398	0.254	0.169
	24	0.415	0.276	0.207	0.138	0.451	0.300	0.227	0.151	0.687	0.457	0.263	0.175
	26	0.449	0.299	0.212	0.141	0.488	0.325	0.234	0.155	0.801	0.533	0.273	0.181
	28	0.489	0.325	0.218	0.145	0.532	0.354	0.240	0.160	0.929	0.618	0.283	0.188
	30	0.536	0.356	0.224	0.149	0.584	0.388	0.247	0.164	1.07	0.710	0.295	0.196
	32	0.591	0.393	0.230	0.153	0.644	0.429	0.255	0.169	1.21	0.807	0.307	0.204
	34	0.656	0.436	0.236	0.157	0.715	0.476	0.262	0.175	1.37	0.911	0.320	0.213
	36	0.734	0.488	0.243	0.162	0.801	0.533	0.271	0.180	1.54	1.02	0.335	0.223
	38	0.818	0.544	0.251	0.167	0.892	0.594	0.280	0.186	1.71	1.14	0.351	0.233
	40	0.906	0.603	0.259	0.172	0.989	0.658	0.289	0.192	1.90	1.26	0.372	0.248
	42	0.999	0.665	0.267	0.178	1.09	0.725	0.299	0.199	2.09	1.39	0.394	0.262
	44	1.10	0.729	0.276	0.184	1.20	0.796	0.310	0.206	2.29	1.53	0.415	0.276
	46	1.20	0.797	0.285	0.190	1.31	0.870	0.322	0.214				
	48	1.30	0.868	0.295	0.197	1.42	0.947	0.338	0.225				
	50	1.42	0.942	0.308	0.205	1.55	1.03	0.356	0.237				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.09		0.723		1.19		0.790		1.71		1.14	
$t_y \times 10^3$, (kips)$^{-1}$		0.263		0.175		0.285		0.190		0.288		0.192	
$t_r \times 10^3$, (kips)$^{-1}$		0.323		0.215		0.351		0.234		0.354		0.236	
r_x/r_y		4.55				4.56				6.10			
r_y, in.		3.65				3.64				2.64			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

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

W40

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		372[h]				362[h]				331[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.304	0.202	0.212	0.141	0.315	0.210	0.217	0.145	0.342	0.227	0.249	0.166
	11	0.335	0.223	0.212	0.141	0.348	0.231	0.217	0.145	0.415	0.276	0.257	0.171
	12	0.341	0.227	0.212	0.141	0.354	0.236	0.217	0.145	0.430	0.286	0.262	0.174
	13	0.348	0.232	0.213	0.142	0.361	0.240	0.218	0.145	0.448	0.298	0.266	0.177
	14	0.356	0.237	0.215	0.143	0.369	0.246	0.221	0.147	0.467	0.311	0.271	0.180
	15	0.365	0.243	0.218	0.145	0.378	0.252	0.224	0.149	0.489	0.326	0.276	0.184
	16	0.374	0.249	0.221	0.147	0.388	0.258	0.227	0.151	0.514	0.342	0.281	0.187
	17	0.384	0.255	0.224	0.149	0.398	0.265	0.230	0.153	0.542	0.361	0.287	0.191
	18	0.395	0.263	0.227	0.151	0.410	0.273	0.233	0.155	0.573	0.381	0.292	0.194
	19	0.407	0.271	0.230	0.153	0.422	0.281	0.236	0.157	0.608	0.404	0.298	0.198
	20	0.420	0.280	0.233	0.155	0.436	0.290	0.239	0.159	0.647	0.430	0.304	0.202
	22	0.450	0.299	0.240	0.159	0.467	0.311	0.246	0.164	0.739	0.492	0.317	0.211
	24	0.485	0.323	0.246	0.164	0.503	0.335	0.253	0.168	0.856	0.570	0.331	0.220
	26	0.526	0.350	0.254	0.169	0.546	0.363	0.261	0.174	1.00	0.668	0.346	0.230
	28	0.574	0.382	0.261	0.174	0.596	0.396	0.269	0.179	1.16	0.774	0.362	0.241
	30	0.631	0.420	0.270	0.179	0.655	0.436	0.278	0.185	1.34	0.889	0.381	0.253
	32	0.698	0.464	0.278	0.185	0.724	0.482	0.287	0.191	1.52	1.01	0.401	0.267
	34	0.777	0.517	0.288	0.191	0.806	0.536	0.297	0.197	1.72	1.14	0.425	0.283
	36	0.871	0.579	0.298	0.198	0.904	0.601	0.307	0.204	1.92	1.28	0.456	0.304
	38	0.970	0.646	0.308	0.205	1.01	0.670	0.319	0.212	2.14	1.43	0.488	0.324
	40	1.08	0.715	0.320	0.213	1.12	0.742	0.331	0.220	2.38	1.58	0.519	0.345
	42	1.19	0.789	0.332	0.221	1.23	0.818	0.344	0.229	2.62	1.74	0.550	0.366
	44	1.30	0.866	0.345	0.230	1.35	0.898	0.358	0.238				
	46	1.42	0.946	0.365	0.243	1.48	0.982	0.380	0.253				
	48	1.55	1.03	0.385	0.256	1.61	1.07	0.401	0.267				
	50	1.68	1.12	0.405	0.270	1.74	1.16	0.422	0.281				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.29		0.856		1.32		0.878		2.10		1.40	
$t_y \times 10^3$, (kips)$^{-1}$		0.304		0.202		0.315		0.210		0.342		0.227	
$t_r \times 10^3$, (kips)$^{-1}$		0.373		0.249		0.387		0.258		0.420		0.280	
r_x/r_y		4.58				4.58				6.19			
r_y, in.		3.60				3.60				2.57			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W40×											
		327[h]				324				297[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.348	0.232	0.253	0.168	0.350	0.233	0.244	0.162	0.386	0.257	0.268	0.178
	11	0.422	0.281	0.261	0.174	0.387	0.258	0.244	0.162	0.424	0.282	0.268	0.178
	12	0.437	0.291	0.265	0.177	0.394	0.262	0.244	0.162	0.432	0.287	0.268	0.178
	13	0.455	0.303	0.270	0.180	0.403	0.268	0.245	0.163	0.441	0.293	0.270	0.179
	14	0.475	0.316	0.275	0.183	0.412	0.274	0.249	0.165	0.451	0.300	0.274	0.182
	15	0.497	0.331	0.280	0.186	0.422	0.281	0.252	0.168	0.462	0.308	0.278	0.185
	16	0.522	0.347	0.285	0.190	0.433	0.288	0.256	0.170	0.474	0.316	0.282	0.188
	17	0.550	0.366	0.290	0.193	0.444	0.296	0.259	0.173	0.488	0.325	0.286	0.190
	18	0.581	0.387	0.296	0.197	0.457	0.304	0.263	0.175	0.502	0.334	0.291	0.193
	19	0.616	0.410	0.302	0.201	0.471	0.314	0.267	0.178	0.518	0.345	0.295	0.197
	20	0.656	0.436	0.308	0.205	0.487	0.324	0.271	0.180	0.535	0.356	0.300	0.200
	22	0.749	0.498	0.321	0.213	0.522	0.347	0.279	0.186	0.575	0.382	0.310	0.206
	24	0.866	0.576	0.335	0.223	0.563	0.374	0.288	0.192	0.621	0.413	0.321	0.213
	26	1.01	0.675	0.350	0.233	0.611	0.406	0.298	0.198	0.675	0.449	0.332	0.221
	28	1.18	0.783	0.367	0.244	0.667	0.444	0.308	0.205	0.739	0.492	0.344	0.229
	30	1.35	0.899	0.385	0.256	0.734	0.488	0.319	0.212	0.815	0.542	0.357	0.238
	32	1.54	1.02	0.406	0.270	0.813	0.541	0.330	0.220	0.904	0.602	0.372	0.247
	34	1.73	1.15	0.430	0.286	0.907	0.603	0.343	0.228	1.01	0.674	0.387	0.257
	36	1.95	1.29	0.462	0.307	1.02	0.676	0.357	0.237	1.13	0.755	0.404	0.269
	38	2.17	1.44	0.494	0.329	1.13	0.754	0.371	0.247	1.26	0.841	0.422	0.281
	40	2.40	1.60	0.526	0.350	1.25	0.835	0.387	0.258	1.40	0.932	0.446	0.297
	42	2.65	1.76	0.557	0.371	1.38	0.921	0.408	0.272	1.54	1.03	0.478	0.318
	44					1.52	1.01	0.435	0.289	1.70	1.13	0.509	0.339
	46					1.66	1.10	0.461	0.307	1.85	1.23	0.541	0.360
	48					1.81	1.20	0.488	0.324	2.02	1.34	0.573	0.381
	50					1.96	1.30	0.514	0.342	2.19	1.46	0.605	0.403
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.12		1.41		1.49		0.992		1.66		1.10	
$t_y \times 10^3$, (kips)$^{-1}$		0.348		0.232		0.350		0.233		0.383		0.255	
$t_r \times 10^3$, (kips)$^{-1}$		0.428		0.285		0.430		0.287		0.470		0.313	
r_x/r_y		6.20				4.58				4.60			
r_y, in.		2.58				3.58				3.54			

[c] Shape is slender for compression with $F_y = 50$ ksi.

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

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

W40

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		294				278				277[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.387	0.258	0.281	0.187	0.406	0.270	0.299	0.199	0.425	0.283	0.285	0.190
	11	0.471	0.314	0.291	0.194	0.496	0.330	0.312	0.207	0.462	0.308	0.285	0.190
	12	0.489	0.325	0.296	0.197	0.515	0.343	0.318	0.211	0.470	0.313	0.285	0.190
	13	0.509	0.339	0.302	0.201	0.537	0.357	0.324	0.216	0.479	0.318	0.287	0.191
	14	0.532	0.354	0.308	0.205	0.562	0.374	0.331	0.220	0.488	0.325	0.291	0.193
	15	0.558	0.371	0.314	0.209	0.589	0.392	0.338	0.225	0.498	0.332	0.295	0.196
	16	0.586	0.390	0.321	0.214	0.620	0.413	0.345	0.229	0.510	0.339	0.300	0.199
	17	0.619	0.412	0.328	0.218	0.655	0.436	0.352	0.234	0.522	0.347	0.304	0.203
	18	0.655	0.436	0.335	0.223	0.694	0.462	0.360	0.240	0.536	0.357	0.309	0.206
	19	0.695	0.463	0.342	0.228	0.738	0.491	0.369	0.245	0.551	0.367	0.314	0.209
	20	0.740	0.493	0.350	0.233	0.788	0.524	0.377	0.251	0.569	0.379	0.320	0.213
	22	0.848	0.564	0.366	0.244	0.905	0.602	0.396	0.263	0.610	0.406	0.330	0.220
	24	0.985	0.655	0.384	0.256	1.06	0.702	0.416	0.277	0.658	0.438	0.342	0.228
	26	1.16	0.769	0.404	0.269	1.24	0.824	0.439	0.292	0.714	0.475	0.355	0.236
	28	1.34	0.892	0.426	0.284	1.44	0.956	0.464	0.309	0.780	0.519	0.368	0.245
	30	1.54	1.02	0.451	0.300	1.65	1.10	0.493	0.328	0.858	0.571	0.382	0.254
	32	1.75	1.16	0.482	0.320	1.88	1.25	0.535	0.356	0.950	0.632	0.398	0.265
	34	1.98	1.31	0.521	0.347	2.12	1.41	0.580	0.386	1.06	0.705	0.415	0.276
	36	2.22	1.47	0.561	0.373	2.38	1.58	0.624	0.415	1.19	0.791	0.434	0.289
	38	2.47	1.64	0.601	0.400	2.65	1.76	0.669	0.445	1.32	0.881	0.454	0.302
	40	2.73	1.82	0.640	0.426	2.93	1.95	0.714	0.475	1.47	0.976	0.484	0.322
	42	3.02	2.01	0.679	0.452	3.23	2.15	0.758	0.504	1.62	1.08	0.519	0.345
	44									1.78	1.18	0.555	0.369
	46									1.94	1.29	0.590	0.393
	48									2.11	1.41	0.625	0.416
	50									2.29	1.53	0.661	0.440
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.38		1.58		2.56		1.70		1.75		1.16	
$t_y \times 10^3$, (kips)$^{-1}$		0.387		0.258		0.406		0.270		0.410		0.273	
$t_r \times 10^3$, (kips)$^{-1}$		0.476		0.317		0.498		0.332		0.503		0.336	
r_x/r_y		6.24				6.27				4.58			
r_y, in.		2.55				2.52				3.58			

[c] Shape is slender for compression with F_y = 50 ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W40×											
		264				249[c]				235[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.432	0.287	0.315	0.210	0.483	0.321	0.318	0.212	0.504	0.335	0.353	0.235
	11	0.527	0.351	0.329	0.219	0.525	0.349	0.318	0.212	0.595	0.396	0.368	0.245
	12	0.548	0.365	0.335	0.223	0.534	0.355	0.318	0.212	0.615	0.409	0.376	0.250
	13	0.571	0.380	0.342	0.228	0.543	0.361	0.320	0.213	0.638	0.424	0.384	0.255
	14	0.597	0.397	0.349	0.233	0.554	0.368	0.325	0.217	0.666	0.443	0.393	0.261
	15	0.627	0.417	0.357	0.238	0.565	0.376	0.331	0.220	0.698	0.464	0.402	0.267
	16	0.660	0.439	0.365	0.243	0.578	0.385	0.336	0.224	0.734	0.488	0.411	0.274
	17	0.697	0.464	0.373	0.248	0.592	0.394	0.342	0.227	0.775	0.515	0.421	0.280
	18	0.738	0.491	0.382	0.254	0.608	0.404	0.347	0.231	0.820	0.546	0.431	0.287
	19	0.785	0.522	0.391	0.260	0.625	0.416	0.353	0.235	0.871	0.580	0.442	0.294
	20	0.838	0.557	0.401	0.267	0.643	0.428	0.359	0.239	0.928	0.618	0.454	0.302
	22	0.963	0.641	0.421	0.280	0.685	0.456	0.372	0.248	1.06	0.709	0.479	0.319
	24	1.12	0.747	0.444	0.295	0.736	0.490	0.386	0.257	1.24	0.823	0.507	0.337
	26	1.32	0.877	0.469	0.312	0.799	0.532	0.401	0.267	1.45	0.967	0.538	0.358
	28	1.53	1.02	0.498	0.331	0.875	0.582	0.417	0.278	1.68	1.12	0.573	0.381
	30	1.75	1.17	0.533	0.354	0.964	0.641	0.435	0.289	1.93	1.29	0.629	0.419
	32	2.00	1.33	0.582	0.387	1.07	0.711	0.454	0.302	2.20	1.46	0.690	0.459
	34	2.25	1.50	0.632	0.420	1.20	0.795	0.475	0.316	2.48	1.65	0.750	0.499
	36	2.53	1.68	0.681	0.453	1.34	0.892	0.498	0.331	2.79	1.85	0.811	0.540
	38	2.81	1.87	0.730	0.486	1.49	0.994	0.530	0.353	3.10	2.06	0.872	0.580
	40	3.12	2.07	0.780	0.519	1.65	1.10	0.573	0.381	3.44	2.29	0.932	0.620
	42	3.44	2.29	0.829	0.552	1.82	1.21	0.616	0.410	3.79	2.52	0.993	0.661
	44					2.00	1.33	0.659	0.438				
	46					2.19	1.46	0.702	0.467				
	48					2.38	1.59	0.746	0.496				
	50					2.59	1.72	0.790	0.525				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.70		1.80		1.96		1.30		3.02		2.01	
$t_y \times 10^3$, (kips)$^{-1}$		0.432		0.287		0.454		0.302		0.483		0.322	
$t_r \times 10^3$, (kips)$^{-1}$		0.530		0.353		0.558		0.372		0.594		0.396	
r_x/r_y		6.27				4.59				6.26			
r_y, in.		2.52				3.55				2.54			

[c] Shape is slender for compression with F_y = 50 ksi.

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

W40

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W40×											
		215[c]				211[c]				199[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.578	0.385	0.370	0.246	0.578	0.385	0.393	0.262	0.629	0.419	0.410	0.273
	11	0.627	0.417	0.370	0.246	0.681	0.453	0.412	0.274	0.685	0.456	0.410	0.273
	12	0.637	0.424	0.370	0.246	0.704	0.468	0.422	0.281	0.696	0.463	0.410	0.273
	13	0.648	0.431	0.373	0.248	0.729	0.485	0.432	0.287	0.708	0.471	0.416	0.277
	14	0.661	0.440	0.379	0.252	0.759	0.505	0.442	0.294	0.722	0.481	0.423	0.282
	15	0.674	0.448	0.385	0.256	0.792	0.527	0.453	0.301	0.738	0.491	0.431	0.287
	16	0.689	0.458	0.392	0.261	0.830	0.552	0.464	0.309	0.754	0.502	0.439	0.292
	17	0.705	0.469	0.399	0.265	0.873	0.581	0.476	0.317	0.773	0.514	0.447	0.297
	18	0.723	0.481	0.406	0.270	0.924	0.615	0.489	0.325	0.793	0.528	0.455	0.303
	19	0.742	0.494	0.413	0.275	0.983	0.654	0.503	0.334	0.815	0.543	0.464	0.309
	20	0.764	0.508	0.421	0.280	1.05	0.698	0.517	0.344	0.840	0.559	0.473	0.315
	22	0.812	0.540	0.437	0.291	1.21	0.803	0.548	0.364	0.896	0.596	0.493	0.328
	24	0.870	0.579	0.455	0.303	1.41	0.938	0.582	0.388	0.963	0.640	0.514	0.342
	26	0.939	0.625	0.474	0.315	1.66	1.10	0.622	0.414	1.04	0.694	0.537	0.357
	28	1.02	0.680	0.495	0.329	1.92	1.28	0.679	0.452	1.14	0.759	0.562	0.374
	30	1.12	0.746	0.517	0.344	2.20	1.47	0.753	0.501	1.26	0.838	0.590	0.393
	32	1.24	0.827	0.542	0.361	2.51	1.67	0.827	0.550	1.41	0.935	0.621	0.413
	34	1.39	0.926	0.569	0.379	2.83	1.88	0.902	0.600	1.58	1.05	0.655	0.436
	36	1.56	1.04	0.605	0.403	3.17	2.11	0.978	0.650	1.77	1.18	0.716	0.476
	38	1.74	1.16	0.660	0.439	3.54	2.35	1.05	0.701	1.98	1.32	0.782	0.520
	40	1.93	1.28	0.715	0.476	3.92	2.61	1.13	0.751	2.19	1.46	0.849	0.565
	42	2.12	1.41	0.771	0.513					2.41	1.61	0.918	0.610
	44	2.33	1.55	0.828	0.551					2.65	1.76	0.987	0.657
	46	2.55	1.69	0.885	0.589					2.90	1.93	1.06	0.703
	48	2.77	1.85	0.942	0.627					3.15	2.10	1.13	0.750
	50	3.01	2.00	1.00	0.665					3.42	2.28	1.20	0.797
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.28		1.52		3.39		2.26		2.60		1.73	
$t_y \times 10^3$, (kips)$^{-1}$		0.526		0.350		0.538		0.358		0.568		0.378	
$t_r \times 10^3$, (kips)$^{-1}$		0.646		0.431		0.661		0.440		0.698		0.465	
r_x/r_y		4.58				6.29				4.64			
r_y, in.		3.54				2.51				3.45			

[c] Shape is slender for compression with F_y = 50 ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W40×											
		183[c]				167[c]				149[c, v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.702	0.467	0.460	0.306	0.767	0.510	0.514	0.342	0.883	0.587	0.596	0.396
	11	0.823	0.548	0.485	0.323	0.907	0.603	0.547	0.364	1.05	0.701	0.644	0.429
	12	0.850	0.565	0.497	0.330	0.937	0.624	0.562	0.374	1.09	0.727	0.663	0.441
	13	0.880	0.585	0.509	0.339	0.973	0.647	0.577	0.384	1.14	0.756	0.682	0.454
	14	0.914	0.608	0.522	0.348	1.01	0.674	0.593	0.395	1.19	0.790	0.703	0.468
	15	0.953	0.634	0.536	0.357	1.06	0.705	0.610	0.406	1.25	0.828	0.725	0.483
	16	0.997	0.663	0.551	0.367	1.11	0.739	0.628	0.418	1.31	0.873	0.749	0.498
	17	1.05	0.696	0.567	0.377	1.17	0.779	0.647	0.431	1.39	0.925	0.774	0.515
	18	1.10	0.734	0.583	0.388	1.24	0.825	0.668	0.444	1.48	0.984	0.801	0.533
	19	1.17	0.777	0.600	0.399	1.32	0.878	0.689	0.459	1.58	1.05	0.830	0.552
	20	1.24	0.826	0.619	0.412	1.41	0.938	0.712	0.474	1.70	1.13	0.861	0.573
	22	1.43	0.948	0.659	0.439	1.64	1.09	0.763	0.508	2.02	1.34	0.930	0.619
	24	1.67	1.11	0.705	0.469	1.94	1.29	0.822	0.547	2.40	1.60	1.03	0.683
	26	1.96	1.30	0.763	0.507	2.28	1.52	0.919	0.611	2.82	1.88	1.18	0.783
	28	2.27	1.51	0.859	0.571	2.65	1.76	1.04	0.690	3.27	2.18	1.33	0.887
	30	2.61	1.74	0.957	0.636	3.04	2.02	1.16	0.771	3.75	2.50	1.49	0.993
	32	2.97	1.98	1.06	0.702	3.45	2.30	1.28	0.853	4.27	2.84	1.66	1.10
	34	3.35	2.23	1.16	0.769	3.90	2.59	1.41	0.937	4.82	3.21	1.82	1.21
	36	3.76	2.50	1.26	0.837	4.37	2.91	1.53	1.02	5.41	3.60	1.99	1.33
	38	4.19	2.79	1.36	0.905	4.87	3.24	1.66	1.11	6.02	4.01	2.16	1.44
	40	4.64	3.09	1.46	0.973	5.40	3.59	1.79	1.19				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		4.03		2.68		4.69		3.12		5.74		3.82	
$t_y \times 10^3$, (kips)$^{-1}$		0.627		0.417		0.677		0.451		0.763		0.507	
$t_r \times 10^3$, (kips)$^{-1}$		0.770		0.513		0.832		0.555		0.937		0.624	
r_x/r_y		6.31				6.38				6.55			
r_y, in.		2.49				2.40				2.29			

[c] Shape is slender for compression with $F_y = 50$ ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with $F_y = 50$ ksi; therefore, $\phi_v = 0.90$ and $\Omega_v = 1.67$.
Note: Heavy line indicates KL/r_y equal to or greater than 200.

W36

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		652[h]				529[h]				487[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.174	0.116	0.122	0.0815	0.214	0.142	0.153	0.102	0.234	0.155	0.167	0.111
	11	0.188	0.125	0.122	0.0815	0.232	0.154	0.153	0.102	0.253	0.169	0.167	0.111
	12	0.190	0.127	0.122	0.0815	0.235	0.157	0.153	0.102	0.257	0.171	0.167	0.111
	13	0.193	0.129	0.122	0.0815	0.239	0.159	0.153	0.102	0.262	0.174	0.167	0.111
	14	0.197	0.131	0.122	0.0815	0.244	0.162	0.153	0.102	0.266	0.177	0.167	0.111
	15	0.200	0.133	0.123	0.0817	0.248	0.165	0.154	0.102	0.272	0.181	0.169	0.112
	16	0.204	0.136	0.124	0.0823	0.253	0.169	0.155	0.103	0.277	0.185	0.170	0.113
	17	0.208	0.139	0.124	0.0828	0.259	0.172	0.157	0.104	0.284	0.189	0.172	0.114
	18	0.213	0.142	0.125	0.0833	0.265	0.176	0.158	0.105	0.290	0.193	0.173	0.115
	19	0.218	0.145	0.126	0.0839	0.272	0.181	0.159	0.106	0.298	0.198	0.175	0.116
	20	0.223	0.149	0.127	0.0845	0.279	0.185	0.160	0.107	0.306	0.203	0.176	0.117
	22	0.236	0.157	0.129	0.0856	0.294	0.196	0.163	0.109	0.323	0.215	0.180	0.120
	24	0.250	0.166	0.130	0.0868	0.313	0.208	0.166	0.110	0.344	0.229	0.183	0.122
	26	0.266	0.177	0.132	0.0880	0.334	0.222	0.169	0.112	0.368	0.245	0.187	0.124
	28	0.284	0.189	0.134	0.0892	0.359	0.239	0.172	0.114	0.395	0.263	0.190	0.127
	30	0.306	0.203	0.136	0.0905	0.387	0.258	0.175	0.117	0.427	0.284	0.194	0.129
	32	0.330	0.220	0.138	0.0918	0.420	0.279	0.178	0.119	0.465	0.309	0.198	0.132
	34	0.359	0.239	0.140	0.0932	0.458	0.305	0.182	0.121	0.508	0.338	0.202	0.135
	36	0.392	0.261	0.142	0.0946	0.502	0.334	0.185	0.123	0.558	0.371	0.207	0.138
	38	0.430	0.286	0.144	0.0960	0.554	0.369	0.189	0.126	0.617	0.410	0.211	0.141
	40	0.475	0.316	0.147	0.0975	0.614	0.409	0.193	0.128	0.684	0.455	0.216	0.144
	42	0.524	0.348	0.149	0.0990	0.677	0.450	0.197	0.131	0.754	0.501	0.221	0.147
	44	0.575	0.382	0.151	0.101	0.743	0.494	0.201	0.134	0.827	0.550	0.226	0.150
	46	0.628	0.418	0.154	0.102	0.812	0.540	0.205	0.137	0.904	0.601	0.232	0.154
	48	0.684	0.455	0.156	0.104	0.884	0.588	0.210	0.140	0.984	0.655	0.237	0.158
	50	0.742	0.494	0.159	0.106	0.960	0.638	0.215	0.143	1.07	0.711	0.243	0.162
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.613		0.408		0.785		0.522		0.865		0.575	
$t_y \times 10^3$, (kips)$^{-1}$		0.174		0.116		0.214		0.142		0.234		0.155	
$t_r \times 10^3$, (kips)$^{-1}$		0.214		0.142		0.263		0.175		0.287		0.191	
r_x/r_y		3.95				4.00				3.99			
r_y, in.		4.10				4.00				3.96			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W36

Shape		W36×											
		441[h]				395[h]				361[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.257	0.171	0.187	0.124	0.288	0.192	0.208	0.139	0.315	0.210	0.230	0.153
	11	0.279	0.186	0.187	0.124	0.313	0.208	0.208	0.139	0.343	0.228	0.230	0.153
	12	0.284	0.189	0.187	0.124	0.318	0.212	0.208	0.139	0.349	0.232	0.230	0.153
	13	0.288	0.192	0.187	0.124	0.324	0.216	0.208	0.139	0.355	0.236	0.230	0.153
	14	0.294	0.196	0.187	0.124	0.330	0.220	0.209	0.139	0.362	0.241	0.231	0.154
	15	0.300	0.199	0.189	0.125	0.337	0.224	0.211	0.141	0.370	0.246	0.234	0.155
	16	0.306	0.204	0.190	0.127	0.344	0.229	0.213	0.142	0.378	0.251	0.236	0.157
	17	0.313	0.208	0.192	0.128	0.352	0.234	0.216	0.144	0.387	0.257	0.239	0.159
	18	0.321	0.213	0.194	0.129	0.361	0.240	0.218	0.145	0.397	0.264	0.242	0.161
	19	0.329	0.219	0.196	0.130	0.371	0.247	0.221	0.147	0.407	0.271	0.245	0.163
	20	0.338	0.225	0.198	0.132	0.381	0.253	0.223	0.148	0.419	0.279	0.248	0.165
	22	0.358	0.238	0.202	0.135	0.404	0.269	0.228	0.152	0.444	0.296	0.254	0.169
	24	0.381	0.254	0.206	0.137	0.431	0.287	0.234	0.155	0.474	0.316	0.260	0.173
	26	0.408	0.272	0.211	0.140	0.462	0.307	0.239	0.159	0.509	0.339	0.267	0.178
	28	0.440	0.293	0.215	0.143	0.498	0.331	0.245	0.163	0.550	0.366	0.274	0.183
	30	0.476	0.317	0.220	0.147	0.540	0.359	0.251	0.167	0.597	0.397	0.282	0.188
	32	0.518	0.345	0.225	0.150	0.589	0.392	0.258	0.172	0.652	0.434	0.290	0.193
	34	0.567	0.377	0.231	0.153	0.646	0.430	0.265	0.176	0.716	0.477	0.299	0.199
	36	0.624	0.415	0.236	0.157	0.713	0.474	0.272	0.181	0.791	0.526	0.308	0.205
	38	0.693	0.461	0.242	0.161	0.792	0.527	0.280	0.186	0.880	0.586	0.317	0.211
	40	0.767	0.511	0.248	0.165	0.878	0.584	0.288	0.191	0.976	0.649	0.327	0.218
	42	0.846	0.563	0.255	0.169	0.968	0.644	0.296	0.197	1.08	0.716	0.338	0.225
	44	0.928	0.618	0.261	0.174	1.06	0.707	0.305	0.203	1.18	0.785	0.350	0.233
	46	1.01	0.675	0.269	0.179	1.16	0.772	0.315	0.210	1.29	0.858	0.362	0.241
	48	1.10	0.735	0.276	0.184	1.26	0.841	0.325	0.216	1.40	0.935	0.376	0.250
	50	1.20	0.798	0.284	0.189	1.37	0.913	0.336	0.224	1.52	1.01	0.395	0.263
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.968		0.644		1.10		0.729		1.22		0.809	
$t_y \times 10^3$, (kips)$^{-1}$		0.257		0.171		0.288		0.192		0.315		0.210	
$t_r \times 10^3$, (kips)$^{-1}$		0.316		0.210		0.354		0.236		0.387		0.258	
r_x/r_y		4.01				4.05				4.05			
r_y, in.		3.92				3.88				3.85			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

W36

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		330				302				282[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.345	0.229	0.253	0.168	0.375	0.250	0.278	0.185	0.404	0.269	0.299	0.199
	11	0.376	0.250	0.253	0.168	0.410	0.272	0.278	0.185	0.440	0.293	0.299	0.199
	12	0.382	0.254	0.253	0.168	0.416	0.277	0.278	0.185	0.447	0.298	0.299	0.199
	13	0.389	0.259	0.253	0.168	0.424	0.282	0.278	0.185	0.456	0.303	0.299	0.199
	14	0.397	0.264	0.254	0.169	0.432	0.288	0.280	0.186	0.465	0.309	0.302	0.201
	15	0.405	0.270	0.257	0.171	0.441	0.294	0.284	0.189	0.475	0.316	0.306	0.203
	16	0.414	0.276	0.260	0.173	0.451	0.300	0.287	0.191	0.486	0.323	0.310	0.206
	17	0.424	0.282	0.264	0.175	0.462	0.308	0.291	0.194	0.497	0.331	0.314	0.209
	18	0.435	0.289	0.267	0.178	0.474	0.315	0.295	0.196	0.510	0.339	0.319	0.212
	19	0.447	0.297	0.270	0.180	0.487	0.324	0.299	0.199	0.524	0.349	0.323	0.215
	20	0.459	0.306	0.274	0.182	0.501	0.333	0.303	0.202	0.539	0.359	0.328	0.218
	22	0.488	0.325	0.281	0.187	0.532	0.354	0.312	0.208	0.573	0.382	0.338	0.225
	24	0.521	0.347	0.289	0.192	0.569	0.378	0.321	0.214	0.613	0.408	0.348	0.232
	26	0.560	0.373	0.297	0.198	0.611	0.407	0.331	0.220	0.660	0.439	0.359	0.239
	28	0.605	0.403	0.306	0.204	0.661	0.440	0.341	0.227	0.714	0.475	0.371	0.247
	30	0.658	0.438	0.315	0.210	0.718	0.478	0.352	0.234	0.777	0.517	0.384	0.255
	32	0.719	0.478	0.325	0.216	0.786	0.523	0.364	0.242	0.850	0.566	0.397	0.264
	34	0.790	0.526	0.335	0.223	0.864	0.575	0.376	0.250	0.936	0.623	0.412	0.274
	36	0.874	0.581	0.346	0.230	0.956	0.636	0.389	0.259	1.04	0.690	0.428	0.284
	38	0.973	0.648	0.358	0.238	1.07	0.709	0.404	0.269	1.16	0.769	0.444	0.296
	40	1.08	0.717	0.371	0.247	1.18	0.785	0.419	0.279	1.28	0.852	0.463	0.308
	42	1.19	0.791	0.384	0.256	1.30	0.866	0.436	0.290	1.41	0.939	0.482	0.321
	44	1.30	0.868	0.399	0.265	1.43	0.950	0.456	0.303	1.55	1.03	0.514	0.342
	46	1.43	0.949	0.417	0.277	1.56	1.04	0.484	0.322	1.69	1.13	0.547	0.364
	48	1.55	1.03	0.441	0.293	1.70	1.13	0.513	0.341	1.84	1.23	0.580	0.386
	50	1.69	1.12	0.465	0.309	1.84	1.23	0.541	0.360	2.00	1.33	0.612	0.407
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.34		0.894		1.48		0.984		1.60		1.06	
$t_y \times 10^3$, (kips)$^{-1}$		0.345		0.229		0.375		0.250		0.403		0.268	
$t_r \times 10^3$, (kips)$^{-1}$		0.423		0.282		0.461		0.307		0.495		0.330	
r_x/r_y		4.05				4.03				4.05			
r_y, in.		3.83				3.82				3.80			

[c] Shape is slender for compression with F_y = 50 ksi.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W36

Shape		W36×											
		262[c]				256				247[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.440	0.293	0.324	0.215	0.444	0.295	0.343	0.228	0.475	0.316	0.346	0.230
	11	0.476	0.317	0.324	0.215	0.532	0.354	0.353	0.235	0.513	0.341	0.346	0.230
	12	0.483	0.322	0.324	0.215	0.550	0.366	0.360	0.239	0.521	0.347	0.346	0.230
	13	0.491	0.327	0.324	0.215	0.571	0.380	0.367	0.244	0.530	0.352	0.346	0.230
	14	0.501	0.333	0.327	0.218	0.595	0.396	0.374	0.249	0.539	0.359	0.350	0.233
	15	0.512	0.340	0.332	0.221	0.622	0.414	0.381	0.254	0.550	0.366	0.355	0.236
	16	0.524	0.348	0.337	0.224	0.651	0.433	0.389	0.259	0.561	0.373	0.360	0.240
	17	0.537	0.357	0.342	0.227	0.684	0.455	0.397	0.264	0.574	0.382	0.366	0.243
	18	0.551	0.366	0.347	0.231	0.721	0.480	0.406	0.270	0.588	0.391	0.372	0.247
	19	0.566	0.377	0.352	0.234	0.762	0.507	0.414	0.276	0.605	0.402	0.378	0.251
	20	0.583	0.388	0.357	0.238	0.808	0.538	0.424	0.282	0.623	0.414	0.384	0.255
	22	0.620	0.413	0.369	0.245	0.916	0.610	0.443	0.295	0.663	0.441	0.396	0.264
	24	0.664	0.442	0.381	0.253	1.05	0.700	0.465	0.309	0.711	0.473	0.410	0.273
	26	0.716	0.476	0.394	0.262	1.22	0.815	0.489	0.325	0.766	0.510	0.424	0.282
	28	0.776	0.516	0.408	0.271	1.42	0.945	0.515	0.343	0.831	0.553	0.440	0.293
	30	0.846	0.563	0.423	0.281	1.63	1.08	0.545	0.362	0.907	0.603	0.457	0.304
	32	0.928	0.617	0.439	0.292	1.86	1.23	0.582	0.387	0.996	0.663	0.475	0.316
	34	1.02	0.681	0.456	0.303	2.09	1.39	0.632	0.420	1.10	0.732	0.495	0.329
	36	1.14	0.757	0.474	0.316	2.35	1.56	0.681	0.453	1.22	0.815	0.516	0.343
	38	1.27	0.843	0.495	0.329	2.62	1.74	0.730	0.486	1.36	0.908	0.539	0.359
	40	1.40	0.934	0.517	0.344	2.90	1.93	0.779	0.519	1.51	1.01	0.570	0.379
	42	1.55	1.03	0.551	0.367	3.20	2.13	0.828	0.551	1.67	1.11	0.613	0.408
	44	1.70	1.13	0.589	0.392	3.51	2.33	0.877	0.584	1.83	1.22	0.657	0.437
	46	1.86	1.24	0.628	0.418					2.00	1.33	0.700	0.466
	48	2.02	1.35	0.666	0.443					2.18	1.45	0.744	0.495
	50	2.19	1.46	0.705	0.469					2.36	1.57	0.788	0.524
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.75		1.16		2.60		1.73		1.88		1.25	
$t_y \times 10^3$, (kips)$^{-1}$		0.433		0.288		0.444		0.295		0.461		0.307	
$t_r \times 10^3$, (kips)$^{-1}$		0.531		0.354		0.545		0.363		0.566		0.377	
r_x/r_y		4.07				5.62				4.06			
r_y, in.		3.76				2.65				3.74			

[c] Shape is slender for compression with F_y = 50 ksi.

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

W36

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		232[c]				231[c]				210[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.498	0.331	0.381	0.253	0.511	0.340	0.370	0.246	0.555	0.369	0.428	0.285
	11	0.591	0.393	0.394	0.262	0.553	0.368	0.370	0.246	0.653	0.435	0.445	0.296
	12	0.613	0.408	0.402	0.267	0.561	0.373	0.370	0.246	0.678	0.451	0.454	0.302
	13	0.637	0.424	0.410	0.273	0.570	0.379	0.370	0.246	0.705	0.469	0.465	0.309
	14	0.663	0.441	0.419	0.278	0.581	0.386	0.375	0.249	0.736	0.489	0.475	0.316
	15	0.694	0.461	0.427	0.284	0.592	0.394	0.381	0.253	0.770	0.512	0.486	0.323
	16	0.727	0.484	0.437	0.291	0.604	0.402	0.387	0.257	0.809	0.538	0.498	0.331
	17	0.765	0.509	0.447	0.297	0.618	0.411	0.393	0.261	0.852	0.567	0.510	0.339
	18	0.807	0.537	0.457	0.304	0.633	0.421	0.399	0.266	0.901	0.599	0.523	0.348
	19	0.855	0.569	0.468	0.311	0.649	0.432	0.406	0.270	0.955	0.635	0.536	0.357
	20	0.907	0.604	0.479	0.319	0.667	0.444	0.412	0.274	1.02	0.676	0.550	0.366
	22	1.03	0.687	0.503	0.335	0.709	0.472	0.426	0.284	1.16	0.772	0.580	0.386
	24	1.19	0.791	0.530	0.352	0.761	0.506	0.442	0.294	1.34	0.893	0.614	0.409
	26	1.39	0.923	0.559	0.372	0.821	0.546	0.458	0.305	1.57	1.05	0.653	0.434
	28	1.61	1.07	0.592	0.394	0.892	0.594	0.476	0.316	1.82	1.21	0.696	0.463
	30	1.85	1.23	0.631	0.420	0.975	0.649	0.494	0.329	2.09	1.39	0.765	0.509
	32	2.10	1.40	0.691	0.460	1.07	0.713	0.515	0.343	2.38	1.58	0.841	0.559
	34	2.37	1.58	0.751	0.500	1.19	0.789	0.537	0.357	2.69	1.79	0.917	0.610
	36	2.66	1.77	0.812	0.540	1.32	0.880	0.562	0.374	3.01	2.00	0.993	0.661
	38	2.96	1.97	0.872	0.580	1.47	0.981	0.588	0.391	3.36	2.23	1.07	0.712
	40	3.28	2.18	0.932	0.620	1.63	1.09	0.631	0.420	3.72	2.48	1.15	0.763
	42	3.62	2.41	0.992	0.660	1.80	1.20	0.680	0.452	4.10	2.73	1.220	0.814
	44					1.98	1.31	0.729	0.485				
	46					2.16	1.44	0.778	0.518				
	48					2.35	1.56	0.828	0.551				
	50					2.55	1.70	0.878	0.584				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.92		1.94		2.02		1.35		3.33		2.22	
$t_y \times 10^3$, (kips)$^{-1}$		0.491		0.327		0.490		0.326		0.540		0.359	
$t_r \times 10^3$, (kips)$^{-1}$		0.603		0.402		0.602		0.401		0.663		0.442	
r_x/r_y		5.65				4.07				5.66			
r_y, in.		2.62				3.71				2.58			

[c] Shape is slender for compression with F_y = 50 ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W36×											
		194[c]				182[c]				170[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.618	0.411	0.464	0.309	0.669	0.445	0.496	0.330	0.732	0.487	0.533	0.355
	11	0.725	0.483	0.485	0.322	0.783	0.521	0.519	0.345	0.856	0.569	0.559	0.372
	12	0.749	0.498	0.496	0.330	0.808	0.538	0.531	0.353	0.883	0.587	0.573	0.381
	13	0.775	0.516	0.507	0.337	0.837	0.557	0.544	0.362	0.913	0.608	0.587	0.390
	14	0.806	0.536	0.519	0.345	0.869	0.578	0.557	0.371	0.948	0.631	0.602	0.400
	15	0.841	0.560	0.532	0.354	0.905	0.602	0.571	0.380	0.988	0.657	0.617	0.411
	16	0.884	0.588	0.545	0.363	0.947	0.630	0.586	0.390	1.03	0.687	0.634	0.422
	17	0.932	0.620	0.559	0.372	0.995	0.662	0.601	0.400	1.08	0.721	0.651	0.433
	18	0.986	0.656	0.574	0.382	1.05	0.701	0.618	0.411	1.14	0.760	0.670	0.445
	19	1.05	0.696	0.589	0.392	1.12	0.744	0.635	0.422	1.21	0.805	0.689	0.458
	20	1.11	0.741	0.606	0.403	1.19	0.792	0.653	0.435	1.29	0.858	0.710	0.472
	22	1.28	0.848	0.641	0.427	1.36	0.908	0.693	0.461	1.48	0.985	0.755	0.502
	24	1.48	0.984	0.681	0.453	1.58	1.05	0.738	0.491	1.72	1.15	0.806	0.536
	26	1.73	1.15	0.726	0.483	1.86	1.24	0.789	0.525	2.02	1.35	0.864	0.575
	28	2.01	1.34	0.786	0.523	2.16	1.43	0.868	0.577	2.35	1.56	0.966	0.643
	30	2.31	1.54	0.873	0.581	2.47	1.65	0.966	0.642	2.69	1.79	1.08	0.717
	32	2.63	1.75	0.961	0.639	2.81	1.87	1.07	0.709	3.07	2.04	1.19	0.792
	34	2.96	1.97	1.05	0.699	3.18	2.11	1.17	0.775	3.46	2.30	1.31	0.869
	36	3.32	2.21	1.14	0.758	3.56	2.37	1.27	0.843	3.88	2.58	1.42	0.946
	38	3.70	2.46	1.23	0.818	3.97	2.64	1.37	0.911	4.32	2.88	1.54	1.02
	40	4.10	2.73	1.32	0.878	4.40	2.93	1.47	0.979	4.79	3.19	1.66	1.10
	42	4.52	3.01	1.41	0.938	4.85	3.23	1.57	1.05	5.28	3.51	1.77	1.18
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		3.65		2.43		3.93		2.61		4.25		2.83	
$t_y \times 10^3$, (kips)$^{-1}$		0.586		0.390		0.623		0.415		0.668		0.444	
$t_r \times 10^3$, (kips)$^{-1}$		0.720		0.480		0.765		0.510		0.821		0.547	
r_x/r_y		5.70				5.69				5.73			
r_y, in.		2.56				2.55				2.53			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W36

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W36×											
		160[c]				150[c]				135[c, v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.791	0.526	0.571	0.380	0.851	0.566	0.613	0.408	0.967	0.643	0.700	0.466
	11	0.925	0.616	0.601	0.400	0.997	0.663	0.648	0.431	1.14	0.758	0.748	0.498
	12	0.955	0.635	0.616	0.410	1.03	0.684	0.665	0.442	1.18	0.783	0.769	0.512
	13	0.988	0.657	0.632	0.420	1.06	0.709	0.682	0.454	1.22	0.812	0.791	0.526
	14	1.03	0.683	0.648	0.431	1.11	0.736	0.701	0.466	1.27	0.845	0.814	0.541
	15	1.07	0.711	0.666	0.443	1.15	0.767	0.721	0.479	1.33	0.883	0.838	0.558
	16	1.12	0.744	0.684	0.455	1.21	0.803	0.741	0.493	1.39	0.927	0.864	0.575
	17	1.17	0.781	0.703	0.468	1.27	0.844	0.763	0.508	1.47	0.977	0.892	0.593
	18	1.24	0.824	0.724	0.482	1.34	0.890	0.786	0.523	1.55	1.03	0.921	0.613
	19	1.31	0.872	0.746	0.496	1.42	0.943	0.811	0.540	1.65	1.10	0.952	0.634
	20	1.39	0.928	0.769	0.511	1.51	1.00	0.837	0.557	1.77	1.18	0.986	0.656
	22	1.61	1.07	0.820	0.545	1.74	1.16	0.895	0.596	2.06	1.37	1.06	0.706
	24	1.88	1.25	0.878	0.584	2.04	1.36	0.962	0.640	2.44	1.62	1.15	0.763
	26	2.20	1.47	0.950	0.632	2.40	1.59	1.06	0.706	2.87	1.91	1.31	0.871
	28	2.56	1.70	1.07	0.714	2.78	1.85	1.20	0.799	3.32	2.21	1.49	0.989
	30	2.94	1.95	1.20	0.797	3.19	2.12	1.34	0.894	3.82	2.54	1.67	1.11
	32	3.34	2.22	1.33	0.883	3.63	2.42	1.49	0.991	4.34	2.89	1.85	1.23
	34	3.77	2.51	1.46	0.969	4.10	2.73	1.64	1.09	4.90	3.26	2.05	1.36
	36	4.23	2.81	1.59	1.06	4.59	3.06	1.79	1.19	5.49	3.66	2.24	1.49
	38	4.71	3.13	1.72	1.15	5.12	3.41	1.94	1.29	6.12	4.07	2.44	1.62
	40	5.22	3.47	1.86	1.23	5.67	3.77	2.10	1.40				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		4.61		3.07		5.02		3.34		5.97		3.97	
$t_y \times 10^3$, (kips)$^{-1}$		0.711		0.473		0.754		0.502		0.837		0.557	
$t_r \times 10^3$, (kips)$^{-1}$		0.873		0.582		0.926		0.617		1.030		0.685	
r_x/r_y		5.76				5.79				5.88			
r_y, in.		2.50				2.47				2.38			

[c] Shape is slender for compression with $F_y = 50$ ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with $F_y = 50$ ksi; therefore, $\phi_v = 0.90$ and $\Omega_v = 1.67$.
Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W33×											
		387[h]				354[h]				318			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.293	0.195	0.228	0.152	0.321	0.214	0.251	0.167	0.356	0.237	0.281	0.187
	11	0.320	0.213	0.228	0.152	0.352	0.234	0.251	0.167	0.391	0.260	0.281	0.187
	12	0.326	0.217	0.228	0.152	0.358	0.238	0.251	0.167	0.398	0.265	0.281	0.187
	13	0.332	0.221	0.228	0.152	0.365	0.243	0.251	0.167	0.406	0.270	0.281	0.187
	14	0.339	0.225	0.230	0.153	0.372	0.248	0.253	0.168	0.414	0.276	0.283	0.189
	15	0.346	0.230	0.232	0.155	0.380	0.253	0.256	0.170	0.423	0.282	0.287	0.191
	16	0.354	0.236	0.235	0.156	0.389	0.259	0.259	0.172	0.434	0.288	0.290	0.193
	17	0.363	0.241	0.237	0.158	0.399	0.266	0.261	0.174	0.445	0.296	0.294	0.195
	18	0.372	0.248	0.239	0.159	0.410	0.273	0.264	0.176	0.457	0.304	0.297	0.198
	19	0.383	0.255	0.242	0.161	0.421	0.280	0.267	0.178	0.470	0.313	0.301	0.200
	20	0.394	0.262	0.244	0.163	0.434	0.289	0.270	0.180	0.484	0.322	0.305	0.203
	22	0.419	0.279	0.250	0.166	0.462	0.308	0.277	0.184	0.516	0.343	0.313	0.208
	24	0.449	0.299	0.255	0.170	0.495	0.330	0.283	0.189	0.554	0.368	0.321	0.214
	26	0.483	0.322	0.261	0.174	0.534	0.355	0.290	0.193	0.598	0.398	0.330	0.220
	28	0.524	0.348	0.267	0.178	0.579	0.386	0.298	0.198	0.649	0.432	0.339	0.226
	30	0.571	0.380	0.273	0.182	0.632	0.421	0.305	0.203	0.710	0.472	0.349	0.232
	32	0.626	0.416	0.280	0.186	0.694	0.462	0.313	0.208	0.780	0.519	0.359	0.239
	34	0.690	0.459	0.287	0.191	0.767	0.510	0.322	0.214	0.863	0.574	0.370	0.246
	36	0.766	0.510	0.294	0.196	0.854	0.568	0.331	0.220	0.963	0.641	0.382	0.254
	38	0.854	0.568	0.302	0.201	0.951	0.633	0.340	0.227	1.07	0.714	0.395	0.263
	40	0.946	0.629	0.310	0.206	1.05	0.701	0.351	0.233	1.19	0.791	0.408	0.271
	42	1.04	0.694	0.318	0.212	1.16	0.773	0.361	0.240	1.31	0.872	0.422	0.281
	44	1.14	0.762	0.327	0.218	1.28	0.848	0.373	0.248	1.44	0.957	0.438	0.291
	46	1.25	0.832	0.337	0.224	1.39	0.927	0.385	0.256	1.57	1.05	0.454	0.302
	48	1.36	0.906	0.347	0.231	1.52	1.01	0.398	0.265	1.71	1.14	0.477	0.318
	50	1.48	0.984	0.358	0.238	1.65	1.10	0.412	0.274	1.86	1.24	0.502	0.334
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.14		0.760		1.26		0.841		1.43		0.948	
$t_y \times 10^3$, (kips)$^{-1}$		0.293		0.195		0.321		0.214		0.356		0.237	
$t_r \times 10^3$, (kips)$^{-1}$		0.360		0.240		0.394		0.263		0.438		0.292	
r_x/r_y		3.87				3.88				3.91			
r_y, in.		3.77				3.74				3.71			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

W33

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W33×											
		291				263				241[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.390	0.260	0.307	0.204	0.432	0.287	0.343	0.228	0.471	0.313	0.379	0.252
	11	0.429	0.285	0.307	0.204	0.475	0.316	0.343	0.228	0.518	0.344	0.379	0.252
	12	0.436	0.290	0.307	0.204	0.483	0.322	0.343	0.228	0.527	0.351	0.379	0.252
	13	0.445	0.296	0.307	0.204	0.493	0.328	0.343	0.228	0.538	0.358	0.380	0.253
	14	0.454	0.302	0.311	0.207	0.503	0.335	0.348	0.231	0.550	0.366	0.386	0.257
	15	0.465	0.309	0.315	0.210	0.515	0.343	0.352	0.234	0.563	0.374	0.391	0.260
	16	0.476	0.317	0.319	0.212	0.528	0.351	0.357	0.238	0.577	0.384	0.397	0.264
	17	0.488	0.325	0.323	0.215	0.542	0.360	0.362	0.241	0.593	0.394	0.403	0.268
	18	0.502	0.334	0.328	0.218	0.557	0.370	0.367	0.244	0.609	0.405	0.409	0.272
	19	0.517	0.344	0.332	0.221	0.573	0.381	0.373	0.248	0.628	0.418	0.416	0.276
	20	0.533	0.354	0.337	0.224	0.591	0.393	0.378	0.252	0.648	0.431	0.422	0.281
	22	0.568	0.378	0.346	0.230	0.631	0.420	0.390	0.259	0.693	0.461	0.436	0.290
	24	0.611	0.406	0.356	0.237	0.679	0.452	0.402	0.267	0.746	0.496	0.450	0.300
	26	0.660	0.439	0.367	0.244	0.734	0.488	0.415	0.276	0.809	0.538	0.466	0.310
	28	0.718	0.478	0.378	0.251	0.799	0.532	0.428	0.285	0.882	0.587	0.483	0.321
	30	0.786	0.523	0.390	0.259	0.875	0.582	0.443	0.295	0.968	0.644	0.501	0.333
	32	0.865	0.576	0.403	0.268	0.965	0.642	0.459	0.305	1.07	0.712	0.520	0.346
	34	0.959	0.638	0.416	0.277	1.07	0.712	0.476	0.317	1.19	0.791	0.541	0.360
	36	1.07	0.713	0.431	0.287	1.20	0.797	0.494	0.329	1.33	0.887	0.564	0.375
	38	1.19	0.794	0.447	0.297	1.33	0.888	0.514	0.342	1.48	0.988	0.589	0.392
	40	1.32	0.880	0.463	0.308	1.48	0.984	0.535	0.356	1.65	1.09	0.619	0.412
	42	1.46	0.970	0.482	0.320	1.63	1.08	0.562	0.374	1.81	1.21	0.663	0.441
	44	1.60	1.06	0.503	0.335	1.79	1.19	0.598	0.398	1.99	1.32	0.708	0.471
	46	1.75	1.16	0.533	0.354	1.96	1.30	0.635	0.422	2.18	1.45	0.753	0.501
	48	1.90	1.27	0.563	0.374	2.13	1.42	0.672	0.447	2.37	1.58	0.797	0.530
	50	2.07	1.37	0.592	0.394	2.31	1.54	0.708	0.471	2.57	1.71	0.842	0.560
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.58		1.05		1.76		1.17		1.96		1.30	
$t_y \times 10^3$, (kips)$^{-1}$		0.390		0.260		0.432		0.287		0.470		0.313	
$t_r \times 10^3$, (kips)$^{-1}$		0.479		0.320		0.530		0.353		0.577		0.385	
r_x/r_y		3.91				3.91				3.90			
r_y, in.		3.68				3.66				3.62			

[c] Shape is slender for compression with F_y = 50 ksi.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W33×											
		221[c]				201[c]				169[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.522	0.347	0.416	0.277	0.588	0.391	0.461	0.307	0.720	0.479	0.566	0.377
	11	0.568	0.378	0.416	0.277	0.640	0.426	0.461	0.307	0.851	0.566	0.595	0.396
	12	0.578	0.384	0.416	0.277	0.651	0.433	0.461	0.307	0.880	0.586	0.608	0.405
	13	0.588	0.391	0.418	0.278	0.663	0.441	0.464	0.309	0.913	0.607	0.623	0.415
	14	0.600	0.399	0.424	0.282	0.676	0.450	0.471	0.314	0.950	0.632	0.638	0.425
	15	0.615	0.409	0.431	0.286	0.690	0.459	0.479	0.319	0.992	0.660	0.654	0.435
	16	0.630	0.419	0.437	0.291	0.706	0.470	0.487	0.324	1.04	0.692	0.671	0.447
	17	0.648	0.431	0.444	0.296	0.724	0.482	0.495	0.329	1.10	0.731	0.689	0.458
	18	0.666	0.443	0.451	0.300	0.743	0.494	0.504	0.335	1.16	0.775	0.708	0.471
	19	0.687	0.457	0.459	0.305	0.764	0.508	0.512	0.341	1.24	0.825	0.728	0.484
	20	0.709	0.472	0.467	0.310	0.788	0.524	0.522	0.347	1.32	0.881	0.749	0.498
	22	0.760	0.505	0.483	0.321	0.845	0.562	0.541	0.360	1.52	1.01	0.794	0.528
	24	0.819	0.545	0.500	0.333	0.912	0.607	0.561	0.374	1.78	1.19	0.846	0.563
	26	0.889	0.591	0.519	0.345	0.991	0.659	0.584	0.388	2.09	1.39	0.905	0.602
	28	0.970	0.646	0.539	0.358	1.08	0.721	0.608	0.404	2.43	1.62	0.999	0.664
	30	1.07	0.710	0.560	0.373	1.19	0.794	0.634	0.422	2.79	1.85	1.11	0.737
	32	1.18	0.786	0.584	0.388	1.32	0.880	0.663	0.441	3.17	2.11	1.21	0.810
	34	1.32	0.876	0.609	0.405	1.48	0.984	0.694	0.462	3.58	2.38	1.33	0.883
	36	1.48	0.982	0.637	0.424	1.66	1.10	0.728	0.484	4.01	2.67	1.44	0.957
	38	1.64	1.09	0.667	0.444	1.85	1.23	0.782	0.520	4.47	2.98	1.55	1.03
	40	1.82	1.21	0.719	0.478	2.05	1.36	0.846	0.563	4.95	3.30	1.66	1.10
	42	2.01	1.34	0.772	0.514	2.26	1.50	0.910	0.606				
	44	2.20	1.47	0.825	0.549	2.48	1.65	0.975	0.649				
	46	2.41	1.60	0.879	0.585	2.71	1.80	1.04	0.692				
	48	2.62	1.75	0.932	0.620	2.95	1.96	1.11	0.736				
	50	2.85	1.89	0.986	0.656	3.20	2.13	1.17	0.780				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.17		1.45		2.42		1.61		4.22		2.81	
$t_y \times 10^3$, (kips)$^{-1}$		0.511		0.340		0.565		0.376		0.675		0.449	
$t_r \times 10^3$, (kips)$^{-1}$		0.628		0.419		0.694		0.463		0.829		0.553	
r_x/r_y		3.93				3.93				5.48			
r_y, in.		3.59				3.56				2.50			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W33

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W33×											
		152[c]				141[c]				130[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.809	0.538	0.637	0.424	0.891	0.593	0.693	0.461	0.982	0.654	0.763	0.508
	11	0.956	0.636	0.673	0.447	1.05	0.702	0.735	0.489	1.16	0.775	0.814	0.542
	12	0.988	0.658	0.689	0.459	1.09	0.726	0.754	0.502	1.20	0.801	0.837	0.557
	13	1.03	0.682	0.707	0.470	1.13	0.753	0.774	0.515	1.25	0.832	0.860	0.572
	14	1.07	0.710	0.725	0.483	1.18	0.784	0.796	0.529	1.30	0.867	0.885	0.589
	15	1.11	0.742	0.745	0.496	1.23	0.820	0.818	0.544	1.36	0.907	0.911	0.606
	16	1.17	0.778	0.765	0.509	1.29	0.860	0.841	0.560	1.43	0.952	0.939	0.624
	17	1.23	0.819	0.787	0.524	1.36	0.907	0.866	0.576	1.51	1.00	0.968	0.644
	18	1.30	0.866	0.810	0.539	1.44	0.960	0.893	0.594	1.60	1.06	0.999	0.665
	19	1.39	0.923	0.834	0.555	1.53	1.02	0.921	0.613	1.70	1.13	1.03	0.687
	20	1.48	0.987	0.860	0.572	1.64	1.09	0.951	0.633	1.82	1.21	1.07	0.711
	22	1.71	1.14	0.917	0.610	1.91	1.27	1.02	0.677	2.13	1.42	1.15	0.764
	24	2.01	1.34	0.982	0.653	2.25	1.50	1.09	0.728	2.52	1.68	1.24	0.826
	26	2.36	1.57	1.07	0.709	2.64	1.76	1.21	0.808	2.96	1.97	1.41	0.939
	28	2.74	1.82	1.20	0.798	3.07	2.04	1.37	0.911	3.43	2.28	1.60	1.06
	30	3.15	2.09	1.33	0.888	3.52	2.34	1.53	1.02	3.94	2.62	1.78	1.19
	32	3.58	2.38	1.47	0.979	4.00	2.66	1.69	1.12	4.48	2.98	1.98	1.32
	34	4.04	2.69	1.61	1.07	4.52	3.01	1.85	1.23	5.06	3.37	2.17	1.45
	36	4.53	3.02	1.75	1.16	5.07	3.37	2.02	1.34	5.68	3.78	2.37	1.58
	38	5.05	3.36	1.89	1.26	5.65	3.76	2.18	1.45	6.32	4.21	2.57	1.71
	40	5.60	3.72	2.03	1.35	6.26	4.16	2.35	1.56				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		4.82		3.21		5.33		3.54		5.99		3.98	
$t_y \times 10^3$, (kips)$^{-1}$		0.744		0.495		0.805		0.535		0.872		0.580	
$t_r \times 10^3$, (kips)$^{-1}$		0.914		0.609		0.989		0.659		1.07		0.714	
r_x/r_y		5.47				5.51				5.52			
r_y, in.		2.47				2.43				2.39			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W33-W30

Shape		W33×				W30×							
		118[c, v]				391[h]				357[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.11	0.738	0.858	0.571	0.290	0.193	0.246	0.163	0.318	0.212	0.270	0.180
	11	1.32	0.879	0.926	0.616	0.319	0.212	0.246	0.163	0.350	0.233	0.270	0.180
	12	1.37	0.910	0.952	0.634	0.325	0.216	0.246	0.163	0.357	0.237	0.270	0.180
	13	1.42	0.946	0.980	0.652	0.331	0.221	0.246	0.164	0.364	0.242	0.270	0.180
	14	1.48	0.988	1.01	0.672	0.339	0.225	0.248	0.165	0.372	0.247	0.273	0.182
	15	1.56	1.03	1.04	0.693	0.346	0.230	0.250	0.166	0.380	0.253	0.276	0.183
	16	1.64	1.09	1.08	0.716	0.355	0.236	0.252	0.168	0.390	0.259	0.278	0.185
	17	1.73	1.15	1.11	0.740	0.364	0.242	0.255	0.169	0.400	0.266	0.281	0.187
	18	1.84	1.22	1.15	0.765	0.374	0.249	0.257	0.171	0.412	0.274	0.284	0.189
	19	1.96	1.31	1.19	0.793	0.385	0.256	0.259	0.172	0.424	0.282	0.287	0.191
	20	2.11	1.40	1.24	0.822	0.397	0.264	0.262	0.174	0.437	0.291	0.290	0.193
	22	2.48	1.65	1.34	0.888	0.424	0.282	0.267	0.177	0.467	0.311	0.296	0.197
	24	2.95	1.97	1.48	0.984	0.456	0.303	0.272	0.181	0.503	0.334	0.302	0.201
	26	3.47	2.31	1.70	1.13	0.493	0.328	0.277	0.184	0.544	0.362	0.308	0.205
	28	4.02	2.68	1.92	1.28	0.536	0.357	0.282	0.188	0.593	0.395	0.315	0.210
	30	4.62	3.07	2.16	1.44	0.587	0.391	0.288	0.192	0.650	0.433	0.322	0.215
	32	5.25	3.49	2.40	1.59	0.647	0.430	0.294	0.196	0.718	0.478	0.330	0.220
	34	5.93	3.95	2.64	1.76	0.717	0.477	0.300	0.200	0.797	0.530	0.338	0.225
	36	6.65	4.42	2.89	1.92	0.802	0.533	0.307	0.204	0.892	0.594	0.346	0.230
	38	7.41	4.93	3.14	2.09	0.893	0.594	0.314	0.209	0.994	0.662	0.355	0.236
	40					0.990	0.658	0.321	0.213	1.10	0.733	0.364	0.242
	42					1.09	0.726	0.328	0.218	1.21	0.808	0.373	0.248
	44					1.20	0.797	0.336	0.224	1.33	0.887	0.383	0.255
	46					1.31	0.871	0.344	0.229	1.46	0.969	0.394	0.262
	48					1.43	0.948	0.353	0.235	1.59	1.06	0.405	0.270
	50					1.55	1.03	0.362	0.241	1.72	1.15	0.417	0.278
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		6.94		4.62		1.15		0.765		1.28		0.850	
$t_y \times 10^3$, (kips)$^{-1}$		0.963		0.640		0.290		0.193		0.318		0.212	
$t_r \times 10^3$, (kips)$^{-1}$		1.18		0.788		0.357		0.238		0.391		0.260	
r_x/r_y		5.60				3.65				3.65			
r_y, in.		3.32				3.67				3.64			

[c] Shape is slender for compression with F_y = 50 ksi.
[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.
Note: Heavy line indicates KL/r_y equal to or greater than 200.

W30

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×											
		326[h]				292				261			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.348	0.232	0.299	0.199	0.388	0.258	0.336	0.224	0.434	0.289	0.378	0.251
	11	0.384	0.256	0.299	0.199	0.429	0.285	0.336	0.224	0.480	0.320	0.378	0.251
	12	0.392	0.260	0.299	0.199	0.437	0.291	0.336	0.224	0.490	0.326	0.378	0.251
	13	0.400	0.266	0.300	0.200	0.446	0.297	0.337	0.225	0.500	0.333	0.380	0.253
	14	0.408	0.272	0.303	0.202	0.456	0.304	0.341	0.227	0.512	0.341	0.385	0.256
	15	0.418	0.278	0.307	0.204	0.467	0.311	0.345	0.230	0.525	0.349	0.390	0.260
	16	0.429	0.285	0.310	0.206	0.479	0.319	0.349	0.232	0.539	0.358	0.395	0.263
	17	0.440	0.293	0.313	0.208	0.492	0.328	0.353	0.235	0.554	0.368	0.400	0.266
	18	0.453	0.301	0.317	0.211	0.507	0.337	0.358	0.238	0.570	0.379	0.406	0.270
	19	0.467	0.311	0.320	0.213	0.522	0.348	0.362	0.241	0.588	0.392	0.411	0.274
	20	0.482	0.321	0.324	0.215	0.539	0.359	0.366	0.244	0.608	0.405	0.417	0.277
	22	0.516	0.343	0.331	0.220	0.578	0.385	0.376	0.250	0.653	0.434	0.429	0.285
	24	0.556	0.370	0.339	0.225	0.623	0.415	0.385	0.256	0.706	0.470	0.441	0.294
	26	0.603	0.401	0.347	0.231	0.677	0.450	0.396	0.263	0.768	0.511	0.454	0.302
	28	0.658	0.438	0.355	0.236	0.740	0.492	0.406	0.270	0.841	0.560	0.468	0.312
	30	0.724	0.481	0.364	0.242	0.813	0.541	0.418	0.278	0.928	0.617	0.483	0.322
	32	0.800	0.532	0.373	0.248	0.901	0.599	0.430	0.286	1.03	0.686	0.499	0.332
	34	0.891	0.593	0.383	0.255	1.00	0.669	0.443	0.295	1.15	0.768	0.516	0.343
	36	0.999	0.665	0.393	0.262	1.13	0.749	0.456	0.304	1.29	0.861	0.534	0.356
	38	1.11	0.741	0.404	0.269	1.26	0.835	0.471	0.313	1.44	0.959	0.554	0.368
	40	1.23	0.821	0.416	0.277	1.39	0.925	0.486	0.323	1.60	1.06	0.575	0.382
	42	1.36	0.905	0.428	0.285	1.53	1.02	0.502	0.334	1.76	1.17	0.597	0.398
	44	1.49	0.993	0.441	0.293	1.68	1.12	0.520	0.346	1.93	1.29	0.626	0.416
	46	1.63	1.09	0.454	0.302	1.84	1.22	0.539	0.358	2.11	1.41	0.662	0.440
	48	1.78	1.18	0.469	0.312	2.00	1.33	0.564	0.375	2.30	1.53	0.698	0.464
	50	1.93	1.28	0.485	0.322	2.17	1.45	0.592	0.394	2.50	1.66	0.734	0.488
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.41		0.941		1.60		1.06		1.82		1.21	
$t_y \times 10^3$, (kips)$^{-1}$		0.348		0.232		0.388		0.258		0.434		0.289	
$t_r \times 10^3$, (kips)$^{-1}$		0.428		0.285		0.477		0.318		0.533		0.355	
r_x/r_y		3.67				3.69				3.71			
r_y, in.		3.60				3.58				3.53			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W30×											
		235				211				191[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.482	0.321	0.421	0.280	0.536	0.357	0.474	0.316	0.604	0.402	0.528	0.351
	11	0.534	0.356	0.421	0.280	0.595	0.396	0.474	0.316	0.663	0.441	0.528	0.351
	12	0.545	0.363	0.421	0.280	0.607	0.404	0.474	0.316	0.676	0.450	0.528	0.351
	13	0.557	0.370	0.424	0.282	0.620	0.413	0.479	0.319	0.691	0.460	0.534	0.355
	14	0.570	0.379	0.430	0.286	0.635	0.423	0.486	0.323	0.707	0.471	0.543	0.361
	15	0.584	0.389	0.436	0.290	0.651	0.433	0.493	0.328	0.726	0.483	0.551	0.367
	16	0.600	0.399	0.442	0.294	0.669	0.445	0.501	0.333	0.746	0.496	0.560	0.373
	17	0.617	0.411	0.448	0.298	0.688	0.458	0.509	0.338	0.768	0.511	0.570	0.379
	18	0.636	0.423	0.455	0.302	0.709	0.472	0.517	0.344	0.792	0.527	0.579	0.385
	19	0.656	0.437	0.461	0.307	0.732	0.487	0.525	0.349	0.818	0.544	0.589	0.392
	20	0.678	0.451	0.468	0.311	0.758	0.504	0.533	0.355	0.846	0.563	0.599	0.399
	22	0.729	0.485	0.483	0.321	0.815	0.542	0.551	0.367	0.911	0.606	0.621	0.413
	24	0.788	0.525	0.498	0.331	0.882	0.587	0.570	0.379	0.988	0.657	0.644	0.429
	26	0.859	0.571	0.514	0.342	0.962	0.640	0.591	0.393	1.08	0.718	0.669	0.445
	28	0.942	0.627	0.531	0.354	1.06	0.702	0.613	0.408	1.19	0.789	0.696	0.463
	30	1.04	0.692	0.550	0.366	1.17	0.777	0.636	0.423	1.31	0.874	0.726	0.483
	32	1.16	0.769	0.570	0.379	1.30	0.864	0.662	0.440	1.47	0.975	0.758	0.504
	34	1.30	0.863	0.591	0.393	1.46	0.971	0.690	0.459	1.65	1.10	0.793	0.527
	36	1.45	0.968	0.614	0.409	1.64	1.09	0.720	0.479	1.85	1.23	0.831	0.553
	38	1.62	1.08	0.639	0.425	1.83	1.21	0.753	0.501	2.06	1.37	0.889	0.591
	40	1.80	1.19	0.666	0.443	2.02	1.34	0.802	0.533	2.28	1.52	0.957	0.637
	42	1.98	1.32	0.704	0.468	2.23	1.48	0.858	0.571	2.52	1.67	1.03	0.683
	44	2.17	1.45	0.748	0.498	2.44	1.63	0.914	0.608	2.76	1.84	1.10	0.729
	46	2.37	1.58	0.792	0.527	2.67	1.78	0.970	0.645	3.02	2.01	1.16	0.775
	48	2.59	1.72	0.837	0.557	2.91	1.94	1.03	0.683	3.29	2.19	1.23	0.821
	50	2.81	1.87	0.881	0.586	3.16	2.10	1.08	0.720	3.57	2.37	1.30	0.867
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.04		1.35		2.30		1.53		2.58		1.72	
$t_y \times 10^3$, (kips)$^{-1}$		0.482		0.321		0.536		0.357		0.595		0.396	
$t_r \times 10^3$, (kips)$^{-1}$		0.592		0.395		0.659		0.439		0.731		0.488	
r_x/r_y		3.70				3.70				3.70			
r_y, in.		3.51				3.49				3.46			

[c] Shape is slender for compression with F_y = 50 ksi.

W30

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×											
		173[c]				148[c]				132[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.678	0.451	0.587	0.391	0.801	0.533	0.713	0.474	0.917	0.610	0.815	0.542
	11	0.745	0.495	0.587	0.391	0.986	0.656	0.765	0.509	1.13	0.751	0.882	0.587
	12	0.758	0.505	0.587	0.391	1.03	0.684	0.784	0.522	1.18	0.783	0.906	0.603
	13	0.773	0.515	0.596	0.396	1.08	0.718	0.804	0.535	1.23	0.819	0.931	0.620
	14	0.790	0.526	0.606	0.403	1.14	0.758	0.826	0.550	1.30	0.862	0.958	0.638
	15	0.809	0.538	0.616	0.410	1.21	0.804	0.849	0.565	1.37	0.915	0.987	0.657
	16	0.829	0.552	0.626	0.417	1.29	0.856	0.873	0.581	1.47	0.975	1.02	0.677
	17	0.852	0.567	0.637	0.424	1.38	0.915	0.898	0.598	1.57	1.04	1.05	0.699
	18	0.878	0.584	0.649	0.432	1.48	0.982	0.925	0.616	1.69	1.12	1.08	0.721
	19	0.908	0.604	0.660	0.439	1.59	1.06	0.954	0.635	1.82	1.21	1.12	0.746
	20	0.941	0.626	0.673	0.447	1.72	1.15	0.984	0.655	1.98	1.32	1.16	0.772
	22	1.01	0.675	0.698	0.465	2.05	1.36	1.05	0.700	2.36	1.57	1.25	0.831
	24	1.10	0.733	0.726	0.483	2.43	1.62	1.13	0.751	2.81	1.87	1.36	0.904
	26	1.21	0.802	0.756	0.503	2.86	1.90	1.25	0.828	3.30	2.19	1.54	1.02
	28	1.33	0.884	0.789	0.525	3.31	2.20	1.39	0.923	3.82	2.54	1.72	1.15
	30	1.48	0.982	0.825	0.549	3.80	2.53	1.53	1.02	4.39	2.92	1.91	1.27
	32	1.65	1.10	0.864	0.575	4.33	2.88	1.67	1.11	4.99	3.32	2.09	1.39
	34	1.86	1.24	0.906	0.603	4.89	3.25	1.82	1.21	5.64	3.75	2.28	1.52
	36	2.09	1.39	0.964	0.641	5.48	3.64	1.96	1.30	6.32	4.21	2.47	1.64
	38	2.32	1.55	1.05	0.696								
	40	2.57	1.71	1.13	0.751								
	42	2.84	1.89	1.21	0.807								
	44	3.12	2.07	1.30	0.863								
	46	3.41	2.27	1.38	0.919								
	48	3.71	2.47	1.47	0.976								
	50	4.02	2.68	1.55	1.03								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.90		1.93		5.24		3.49		6.10		4.06	
$t_y \times 10^3$, (kips)$^{-1}$		0.656		0.437		0.766		0.510		0.861		0.573	
$t_r \times 10^3$, (kips)$^{-1}$		0.806		0.537		0.941		0.627		1.06		0.705	
r_x/r_y		3.71				5.44				5.42			
r_y, in.		3.42				2.28				2.25			

[c] Shape is slender for compression with F_y = 50 ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W30×											
		124[c]				116[c]				108[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.991	0.659	0.873	0.581	1.07	0.713	0.943	0.627	1.17	0.782	1.03	0.685
	11	1.22	0.811	0.949	0.631	1.32	0.880	1.03	0.686	1.45	0.968	1.14	0.755
	12	1.27	0.845	0.976	0.649	1.38	0.918	1.06	0.706	1.52	1.01	1.17	0.779
	13	1.33	0.885	1.00	0.668	1.45	0.962	1.09	0.728	1.59	1.06	1.21	0.804
	14	1.40	0.931	1.03	0.688	1.52	1.01	1.13	0.750	1.68	1.12	1.25	0.830
	15	1.48	0.984	1.07	0.710	1.61	1.07	1.16	0.775	1.78	1.18	1.29	0.859
	16	1.57	1.05	1.10	0.732	1.72	1.14	1.20	0.801	1.90	1.26	1.34	0.889
	17	1.69	1.12	1.14	0.757	1.84	1.23	1.24	0.828	2.04	1.35	1.39	0.922
	18	1.82	1.21	1.18	0.782	1.99	1.32	1.29	0.858	2.20	1.47	1.44	0.957
	19	1.97	1.31	1.22	0.810	2.16	1.44	1.34	0.890	2.40	1.60	1.50	0.995
	20	2.13	1.42	1.26	0.840	2.35	1.56	1.39	0.924	2.62	1.74	1.56	1.04
	22	2.55	1.70	1.36	0.907	2.83	1.88	1.51	1.00	3.16	2.11	1.70	1.13
	24	3.04	2.02	1.51	1.01	3.36	2.24	1.70	1.13	3.77	2.51	1.96	1.31
	26	3.57	2.37	1.72	1.14	3.95	2.63	1.94	1.29	4.42	2.94	2.24	1.49
	28	4.14	2.75	1.92	1.28	4.58	3.05	2.18	1.45	5.13	3.41	2.52	1.68
	30	4.75	3.16	2.13	1.42	5.26	3.50	2.42	1.61	5.88	3.91	2.81	1.87
	32	5.40	3.60	2.35	1.56	5.98	3.98	2.67	1.78	6.69	4.45	3.10	2.06
	34	6.10	4.06	2.56	1.70	6.75	4.49	2.92	1.94	7.56	5.03	3.40	2.26
	36	6.84	4.55	2.78	1.85	7.57	5.04	3.17	2.11				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		6.60		4.39		7.24		4.82		8.12		5.40	
$t_y \times 10^3$, (kips)$^{-1}$		0.915		0.609		0.977		0.650		1.05		0.701	
$t_r \times 10^3$, (kips)$^{-1}$		1.12		0.749		1.20		0.800		1.29		0.863	
r_x/r_y		5.43				5.48				5.53			
r_y, in.		2.23				2.19				2.15			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W30-W27

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W30×								W27×			
		99[c]				90[c, v]				539[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.31	0.872	1.14	0.760	1.49	0.994	1.26	0.838	0.210	0.140	0.189	0.125
	11	1.63	1.08	1.27	0.846	1.85	1.23	1.41	0.936	0.231	0.154	0.189	0.125
	12	1.70	1.13	1.31	0.874	1.93	1.28	1.45	0.968	0.235	0.157	0.189	0.125
	13	1.79	1.19	1.36	0.903	2.02	1.35	1.51	1.00	0.240	0.160	0.189	0.125
	14	1.89	1.26	1.41	0.935	2.13	1.42	1.56	1.04	0.245	0.163	0.190	0.126
	15	2.01	1.33	1.46	0.969	2.26	1.50	1.62	1.08	0.251	0.167	0.191	0.127
	16	2.14	1.43	1.51	1.01	2.41	1.60	1.68	1.12	0.257	0.171	0.192	0.128
	17	2.30	1.53	1.57	1.04	2.59	1.72	1.75	1.16	0.264	0.176	0.193	0.128
	18	2.50	1.66	1.63	1.09	2.79	1.86	1.82	1.21	0.271	0.181	0.194	0.129
	19	2.73	1.81	1.70	1.13	3.04	2.02	1.90	1.27	0.279	0.186	0.195	0.130
	20	3.00	1.99	1.78	1.18	3.34	2.22	1.99	1.32	0.288	0.192	0.196	0.131
	22	3.63	2.41	2.00	1.33	4.04	2.69	2.28	1.52	0.308	0.205	0.199	0.132
	24	4.31	2.87	2.32	1.54	4.80	3.20	2.65	1.76	0.331	0.220	0.201	0.134
	26	5.06	3.37	2.65	1.76	5.64	3.75	3.04	2.02	0.358	0.238	0.203	0.135
	28	5.87	3.91	2.99	1.99	6.54	4.35	3.44	2.29	0.390	0.260	0.206	0.137
	30	6.74	4.49	3.34	2.22	7.51	4.99	3.85	2.56	0.428	0.285	0.208	0.139
	32	7.67	5.10	3.69	2.46	8.54	5.68	4.27	2.84	0.472	0.314	0.211	0.140
	34	8.66	5.76	4.06	2.70	9.64	6.41	4.70	3.13	0.524	0.348	0.213	0.142
	36									0.586	0.390	0.216	0.144
	38									0.653	0.435	0.219	0.146
	40									0.724	0.481	0.222	0.148
	42									0.798	0.531	0.225	0.149
	44									0.876	0.583	0.228	0.151
	46									0.957	0.637	0.231	0.154
	48									1.04	0.693	0.234	0.156
	50									1.13	0.752	0.237	0.158
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		9.23		6.14		10.3		6.83		0.815		0.542	
$t_y \times 10^3$, (kips)$^{-1}$		1.15		0.766		1.27		0.845		0.210		0.140	
$t_r \times 10^3$, (kips)$^{-1}$		1.41		0.943		1.56		1.04		0.258		0.172	
r_x/r_y		5.57				5.60				3.48			
r_y, in.		2.10				2.09				3.65			

[c] Shape is slender for compression with F_y = 50 ksi.
[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.
Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W27×											
		368[h]				336[h]				307[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.306	0.204	0.287	0.191	0.337	0.224	0.315	0.210	0.370	0.246	0.346	0.230
	11	0.340	0.226	0.287	0.191	0.375	0.249	0.315	0.210	0.413	0.275	0.346	0.230
	12	0.347	0.231	0.287	0.191	0.382	0.254	0.315	0.210	0.422	0.281	0.346	0.230
	13	0.355	0.236	0.289	0.192	0.391	0.260	0.318	0.211	0.432	0.287	0.349	0.232
	14	0.363	0.242	0.291	0.194	0.400	0.266	0.320	0.213	0.442	0.294	0.353	0.235
	15	0.373	0.248	0.294	0.195	0.411	0.273	0.323	0.215	0.454	0.302	0.356	0.237
	16	0.383	0.255	0.296	0.197	0.422	0.281	0.326	0.217	0.467	0.311	0.360	0.239
	17	0.394	0.262	0.299	0.199	0.435	0.289	0.329	0.219	0.481	0.320	0.364	0.242
	18	0.406	0.270	0.301	0.200	0.448	0.298	0.332	0.221	0.497	0.330	0.367	0.244
	19	0.419	0.279	0.304	0.202	0.463	0.308	0.336	0.223	0.513	0.342	0.371	0.247
	20	0.434	0.289	0.306	0.204	0.480	0.319	0.339	0.225	0.532	0.354	0.375	0.250
	22	0.467	0.311	0.312	0.207	0.517	0.344	0.345	0.230	0.574	0.382	0.383	0.255
	24	0.506	0.336	0.317	0.211	0.560	0.373	0.352	0.234	0.624	0.415	0.392	0.261
	26	0.552	0.367	0.323	0.215	0.612	0.407	0.359	0.239	0.683	0.454	0.401	0.267
	28	0.606	0.403	0.329	0.219	0.674	0.448	0.367	0.244	0.753	0.501	0.410	0.273
	30	0.670	0.446	0.335	0.223	0.746	0.497	0.375	0.249	0.836	0.557	0.420	0.279
	32	0.746	0.497	0.342	0.227	0.833	0.554	0.383	0.255	0.936	0.623	0.430	0.286
	34	0.839	0.558	0.348	0.232	0.938	0.624	0.391	0.260	1.06	0.703	0.441	0.293
	36	0.941	0.626	0.355	0.236	1.05	0.700	0.400	0.266	1.18	0.788	0.452	0.301
	38	1.05	0.697	0.363	0.241	1.17	0.780	0.409	0.272	1.32	0.878	0.464	0.309
	40	1.16	0.773	0.370	0.246	1.30	0.864	0.419	0.279	1.46	0.972	0.476	0.317
	42	1.28	0.852	0.378	0.252	1.43	0.952	0.429	0.285	1.61	1.07	0.490	0.326
	44	1.41	0.935	0.386	0.257	1.57	1.05	0.439	0.292	1.77	1.18	0.504	0.335
	46	1.54	1.02	0.395	0.263	1.72	1.14	0.451	0.300	1.93	1.29	0.518	0.345
	48	1.67	1.11	0.404	0.269	1.87	1.24	0.462	0.308	2.10	1.40	0.534	0.355
	50	1.81	1.21	0.413	0.275	2.03	1.35	0.475	0.316	2.28	1.52	0.551	0.367
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.28		0.850		1.41		0.941		1.57		1.04	
$t_y \times 10^3$, (kips)$^{-1}$		0.306		0.204		0.337		0.224		0.370		0.246	
$t_r \times 10^3$, (kips)$^{-1}$		0.376		0.251		0.414		0.276		0.455		0.303	
r_x/r_y		3.51				3.51				3.52			
r_y, in.		3.48				3.45				3.41			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

W27

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×											
		281				258				235			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.402	0.267	0.381	0.253	0.439	0.292	0.418	0.278	0.481	0.320	0.461	0.307
	11	0.449	0.299	0.381	0.253	0.491	0.327	0.418	0.278	0.540	0.359	0.461	0.307
	12	0.459	0.305	0.381	0.253	0.502	0.334	0.419	0.279	0.552	0.367	0.463	0.308
	13	0.469	0.312	0.385	0.256	0.514	0.342	0.424	0.282	0.565	0.376	0.469	0.312
	14	0.481	0.320	0.389	0.259	0.527	0.351	0.429	0.285	0.580	0.386	0.475	0.316
	15	0.494	0.329	0.393	0.262	0.541	0.360	0.434	0.289	0.596	0.396	0.481	0.320
	16	0.508	0.338	0.397	0.264	0.557	0.371	0.439	0.292	0.614	0.408	0.487	0.324
	17	0.524	0.348	0.402	0.267	0.575	0.382	0.444	0.296	0.633	0.421	0.494	0.328
	18	0.541	0.360	0.406	0.270	0.594	0.395	0.450	0.299	0.655	0.436	0.500	0.333
	19	0.559	0.372	0.411	0.273	0.615	0.409	0.455	0.303	0.678	0.451	0.507	0.337
	20	0.580	0.386	0.416	0.277	0.637	0.424	0.461	0.307	0.704	0.468	0.514	0.342
	22	0.626	0.417	0.426	0.283	0.689	0.459	0.473	0.315	0.762	0.507	0.529	0.352
	24	0.681	0.453	0.436	0.290	0.751	0.500	0.485	0.323	0.832	0.553	0.544	0.362
	26	0.747	0.497	0.447	0.297	0.824	0.549	0.498	0.332	0.914	0.608	0.560	0.373
	28	0.824	0.548	0.458	0.305	0.912	0.607	0.512	0.341	1.01	0.674	0.578	0.384
	30	0.917	0.610	0.470	0.313	1.02	0.676	0.527	0.351	1.13	0.753	0.596	0.397
	32	1.03	0.683	0.482	0.321	1.14	0.760	0.543	0.361	1.27	0.848	0.616	0.410
	34	1.16	0.772	0.496	0.330	1.29	0.858	0.559	0.372	1.44	0.957	0.637	0.424
	36	1.30	0.865	0.510	0.339	1.45	0.962	0.577	0.384	1.61	1.07	0.660	0.439
	38	1.45	0.964	0.524	0.349	1.61	1.07	0.596	0.396	1.80	1.20	0.684	0.455
	40	1.61	1.07	0.540	0.359	1.78	1.19	0.616	0.410	1.99	1.33	0.710	0.472
	42	1.77	1.18	0.557	0.370	1.97	1.31	0.637	0.424	2.20	1.46	0.738	0.491
	44	1.94	1.29	0.574	0.382	2.16	1.44	0.660	0.439	2.41	1.60	0.776	0.516
	46	2.12	1.41	0.593	0.395	2.36	1.57	0.685	0.456	2.63	1.75	0.818	0.544
	48	2.31	1.54	0.614	0.408	2.57	1.71	0.721	0.479	2.87	1.91	0.861	0.573
	50	2.51	1.67	0.639	0.425	2.79	1.85	0.756	0.503	3.11	2.07	0.904	0.601
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.73		1.15		1.91		1.27		2.12		1.41	
$t_y \times 10^3$, (kips)$^{-1}$		0.402		0.267		0.439		0.292		0.481		0.320	
$t_r \times 10^3$, (kips)$^{-1}$		0.494		0.329		0.539		0.359		0.591		0.394	
r_x/r_y		3.54				3.54				3.54			
r_y, in.		3.39				3.36				3.33			

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W27×											
		217				194				178			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.523	0.348	0.501	0.333	0.585	0.389	0.565	0.376	0.636	0.423	0.625	0.416
	11	0.587	0.390	0.501	0.333	0.658	0.438	0.565	0.376	0.718	0.478	0.625	0.416
	12	0.600	0.399	0.503	0.335	0.673	0.448	0.568	0.378	0.734	0.489	0.630	0.419
	13	0.614	0.409	0.510	0.339	0.689	0.459	0.576	0.383	0.753	0.501	0.640	0.426
	14	0.630	0.419	0.517	0.344	0.708	0.471	0.584	0.389	0.773	0.515	0.650	0.432
	15	0.648	0.431	0.524	0.348	0.728	0.484	0.593	0.395	0.796	0.530	0.661	0.439
	16	0.667	0.444	0.531	0.353	0.750	0.499	0.602	0.401	0.821	0.546	0.671	0.447
	17	0.689	0.458	0.538	0.358	0.775	0.516	0.612	0.407	0.849	0.565	0.683	0.454
	18	0.712	0.474	0.546	0.363	0.802	0.533	0.621	0.413	0.879	0.585	0.694	0.462
	19	0.738	0.491	0.554	0.369	0.831	0.553	0.631	0.420	0.912	0.607	0.706	0.470
	20	0.766	0.510	0.562	0.374	0.863	0.574	0.641	0.427	0.948	0.631	0.718	0.478
	22	0.830	0.552	0.579	0.385	0.937	0.623	0.663	0.441	1.03	0.686	0.745	0.495
	24	0.906	0.603	0.597	0.398	1.02	0.682	0.686	0.456	1.13	0.752	0.773	0.514
	26	0.997	0.663	0.617	0.410	1.13	0.751	0.711	0.473	1.25	0.830	0.803	0.534
	28	1.11	0.735	0.637	0.424	1.25	0.834	0.737	0.490	1.39	0.925	0.836	0.556
	30	1.23	0.822	0.660	0.439	1.40	0.934	0.766	0.509	1.56	1.04	0.871	0.580
	32	1.39	0.927	0.683	0.455	1.59	1.06	0.797	0.530	1.77	1.18	0.910	0.606
	34	1.57	1.05	0.709	0.471	1.79	1.19	0.830	0.552	2.00	1.33	0.952	0.634
	36	1.76	1.17	0.736	0.490	2.01	1.34	0.867	0.577	2.24	1.49	1.00	0.665
	38	1.96	1.31	0.766	0.509	2.24	1.49	0.906	0.603	2.49	1.66	1.07	0.713
	40	2.18	1.45	0.798	0.531	2.48	1.65	0.968	0.644	2.76	1.84	1.15	0.765
	42	2.40	1.60	0.842	0.560	2.73	1.82	1.03	0.687	3.05	2.03	1.23	0.817
	44	2.63	1.75	0.892	0.593	3.00	2.00	1.10	0.729	3.34	2.23	1.31	0.869
	46	2.88	1.91	0.942	0.627	3.28	2.18	1.16	0.771	3.66	2.43	1.38	0.920
	48	3.13	2.09	0.992	0.660	3.57	2.38	1.22	0.813	3.98	2.65	1.46	0.972
	50	3.40	2.26	1.04	0.693	3.88	2.58	1.29	0.855	4.32	2.87	1.54	1.02
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.31		1.54		2.62		1.74		2.92		1.94	
$t_y \times 10^3$, (kips)$^{-1}$		0.523		0.348		0.585		0.389		0.636		0.423	
$t_r \times 10^3$, (kips)$^{-1}$		0.642		0.428		0.718		0.479		0.781		0.521	
r_x/r_y		3.55				3.56				3.57			
r_y, in.		3.32				3.29				3.25			

W27

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×											
		161[c]				146[c]				129[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.704	0.468	0.692	0.460	0.792	0.527	0.768	0.511	0.910	0.606	0.902	0.600
	11	0.793	0.527	0.692	0.460	0.883	0.587	0.768	0.511	1.15	0.763	0.976	0.649
	12	0.811	0.540	0.698	0.465	0.901	0.600	0.777	0.517	1.21	0.802	1.00	0.666
	13	0.832	0.554	0.710	0.472	0.922	0.614	0.791	0.526	1.27	0.846	1.03	0.684
	14	0.855	0.569	0.722	0.480	0.946	0.629	0.805	0.535	1.35	0.897	1.06	0.703
	15	0.881	0.586	0.735	0.489	0.974	0.648	0.819	0.545	1.44	0.955	1.09	0.723
	16	0.909	0.604	0.747	0.497	1.01	0.669	0.835	0.555	1.53	1.02	1.12	0.744
	17	0.939	0.625	0.761	0.506	1.04	0.692	0.850	0.566	1.65	1.10	1.15	0.767
	18	0.973	0.647	0.775	0.515	1.08	0.718	0.867	0.577	1.78	1.18	1.19	0.791
	19	1.01	0.672	0.789	0.525	1.12	0.746	0.884	0.588	1.92	1.28	1.23	0.816
	20	1.05	0.699	0.804	0.535	1.17	0.776	0.901	0.600	2.09	1.39	1.27	0.843
	22	1.14	0.761	0.835	0.556	1.27	0.846	0.939	0.625	2.51	1.67	1.36	0.903
	24	1.25	0.835	0.869	0.578	1.40	0.930	0.980	0.652	2.99	1.99	1.46	0.973
	26	1.39	0.924	0.906	0.603	1.55	1.03	1.02	0.681	3.51	2.33	1.64	1.09
	28	1.55	1.03	0.946	0.630	1.73	1.15	1.07	0.714	4.07	2.71	1.82	1.21
	30	1.74	1.16	0.990	0.659	1.95	1.30	1.13	0.750	4.67	3.11	2.00	1.33
	32	1.98	1.31	1.04	0.691	2.22	1.48	1.19	0.789	5.31	3.54	2.18	1.45
	34	2.23	1.48	1.09	0.726	2.50	1.67	1.27	0.843	6.00	3.99	2.36	1.57
	36	2.50	1.66	1.17	0.781	2.81	1.87	1.38	0.919	6.73	4.47	2.54	1.69
	38	2.79	1.85	1.27	0.844	3.13	2.08	1.50	0.995				
	40	3.09	2.05	1.36	0.907	3.47	2.31	1.61	1.07				
	42	3.40	2.26	1.46	0.970	3.82	2.54	1.73	1.15				
	44	3.73	2.48	1.55	1.03	4.19	2.79	1.84	1.23				
	46	4.08	2.72	1.65	1.10	4.58	3.05	1.96	1.30				
	48	4.44	2.96	1.74	1.16	4.99	3.32	2.07	1.38				
	50	4.82	3.21	1.84	1.22	5.41	3.60	2.19	1.46				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		3.27		2.17		3.65		2.43		6.19		4.12	
$t_y \times 10^3$, (kips)$^{-1}$		0.702		0.467		0.773		0.514		0.884		0.588	
$t_r \times 10^3$, (kips)$^{-1}$		0.862		0.575		0.950		0.633		1.09		0.724	
r_x/r_y		3.56				3.59				5.07			
r_y, in.		3.23				3.20				2.21			

[c] Shape is slender for compression with F_y = 50 ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W27×											
		114[c]				102[c]				94[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.05	0.696	1.04	0.691	1.21	0.804	1.17	0.777	1.34	0.890	1.28	0.853
	11	1.31	0.873	1.13	0.754	1.51	1.01	1.28	0.854	1.67	1.11	1.42	0.944
	12	1.37	0.913	1.17	0.775	1.58	1.05	1.32	0.880	1.75	1.17	1.46	0.974
	13	1.45	0.962	1.20	0.798	1.66	1.11	1.36	0.907	1.84	1.23	1.51	1.01
	14	1.53	1.02	1.24	0.822	1.76	1.17	1.41	0.935	1.95	1.30	1.56	1.04
	15	1.64	1.09	1.27	0.847	1.86	1.24	1.45	0.966	2.07	1.38	1.62	1.07
	16	1.75	1.17	1.31	0.874	1.99	1.33	1.50	1.00	2.21	1.47	1.67	1.11
	17	1.89	1.25	1.36	0.903	2.15	1.43	1.55	1.03	2.38	1.58	1.74	1.15
	18	2.04	1.36	1.40	0.934	2.33	1.55	1.61	1.07	2.59	1.72	1.80	1.20
	19	2.21	1.47	1.45	0.967	2.53	1.69	1.67	1.11	2.82	1.88	1.88	1.25
	20	2.41	1.60	1.51	1.00	2.77	1.84	1.74	1.16	3.09	2.06	1.95	1.30
	22	2.90	1.93	1.63	1.08	3.34	2.22	1.89	1.25	3.74	2.49	2.16	1.44
	24	3.46	2.30	1.80	1.20	3.98	2.65	2.15	1.43	4.45	2.96	2.50	1.66
	26	4.06	2.70	2.04	1.36	4.67	3.11	2.44	1.63	5.22	3.47	2.84	1.89
	28	4.70	3.13	2.27	1.51	5.42	3.60	2.74	1.82	6.06	4.03	3.19	2.12
	30	5.40	3.59	2.51	1.67	6.22	4.14	3.03	2.02	6.95	4.62	3.54	2.36
	32	6.14	4.09	2.75	1.83	7.07	4.71	3.33	2.22	7.91	5.26	3.90	2.59
	34	6.94	4.61	2.99	1.99	7.99	5.31	3.63	2.42	8.93	5.94	4.26	2.83
	36	7.78	5.17	3.23	2.15								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		7.23		4.81		8.21		5.46		9.18		6.11	
$t_y \times 10^3$, (kips)$^{-1}$		0.994		0.661		1.11		0.741		1.21		0.805	
$t_r \times 10^3$, (kips)$^{-1}$		1.22		0.814		1.37		0.912		1.49		0.991	
r_x/r_y		5.05				5.12				5.14			
r_y, in.		2.18				2.15				2.12			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W27-W24

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W27×				W24×							
		84[c]				370[h]				335[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.53	1.02	1.46	0.971	0.306	0.204	0.315	0.210	0.340	0.226	0.349	0.232
	11	1.92	1.28	1.63	1.09	0.345	0.230	0.315	0.210	0.384	0.255	0.349	0.232
	12	2.02	1.34	1.69	1.12	0.353	0.235	0.316	0.210	0.393	0.261	0.351	0.233
	13	2.12	1.41	1.75	1.16	0.362	0.241	0.319	0.212	0.403	0.268	0.354	0.235
	14	2.25	1.49	1.81	1.20	0.372	0.247	0.321	0.213	0.414	0.276	0.357	0.237
	15	2.39	1.59	1.88	1.25	0.382	0.254	0.323	0.215	0.426	0.284	0.359	0.239
	16	2.56	1.70	1.95	1.30	0.394	0.262	0.326	0.217	0.440	0.293	0.362	0.241
	17	2.76	1.84	2.03	1.35	0.407	0.271	0.328	0.218	0.455	0.303	0.365	0.243
	18	3.00	1.99	2.11	1.41	0.422	0.280	0.330	0.220	0.471	0.314	0.368	0.245
	19	3.28	2.18	2.21	1.47	0.437	0.291	0.333	0.221	0.489	0.325	0.371	0.247
	20	3.62	2.41	2.31	1.53	0.454	0.302	0.335	0.223	0.509	0.338	0.375	0.249
	22	4.38	2.91	2.64	1.76	0.494	0.328	0.340	0.226	0.554	0.368	0.381	0.254
	24	5.21	3.47	3.06	2.04	0.540	0.359	0.346	0.230	0.608	0.404	0.388	0.258
	26	6.12	4.07	3.49	2.32	0.596	0.397	0.351	0.234	0.672	0.447	0.395	0.263
	28	7.10	4.72	3.93	2.62	0.663	0.441	0.357	0.237	0.750	0.499	0.402	0.267
	30	8.15	5.42	4.38	2.92	0.743	0.495	0.363	0.241	0.843	0.561	0.409	0.272
	32	9.27	6.17	4.84	3.22	0.842	0.560	0.369	0.245	0.957	0.636	0.417	0.277
	34	10.5	6.96	5.31	3.53	0.950	0.632	0.375	0.249	1.08	0.718	0.425	0.283
	36					1.07	0.709	0.381	0.254	1.21	0.806	0.433	0.288
	38					1.19	0.790	0.388	0.258	1.35	0.897	0.442	0.294
	40					1.32	0.875	0.395	0.263	1.49	0.994	0.451	0.300
	42					1.45	0.965	0.402	0.267	1.65	1.10	0.460	0.306
	44					1.59	1.06	0.409	0.272	1.81	1.20	0.470	0.313
	46					1.74	1.16	0.417	0.277	1.98	1.32	0.480	0.319
	48					1.89	1.26	0.425	0.283	2.15	1.43	0.491	0.326
	50					2.05	1.37	0.433	0.288	2.34	1.55	0.502	0.334
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		10.7		7.14		1.33		0.888		1.50		1.00	
$t_y \times 10^3$, (kips)$^{-1}$		1.35		0.900		0.306		0.204		0.340		0.226	
$t_r \times 10^3$, (kips)$^{-1}$		1.66		1.11		0.376		0.251		0.417		0.278	
r_x/r_y		5.17				3.39				3.41			
r_y, in.		2.07				3.27				3.23			

[c] Shape is slender for compression with $F_y = 50$ ksi.

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W24×											
		306[h]				279[h]				250			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.372	0.248	0.386	0.257	0.408	0.271	0.427	0.284	0.454	0.302	0.479	0.319
	11	0.422	0.281	0.386	0.257	0.463	0.308	0.427	0.284	0.517	0.344	0.479	0.319
	12	0.432	0.287	0.389	0.259	0.474	0.316	0.430	0.286	0.530	0.353	0.483	0.322
	13	0.443	0.295	0.392	0.261	0.487	0.324	0.434	0.289	0.544	0.362	0.489	0.325
	14	0.455	0.303	0.396	0.263	0.501	0.333	0.438	0.292	0.560	0.373	0.494	0.329
	15	0.469	0.312	0.399	0.266	0.516	0.343	0.443	0.294	0.578	0.384	0.499	0.332
	16	0.484	0.322	0.403	0.268	0.533	0.355	0.447	0.297	0.597	0.397	0.505	0.336
	17	0.501	0.333	0.406	0.270	0.552	0.367	0.451	0.300	0.619	0.412	0.510	0.340
	18	0.520	0.346	0.410	0.273	0.573	0.381	0.456	0.303	0.642	0.427	0.516	0.343
	19	0.540	0.359	0.414	0.275	0.595	0.396	0.461	0.306	0.668	0.445	0.522	0.347
	20	0.562	0.374	0.418	0.278	0.620	0.413	0.465	0.310	0.697	0.463	0.528	0.351
	22	0.612	0.407	0.426	0.283	0.677	0.451	0.475	0.316	0.762	0.507	0.541	0.360
	24	0.673	0.448	0.434	0.289	0.746	0.496	0.485	0.323	0.841	0.559	0.554	0.368
	26	0.746	0.496	0.442	0.294	0.828	0.551	0.496	0.330	0.935	0.622	0.567	0.378
	28	0.834	0.555	0.451	0.300	0.927	0.617	0.507	0.337	1.05	0.698	0.582	0.387
	30	0.939	0.625	0.461	0.306	1.05	0.697	0.519	0.345	1.19	0.792	0.597	0.397
	32	1.07	0.711	0.470	0.313	1.19	0.793	0.531	0.353	1.35	0.901	0.613	0.408
	34	1.21	0.802	0.480	0.320	1.35	0.895	0.544	0.362	1.53	1.02	0.630	0.419
	36	1.35	0.899	0.491	0.327	1.51	1.00	0.557	0.371	1.71	1.14	0.648	0.431
	38	1.51	1.00	0.502	0.334	1.68	1.12	0.571	0.380	1.91	1.27	0.667	0.444
	40	1.67	1.11	0.513	0.341	1.86	1.24	0.586	0.390	2.12	1.41	0.687	0.457
	42	1.84	1.22	0.525	0.349	2.05	1.37	0.601	0.400	2.33	1.55	0.708	0.471
	44	2.02	1.34	0.538	0.358	2.25	1.50	0.618	0.411	2.56	1.70	0.731	0.486
	46	2.21	1.47	0.551	0.367	2.46	1.64	0.635	0.423	2.80	1.86	0.755	0.502
	48	2.40	1.60	0.565	0.376	2.68	1.78	0.653	0.435	3.05	2.03	0.781	0.519
	50	2.61	1.73	0.579	0.386	2.91	1.94	0.673	0.448	3.31	2.20	0.814	0.541
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.66		1.11		1.85		1.23		2.08		1.39	
$t_y \times 10^3$, (kips)$^{-1}$		0.372		0.248		0.408		0.271		0.454		0.302	
$t_r \times 10^3$, (kips)$^{-1}$		0.457		0.305		0.501		0.334		0.558		0.372	
r_x/r_y		3.41				3.41				3.41			
r_y, in.		3.20				3.17				3.14			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

W24

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		229				207				192			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.497	0.331	0.528	0.351	0.550	0.366	0.588	0.391	0.591	0.393	0.637	0.424
	11	0.567	0.377	0.528	0.351	0.629	0.419	0.589	0.392	0.677	0.450	0.639	0.425
	12	0.581	0.387	0.534	0.355	0.646	0.430	0.596	0.397	0.694	0.462	0.647	0.431
	13	0.597	0.397	0.540	0.359	0.664	0.442	0.604	0.402	0.714	0.475	0.656	0.437
	14	0.615	0.409	0.547	0.364	0.684	0.455	0.612	0.407	0.736	0.490	0.665	0.443
	15	0.635	0.422	0.553	0.368	0.706	0.470	0.620	0.412	0.760	0.506	0.675	0.449
	16	0.657	0.437	0.560	0.372	0.731	0.486	0.628	0.418	0.787	0.524	0.684	0.455
	17	0.681	0.453	0.567	0.377	0.758	0.505	0.637	0.424	0.816	0.543	0.694	0.462
	18	0.707	0.471	0.574	0.382	0.788	0.525	0.646	0.429	0.849	0.565	0.705	0.469
	19	0.736	0.490	0.581	0.387	0.821	0.547	0.655	0.435	0.885	0.589	0.715	0.476
	20	0.768	0.511	0.588	0.391	0.858	0.571	0.664	0.442	0.924	0.615	0.726	0.483
	22	0.842	0.560	0.604	0.402	0.942	0.626	0.683	0.454	1.02	0.675	0.749	0.498
	24	0.930	0.619	0.620	0.412	1.04	0.694	0.704	0.468	1.13	0.749	0.773	0.514
	26	1.04	0.690	0.637	0.424	1.17	0.775	0.725	0.483	1.26	0.837	0.799	0.532
	28	1.17	0.776	0.655	0.436	1.31	0.874	0.749	0.498	1.42	0.944	0.827	0.550
	30	1.33	0.883	0.674	0.448	1.50	0.996	0.773	0.514	1.62	1.08	0.857	0.570
	32	1.51	1.00	0.694	0.462	1.70	1.13	0.800	0.532	1.84	1.23	0.888	0.591
	34	1.70	1.13	0.716	0.476	1.92	1.28	0.828	0.551	2.08	1.38	0.923	0.614
	36	1.91	1.27	0.739	0.491	2.16	1.43	0.858	0.571	2.33	1.55	0.960	0.639
	38	2.13	1.42	0.763	0.508	2.40	1.60	0.891	0.593	2.60	1.73	1.00	0.666
	40	2.36	1.57	0.789	0.525	2.66	1.77	0.926	0.616	2.88	1.92	1.05	0.697
	42	2.60	1.73	0.817	0.544	2.93	1.95	0.967	0.643	3.17	2.11	1.11	0.740
	44	2.85	1.90	0.847	0.563	3.22	2.14	1.02	0.679	3.48	2.32	1.17	0.782
	46	3.12	2.08	0.884	0.588	3.52	2.34	1.07	0.715	3.81	2.53	1.24	0.824
	48	3.40	2.26	0.928	0.617	3.83	2.55	1.13	0.751	4.15	2.76	1.30	0.866
	50	3.68	2.45	0.971	0.646	4.16	2.77	1.18	0.787	4.50	2.99	1.36	0.908
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.31		1.54		2.60		1.73		2.83		1.88	
$t_y \times 10^3$, (kips)$^{-1}$		0.497		0.331		0.550		0.366		0.591		0.393	
$t_r \times 10^3$, (kips)$^{-1}$		0.611		0.407		0.676		0.451		0.726		0.484	
r_x/r_y		3.44				3.44				3.42			
r_y, in.		3.11				3.08				3.07			

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W24×											
		176				162				146			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.646	0.430	0.697	0.464	0.699	0.465	0.761	0.506	0.777	0.517	0.852	0.567
	11	0.742	0.493	0.700	0.466	0.801	0.533	0.764	0.508	0.894	0.595	0.857	0.571
	12	0.761	0.506	0.710	0.472	0.822	0.547	0.776	0.516	0.918	0.611	0.872	0.580
	13	0.783	0.521	0.721	0.479	0.846	0.563	0.788	0.524	0.945	0.629	0.887	0.590
	14	0.808	0.537	0.731	0.487	0.872	0.580	0.801	0.533	0.975	0.649	0.902	0.600
	15	0.835	0.555	0.743	0.494	0.901	0.600	0.814	0.541	1.01	0.671	0.918	0.611
	16	0.865	0.575	0.754	0.502	0.934	0.621	0.827	0.550	1.05	0.696	0.935	0.622
	17	0.898	0.597	0.766	0.510	0.969	0.645	0.841	0.560	1.09	0.723	0.952	0.633
	18	0.934	0.622	0.778	0.518	1.01	0.671	0.855	0.569	1.13	0.753	0.970	0.645
	19	0.975	0.649	0.791	0.526	1.05	0.700	0.870	0.579	1.18	0.786	0.988	0.657
	20	1.02	0.678	0.804	0.535	1.10	0.731	0.886	0.589	1.24	0.823	1.01	0.670
	22	1.12	0.746	0.832	0.553	1.21	0.804	0.918	0.611	1.36	0.907	1.05	0.697
	24	1.25	0.829	0.861	0.573	1.34	0.892	0.953	0.634	1.52	1.01	1.09	0.727
	26	1.40	0.928	0.893	0.594	1.50	0.999	0.991	0.660	1.70	1.13	1.14	0.759
	28	1.58	1.05	0.927	0.617	1.70	1.13	1.03	0.687	1.93	1.29	1.19	0.794
	30	1.80	1.20	0.964	0.641	1.94	1.29	1.08	0.716	2.21	1.47	1.25	0.832
	32	2.05	1.37	1.00	0.668	2.21	1.47	1.13	0.749	2.52	1.68	1.31	0.874
	34	2.32	1.54	1.05	0.697	2.49	1.66	1.18	0.784	2.84	1.89	1.39	0.926
	36	2.60	1.73	1.09	0.728	2.79	1.86	1.24	0.826	3.19	2.12	1.50	1.00
	38	2.90	1.93	1.15	0.767	3.11	2.07	1.33	0.886	3.55	2.36	1.62	1.08
	40	3.21	2.13	1.23	0.818	3.45	2.29	1.42	0.947	3.93	2.62	1.73	1.15
	42	3.54	2.35	1.31	0.869	3.80	2.53	1.51	1.01	4.34	2.89	1.85	1.23
	44	3.88	2.58	1.38	0.920	4.17	2.78	1.60	1.07	4.76	3.17	1.96	1.30
	46	4.24	2.82	1.46	0.970	4.56	3.03	1.69	1.13	5.20	3.46	2.07	1.38
	48	4.62	3.07	1.53	1.02	4.96	3.30	1.78	1.19	5.67	3.77	2.19	1.45
	50	5.01	3.34	1.61	1.07	5.39	3.58	1.87	1.25	6.15	4.09	2.30	1.53
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		3.10		2.06		3.39		2.26		3.82		2.54	
$t_y \times 10^3$, (kips)$^{-1}$		0.646		0.430		0.699		0.465		0.777		0.517	
$t_r \times 10^3$, (kips)$^{-1}$		0.794		0.529		0.858		0.572		0.954		0.636	
r_x/r_y		3.45				3.41				3.42			
r_y, in.		3.04				3.05				3.01			

W24

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		131				117[c]				104[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.865	0.576	0.963	0.641	0.994	0.661	1.09	0.725	1.14	0.759	1.23	0.820
	11	1.00	0.665	0.972	0.646	1.13	0.752	1.10	0.733	1.30	0.862	1.25	0.832
	12	1.03	0.684	0.989	0.658	1.16	0.771	1.12	0.748	1.33	0.884	1.28	0.849
	13	1.06	0.704	1.01	0.670	1.19	0.794	1.15	0.762	1.37	0.908	1.30	0.867
	14	1.09	0.727	1.03	0.683	1.23	0.820	1.17	0.778	1.41	0.936	1.33	0.886
	15	1.13	0.753	1.05	0.696	1.28	0.850	1.19	0.794	1.45	0.966	1.36	0.905
	16	1.17	0.781	1.07	0.710	1.33	0.882	1.22	0.810	1.50	1.00	1.39	0.925
	17	1.22	0.813	1.09	0.724	1.38	0.919	1.24	0.828	1.56	1.04	1.42	0.946
	18	1.27	0.848	1.11	0.739	1.44	0.959	1.27	0.846	1.63	1.08	1.46	0.969
	19	1.33	0.886	1.13	0.754	1.51	1.00	1.30	0.865	1.70	1.13	1.49	0.992
	20	1.39	0.928	1.16	0.770	1.58	1.05	1.33	0.885	1.79	1.19	1.53	1.02
	22	1.54	1.03	1.21	0.804	1.75	1.16	1.39	0.927	1.99	1.32	1.61	1.07
	24	1.72	1.14	1.26	0.841	1.96	1.30	1.46	0.974	2.23	1.48	1.69	1.13
	26	1.94	1.29	1.33	0.882	2.21	1.47	1.54	1.03	2.52	1.68	1.79	1.19
	28	2.21	1.47	1.39	0.928	2.53	1.68	1.63	1.08	2.89	1.92	1.90	1.27
	30	2.53	1.68	1.47	0.977	2.90	1.93	1.73	1.15	3.32	2.21	2.06	1.37
	32	2.88	1.92	1.56	1.04	3.30	2.20	1.89	1.26	3.77	2.51	2.29	1.52
	34	3.25	2.16	1.70	1.13	3.72	2.48	2.07	1.38	4.26	2.83	2.51	1.67
	36	3.65	2.43	1.84	1.23	4.18	2.78	2.25	1.50	4.78	3.18	2.74	1.82
	38	4.06	2.70	1.99	1.32	4.65	3.10	2.43	1.62	5.32	3.54	2.97	1.98
	40	4.50	3.00	2.13	1.42	5.16	3.43	2.62	1.74	5.90	3.92	3.20	2.13
	42	4.96	3.30	2.28	1.52	5.68	3.78	2.80	1.86	6.50	4.33	3.44	2.29
	44	5.45	3.62	2.42	1.61	6.24	4.15	2.98	1.99	7.13	4.75	3.67	2.44
	46	5.95	3.96	2.57	1.71	6.82	4.54	3.17	2.11	7.80	5.19	3.91	2.60
	48	6.48	4.31	2.71	1.80	7.42	4.94	3.35	2.23	8.49	5.65	4.14	2.76

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	4.37	2.91	4.99	3.32	5.71	3.80
$t_y \times 10^3$, (kips)$^{-1}$	0.865	0.576	0.971	0.646	1.09	0.724
$t_r \times 10^3$, (kips)$^{-1}$	1.06	0.709	1.19	0.795	1.34	0.891
r_x/r_y	3.43		3.44		3.47	
r_y, in.	2.97		2.94		2.91	

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W24×											
		103[c]				94[c]				84[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.13	0.753	1.27	0.847	1.26	0.840	1.40	0.933	1.46	0.968	1.59	1.06
	11	1.52	1.01	1.42	0.944	1.67	1.11	1.57	1.05	1.92	1.28	1.80	1.20
	12	1.62	1.08	1.46	0.972	1.78	1.18	1.62	1.08	2.03	1.35	1.87	1.24
	13	1.73	1.15	1.51	1.00	1.90	1.26	1.68	1.12	2.17	1.44	1.93	1.28
	14	1.86	1.23	1.55	1.03	2.04	1.36	1.73	1.15	2.33	1.55	2.00	1.33
	15	2.00	1.33	1.61	1.07	2.21	1.47	1.79	1.19	2.52	1.68	2.08	1.38
	16	2.18	1.45	1.66	1.10	2.40	1.60	1.86	1.24	2.75	1.83	2.16	1.44
	17	2.38	1.58	1.72	1.14	2.62	1.74	1.93	1.28	3.01	2.00	2.25	1.49
	18	2.61	1.74	1.78	1.19	2.88	1.92	2.01	1.33	3.32	2.21	2.34	1.56
	19	2.88	1.92	1.85	1.23	3.18	2.12	2.09	1.39	3.68	2.45	2.45	1.63
	20	3.19	2.12	1.92	1.28	3.53	2.35	2.17	1.45	4.08	2.71	2.56	1.70
	22	3.86	2.57	2.09	1.39	4.27	2.84	2.43	1.61	4.94	3.28	2.95	1.96
	24	4.60	3.06	2.37	1.58	5.08	3.38	2.76	1.84	5.88	3.91	3.37	2.24
	26	5.40	3.59	2.65	1.77	5.96	3.97	3.10	2.06	6.90	4.59	3.80	2.53
	28	6.26	4.16	2.94	1.95	6.92	4.60	3.44	2.29	8.00	5.32	4.24	2.82
	30	7.19	4.78	3.22	2.14	7.94	5.28	3.79	2.52	9.18	6.11	4.67	3.11
	32	8.18	5.44	3.50	2.33	9.03	6.01	4.13	2.75	10.4	6.95	5.11	3.40

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	8.58	5.71	9.50	6.32	10.9	7.27
$t_y \times 10^3$, (kips)$^{-1}$	1.10	0.733	1.21	0.802	1.35	0.900
$t_r \times 10^3$, (kips)$^{-1}$	1.35	0.903	1.48	0.987	1.66	1.11
r_x/r_y	5.03		4.98		5.02	
r_y, in.	1.99		1.98		1.95	

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W24

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W24×											
		76				68[c]				62[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.64	1.09	1.78	1.19	1.87	1.24	2.01	1.34	2.08	1.38	2.33	1.55
	6	1.78	1.18	1.78	1.19	2.03	1.35	2.01	1.34	2.40	1.60	2.44	1.63
	7	1.83	1.22	1.79	1.19	2.09	1.39	2.04	1.36	2.54	1.69	2.56	1.70
	8	1.89	1.26	1.85	1.23	2.17	1.44	2.11	1.40	2.72	1.81	2.68	1.78
	9	1.97	1.31	1.91	1.27	2.26	1.50	2.18	1.45	2.94	1.96	2.82	1.87
	10	2.06	1.37	1.97	1.31	2.36	1.57	2.26	1.50	3.22	2.14	2.97	1.97
	11	2.17	1.44	2.04	1.36	2.49	1.66	2.34	1.56	3.59	2.39	3.13	2.08
	12	2.30	1.53	2.11	1.41	2.64	1.76	2.43	1.62	4.07	2.71	3.32	2.21
	13	2.45	1.63	2.19	1.46	2.82	1.88	2.53	1.68	4.67	3.11	3.53	2.35
	14	2.62	1.75	2.28	1.52	3.03	2.02	2.63	1.75	5.42	3.60	3.77	2.51
	15	2.84	1.89	2.37	1.58	3.29	2.19	2.75	1.83	6.22	4.14	4.15	2.76
	16	3.10	2.06	2.47	1.64	3.59	2.39	2.87	1.91	7.08	4.71	4.62	3.08
	17	3.40	2.26	2.58	1.71	3.97	2.64	3.01	2.00	7.99	5.31	5.11	3.40
	18	3.76	2.50	2.69	1.79	4.42	2.94	3.16	2.10	8.96	5.96	5.60	3.72
	19	4.19	2.79	2.82	1.88	4.92	3.27	3.35	2.23	9.98	6.64	6.10	4.06
	20	4.64	3.09	3.02	2.01	5.45	3.63	3.66	2.43	11.1	7.36	6.61	4.40
	22	5.62	3.74	3.53	2.35	6.60	4.39	4.29	2.85	13.4	8.90	7.64	5.08
	24	6.68	4.45	4.05	2.69	7.85	5.22	4.94	3.29				
	26	7.84	5.22	4.58	3.05	9.21	6.13	5.61	3.74				
	28	9.10	6.05	5.12	3.41	10.7	7.11	6.30	4.19				
	30	10.4	6.95	5.66	3.77	12.3	8.16	6.99	4.65				
	32	11.9	7.90	6.21	4.13								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		12.5		8.29		14.5		9.67		22.7		15.1	
$t_y \times 10^3$, (kips)$^{-1}$		1.49		0.992		1.66		1.11		1.84		1.22	
$t_r \times 10^3$, (kips)$^{-1}$		1.83		1.22		2.04		1.36		2.25		1.50	
r_x/r_y		5.05				5.11				6.69			
r_y, in.		1.92				1.87				1.38			

[c] Shape is slender for compression with F_y = 50 ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W24-W21

Shape		W24×				W21×							
		55[c, v]				201				182			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.42	1.61	2.66	1.77	0.563	0.375	0.672	0.447	0.623	0.415	0.748	0.498
	6	2.80	1.87	2.82	1.87	0.587	0.391	0.672	0.447	0.650	0.432	0.748	0.498
	7	2.97	1.98	2.95	1.96	0.596	0.397	0.672	0.447	0.660	0.439	0.748	0.498
	8	3.18	2.11	3.10	2.07	0.606	0.403	0.672	0.447	0.672	0.447	0.748	0.498
	9	3.45	2.29	3.27	2.18	0.618	0.411	0.672	0.447	0.685	0.456	0.748	0.498
	10	3.79	2.52	3.46	2.30	0.632	0.421	0.672	0.447	0.700	0.466	0.748	0.498
	11	4.23	2.81	3.67	2.44	0.648	0.431	0.675	0.449	0.718	0.478	0.752	0.500
	12	4.80	3.19	3.91	2.60	0.665	0.443	0.682	0.454	0.737	0.491	0.761	0.507
	13	5.57	3.70	4.18	2.78	0.685	0.455	0.690	0.459	0.759	0.505	0.771	0.513
	14	6.46	4.29	4.51	3.00	0.706	0.470	0.698	0.464	0.784	0.521	0.780	0.519
	15	7.41	4.93	5.08	3.38	0.730	0.486	0.706	0.470	0.811	0.539	0.790	0.526
	16	8.43	5.61	5.68	3.78	0.757	0.504	0.714	0.475	0.841	0.559	0.801	0.533
	17	9.52	6.33	6.29	4.18	0.786	0.523	0.723	0.481	0.874	0.581	0.811	0.540
	18	10.7	7.10	6.91	4.60	0.819	0.545	0.731	0.487	0.910	0.606	0.822	0.547
	19	11.9	7.91	7.55	5.02	0.854	0.568	0.740	0.492	0.951	0.632	0.833	0.554
	20	13.2	8.77	8.20	5.46	0.894	0.595	0.749	0.498	0.995	0.662	0.844	0.562
	22	15.9	10.6	9.52	6.34	0.985	0.655	0.768	0.511	1.10	0.730	0.868	0.577
	24					1.10	0.729	0.788	0.524	1.22	0.813	0.893	0.594
	26					1.23	0.818	0.809	0.538	1.37	0.914	0.919	0.612
	28					1.39	0.926	0.831	0.553	1.56	1.04	0.947	0.630
	30					1.59	1.06	0.854	0.568	1.79	1.19	0.977	0.650
	32					1.81	1.21	0.878	0.584	2.03	1.35	1.01	0.671
	34					2.05	1.36	0.904	0.602	2.30	1.53	1.04	0.694
	36					2.30	1.53	0.932	0.620	2.57	1.71	1.08	0.718
	38					2.56	1.70	0.961	0.640	2.87	1.91	1.12	0.744
	40					2.83	1.89	0.993	0.660	3.18	2.11	1.16	0.772
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		26.8		17.8		2.68		1.78		2.99		1.99	
$t_y \times 10^3$, (kips)$^{-1}$		2.06		1.37		0.563		0.375		0.623		0.415	
$t_r \times 10^3$, (kips)$^{-1}$		2.53		1.69		0.692		0.461		0.765		0.510	
r_x/r_y		6.80				3.14				3.13			
r_y, in.		1.34				3.02				3.00			

[c] Shape is slender for compression with F_y = 50 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.
Note: Heavy line indicates KL/r_y equal to or greater than 200.

W21

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		166				147				132			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.684	0.455	0.825	0.549	0.773	0.514	0.955	0.635	0.861	0.573	1.07	0.712
	6	0.714	0.475	0.825	0.549	0.808	0.537	0.955	0.635	0.900	0.599	1.07	0.712
	7	0.725	0.482	0.825	0.549	0.820	0.546	0.955	0.635	0.914	0.608	1.07	0.712
	8	0.738	0.491	0.825	0.549	0.835	0.556	0.955	0.635	0.931	0.620	1.07	0.712
	9	0.753	0.501	0.825	0.549	0.853	0.567	0.955	0.635	0.951	0.633	1.07	0.712
	10	0.770	0.512	0.825	0.549	0.873	0.581	0.955	0.635	0.973	0.647	1.07	0.712
	11	0.789	0.525	0.829	0.552	0.895	0.596	0.963	0.641	0.999	0.664	1.08	0.719
	12	0.811	0.540	0.841	0.559	0.920	0.612	0.978	0.651	1.03	0.683	1.10	0.731
	13	0.835	0.556	0.852	0.567	0.949	0.631	0.993	0.661	1.06	0.705	1.12	0.743
	14	0.862	0.574	0.864	0.575	0.980	0.652	1.01	0.671	1.09	0.728	1.14	0.756
	15	0.892	0.594	0.876	0.583	1.02	0.675	1.02	0.682	1.13	0.755	1.16	0.769
	16	0.925	0.616	0.888	0.591	1.05	0.701	1.04	0.693	1.18	0.784	1.18	0.782
	17	0.962	0.640	0.901	0.599	1.10	0.730	1.06	0.704	1.23	0.816	1.20	0.796
	18	1.00	0.667	0.914	0.608	1.14	0.761	1.08	0.716	1.28	0.852	1.22	0.811
	19	1.05	0.697	0.927	0.617	1.20	0.796	1.09	0.728	1.34	0.892	1.24	0.826
	20	1.10	0.729	0.941	0.626	1.25	0.835	1.11	0.740	1.41	0.935	1.26	0.841
	22	1.21	0.805	0.970	0.645	1.39	0.924	1.15	0.767	1.56	1.04	1.31	0.874
	24	1.35	0.897	1.00	0.666	1.55	1.03	1.19	0.795	1.74	1.16	1.37	0.910
	26	1.52	1.01	1.03	0.688	1.75	1.17	1.24	0.825	1.97	1.31	1.43	0.948
	28	1.72	1.15	1.07	0.711	2.00	1.33	1.29	0.858	2.25	1.50	1.49	0.990
	30	1.98	1.31	1.11	0.736	2.29	1.53	1.34	0.894	2.59	1.72	1.56	1.04
	32	2.25	1.50	1.15	0.763	2.61	1.74	1.40	0.933	2.95	1.96	1.63	1.09
	34	2.54	1.69	1.19	0.792	2.95	1.96	1.47	0.975	3.32	2.21	1.72	1.14
	36	2.85	1.89	1.24	0.823	3.30	2.20	1.54	1.02	3.73	2.48	1.85	1.23
	38	3.17	2.11	1.29	0.857	3.68	2.45	1.64	1.09	4.15	2.76	1.98	1.32
	40	3.51	2.34	1.34	0.895	4.08	2.71	1.75	1.16	4.60	3.06	2.12	1.41
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		3.30		2.19		3.85		2.56		4.33		2.88	
$t_y \times 10^3$, (kips)$^{-1}$		0.684		0.455		0.773		0.514		0.861		0.573	
$t_r \times 10^3$, (kips)$^{-1}$		0.841		0.560		0.950		0.633		1.06		0.705	
r_x/r_y		3.13				3.11				3.11			
r_y, in.		2.99				2.95				2.93			

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W21×											
		122				111				101[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.930	0.619	1.16	0.772	1.02	0.682	1.28	0.850	1.13	0.754	1.41	0.937
	6	0.973	0.647	1.16	0.772	1.07	0.713	1.28	0.850	1.18	0.785	1.41	0.937
	7	0.988	0.658	1.16	0.772	1.09	0.725	1.28	0.850	1.20	0.797	1.41	0.937
	8	1.01	0.670	1.16	0.772	1.11	0.739	1.28	0.850	1.22	0.810	1.41	0.937
	9	1.03	0.684	1.16	0.772	1.13	0.754	1.28	0.850	1.24	0.826	1.41	0.937
	10	1.05	0.700	1.16	0.772	1.16	0.773	1.28	0.850	1.27	0.846	1.41	0.937
	11	1.08	0.719	1.17	0.781	1.19	0.793	1.29	0.861	1.31	0.869	1.43	0.951
	12	1.11	0.739	1.19	0.795	1.23	0.816	1.32	0.877	1.34	0.894	1.46	0.969
	13	1.15	0.763	1.22	0.809	1.27	0.842	1.34	0.894	1.39	0.923	1.49	0.989
	14	1.19	0.789	1.24	0.823	1.31	0.871	1.37	0.911	1.43	0.955	1.52	1.01
	15	1.23	0.817	1.26	0.838	1.36	0.903	1.40	0.929	1.49	0.990	1.55	1.03
	16	1.28	0.849	1.28	0.854	1.41	0.939	1.42	0.947	1.55	1.03	1.58	1.05
	17	1.33	0.884	1.31	0.870	1.47	0.979	1.45	0.966	1.61	1.07	1.61	1.07
	18	1.39	0.924	1.33	0.887	1.54	1.02	1.48	0.986	1.69	1.12	1.65	1.10
	19	1.45	0.967	1.36	0.905	1.61	1.07	1.51	1.01	1.77	1.18	1.69	1.12
	20	1.52	1.01	1.39	0.923	1.69	1.12	1.55	1.03	1.86	1.23	1.72	1.15
	22	1.69	1.13	1.45	0.961	1.88	1.25	1.62	1.08	2.06	1.37	1.81	1.20
	24	1.89	1.26	1.51	1.00	2.11	1.40	1.69	1.13	2.32	1.54	1.90	1.26
	26	2.14	1.43	1.58	1.05	2.39	1.59	1.78	1.18	2.63	1.75	2.00	1.33
	28	2.45	1.63	1.65	1.10	2.74	1.82	1.87	1.24	3.02	2.01	2.11	1.41
	30	2.82	1.87	1.74	1.16	3.14	2.09	1.97	1.31	3.46	2.30	2.24	1.49
	32	3.20	2.13	1.83	1.22	3.58	2.38	2.12	1.41	3.94	2.62	2.46	1.64
	34	3.62	2.41	1.97	1.31	4.04	2.69	2.31	1.53	4.45	2.96	2.69	1.79
	36	4.06	2.70	2.12	1.41	4.53	3.01	2.50	1.66	4.99	3.32	2.92	1.94
	38	4.52	3.01	2.28	1.52	5.05	3.36	2.69	1.79	5.56	3.70	3.14	2.09
	40	5.01	3.33	2.44	1.62	5.59	3.72	2.88	1.91	6.16	4.10	3.37	2.24
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		4.71		3.14		5.22		3.48		5.77		3.84	
$t_y \times 10^3$, (kips)$^{-1}$		0.930		0.619		1.02		0.682		1.12		0.746	
$t_r \times 10^3$, (kips)$^{-1}$		1.14		0.762		1.26		0.839		1.38		0.918	
r_x/r_y		3.11				3.12				3.12			
r_y, in.		2.92				2.90				2.89			

[c] Shape is slender for compression with F_y = 50 ksi.

W21

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		93				83[c]				73[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.22	0.814	1.61	1.07	1.38	0.916	1.82	1.21	1.62	1.08	2.07	1.38
	6	1.37	0.910	1.61	1.07	1.53	1.02	1.82	1.21	1.78	1.19	2.07	1.38
	7	1.42	0.948	1.63	1.09	1.60	1.06	1.85	1.23	1.85	1.23	2.11	1.40
	8	1.49	0.993	1.68	1.12	1.67	1.11	1.90	1.26	1.93	1.28	2.18	1.45
	9	1.57	1.05	1.73	1.15	1.77	1.17	1.96	1.30	2.02	1.35	2.25	1.49
	10	1.67	1.11	1.78	1.18	1.87	1.25	2.02	1.34	2.14	1.43	2.32	1.55
	11	1.78	1.19	1.83	1.22	2.00	1.33	2.09	1.39	2.29	1.52	2.40	1.60
	12	1.91	1.27	1.89	1.25	2.15	1.43	2.16	1.43	2.47	1.64	2.49	1.66
	13	2.07	1.38	1.95	1.29	2.33	1.55	2.23	1.48	2.67	1.78	2.58	1.72
	14	2.25	1.50	2.01	1.34	2.53	1.69	2.31	1.54	2.92	1.94	2.68	1.79
	15	2.46	1.64	2.08	1.38	2.78	1.85	2.40	1.60	3.20	2.13	2.79	1.86
	16	2.71	1.80	2.15	1.43	3.06	2.04	2.49	1.66	3.54	2.35	2.91	1.94
	17	3.01	2.00	2.23	1.48	3.40	2.26	2.59	1.72	3.93	2.62	3.04	2.02
	18	3.36	2.23	2.32	1.54	3.80	2.53	2.70	1.80	4.41	2.93	3.18	2.11
	19	3.74	2.49	2.41	1.60	4.23	2.82	2.82	1.88	4.91	3.27	3.33	2.22
	20	4.15	2.76	2.51	1.67	4.69	3.12	2.95	1.96	5.44	3.62	3.58	2.38
	22	5.02	3.34	2.77	1.84	5.67	3.78	3.37	2.24	6.58	4.38	4.13	2.75
	24	5.97	3.97	3.12	2.07	6.75	4.49	3.81	2.53	7.83	5.21	4.68	3.12
	26	7.01	4.66	3.46	2.30	7.93	5.27	4.25	2.83	9.19	6.12	5.24	3.49
	28	8.13	5.41	3.81	2.54	9.19	6.12	4.69	3.12	10.7	7.09	5.81	3.86
	30	9.33	6.21	4.16	2.77	10.6	7.02	5.13	3.41	12.2	8.14	6.37	4.24

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	10.3	6.83	11.7	7.77	13.4	8.91
$t_y \times 10^3$, (kips)$^{-1}$	1.22	0.814	1.37	0.911	1.55	1.03
$t_r \times 10^3$, (kips)$^{-1}$	1.50	1.00	1.68	1.12	1.91	1.27
r_x/r_y	4.73		4.74		4.77	
r_y, in.	1.84		1.83		1.81	

[c] Shape is slender for compression with F_y = 50 ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W21×											
		68[c]				62[c]				57[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.77	1.18	2.23	1.48	1.98	1.31	2.47	1.65	2.18	1.45	2.76	1.84
	6	1.95	1.30	2.23	1.48	2.18	1.45	2.47	1.65	2.56	1.71	2.91	1.94
	7	2.02	1.34	2.27	1.51	2.26	1.50	2.54	1.69	2.73	1.82	3.04	2.03
	8	2.10	1.40	2.35	1.56	2.35	1.56	2.62	1.74	2.94	1.96	3.19	2.12
	9	2.21	1.47	2.43	1.62	2.47	1.64	2.71	1.81	3.21	2.14	3.35	2.23
	10	2.33	1.55	2.51	1.67	2.61	1.74	2.81	1.87	3.56	2.37	3.53	2.35
	11	2.48	1.65	2.61	1.73	2.78	1.85	2.92	1.94	4.02	2.68	3.73	2.48
	12	2.67	1.77	2.70	1.80	2.98	1.98	3.04	2.02	4.60	3.06	3.95	2.63
	13	2.89	1.92	2.81	1.87	3.22	2.14	3.16	2.10	5.32	3.54	4.20	2.79
	14	3.16	2.10	2.93	1.95	3.53	2.35	3.30	2.19	6.17	4.10	4.48	2.98
	15	3.47	2.31	3.05	2.03	3.89	2.59	3.44	2.29	7.08	4.71	4.94	3.29
	16	3.84	2.55	3.19	2.12	4.31	2.87	3.61	2.40	8.06	5.36	5.47	3.64
	17	4.27	2.84	3.34	2.22	4.83	3.21	3.78	2.52	9.10	6.05	6.01	4.00
	18	4.79	3.19	3.50	2.33	5.41	3.60	3.98	2.65	10.2	6.79	6.55	4.36
	19	5.34	3.55	3.72	2.48	6.03	4.01	4.33	2.88	11.4	7.56	7.10	4.72
	20	5.91	3.93	4.03	2.68	6.68	4.45	4.70	3.13	12.6	8.38	7.65	5.09
	22	7.16	4.76	4.66	3.10	8.09	5.38	5.46	3.63	15.2	10.1	8.76	5.83
	24	8.52	5.67	5.31	3.53	9.63	6.40	6.24	4.15				
	26	9.99	6.65	5.95	3.96	11.3	7.52	7.02	4.67				
	28	11.6	7.71	6.60	4.39	13.1	8.72	7.81	5.20				
	30	13.3	8.85	7.26	4.83								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		14.6		9.71		16.4		10.9		24.1		16.0	
$t_y \times 10^3$, (kips)$^{-1}$		1.67		1.11		1.83		1.21		2.00		1.33	
$t_r \times 10^3$, (kips)$^{-1}$		2.05		1.37		2.24		1.49		2.46		1.64	
r_x/r_y		4.78				4.82				6.19			
r_y, in.		1.80				1.77				1.35			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W21

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W21×											
		55[c]				50[c]				48[c, f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.29	1.52	2.83	1.88	2.54	1.69	3.24	2.15	2.71	1.80	3.36	2.23
	6	2.52	1.68	2.83	1.88	3.01	2.00	3.45	2.30	3.00	1.99	3.36	2.23
	7	2.61	1.74	2.92	1.94	3.22	2.14	3.63	2.41	3.11	2.07	3.47	2.31
	8	2.73	1.81	3.02	2.01	3.48	2.31	3.81	2.54	3.25	2.16	3.61	2.40
	9	2.86	1.91	3.14	2.09	3.81	2.54	4.02	2.68	3.42	2.28	3.76	2.50
	10	3.03	2.02	3.27	2.17	4.25	2.82	4.26	2.83	3.63	2.42	3.92	2.61
	11	3.23	2.15	3.40	2.26	4.83	3.21	4.52	3.01	3.88	2.58	4.10	2.73
	12	3.47	2.31	3.55	2.36	5.57	3.71	4.82	3.21	4.19	2.79	4.30	2.86
	13	3.76	2.50	3.71	2.47	6.52	4.34	5.16	3.43	4.56	3.04	4.51	3.00
	14	4.11	2.73	3.89	2.59	7.56	5.03	5.67	3.77	5.02	3.34	4.74	3.16
	15	4.55	3.03	4.08	2.71	8.68	5.77	6.36	4.23	5.60	3.72	5.01	3.33
	16	5.07	3.38	4.29	2.86	9.87	6.57	7.06	4.70	6.31	4.20	5.30	3.52
	17	5.71	3.80	4.53	3.01	11.1	7.42	7.78	5.17	7.13	4.74	5.75	3.82
	18	6.40	4.26	4.92	3.27	12.5	8.31	8.51	5.66	7.99	5.32	6.35	4.22
	19	7.13	4.75	5.38	3.58	13.9	9.26	9.24	6.15	8.90	5.92	6.97	4.63
	20	7.90	5.26	5.86	3.90	15.4	10.3	9.99	6.65	9.86	6.56	7.60	5.06
	21	8.71	5.80	6.34	4.22	17.0	11.3	10.7	7.15	10.9	7.23	8.25	5.49
	22	9.56	6.36	6.84	4.55					11.9	7.94	8.91	5.93
	23	10.5	6.95	7.34	4.88					13.0	8.68	9.58	6.37
	24	11.4	7.57	7.84	5.22					14.2	9.45	10.3	6.82
	25	12.3	8.22	8.35	5.56					15.4	10.3	10.9	7.28
	26	13.4	8.89	8.87	5.90					16.7	11.1	11.6	7.75
	27	14.4	9.58	9.38	6.24					18.0	12.0	12.3	8.22
	28	15.5	10.3	9.90	6.59								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		19.4		12.9		29.2		19.4		24.2		16.1	
$t_y \times 10^3$, (kips)$^{-1}$		2.06		1.37		2.27		1.51		2.37		1.58	
$t_r \times 10^3$, (kips)$^{-1}$		2.53		1.69		2.79		1.86		2.91		1.94	
r_x/r_y		4.86				6.29				4.96			
r_y, in.		1.73				1.30				1.66			

[c] Shape is slender for compression with $F_y = 50$ ksi.

[f] Shape does not meet compact limit for flexure with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W21-W18

Shape		W21×				W18×							
		44[c]				311[h]				283[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.97	1.98	3.73	2.48	0.365	0.243	0.473	0.314	0.401	0.267	0.527	0.351
	6	3.53	2.35	4.03	2.68	0.381	0.253	0.473	0.314	0.419	0.279	0.527	0.351
	7	3.78	2.51	4.24	2.82	0.387	0.257	0.473	0.314	0.426	0.284	0.527	0.351
	8	4.09	2.72	4.48	2.98	0.394	0.262	0.473	0.314	0.434	0.289	0.527	0.351
	9	4.50	3.00	4.75	3.16	0.402	0.268	0.473	0.314	0.443	0.295	0.527	0.351
	10	5.03	3.35	5.05	3.36	0.412	0.274	0.473	0.314	0.454	0.302	0.527	0.351
	11	5.74	3.82	5.39	3.59	0.422	0.281	0.474	0.315	0.466	0.310	0.530	0.352
	12	6.68	4.45	5.79	3.85	0.434	0.289	0.477	0.317	0.480	0.319	0.533	0.355
	13	7.84	5.22	6.25	4.16	0.447	0.298	0.480	0.319	0.495	0.329	0.537	0.357
	14	9.10	6.05	7.11	4.73	0.462	0.308	0.483	0.321	0.512	0.340	0.540	0.359
	15	10.4	6.95	7.99	5.32	0.479	0.319	0.486	0.323	0.530	0.353	0.544	0.362
	16	11.9	7.91	8.90	5.92	0.497	0.331	0.489	0.325	0.551	0.367	0.548	0.364
	17	13.4	8.93	9.83	6.54	0.517	0.344	0.492	0.327	0.574	0.382	0.551	0.367
	18	15.0	10.0	10.8	7.18	0.540	0.359	0.495	0.329	0.600	0.399	0.555	0.369
	19	16.8	11.1	11.8	7.82	0.564	0.375	0.498	0.331	0.628	0.418	0.559	0.372
	20	18.6	12.4	12.7	8.47	0.592	0.394	0.501	0.333	0.659	0.439	0.563	0.374
	22					0.655	0.436	0.507	0.338	0.732	0.487	0.571	0.380
	24					0.732	0.487	0.514	0.342	0.821	0.546	0.579	0.385
	26					0.826	0.550	0.521	0.347	0.929	0.618	0.588	0.391
	28					0.942	0.627	0.528	0.351	1.06	0.708	0.596	0.397
	30					1.08	0.720	0.535	0.356	1.22	0.813	0.605	0.403
	32					1.23	0.819	0.542	0.361	1.39	0.925	0.614	0.409
	34					1.39	0.924	0.550	0.366	1.57	1.04	0.624	0.415
	36					1.56	1.04	0.557	0.371	1.76	1.17	0.634	0.422
	38					1.74	1.15	0.565	0.376	1.96	1.30	0.644	0.428
	40					1.92	1.28	0.573	0.382	2.17	1.45	0.654	0.435
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		35.0		23.3		1.72		1.15		1.93		1.28	
$t_y \times 10^3$, (kips)$^{-1}$		2.57		1.71		0.365		0.243		0.401		0.267	
$t_r \times 10^3$, (kips)$^{-1}$		3.16		2.10		0.448		0.299		0.493		0.328	
r_x/r_y		6.40				2.96				2.96			
r_y, in.		1.26				2.95				2.91			

[c] Shape is slender for compression with $F_y = 50$ ksi.

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

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

W18

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		258[h]				234[h]				211			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.439	0.292	0.583	0.388	0.487	0.324	0.649	0.432	0.536	0.357	0.727	0.484
	6	0.460	0.306	0.583	0.388	0.510	0.339	0.649	0.432	0.562	0.374	0.727	0.484
	7	0.468	0.311	0.583	0.388	0.519	0.345	0.649	0.432	0.572	0.381	0.727	0.484
	8	0.477	0.317	0.583	0.388	0.529	0.352	0.649	0.432	0.584	0.388	0.727	0.484
	9	0.487	0.324	0.583	0.388	0.541	0.360	0.649	0.432	0.597	0.397	0.727	0.484
	10	0.499	0.332	0.583	0.388	0.554	0.369	0.649	0.432	0.612	0.407	0.727	0.484
	11	0.512	0.341	0.587	0.390	0.570	0.379	0.654	0.435	0.629	0.419	0.734	0.488
	12	0.528	0.351	0.591	0.393	0.587	0.390	0.659	0.438	0.649	0.432	0.740	0.493
	13	0.545	0.362	0.595	0.396	0.606	0.403	0.664	0.442	0.671	0.446	0.747	0.497
	14	0.564	0.375	0.600	0.399	0.628	0.418	0.670	0.446	0.695	0.462	0.754	0.502
	15	0.585	0.389	0.604	0.402	0.652	0.434	0.675	0.449	0.722	0.480	0.761	0.506
	16	0.608	0.405	0.609	0.405	0.678	0.451	0.681	0.453	0.752	0.501	0.768	0.511
	17	0.634	0.422	0.613	0.408	0.708	0.471	0.687	0.457	0.786	0.523	0.775	0.516
	18	0.663	0.441	0.618	0.411	0.741	0.493	0.692	0.461	0.823	0.548	0.782	0.520
	19	0.695	0.462	0.623	0.414	0.777	0.517	0.698	0.465	0.865	0.575	0.790	0.525
	20	0.730	0.486	0.627	0.417	0.818	0.544	0.704	0.469	0.910	0.606	0.797	0.531
	22	0.812	0.541	0.637	0.424	0.912	0.607	0.717	0.477	1.02	0.677	0.813	0.541
	24	0.913	0.607	0.648	0.431	1.03	0.683	0.729	0.485	1.15	0.765	0.829	0.552
	26	1.04	0.690	0.658	0.438	1.17	0.778	0.742	0.494	1.31	0.873	0.846	0.563
	28	1.19	0.793	0.669	0.445	1.35	0.897	0.756	0.503	1.52	1.01	0.864	0.575
	30	1.37	0.910	0.680	0.453	1.55	1.03	0.770	0.513	1.74	1.16	0.882	0.587
	32	1.56	1.04	0.692	0.460	1.76	1.17	0.785	0.522	1.98	1.32	0.902	0.600
	34	1.76	1.17	0.704	0.468	1.99	1.32	0.800	0.533	2.24	1.49	0.922	0.613
	36	1.97	1.31	0.716	0.477	2.23	1.48	0.816	0.543	2.51	1.67	0.943	0.627
	38	2.19	1.46	0.729	0.485	2.48	1.65	0.833	0.554	2.79	1.86	0.965	0.642
	40	2.43	1.62	0.743	0.494	2.75	1.83	0.850	0.566	3.09	2.06	0.988	0.657
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.15		1.43		2.39		1.59		2.70		1.80	
$t_y \times 10^3$, (kips)$^{-1}$		0.439		0.292		0.487		0.324		0.536		0.357	
$t_r \times 10^3$, (kips)$^{-1}$		0.540		0.360		0.598		0.399		0.659		0.439	
r_x/r_y		2.96				2.96				2.96			
r_y, in.		2.88				2.85				2.82			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W18

Shape		W18×											
		192				175				158			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.594	0.395	0.806	0.536	0.650	0.432	0.895	0.596	0.721	0.480	1.00	0.666
	6	0.624	0.415	0.806	0.536	0.683	0.454	0.895	0.596	0.759	0.505	1.00	0.666
	7	0.635	0.423	0.806	0.536	0.695	0.463	0.895	0.596	0.773	0.514	1.00	0.666
	8	0.648	0.431	0.806	0.536	0.710	0.472	0.895	0.596	0.789	0.525	1.00	0.666
	9	0.663	0.441	0.806	0.536	0.727	0.484	0.895	0.596	0.808	0.538	1.00	0.666
	10	0.680	0.453	0.807	0.537	0.746	0.496	0.898	0.597	0.830	0.552	1.00	0.668
	11	0.700	0.466	0.815	0.542	0.768	0.511	0.907	0.604	0.855	0.569	1.02	0.676
	12	0.722	0.480	0.823	0.548	0.793	0.528	0.917	0.610	0.883	0.587	1.03	0.685
	13	0.747	0.497	0.831	0.553	0.821	0.546	0.927	0.617	0.914	0.608	1.04	0.693
	14	0.775	0.515	0.840	0.559	0.852	0.567	0.938	0.624	0.950	0.632	1.05	0.702
	15	0.806	0.536	0.848	0.564	0.887	0.590	0.948	0.631	0.989	0.658	1.07	0.710
	16	0.840	0.559	0.857	0.570	0.926	0.616	0.959	0.638	1.03	0.687	1.08	0.719
	17	0.879	0.585	0.866	0.576	0.969	0.645	0.970	0.645	1.08	0.720	1.10	0.729
	18	0.921	0.613	0.875	0.582	1.02	0.677	0.981	0.653	1.14	0.756	1.11	0.738
	19	0.968	0.644	0.884	0.588	1.07	0.712	0.993	0.661	1.20	0.796	1.12	0.748
	20	1.02	0.679	0.894	0.595	1.13	0.752	1.00	0.669	1.26	0.841	1.14	0.758
	22	1.14	0.761	0.913	0.608	1.27	0.844	1.03	0.685	1.42	0.946	1.17	0.779
	24	1.30	0.862	0.934	0.621	1.44	0.958	1.06	0.702	1.62	1.08	1.20	0.801
	26	1.48	0.987	0.955	0.636	1.65	1.10	1.08	0.720	1.86	1.24	1.24	0.824
	28	1.72	1.14	0.978	0.651	1.92	1.28	1.11	0.739	2.16	1.44	1.28	0.849
	30	1.97	1.31	1.00	0.666	2.20	1.47	1.14	0.759	2.48	1.65	1.32	0.875
	32	2.24	1.49	1.03	0.683	2.51	1.67	1.17	0.780	2.82	1.88	1.36	0.903
	34	2.53	1.68	1.05	0.700	2.83	1.88	1.21	0.803	3.19	2.12	1.40	0.933
	36	2.84	1.89	1.08	0.718	3.17	2.11	1.24	0.827	3.57	2.38	1.45	0.965
	38	3.16	2.10	1.11	0.737	3.53	2.35	1.28	0.852	3.98	2.65	1.50	0.999
	40	3.50	2.33	1.14	0.757	3.91	2.60	1.32	0.878	4.41	2.93	1.56	1.04
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.99		1.99		3.36		2.24		3.76		2.50	
$t_y \times 10^3$, (kips)$^{-1}$		0.594		0.395		0.650		0.432		0.721		0.480	
$t_r \times 10^3$, (kips)$^{-1}$		0.730		0.487		0.798		0.532		0.886		0.591	
r_x/r_y		2.97				2.97				2.96			
r_y, in.		2.79				2.76				2.74			

W18

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		143				130				119			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.795	0.529	1.11	0.736	0.872	0.580	1.23	0.817	0.952	0.633	1.36	0.905
	6	0.837	0.557	1.11	0.736	0.919	0.611	1.23	0.817	1.00	0.667	1.36	0.905
	7	0.853	0.567	1.11	0.736	0.936	0.623	1.23	0.817	1.02	0.680	1.36	0.905
	8	0.871	0.580	1.11	0.736	0.957	0.636	1.23	0.817	1.04	0.695	1.36	0.905
	9	0.892	0.594	1.11	0.736	0.980	0.652	1.23	0.817	1.07	0.712	1.36	0.905
	10	0.917	0.610	1.11	0.740	1.01	0.670	1.24	0.823	1.10	0.732	1.37	0.912
	11	0.945	0.629	1.13	0.750	1.04	0.691	1.25	0.835	1.13	0.755	1.39	0.926
	12	0.976	0.649	1.14	0.760	1.07	0.714	1.27	0.847	1.17	0.781	1.41	0.941
	13	1.01	0.673	1.16	0.770	1.11	0.741	1.29	0.859	1.22	0.810	1.44	0.956
	14	1.05	0.699	1.17	0.780	1.16	0.770	1.31	0.872	1.27	0.842	1.46	0.972
	15	1.10	0.729	1.19	0.791	1.21	0.803	1.33	0.886	1.32	0.878	1.49	0.989
	16	1.14	0.762	1.21	0.802	1.26	0.840	1.35	0.899	1.38	0.919	1.51	1.01
	17	1.20	0.798	1.22	0.814	1.32	0.881	1.37	0.913	1.45	0.964	1.54	1.02
	18	1.26	0.839	1.24	0.825	1.39	0.926	1.39	0.928	1.52	1.01	1.57	1.04
	19	1.33	0.884	1.26	0.838	1.47	0.977	1.42	0.943	1.61	1.07	1.59	1.06
	20	1.41	0.935	1.28	0.850	1.55	1.03	1.44	0.959	1.70	1.13	1.62	1.08
	22	1.58	1.05	1.32	0.876	1.75	1.17	1.49	0.992	1.92	1.28	1.69	1.12
	24	1.81	1.20	1.36	0.904	2.00	1.33	1.54	1.03	2.20	1.46	1.75	1.17
	26	2.08	1.39	1.40	0.933	2.32	1.54	1.60	1.06	2.55	1.70	1.83	1.21
	28	2.42	1.61	1.45	0.965	2.69	1.79	1.66	1.10	2.96	1.97	1.90	1.27
	30	2.77	1.85	1.50	0.999	3.09	2.05	1.73	1.15	3.39	2.26	1.99	1.32
	32	3.16	2.10	1.56	1.03	3.51	2.34	1.80	1.20	3.86	2.57	2.08	1.39
	34	3.56	2.37	1.61	1.07	3.97	2.64	1.87	1.25	4.36	2.90	2.19	1.46
	36	4.00	2.66	1.68	1.12	4.45	2.96	1.96	1.30	4.89	3.25	2.34	1.56
	38	4.45	2.96	1.74	1.16	4.95	3.30	2.08	1.38	5.45	3.62	2.50	1.66
	40	4.93	3.28	1.82	1.21	5.49	3.65	2.20	1.47	6.04	4.02	2.65	1.77
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		4.17		2.78		4.64		3.09		5.16		3.43	
$t_y \times 10^3$, (kips)$^{-1}$		0.795		0.529		0.872		0.580		0.952		0.633	
$t_r \times 10^3$, (kips)$^{-1}$		0.977		0.651		1.07		0.714		1.17		0.779	
r_x/r_y		2.97				2.97				2.94			
r_y, in.		2.72				2.70				2.69			

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W18

Shape		W18×											
		106				97				86			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.07	0.715	1.55	1.03	1.17	0.780	1.69	1.12	1.32	0.878	1.92	1.27
	6	1.13	0.754	1.55	1.03	1.24	0.823	1.69	1.12	1.39	0.928	1.92	1.27
	7	1.16	0.769	1.55	1.03	1.26	0.839	1.69	1.12	1.42	0.946	1.92	1.27
	8	1.18	0.786	1.55	1.03	1.29	0.858	1.69	1.12	1.46	0.968	1.92	1.27
	9	1.21	0.806	1.55	1.03	1.32	0.880	1.69	1.12	1.49	0.994	1.92	1.27
	10	1.25	0.829	1.56	1.04	1.36	0.906	1.71	1.14	1.54	1.02	1.94	1.29
	11	1.29	0.856	1.59	1.06	1.41	0.935	1.74	1.16	1.59	1.06	1.98	1.32
	12	1.33	0.885	1.62	1.08	1.45	0.968	1.77	1.18	1.64	1.09	2.02	1.35
	13	1.38	0.919	1.65	1.10	1.51	1.00	1.81	1.20	1.71	1.14	2.06	1.37
	14	1.44	0.957	1.68	1.12	1.57	1.05	1.84	1.23	1.78	1.18	2.11	1.40
	15	1.50	0.999	1.71	1.14	1.64	1.09	1.88	1.25	1.86	1.24	2.15	1.43
	16	1.57	1.05	1.74	1.16	1.72	1.14	1.92	1.28	1.95	1.30	2.20	1.47
	17	1.65	1.10	1.78	1.18	1.81	1.20	1.96	1.30	2.05	1.36	2.25	1.50
	18	1.74	1.16	1.81	1.21	1.90	1.27	2.00	1.33	2.16	1.44	2.31	1.53
	19	1.84	1.22	1.85	1.23	2.01	1.34	2.04	1.36	2.29	1.52	2.36	1.57
	20	1.95	1.30	1.89	1.26	2.13	1.42	2.09	1.39	2.43	1.61	2.42	1.61
	22	2.21	1.47	1.97	1.31	2.42	1.61	2.18	1.45	2.76	1.83	2.54	1.69
	24	2.53	1.68	2.06	1.37	2.78	1.85	2.29	1.52	3.17	2.11	2.68	1.79
	26	2.94	1.96	2.15	1.43	3.24	2.15	2.41	1.60	3.70	2.46	2.84	1.89
	28	3.41	2.27	2.26	1.50	3.75	2.50	2.54	1.69	4.29	2.86	3.01	2.00
	30	3.92	2.61	2.38	1.58	4.31	2.87	2.68	1.78	4.93	3.28	3.29	2.19
	32	4.46	2.97	2.51	1.67	4.90	3.26	2.91	1.93	5.61	3.73	3.59	2.39
	34	5.03	3.35	2.72	1.81	5.53	3.68	3.15	2.09	6.33	4.21	3.90	2.60
	36	5.64	3.75	2.92	1.94	6.20	4.13	3.38	2.25	7.10	4.72	4.21	2.80
	38	6.29	4.18	3.12	2.08	6.91	4.60	3.62	2.41	7.91	5.26	4.51	3.00
	40	6.97	4.63	3.32	2.21	7.66	5.10	3.86	2.57	8.76	5.83	4.82	3.21
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		5.89		3.92		6.44		4.29		7.36		4.90	
$t_y \times 10^3$, (kips)$^{-1}$		1.07		0.715		1.17		0.780		1.32		0.878	
$t_r \times 10^3$, (kips)$^{-1}$		1.32		0.879		1.44		0.960		1.62		1.08	
r_x/r_y		2.95				2.95				2.95			
r_y, in.		2.66				2.65				2.63			

W18

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		76[c]				71				65			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.52	1.01	2.19	1.45	1.60	1.06	2.44	1.62	1.75	1.16	2.68	1.78
	6	1.59	1.06	2.19	1.45	1.82	1.21	2.44	1.62	2.00	1.33	2.68	1.78
	7	1.62	1.08	2.19	1.45	1.91	1.27	2.51	1.67	2.09	1.39	2.76	1.84
	8	1.66	1.10	2.19	1.45	2.02	1.34	2.59	1.72	2.21	1.47	2.85	1.90
	9	1.70	1.13	2.19	1.45	2.15	1.43	2.67	1.78	2.36	1.57	2.95	1.96
	10	1.75	1.16	2.22	1.48	2.30	1.53	2.76	1.83	2.53	1.68	3.05	2.03
	11	1.81	1.20	2.27	1.51	2.48	1.65	2.85	1.90	2.73	1.82	3.15	2.10
	12	1.87	1.24	2.32	1.54	2.70	1.80	2.95	1.96	2.97	1.98	3.27	2.18
	13	1.94	1.29	2.37	1.58	2.96	1.97	3.05	2.03	3.26	2.17	3.39	2.26
	14	2.03	1.35	2.43	1.62	3.26	2.17	3.17	2.11	3.60	2.40	3.53	2.35
	15	2.12	1.41	2.49	1.65	3.63	2.41	3.29	2.19	4.01	2.67	3.67	2.44
	16	2.22	1.48	2.55	1.69	4.06	2.70	3.42	2.28	4.50	2.99	3.83	2.55
	17	2.34	1.56	2.61	1.74	4.58	3.05	3.57	2.37	5.08	3.38	4.00	2.66
	18	2.47	1.64	2.68	1.78	5.14	3.42	3.72	2.48	5.69	3.79	4.19	2.79
	19	2.62	1.74	2.75	1.83	5.73	3.81	3.89	2.59	6.34	4.22	4.43	2.95
	20	2.78	1.85	2.82	1.88	6.34	4.22	4.12	2.74	7.02	4.67	4.76	3.17
	22	3.16	2.11	2.98	1.98	7.68	5.11	4.69	3.12	8.50	5.66	5.44	3.62
	24	3.65	2.43	3.16	2.10	9.14	6.08	5.25	3.50	10.1	6.73	6.11	4.07
	26	4.26	2.84	3.36	2.24	10.7	7.13	5.82	3.87	11.9	7.90	6.79	4.51
	28	4.94	3.29	3.67	2.44	12.4	8.27	6.38	4.25	13.8	9.16	7.46	4.96
	30	5.68	3.78	4.06	2.70								
	32	6.46	4.30	4.45	2.96								
	34	7.29	4.85	4.85	3.22								
	36	8.17	5.44	5.24	3.49								
	38	9.11	6.06	5.64	3.75								
	40	10.1	6.71	6.04	4.02								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		8.44		5.62		14.4		9.60		15.8		10.5	
$t_y \times 10^3$, (kips)$^{-1}$		1.50		0.997		1.60		1.06		1.75		1.16	
$t_r \times 10^3$, (kips)$^{-1}$		1.84		1.23		1.96		1.31		2.15		1.43	
r_x/r_y		2.96				4.41				4.43			
r_y, in.		2.61				1.70				1.69			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W18×											
		60[c]				55[c]				50[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.94	1.29	2.90	1.93	2.14	1.43	3.18	2.12	2.42	1.61	3.53	2.35
	6	2.18	1.45	2.90	1.93	2.40	1.60	3.19	2.12	2.72	1.81	3.55	2.36
	7	2.28	1.52	3.00	1.99	2.51	1.67	3.30	2.20	2.84	1.89	3.68	2.45
	8	2.41	1.60	3.10	2.06	2.64	1.75	3.42	2.27	2.98	1.98	3.81	2.54
	9	2.57	1.71	3.20	2.13	2.80	1.86	3.54	2.36	3.16	2.10	3.96	2.64
	10	2.76	1.83	3.32	2.21	3.01	2.00	3.68	2.45	3.37	2.24	4.12	2.74
	11	2.98	1.98	3.44	2.29	3.26	2.17	3.83	2.55	3.63	2.42	4.29	2.86
	12	3.25	2.16	3.58	2.38	3.55	2.36	3.99	2.65	3.97	2.64	4.48	2.98
	13	3.56	2.37	3.72	2.48	3.90	2.60	4.16	2.77	4.37	2.91	4.69	3.12
	14	3.94	2.62	3.88	2.58	4.32	2.87	4.35	2.89	4.85	3.23	4.91	3.27
	15	4.39	2.92	4.05	2.69	4.82	3.21	4.55	3.03	5.42	3.61	5.16	3.43
	16	4.94	3.28	4.23	2.82	5.43	3.61	4.78	3.18	6.13	4.08	5.44	3.62
	17	5.57	3.71	4.44	2.95	6.13	4.08	5.03	3.35	6.92	4.60	5.76	3.83
	18	6.25	4.16	4.66	3.10	6.87	4.57	5.39	3.59	7.76	5.16	6.31	4.20
	19	6.96	4.63	5.02	3.34	7.65	5.09	5.85	3.89	8.64	5.75	6.86	4.57
	20	7.71	5.13	5.41	3.60	8.48	5.64	6.32	4.20	9.58	6.37	7.43	4.94
	22	9.33	6.21	6.19	4.12	10.3	6.83	7.26	4.83	11.6	7.71	8.56	5.70
	24	11.1	7.39	6.98	4.64	12.2	8.13	8.20	5.46	13.8	9.17	9.72	6.47
	26	13.0	8.67	7.76	5.16	14.3	9.54	9.16	6.09	16.2	10.8	10.9	7.24
	28	15.1	10.1	8.55	5.69								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		17.3		11.5		19.3		12.8		21.5		14.3	
$t_y \times 10^3$, (kips)$^{-1}$		1.90		1.26		2.06		1.37		2.27		1.51	
$t_r \times 10^3$, (kips)$^{-1}$		2.33		1.55		2.53		1.69		2.79		1.86	
r_x/r_y		4.45				4.44				4.47			
r_y, in.		1.68				1.67				1.65			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W18

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W18×											
		46[c]				40[c]				35[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.65	1.76	3.93	2.61	3.15	2.10	4.54	3.02	3.71	2.47	5.36	3.56
	6	3.19	2.12	4.19	2.79	3.79	2.52	4.88	3.25	4.49	2.99	5.84	3.89
	7	3.42	2.28	4.39	2.92	4.06	2.70	5.13	3.41	4.83	3.21	6.17	4.11
	8	3.72	2.48	4.61	3.07	4.41	2.94	5.40	3.59	5.27	3.51	6.54	4.35
	9	4.13	2.75	4.85	3.23	4.87	3.24	5.71	3.80	5.85	3.89	6.96	4.63
	10	4.66	3.10	5.12	3.41	5.45	3.63	6.05	4.03	6.61	4.40	7.43	4.94
	11	5.32	3.54	5.43	3.61	6.24	4.15	6.44	4.28	7.63	5.08	7.97	5.30
	12	6.15	4.09	5.77	3.84	7.25	4.82	6.88	4.58	9.00	5.99	8.60	5.72
	13	7.21	4.80	6.16	4.10	8.51	5.66	7.38	4.91	10.6	7.03	9.67	6.43
	14	8.36	5.56	6.69	4.45	9.87	6.56	8.30	5.52	12.2	8.15	11.0	7.29
	15	9.60	6.38	7.45	4.95	11.3	7.54	9.27	6.17	14.1	9.36	12.3	8.17
	16	10.9	7.26	8.21	5.46	12.9	8.57	10.3	6.83	16.0	10.6	13.6	9.07
	17	12.3	8.20	8.98	5.97	14.5	9.68	11.3	7.50	18.1	12.0	15.0	10.0
	18	13.8	9.19	9.75	6.49	16.3	10.9	12.3	8.17	20.2	13.5	16.4	10.9
	19	15.4	10.2	10.5	7.01	18.2	12.1	13.3	8.85	22.6	15.0	17.9	11.9
	20	17.1	11.3	11.3	7.53	20.1	13.4	14.4	9.54	25.0	16.6	19.3	12.8
	21	18.8	12.5	12.1	8.05	22.2	14.8	15.4	10.2				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		30.5		20.3		35.6		23.7		44.2		29.4	
$t_y \times 10^3$, (kips)$^{-1}$		2.47		1.65		2.83		1.88		3.24		2.16	
$t_r \times 10^3$, (kips)$^{-1}$		3.04		2.03		3.48		2.32		3.98		2.66	
r_x/r_y		5.62				5.68				5.77			
r_y, in.		1.29				1.27				1.22			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W16×											
		100				89				77			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.14	0.756	1.80	1.20	1.27	0.848	2.04	1.35	1.48	0.983	2.38	1.58
	6	1.21	0.803	1.80	1.20	1.36	0.902	2.04	1.35	1.57	1.05	2.38	1.58
	7	1.23	0.820	1.80	1.20	1.39	0.922	2.04	1.35	1.61	1.07	2.38	1.58
	8	1.26	0.841	1.80	1.20	1.42	0.946	2.04	1.35	1.65	1.10	2.38	1.58
	9	1.30	0.865	1.80	1.20	1.46	0.973	2.04	1.36	1.70	1.13	2.39	1.59
	10	1.34	0.893	1.83	1.22	1.51	1.01	2.08	1.38	1.76	1.17	2.44	1.62
	11	1.39	0.925	1.86	1.24	1.57	1.04	2.12	1.41	1.82	1.21	2.49	1.65
	12	1.45	0.962	1.89	1.26	1.63	1.08	2.16	1.44	1.89	1.26	2.54	1.69
	13	1.51	1.00	1.93	1.28	1.70	1.13	2.20	1.46	1.98	1.32	2.59	1.72
	14	1.58	1.05	1.96	1.30	1.78	1.18	2.24	1.49	2.07	1.38	2.65	1.76
	15	1.65	1.10	1.99	1.33	1.87	1.24	2.29	1.52	2.18	1.45	2.71	1.80
	16	1.74	1.16	2.03	1.35	1.97	1.31	2.34	1.55	2.30	1.53	2.77	1.84
	17	1.84	1.23	2.07	1.38	2.08	1.39	2.38	1.59	2.43	1.62	2.83	1.89
	18	1.95	1.30	2.11	1.40	2.21	1.47	2.43	1.62	2.59	1.72	2.90	1.93
	19	2.08	1.38	2.15	1.43	2.35	1.57	2.49	1.65	2.76	1.83	2.97	1.98
	20	2.22	1.47	2.19	1.46	2.51	1.67	2.54	1.69	2.95	1.96	3.05	2.03
	22	2.55	1.70	2.28	1.51	2.90	1.93	2.66	1.77	3.41	2.27	3.21	2.14
	24	2.98	1.98	2.37	1.58	3.40	2.26	2.79	1.86	4.00	2.66	3.39	2.26
	26	3.50	2.33	2.48	1.65	3.99	2.65	2.93	1.95	4.70	3.13	3.59	2.39
	28	4.06	2.70	2.59	1.72	4.62	3.08	3.09	2.06	5.45	3.62	3.83	2.55
	30	4.66	3.10	2.72	1.81	5.31	3.53	3.27	2.17	6.25	4.16	4.20	2.80
	32	5.30	3.52	2.85	1.90	6.04	4.02	3.54	2.36	7.12	4.73	4.57	3.04
	34	5.98	3.98	3.04	2.03	6.82	4.54	3.82	2.54	8.03	5.34	4.94	3.29
	36	6.70	4.46	3.26	2.17	7.64	5.09	4.09	2.72	9.01	5.99	5.31	3.53
	38	7.47	4.97	3.47	2.31	8.52	5.67	4.36	2.90	10.0	6.68	5.68	3.78
	40	8.28	5.51	3.68	2.45	9.44	6.28	4.63	3.08	11.1	7.40	6.04	4.02
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		6.49		4.32		7.41		4.93		8.67		5.77	
$t_y \times 10^3$, (kips)$^{-1}$		1.14		0.756		1.27		0.848		1.48		0.983	
$t_r \times 10^3$, (kips)$^{-1}$		1.40		0.930		1.57		1.04		1.82		1.21	
r_x/r_y		2.83				2.83				2.83			
r_y, in.		2.51				2.49				2.47			

W16

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W16×											
		67[c]				57				50[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.71	1.14	2.74	1.82	1.99	1.32	3.39	2.26	2.30	1.53	3.87	2.58
	6	1.81	1.21	2.74	1.82	2.31	1.53	3.43	2.28	2.64	1.76	3.92	2.61
	7	1.86	1.23	2.74	1.82	2.43	1.62	3.54	2.35	2.79	1.85	4.06	2.70
	8	1.90	1.27	2.74	1.82	2.59	1.72	3.65	2.43	2.97	1.97	4.21	2.80
	9	1.96	1.31	2.76	1.84	2.77	1.85	3.78	2.51	3.18	2.12	4.36	2.90
	10	2.03	1.35	2.82	1.88	3.00	2.00	3.91	2.60	3.45	2.29	4.53	3.02
	11	2.10	1.40	2.88	1.92	3.27	2.18	4.05	2.70	3.76	2.50	4.72	3.14
	12	2.19	1.46	2.95	1.96	3.59	2.39	4.20	2.80	4.14	2.75	4.91	3.27
	13	2.29	1.52	3.02	2.01	3.98	2.65	4.37	2.91	4.59	3.06	5.13	3.41
	14	2.40	1.59	3.09	2.06	4.45	2.96	4.55	3.03	5.14	3.42	5.37	3.57
	15	2.52	1.68	3.17	2.11	5.02	3.34	4.74	3.15	5.80	3.86	5.63	3.74
	16	2.66	1.77	3.25	2.16	5.70	3.79	4.95	3.29	6.60	4.39	5.91	3.93
	17	2.82	1.87	3.33	2.22	6.44	4.28	5.18	3.45	7.45	4.96	6.23	4.14
	18	2.99	1.99	3.42	2.27	7.22	4.80	5.43	3.61	8.35	5.56	6.74	4.48
	19	3.19	2.12	3.51	2.34	8.04	5.35	5.81	3.86	9.31	6.19	7.28	4.85
	20	3.42	2.27	3.61	2.40	8.91	5.93	6.23	4.14	10.3	6.86	7.83	5.21
	22	3.96	2.63	3.83	2.55	10.8	7.17	7.07	4.70	12.5	8.30	8.93	5.94
	24	4.65	3.10	4.07	2.71	12.8	8.54	7.90	5.26	14.8	9.88	10.0	6.67
	26	5.46	3.63	4.34	2.89	15.1	10.0	8.74	5.82	17.4	11.6	11.1	7.40
	28	6.33	4.21	4.82	3.21								
	30	7.27	4.84	5.31	3.53								
	32	8.27	5.50	5.80	3.86								
	34	9.34	6.21	6.29	4.18								
	36	10.5	6.96	6.77	4.51								
	38	11.7	7.76	7.26	4.83								
	40	12.9	8.60	7.75	5.15								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		10.0		6.68		18.9		12.5		21.9		14.5	
$t_y \times 10^3$, (kips)$^{-1}$		1.70		1.13		1.99		1.32		2.27		1.51	
$t_r \times 10^3$, (kips)$^{-1}$		2.09		1.40		2.44		1.63		2.79		1.86	
r_x/r_y		2.83				4.20				4.20			
r_y, in.		2.46				1.60				1.59			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W16×											
		45[c]				40[c]				36[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.61	1.73	4.33	2.88	3.03	2.02	4.88	3.25	3.42	2.28	5.57	3.70
	6	2.97	1.98	4.40	2.93	3.44	2.29	4.96	3.30	3.91	2.60	5.71	3.80
	7	3.12	2.08	4.56	3.03	3.61	2.40	5.16	3.43	4.10	2.73	5.94	3.95
	8	3.31	2.20	4.74	3.15	3.81	2.54	5.36	3.57	4.35	2.89	6.20	4.12
	9	3.55	2.36	4.92	3.28	4.06	2.70	5.59	3.72	4.65	3.10	6.48	4.31
	10	3.85	2.56	5.13	3.41	4.37	2.91	5.83	3.88	5.03	3.34	6.78	4.51
	11	4.21	2.80	5.35	3.56	4.75	3.16	6.10	4.06	5.49	3.65	7.12	4.74
	12	4.65	3.09	5.59	3.72	5.24	3.48	6.39	4.25	6.07	4.04	7.49	4.98
	13	5.17	3.44	5.86	3.90	5.83	3.88	6.72	4.47	6.81	4.53	7.90	5.26
	14	5.80	3.86	6.15	4.09	6.54	4.35	7.07	4.71	7.70	5.12	8.36	5.56
	15	6.58	4.37	6.47	4.30	7.41	4.93	7.47	4.97	8.80	5.86	8.88	5.91
	16	7.48	4.98	6.82	4.54	8.43	5.61	7.96	5.30	10.0	6.66	9.79	6.51
	17	8.45	5.62	7.36	4.90	9.52	6.33	8.76	5.83	11.3	7.52	10.8	7.19
	18	9.47	6.30	8.03	5.34	10.7	7.10	9.58	6.38	12.7	8.43	11.9	7.89
	19	10.5	7.02	8.70	5.79	11.9	7.91	10.4	6.93	14.1	9.40	12.9	8.59
	20	11.7	7.78	9.37	6.23	13.2	8.77	11.2	7.48	15.6	10.4	14.0	9.31
	21	12.9	8.57	10.0	6.68	14.5	9.66	12.1	8.04	17.3	11.5	15.1	10.0
	22	14.1	9.41	10.7	7.14	15.9	10.6	12.9	8.61	18.9	12.6	16.2	10.8
	23	15.5	10.3	11.4	7.59	17.4	11.6	13.8	9.17	20.7	13.8	17.3	11.5
	24	16.8	11.2	12.1	8.04	19.0	12.6	14.6	9.74	22.5	15.0	18.4	12.2
	25	18.3	12.2	12.8	8.50	20.6	13.7	15.5	10.3	24.4	16.3	19.5	13.0
	26	19.8	13.1	13.5	8.95	22.3	14.8	16.4	10.9				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		24.6		16.3		28.1		18.7		33.0		21.9	
$t_y \times 10^3$, (kips)$^{-1}$		2.51		1.67		2.83		1.88		3.15		2.10	
$t_r \times 10^3$, (kips)$^{-1}$		3.08		2.06		3.48		2.32		3.87		2.58	
r_x/r_y		4.24				4.22				4.28			
r_y, in.		1.57				1.57				1.52			

[c] Shape is slender for compression with F_y = 50 ksi.

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

W16

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W16×							
		31[c]				26[c, v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.09	2.72	6.60	4.39	5.06	3.37	8.06	5.36
	6	5.08	3.38	7.28	4.85	6.33	4.21	9.07	6.03
	7	5.52	3.67	7.71	5.13	6.91	4.60	9.66	6.43
	8	6.10	4.06	8.19	5.45	7.68	5.11	10.3	6.87
	9	6.87	4.57	8.74	5.82	8.70	5.79	11.1	7.39
	10	7.89	5.25	9.37	6.23	10.1	6.72	12.0	7.99
	11	9.28	6.17	10.1	6.71	12.0	8.01	13.1	8.69
	12	11.0	7.34	11.1	7.35	14.3	9.53	15.0	10.0
	13	13.0	8.62	12.6	8.39	16.8	11.2	17.2	11.5
	14	15.0	10.0	14.2	9.45	19.5	13.0	19.5	13.0
	15	17.2	11.5	15.8	10.5	22.4	14.9	21.9	14.6
	16	19.6	13.1	17.5	11.6	25.5	16.9	24.3	16.2
	17	22.2	14.7	19.2	12.8	28.7	19.1	26.7	17.8
	18	24.8	16.5	20.9	13.9	32.2	21.4	29.2	19.4
	19	27.7	18.4	22.6	15.0				

Other Constants and Properties				
$b_y \times 10^3$, (kip-ft)$^{-1}$	50.7	33.7	65.0	43.3
$t_y \times 10^3$, (kips)$^{-1}$	3.66	2.43	4.35	2.89
$t_r \times 10^3$, (kips)$^{-1}$	4.49	3.00	5.34	3.56
r_x/r_y	5.48		5.59	
r_y, in.	1.17		1.12	

[c] Shape is slender for compression with F_y = 50 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.
Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W14

Shape		W14×											
		730[h]				665[h]				605[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.155	0.103	0.215	0.143	0.170	0.113	0.241	0.160	0.188	0.125	0.270	0.180
	11	0.165	0.110	0.215	0.143	0.181	0.120	0.241	0.160	0.200	0.133	0.270	0.180
	12	0.166	0.111	0.215	0.143	0.183	0.122	0.241	0.160	0.202	0.134	0.270	0.180
	13	0.168	0.112	0.215	0.143	0.185	0.123	0.241	0.160	0.204	0.136	0.270	0.180
	14	0.171	0.114	0.215	0.143	0.188	0.125	0.241	0.160	0.207	0.138	0.270	0.180
	15	0.173	0.115	0.215	0.143	0.190	0.127	0.241	0.160	0.210	0.140	0.270	0.180
	16	0.176	0.117	0.215	0.143	0.193	0.129	0.241	0.160	0.214	0.142	0.270	0.180
	17	0.178	0.119	0.215	0.143	0.197	0.131	0.241	0.160	0.217	0.145	0.270	0.180
	18	0.181	0.121	0.215	0.143	0.200	0.133	0.242	0.161	0.221	0.147	0.271	0.180
	19	0.185	0.123	0.216	0.143	0.204	0.135	0.242	0.161	0.225	0.150	0.272	0.181
	20	0.188	0.125	0.216	0.144	0.208	0.138	0.242	0.161	0.230	0.153	0.272	0.181
	22	0.196	0.130	0.217	0.144	0.216	0.144	0.243	0.162	0.240	0.160	0.273	0.182
	24	0.205	0.136	0.217	0.145	0.226	0.151	0.244	0.163	0.252	0.167	0.274	0.183
	26	0.215	0.143	0.218	0.145	0.238	0.158	0.245	0.163	0.265	0.176	0.276	0.183
	28	0.226	0.150	0.219	0.146	0.251	0.167	0.246	0.164	0.280	0.186	0.277	0.184
	30	0.239	0.159	0.220	0.146	0.266	0.177	0.247	0.164	0.297	0.197	0.278	0.185
	32	0.254	0.169	0.221	0.147	0.282	0.188	0.248	0.165	0.316	0.210	0.279	0.186
	34	0.270	0.180	0.221	0.147	0.301	0.201	0.249	0.166	0.338	0.225	0.280	0.187
	36	0.289	0.192	0.222	0.148	0.323	0.215	0.250	0.166	0.363	0.241	0.282	0.187
	38	0.310	0.206	0.223	0.148	0.347	0.231	0.251	0.167	0.391	0.260	0.283	0.188
	40	0.334	0.222	0.224	0.149	0.375	0.250	0.252	0.168	0.423	0.282	0.284	0.189
	42	0.361	0.240	0.225	0.150	0.407	0.271	0.253	0.168	0.460	0.306	0.285	0.190
	44	0.392	0.261	0.226	0.150	0.443	0.295	0.254	0.169	0.503	0.335	0.287	0.191
	46	0.429	0.285	0.226	0.151	0.485	0.322	0.255	0.170	0.550	0.366	0.288	0.191
	48	0.467	0.311	0.227	0.151	0.528	0.351	0.256	0.171	0.599	0.399	0.289	0.192
	50	0.506	0.337	0.228	0.152	0.573	0.381	0.257	0.171	0.650	0.432	0.290	0.193
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.437		0.290		0.488		0.325		0.546		0.364	
$t_y \times 10^3$, (kips)$^{-1}$		0.155		0.103		0.170		0.113		0.188		0.125	
$t_r \times 10^3$, (kips)$^{-1}$		0.191		0.127		0.209		0.140		0.230		0.154	
r_x/r_y		1.74				1.73				1.71			
r_y, in.		4.69				4.62				4.55			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

W14

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		550[h]				500[h]				455[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.206	0.137	0.302	0.201	0.227	0.151	0.339	0.226	0.249	0.166	0.381	0.253
	11	0.220	0.146	0.302	0.201	0.242	0.161	0.339	0.226	0.266	0.177	0.381	0.253
	12	0.222	0.148	0.302	0.201	0.245	0.163	0.339	0.226	0.270	0.179	0.381	0.253
	13	0.225	0.150	0.302	0.201	0.249	0.166	0.339	0.226	0.273	0.182	0.381	0.253
	14	0.228	0.152	0.302	0.201	0.252	0.168	0.339	0.226	0.278	0.185	0.381	0.253
	15	0.232	0.154	0.302	0.201	0.256	0.171	0.339	0.226	0.282	0.188	0.381	0.253
	16	0.236	0.157	0.302	0.201	0.261	0.173	0.340	0.226	0.287	0.191	0.381	0.254
	17	0.240	0.160	0.303	0.201	0.265	0.177	0.340	0.227	0.292	0.194	0.382	0.254
	18	0.244	0.162	0.303	0.202	0.270	0.180	0.341	0.227	0.298	0.198	0.383	0.255
	19	0.249	0.166	0.304	0.202	0.276	0.183	0.342	0.228	0.304	0.202	0.384	0.256
	20	0.254	0.169	0.305	0.203	0.282	0.187	0.343	0.228	0.310	0.207	0.385	0.256
	22	0.265	0.177	0.306	0.204	0.295	0.196	0.345	0.229	0.325	0.216	0.387	0.258
	24	0.279	0.185	0.308	0.205	0.309	0.206	0.346	0.230	0.342	0.227	0.389	0.259
	26	0.293	0.195	0.309	0.206	0.327	0.217	0.348	0.232	0.361	0.240	0.392	0.261
	28	0.310	0.207	0.310	0.207	0.346	0.230	0.350	0.233	0.383	0.255	0.394	0.262
	30	0.330	0.219	0.312	0.208	0.368	0.245	0.352	0.234	0.408	0.272	0.396	0.263
	32	0.352	0.234	0.313	0.209	0.394	0.262	0.353	0.235	0.437	0.291	0.398	0.265
	34	0.377	0.251	0.315	0.209	0.422	0.281	0.355	0.236	0.470	0.313	0.400	0.266
	36	0.406	0.270	0.316	0.210	0.455	0.303	0.357	0.238	0.508	0.338	0.403	0.268
	38	0.438	0.292	0.318	0.211	0.493	0.328	0.359	0.239	0.551	0.366	0.405	0.269
	40	0.475	0.316	0.319	0.213	0.536	0.357	0.361	0.240	0.600	0.399	0.407	0.271
	42	0.518	0.345	0.321	0.214	0.586	0.390	0.363	0.241	0.657	0.437	0.409	0.272
	44	0.568	0.378	0.322	0.215	0.643	0.428	0.365	0.243	0.721	0.480	0.412	0.274
	46	0.621	0.413	0.324	0.216	0.703	0.468	0.367	0.244	0.789	0.525	0.414	0.276
	48	0.676	0.450	0.326	0.217	0.765	0.509	0.369	0.245	0.859	0.571	0.417	0.277
	50	0.733	0.488	0.327	0.218	0.830	0.552	0.371	0.247	0.932	0.620	0.419	0.279
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.611		0.407		0.683		0.454		0.761		0.506	
$t_y \times 10^3$, (kips)$^{-1}$		0.206		0.137		0.227		0.151		0.249		0.166	
$t_r \times 10^3$, (kips)$^{-1}$		0.253		0.169		0.279		0.186		0.306		0.204	
r_x/r_y		1.70				1.69				1.67			
r_y, in.		4.49				4.43				4.38			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W14

Shape		W14×											
		426[h]				398[h]				370[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.267	0.178	0.410	0.273	0.285	0.190	0.445	0.296	0.306	0.204	0.484	0.322
	11	0.286	0.190	0.410	0.273	0.306	0.203	0.445	0.296	0.329	0.219	0.484	0.322
	12	0.290	0.193	0.410	0.273	0.310	0.206	0.445	0.296	0.333	0.222	0.484	0.322
	13	0.294	0.195	0.410	0.273	0.314	0.209	0.445	0.296	0.338	0.225	0.484	0.322
	14	0.298	0.198	0.410	0.273	0.319	0.212	0.445	0.296	0.343	0.228	0.484	0.322
	15	0.303	0.202	0.410	0.273	0.324	0.216	0.445	0.296	0.349	0.232	0.484	0.322
	16	0.308	0.205	0.411	0.273	0.330	0.220	0.446	0.297	0.355	0.236	0.485	0.323
	17	0.314	0.209	0.412	0.274	0.336	0.224	0.447	0.298	0.362	0.241	0.487	0.324
	18	0.320	0.213	0.413	0.275	0.343	0.228	0.449	0.298	0.369	0.246	0.489	0.325
	19	0.327	0.218	0.414	0.276	0.350	0.233	0.450	0.299	0.377	0.251	0.490	0.326
	20	0.334	0.222	0.415	0.276	0.358	0.238	0.451	0.300	0.386	0.257	0.492	0.327
	22	0.350	0.233	0.418	0.278	0.376	0.250	0.454	0.302	0.405	0.270	0.495	0.329
	24	0.369	0.245	0.420	0.280	0.396	0.263	0.457	0.304	0.427	0.284	0.498	0.331
	26	0.390	0.259	0.423	0.281	0.419	0.279	0.460	0.306	0.453	0.301	0.501	0.334
	28	0.414	0.276	0.425	0.283	0.445	0.296	0.462	0.308	0.482	0.321	0.505	0.336
	30	0.442	0.294	0.428	0.285	0.475	0.316	0.465	0.310	0.515	0.343	0.508	0.338
	32	0.474	0.315	0.430	0.286	0.510	0.339	0.468	0.312	0.554	0.368	0.512	0.340
	34	0.510	0.339	0.433	0.288	0.550	0.366	0.471	0.314	0.597	0.397	0.515	0.343
	36	0.551	0.367	0.435	0.290	0.595	0.396	0.474	0.316	0.648	0.431	0.519	0.345
	38	0.599	0.399	0.438	0.291	0.647	0.431	0.477	0.318	0.705	0.469	0.522	0.347
	40	0.654	0.435	0.441	0.293	0.707	0.470	0.480	0.320	0.772	0.514	0.526	0.350
	42	0.718	0.478	0.443	0.295	0.778	0.517	0.484	0.322	0.850	0.566	0.529	0.352
	44	0.788	0.524	0.446	0.297	0.853	0.568	0.487	0.324	0.933	0.621	0.533	0.355
	46	0.861	0.573	0.449	0.299	0.933	0.621	0.490	0.326	1.02	0.679	0.537	0.357
	48	0.938	0.624	0.452	0.300	1.02	0.676	0.493	0.328	1.11	0.739	0.541	0.360
	50	1.02	0.677	0.454	0.302	1.10	0.733	0.496	0.330	1.21	0.802	0.545	0.362
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		0.821		0.546		0.886		0.590		0.963		0.641	
$t_y \times 10^3$, (kips)$^{-1}$		0.267		0.178		0.285		0.190		0.306		0.204	
$t_r \times 10^3$, (kips)$^{-1}$		0.328		0.219		0.351		0.234		0.376		0.251	
r_x/r_y		1.67				1.66				1.66			
r_y, in.		4.34				4.31				4.27			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

W14

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		342[h]				311[h]				283[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.331	0.220	0.530	0.353	0.365	0.243	0.591	0.393	0.401	0.267	0.657	0.437
	11	0.355	0.236	0.530	0.353	0.393	0.261	0.591	0.393	0.431	0.287	0.657	0.437
	12	0.360	0.239	0.530	0.353	0.398	0.265	0.591	0.393	0.437	0.291	0.657	0.437
	13	0.365	0.243	0.530	0.353	0.404	0.269	0.591	0.393	0.444	0.296	0.657	0.437
	14	0.371	0.247	0.530	0.353	0.411	0.273	0.591	0.393	0.451	0.300	0.657	0.437
	15	0.377	0.251	0.530	0.353	0.418	0.278	0.591	0.393	0.459	0.306	0.658	0.438
	16	0.384	0.256	0.532	0.354	0.426	0.283	0.593	0.395	0.468	0.312	0.661	0.440
	17	0.392	0.261	0.534	0.355	0.434	0.289	0.596	0.396	0.478	0.318	0.663	0.441
	18	0.400	0.266	0.536	0.356	0.443	0.295	0.598	0.398	0.488	0.325	0.666	0.443
	19	0.409	0.272	0.538	0.358	0.453	0.302	0.600	0.399	0.499	0.332	0.669	0.445
	20	0.418	0.278	0.539	0.359	0.464	0.309	0.602	0.401	0.511	0.340	0.672	0.447
	22	0.439	0.292	0.543	0.361	0.488	0.325	0.607	0.404	0.537	0.358	0.677	0.451
	24	0.463	0.308	0.547	0.364	0.515	0.343	0.612	0.407	0.568	0.378	0.683	0.455
	26	0.491	0.327	0.551	0.367	0.547	0.364	0.617	0.410	0.604	0.402	0.689	0.458
	28	0.523	0.348	0.555	0.369	0.583	0.388	0.621	0.413	0.645	0.429	0.695	0.462
	30	0.560	0.373	0.559	0.372	0.625	0.416	0.626	0.417	0.691	0.460	0.701	0.466
	32	0.602	0.401	0.563	0.374	0.673	0.448	0.631	0.420	0.745	0.496	0.707	0.471
	34	0.651	0.433	0.567	0.377	0.729	0.485	0.636	0.423	0.807	0.537	0.713	0.475
	36	0.706	0.470	0.571	0.380	0.792	0.527	0.641	0.427	0.879	0.585	0.720	0.479
	38	0.770	0.513	0.575	0.383	0.865	0.576	0.647	0.430	0.961	0.640	0.726	0.483
	40	0.844	0.562	0.580	0.386	0.951	0.633	0.652	0.434	1.06	0.704	0.733	0.488
	42	0.931	0.619	0.584	0.389	1.05	0.697	0.657	0.437	1.17	0.776	0.740	0.492
	44	1.02	0.680	0.588	0.391	1.15	0.765	0.663	0.441	1.28	0.852	0.747	0.497
	46	1.12	0.743	0.593	0.394	1.26	0.837	0.669	0.445	1.40	0.931	0.754	0.501
	48	1.22	0.809	0.597	0.397	1.37	0.911	0.674	0.449	1.52	1.01	0.761	0.506
	50	1.32	0.878	0.602	0.401	1.49	0.988	0.680	0.452	1.65	1.10	0.768	0.511
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.05		0.701		1.17		0.780		1.30		0.865	
$t_y \times 10^3$, (kips)$^{-1}$		0.331		0.220		0.365		0.243		0.401		0.267	
$t_r \times 10^3$, (kips)$^{-1}$		0.406		0.271		0.449		0.299		0.493		0.328	
r_x/r_y		1.65				1.64				1.63			
r_y, in.		4.24				4.20				4.17			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W14×											
		257				233				211			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.442	0.294	0.732	0.487	0.488	0.324	0.817	0.544	0.539	0.358	0.914	0.608
	11	0.476	0.317	0.732	0.487	0.526	0.350	0.817	0.544	0.582	0.387	0.914	0.608
	12	0.483	0.321	0.732	0.487	0.534	0.355	0.817	0.544	0.590	0.393	0.914	0.608
	13	0.490	0.326	0.732	0.487	0.542	0.361	0.817	0.544	0.600	0.399	0.914	0.608
	14	0.499	0.332	0.732	0.487	0.551	0.367	0.817	0.544	0.610	0.406	0.914	0.608
	15	0.508	0.338	0.733	0.488	0.561	0.374	0.819	0.545	0.622	0.414	0.917	0.610
	16	0.517	0.344	0.736	0.490	0.572	0.381	0.823	0.548	0.634	0.422	0.922	0.613
	17	0.528	0.351	0.740	0.492	0.584	0.389	0.827	0.551	0.647	0.431	0.927	0.617
	18	0.540	0.359	0.743	0.494	0.597	0.397	0.832	0.553	0.662	0.440	0.932	0.620
	19	0.552	0.367	0.746	0.497	0.611	0.407	0.836	0.556	0.678	0.451	0.937	0.623
	20	0.566	0.376	0.750	0.499	0.626	0.417	0.840	0.559	0.695	0.462	0.942	0.627
	22	0.596	0.396	0.757	0.503	0.660	0.439	0.849	0.565	0.733	0.488	0.953	0.634
	24	0.630	0.419	0.764	0.508	0.699	0.465	0.857	0.571	0.777	0.517	0.964	0.641
	26	0.671	0.446	0.771	0.513	0.745	0.495	0.866	0.576	0.828	0.551	0.975	0.649
	28	0.717	0.477	0.778	0.518	0.797	0.530	0.876	0.583	0.887	0.590	0.987	0.656
	30	0.770	0.512	0.786	0.523	0.857	0.570	0.885	0.589	0.955	0.635	0.998	0.664
	32	0.831	0.553	0.794	0.528	0.926	0.616	0.895	0.595	1.03	0.687	1.01	0.672
	34	0.902	0.600	0.801	0.533	1.01	0.669	0.904	0.602	1.12	0.747	1.02	0.680
	36	0.983	0.654	0.809	0.539	1.10	0.731	0.914	0.608	1.23	0.817	1.04	0.689
	38	1.08	0.717	0.818	0.544	1.20	0.801	0.925	0.615	1.35	0.897	1.05	0.697
	40	1.19	0.791	0.826	0.549	1.33	0.886	0.935	0.622	1.49	0.993	1.06	0.706
	42	1.31	0.872	0.834	0.555	1.47	0.976	0.946	0.629	1.65	1.09	1.08	0.715
	44	1.44	0.957	0.843	0.561	1.61	1.07	0.957	0.637	1.81	1.20	1.09	0.725
	46	1.57	1.05	0.852	0.567	1.76	1.17	0.968	0.644	1.97	1.31	1.10	0.734
	48	1.71	1.14	0.861	0.573	1.92	1.28	0.979	0.652	2.15	1.43	1.12	0.744
	50	1.86	1.24	0.870	0.579	2.08	1.38	0.991	0.659	2.33	1.55	1.13	0.754
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.45		0.964		1.61		1.07		1.80		1.20	
$t_y \times 10^3$, (kips)$^{-1}$		0.442		0.294		0.488		0.324		0.539		0.358	
$t_r \times 10^3$, (kips)$^{-1}$		0.543		0.362		0.599		0.399		0.662		0.441	
r_x/r_y		1.62				1.62				1.61			
r_y, in.		4.13				4.10				4.07			

W14

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		193				176				159			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.588	0.391	1.00	0.668	0.645	0.429	1.11	0.741	0.715	0.476	1.24	0.826
	11	0.636	0.423	1.00	0.668	0.698	0.464	1.11	0.741	0.774	0.515	1.24	0.826
	12	0.645	0.429	1.00	0.668	0.708	0.471	1.11	0.741	0.786	0.523	1.24	0.826
	13	0.655	0.436	1.00	0.668	0.720	0.479	1.11	0.741	0.799	0.532	1.24	0.826
	14	0.667	0.444	1.00	0.668	0.733	0.487	1.11	0.741	0.814	0.541	1.24	0.826
	15	0.679	0.452	1.01	0.670	0.747	0.497	1.12	0.745	0.829	0.552	1.25	0.831
	16	0.693	0.461	1.01	0.675	0.762	0.507	1.13	0.750	0.846	0.563	1.26	0.837
	17	0.708	0.471	1.02	0.679	0.778	0.518	1.13	0.755	0.865	0.576	1.27	0.843
	18	0.724	0.482	1.03	0.683	0.796	0.530	1.14	0.760	0.885	0.589	1.28	0.850
	19	0.741	0.493	1.03	0.687	0.816	0.543	1.15	0.765	0.907	0.603	1.29	0.856
	20	0.760	0.506	1.04	0.691	0.837	0.557	1.16	0.770	0.931	0.619	1.30	0.863
	22	0.802	0.534	1.05	0.700	0.884	0.588	1.17	0.781	0.983	0.654	1.32	0.876
	24	0.851	0.566	1.07	0.709	0.938	0.624	1.19	0.791	1.04	0.695	1.34	0.889
	26	0.908	0.604	1.08	0.718	1.00	0.666	1.21	0.803	1.12	0.742	1.36	0.904
	28	0.973	0.647	1.09	0.727	1.07	0.715	1.22	0.814	1.20	0.797	1.38	0.918
	30	1.05	0.697	1.11	0.737	1.16	0.771	1.24	0.826	1.29	0.860	1.40	0.933
	32	1.13	0.755	1.12	0.747	1.26	0.836	1.26	0.838	1.40	0.934	1.43	0.949
	34	1.23	0.822	1.14	0.757	1.37	0.911	1.28	0.851	1.53	1.02	1.45	0.965
	36	1.35	0.899	1.15	0.767	1.50	0.998	1.30	0.864	1.68	1.12	1.47	0.981
	38	1.49	0.989	1.17	0.778	1.65	1.10	1.32	0.877	1.85	1.23	1.50	0.998
	40	1.65	1.09	1.19	0.789	1.83	1.22	1.34	0.891	2.05	1.36	1.53	1.02
	42	1.81	1.21	1.20	0.800	2.02	1.34	1.36	0.905	2.26	1.50	1.56	1.03
	44	1.99	1.32	1.22	0.812	2.22	1.47	1.38	0.920	2.48	1.65	1.58	1.05
	46	2.18	1.45	1.24	0.824	2.42	1.61	1.41	0.935	2.71	1.81	1.61	1.07
	48	2.37	1.58	1.26	0.836	2.64	1.75	1.43	0.951	2.95	1.97	1.64	1.09
	50	2.57	1.71	1.28	0.848	2.86	1.90	1.45	0.967	3.21	2.13	1.68	1.12
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.98		1.32		2.19		1.45		2.44		1.62	
$t_y \times 10^3$, (kips)$^{-1}$		0.588		0.391		0.645		0.429		0.715		0.476	
$t_r \times 10^3$, (kips)$^{-1}$		0.722		0.482		0.792		0.528		0.878		0.586	
r_x/r_y		1.60				1.60				1.60			
r_y, in.		4.05				4.02				4.00			

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W14

Shape		W14×											
		145				132				120			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.782	0.520	1.37	0.912	0.861	0.573	1.52	1.01	0.946	0.630	1.68	1.12
	11	0.848	0.564	1.37	0.912	0.942	0.627	1.52	1.01	1.04	0.690	1.68	1.12
	12	0.861	0.573	1.37	0.912	0.958	0.638	1.52	1.01	1.05	0.702	1.68	1.12
	13	0.875	0.582	1.37	0.912	0.976	0.650	1.52	1.01	1.07	0.715	1.68	1.12
	14	0.891	0.593	1.37	0.912	0.996	0.663	1.53	1.02	1.10	0.730	1.69	1.13
	15	0.908	0.604	1.38	0.919	1.02	0.677	1.55	1.03	1.12	0.746	1.71	1.14
	16	0.927	0.617	1.39	0.926	1.04	0.693	1.56	1.04	1.15	0.763	1.73	1.15
	17	0.948	0.631	1.40	0.933	1.07	0.710	1.57	1.05	1.18	0.783	1.74	1.16
	18	0.970	0.645	1.41	0.941	1.10	0.729	1.59	1.06	1.21	0.803	1.76	1.17
	19	0.994	0.662	1.43	0.949	1.13	0.749	1.60	1.07	1.24	0.826	1.78	1.18
	20	1.02	0.679	1.44	0.956	1.16	0.771	1.62	1.08	1.28	0.851	1.80	1.20
	22	1.08	0.718	1.46	0.973	1.23	0.821	1.65	1.10	1.36	0.906	1.84	1.22
	24	1.15	0.763	1.49	0.989	1.32	0.880	1.68	1.12	1.46	0.971	1.88	1.25
	26	1.23	0.816	1.51	1.01	1.42	0.948	1.71	1.14	1.57	1.05	1.92	1.28
	28	1.32	0.876	1.54	1.02	1.54	1.03	1.75	1.16	1.71	1.14	1.96	1.30
	30	1.42	0.947	1.57	1.04	1.68	1.12	1.79	1.19	1.86	1.24	2.00	1.33
	32	1.54	1.03	1.60	1.06	1.85	1.23	1.82	1.21	2.05	1.36	2.05	1.37
	34	1.69	1.12	1.63	1.08	2.04	1.35	1.86	1.24	2.26	1.50	2.10	1.40
	36	1.85	1.23	1.66	1.10	2.26	1.51	1.90	1.27	2.51	1.67	2.15	1.43
	38	2.05	1.36	1.69	1.12	2.52	1.68	1.95	1.29	2.80	1.86	2.21	1.47
	40	2.27	1.51	1.72	1.15	2.79	1.86	1.99	1.32	3.10	2.07	2.27	1.51
	42	2.50	1.66	1.76	1.17	3.08	2.05	2.04	1.36	3.42	2.28	2.33	1.55
	44	2.74	1.82	1.79	1.19	3.38	2.25	2.09	1.39	3.76	2.50	2.39	1.59
	46	3.00	1.99	1.83	1.22	3.70	2.46	2.14	1.42	4.11	2.73	2.46	1.63
	48	3.26	2.17	1.87	1.24	4.02	2.68	2.19	1.46	4.47	2.97	2.53	1.68
	50	3.54	2.36	1.91	1.27	4.37	2.91	2.25	1.50	4.85	3.23	2.60	1.73
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.68		1.78		3.15		2.10		3.49		2.32	
$t_y \times 10^3$, (kips)$^{-1}$		0.782		0.520		0.861		0.573		0.946		0.630	
$t_r \times 10^3$, (kips)$^{-1}$		0.961		0.641		1.06		0.705		1.16		0.775	
r_x/r_y		1.59				1.67				1.67			
r_y, in.		3.98				3.76				3.74			

W14

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		109				99[f]				90[f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.04	0.694	1.86	1.23	1.15	0.764	2.07	1.38	1.26	0.839	2.33	1.55
	11	1.14	0.761	1.86	1.23	1.26	0.838	2.07	1.38	1.38	0.920	2.33	1.55
	12	1.16	0.774	1.86	1.23	1.28	0.853	2.07	1.38	1.41	0.937	2.33	1.55
	13	1.19	0.789	1.86	1.23	1.31	0.869	2.07	1.38	1.44	0.955	2.33	1.55
	14	1.21	0.805	1.87	1.25	1.33	0.887	2.08	1.38	1.47	0.975	2.33	1.55
	15	1.24	0.823	1.89	1.26	1.36	0.907	2.10	1.40	1.50	0.997	2.33	1.55
	16	1.27	0.843	1.91	1.27	1.40	0.929	2.13	1.42	1.53	1.02	2.35	1.57
	17	1.30	0.864	1.93	1.29	1.43	0.953	2.15	1.43	1.57	1.05	2.38	1.59
	18	1.33	0.887	1.95	1.30	1.47	0.978	2.18	1.45	1.62	1.08	2.42	1.61
	19	1.37	0.913	1.98	1.31	1.51	1.01	2.21	1.47	1.66	1.11	2.45	1.63
	20	1.41	0.940	2.00	1.33	1.56	1.04	2.23	1.49	1.71	1.14	2.48	1.65
	22	1.51	1.00	2.04	1.36	1.66	1.11	2.29	1.52	1.83	1.22	2.55	1.70
	24	1.61	1.07	2.09	1.39	1.78	1.19	2.35	1.56	1.96	1.31	2.62	1.74
	26	1.74	1.16	2.14	1.43	1.92	1.28	2.41	1.60	2.12	1.41	2.70	1.80
	28	1.89	1.26	2.20	1.46	2.09	1.39	2.48	1.65	2.30	1.53	2.78	1.85
	30	2.06	1.37	2.25	1.50	2.28	1.52	2.55	1.69	2.52	1.68	2.87	1.91
	32	2.27	1.51	2.31	1.54	2.51	1.67	2.62	1.74	2.77	1.84	2.96	1.97
	34	2.50	1.67	2.37	1.58	2.78	1.85	2.70	1.80	3.07	2.04	3.06	2.03
	36	2.79	1.86	2.44	1.62	3.10	2.06	2.78	1.85	3.42	2.28	3.16	2.10
	38	3.11	2.07	2.51	1.67	3.45	2.30	2.87	1.91	3.81	2.54	3.27	2.18
	40	3.44	2.29	2.58	1.72	3.83	2.55	2.96	1.97	4.23	2.81	3.39	2.26
	42	3.80	2.53	2.66	1.77	4.22	2.81	3.06	2.04	4.66	3.10	3.52	2.34
	44	4.17	2.77	2.74	1.82	4.63	3.08	3.17	2.11	5.11	3.40	3.72	2.48
	46	4.55	3.03	2.82	1.88	5.06	3.37	3.31	2.20	5.59	3.72	3.94	2.62
	48	4.96	3.30	2.92	1.94	5.51	3.67	3.48	2.32	6.08	4.05	4.15	2.76
	50	5.38	3.58	3.05	2.03	5.98	3.98	3.66	2.43	6.60	4.39	4.36	2.90
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		3.84		2.56		4.29		2.85		4.90		3.26	
$t_y \times 10^3$, (kips)$^{-1}$		1.04		0.694		1.15		0.764		1.26		0.839	
$t_r \times 10^3$, (kips)$^{-1}$		1.28		0.855		1.41		0.940		1.55		1.03	
r_x/r_y		1.67				1.66				1.66			
r_y, in.		3.73				3.71				3.70			

[f] Shape does not meet compact limit for flexure with $F_y = 50$ ksi.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W14×											
		82				74				68			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.39	0.926	2.56	1.71	1.53	1.02	2.83	1.88	1.67	1.11	3.10	2.06
	6	1.48	0.985	2.56	1.71	1.63	1.08	2.83	1.88	1.78	1.18	3.10	2.06
	7	1.51	1.01	2.56	1.71	1.67	1.11	2.83	1.88	1.82	1.21	3.10	2.06
	8	1.55	1.03	2.56	1.71	1.71	1.14	2.83	1.88	1.87	1.24	3.10	2.06
	9	1.60	1.06	2.57	1.71	1.76	1.17	2.84	1.89	1.92	1.28	3.12	2.07
	10	1.65	1.10	2.61	1.74	1.82	1.21	2.89	1.92	1.99	1.32	3.17	2.11
	11	1.71	1.14	2.66	1.77	1.88	1.25	2.94	1.96	2.06	1.37	3.23	2.15
	12	1.78	1.18	2.70	1.80	1.96	1.30	2.99	1.99	2.15	1.43	3.30	2.19
	13	1.86	1.24	2.74	1.83	2.05	1.36	3.05	2.03	2.24	1.49	3.36	2.24
	14	1.95	1.30	2.79	1.86	2.14	1.43	3.10	2.06	2.35	1.56	3.43	2.28
	15	2.05	1.36	2.84	1.89	2.25	1.50	3.16	2.10	2.47	1.64	3.50	2.33
	16	2.16	1.44	2.89	1.92	2.37	1.58	3.22	2.14	2.61	1.73	3.57	2.38
	17	2.28	1.52	2.94	1.96	2.51	1.67	3.29	2.19	2.76	1.84	3.65	2.43
	18	2.42	1.61	2.99	1.99	2.67	1.78	3.35	2.23	2.93	1.95	3.73	2.48
	19	2.58	1.72	3.05	2.03	2.84	1.89	3.42	2.28	3.13	2.08	3.81	2.53
	20	2.76	1.84	3.11	2.07	3.04	2.02	3.49	2.32	3.35	2.23	3.90	2.59
	22	3.19	2.12	3.23	2.15	3.51	2.33	3.65	2.43	3.88	2.58	4.08	2.72
	24	3.74	2.49	3.36	2.24	4.12	2.74	3.81	2.54	4.56	3.03	4.29	2.85
	26	4.39	2.92	3.51	2.33	4.83	3.21	3.99	2.66	5.35	3.56	4.51	3.00
	28	5.09	3.39	3.66	2.44	5.60	3.73	4.20	2.79	6.21	4.13	4.77	3.17
	30	5.84	3.89	3.83	2.55	6.43	4.28	4.42	2.94	7.12	4.74	5.10	3.39
	32	6.65	4.42	4.02	2.67	7.32	4.87	4.72	3.14	8.11	5.39	5.53	3.68
	34	7.50	4.99	4.26	2.84	8.26	5.50	5.07	3.38	9.15	6.09	5.96	3.96
	36	8.41	5.60	4.56	3.03	9.26	6.16	5.43	3.61	10.3	6.83	6.38	4.25
	38	9.37	6.24	4.85	3.22	10.3	6.86	5.78	3.85	11.4	7.60	6.81	4.53
	40	10.4	6.91	5.14	3.42	11.4	7.61	6.14	4.08	12.7	8.43	7.23	4.81
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		7.95		5.29		8.80		5.85		9.65		6.42	
$t_y \times 10^3$, (kips)$^{-1}$		1.39		0.926		1.53		1.02		1.67		1.11	
$t_r \times 10^3$, (kips)$^{-1}$		1.71		1.14		1.88		1.25		2.05		1.37	
r_x/r_y		2.44				2.44				2.44			
r_y, in.		2.48				2.48				2.46			

W14

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		61				53				48			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.87	1.24	3.49	2.32	2.14	1.42	4.09	2.72	2.37	1.58	4.54	3.02
	6	1.99	1.32	3.49	2.32	2.37	1.58	4.09	2.72	2.63	1.75	4.54	3.02
	7	2.03	1.35	3.49	2.32	2.46	1.64	4.11	2.74	2.73	1.82	4.57	3.04
	8	2.09	1.39	3.49	2.32	2.57	1.71	4.21	2.80	2.85	1.90	4.70	3.13
	9	2.15	1.43	3.52	2.34	2.70	1.80	4.32	2.88	2.99	1.99	4.83	3.21
	10	2.22	1.48	3.59	2.39	2.85	1.90	4.44	2.95	3.16	2.10	4.96	3.30
	11	2.31	1.54	3.66	2.44	3.02	2.01	4.56	3.03	3.36	2.23	5.11	3.40
	12	2.40	1.60	3.74	2.49	3.23	2.15	4.68	3.11	3.59	2.39	5.26	3.50
	13	2.51	1.67	3.82	2.54	3.47	2.31	4.81	3.20	3.86	2.57	5.43	3.61
	14	2.63	1.75	3.90	2.59	3.75	2.49	4.96	3.30	4.17	2.77	5.60	3.73
	15	2.77	1.84	3.99	2.65	4.07	2.71	5.11	3.40	4.53	3.02	5.79	3.85
	16	2.92	1.95	4.08	2.71	4.45	2.96	5.26	3.50	4.96	3.30	5.98	3.98
	17	3.10	2.06	4.17	2.78	4.89	3.25	5.43	3.62	5.45	3.63	6.20	4.12
	18	3.29	2.19	4.27	2.84	5.40	3.59	5.61	3.74	6.03	4.01	6.42	4.27
	19	3.51	2.34	4.38	2.91	6.01	4.00	5.81	3.86	6.72	4.47	6.67	4.44
	20	3.76	2.50	4.49	2.98	6.66	4.43	6.01	4.00	7.45	4.96	6.94	4.61
	22	4.36	2.90	4.72	3.14	8.06	5.36	6.47	4.31	9.01	6.00	7.69	5.12
	24	5.14	3.42	4.99	3.32	9.60	6.38	7.22	4.80	10.7	7.14	8.64	5.75
	26	6.03	4.01	5.28	3.51	11.3	7.49	7.99	5.32	12.6	8.38	9.59	6.38
	28	6.99	4.65	5.66	3.77	13.1	8.69	8.76	5.83	14.6	9.72	10.5	7.01
	30	8.02	5.34	6.20	4.13	15.0	9.98	9.53	6.34	16.8	11.2	11.5	7.65
	32	9.13	6.07	6.74	4.48	17.1	11.3	10.3	6.85				
	34	10.3	6.86	7.27	4.84								
	36	11.6	7.69	7.81	5.20								
	38	12.9	8.57	8.34	5.55								
	40	14.3	9.49	8.87	5.90								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		10.9		7.23		16.2		10.8		18.2		12.1	
$t_y \times 10^3$, (kips)$^{-1}$		1.87		1.24		2.14		1.42		2.37		1.58	
$t_r \times 10^3$, (kips)$^{-1}$		2.29		1.53		2.63		1.75		2.91		1.94	
r_x/r_y		2.44				3.07				3.06			
r_y, in.		2.45				1.92				1.91			

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W14×											
		43[c]				38[c]				34[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.68	1.78	5.12	3.41	3.06	2.04	5.79	3.85	3.50	2.33	6.53	4.34
	6	2.95	1.96	5.12	3.41	3.51	2.34	5.90	3.93	4.02	2.67	6.67	4.44
	7	3.06	2.04	5.17	3.44	3.70	2.46	6.12	4.07	4.23	2.81	6.94	4.61
	8	3.20	2.13	5.31	3.54	3.95	2.63	6.36	4.23	4.49	2.99	7.22	4.80
	9	3.37	2.24	5.47	3.64	4.25	2.83	6.61	4.40	4.81	3.20	7.53	5.01
	10	3.56	2.37	5.64	3.75	4.62	3.08	6.89	4.58	5.24	3.48	7.87	5.23
	11	3.79	2.52	5.82	3.87	5.07	3.37	7.19	4.78	5.76	3.83	8.24	5.48
	12	4.05	2.70	6.01	4.00	5.61	3.73	7.52	5.00	6.38	4.25	8.64	5.75
	13	4.36	2.90	6.21	4.13	6.25	4.16	7.88	5.24	7.14	4.75	9.09	6.05
	14	4.72	3.14	6.42	4.27	7.04	4.68	8.27	5.50	8.07	5.37	9.58	6.37
	15	5.15	3.42	6.66	4.43	8.01	5.33	8.71	5.80	9.21	6.13	10.1	6.74
	16	5.64	3.75	6.90	4.59	9.11	6.06	9.20	6.12	10.5	6.97	11.0	7.29
	17	6.21	4.13	7.17	4.77	10.3	6.85	9.99	6.65	11.8	7.87	12.0	8.01
	18	6.90	4.59	7.46	4.97	11.5	7.68	10.9	7.23	13.3	8.82	13.1	8.73
	19	7.68	5.11	7.78	5.17	12.9	8.55	11.8	7.82	14.8	9.83	14.2	9.47
	20	8.51	5.66	8.12	5.40	14.2	9.48	12.6	8.41	16.4	10.9	15.3	10.2
	21	9.39	6.25	8.71	5.80	15.7	10.4	13.5	9.00	18.0	12.0	16.5	11.0
	22	10.3	6.85	9.31	6.19	17.2	11.5	14.4	9.60	19.8	13.2	17.6	11.7
	23	11.3	7.49	9.90	6.59	18.8	12.5	15.3	10.2	21.6	14.4	18.7	12.4
	24	12.3	8.16	10.5	6.99	20.5	13.6	16.2	10.8	23.6	15.7	19.8	13.2
	25	13.3	8.85	11.1	7.39	22.3	14.8	17.1	11.4	25.6	17.0	21.0	13.9
	26	14.4	9.57	11.7	7.78								
	27	15.5	10.3	12.3	8.18								
	28	16.7	11.1	12.9	8.58								
	29	17.9	11.9	13.5	8.98								
	30	19.2	12.7	14.1	9.37								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		20.6		13.7		29.4		19.6		33.6		22.4	
$t_y \times 10^3$, (kips)$^{-1}$		2.65		1.76		2.98		1.98		3.34		2.22	
$t_r \times 10^3$, (kips)$^{-1}$		3.26		2.17		3.66		2.44		4.10		2.74	
r_x/r_y		3.08				3.79				3.81			
r_y, in.		1.89				1.55				1.53			

[c] Shape is slender for compression with F_y = 50 ksi.

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

W14

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W14×											
		30[c]				26[c]				22[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.02	2.68	7.53	5.01	4.73	3.15	8.86	5.90	5.82	3.87	10.7	7.14
	6	4.63	3.08	7.76	5.16	6.18	4.11	10.0	6.67	7.65	5.09	12.4	8.24
	7	4.89	3.25	8.09	5.38	6.85	4.56	10.7	7.10	8.52	5.67	13.3	8.83
	8	5.20	3.46	8.44	5.62	7.75	5.16	11.4	7.59	9.70	6.45	14.3	9.51
	9	5.59	3.72	8.83	5.88	9.02	6.00	12.3	8.15	11.3	7.54	15.5	10.3
	10	6.07	4.04	9.26	6.16	10.7	7.13	13.2	8.80	13.6	9.08	16.9	11.2
	11	6.70	4.46	9.74	6.48	12.9	8.60	14.4	9.56	16.5	11.0	19.2	12.8
	12	7.47	4.97	10.3	6.83	15.4	10.2	16.5	11.0	19.7	13.1	22.3	14.8
	13	8.41	5.60	10.8	7.21	18.1	12.0	18.7	12.4	23.1	15.3	25.4	16.9
	14	9.56	6.36	11.5	7.65	20.9	13.9	20.9	13.9	26.8	17.8	28.5	19.0
	15	11.0	7.30	12.3	8.20	24.0	16.0	23.2	15.4	30.7	20.4	31.8	21.2
	16	12.5	8.31	13.7	9.12	27.3	18.2	25.5	17.0	34.9	23.2	35.1	23.3
	17	14.1	9.38	15.1	10.0	30.9	20.5	27.8	18.5	39.4	26.2	38.4	25.6
	18	15.8	10.5	16.5	11.0	34.6	23.0	30.1	20.0				
	19	17.6	11.7	18.0	12.0								
	20	19.5	13.0	19.4	12.9								
	21	21.5	14.3	20.9	13.9								
	22	23.6	15.7	22.4	14.9								
	23	25.8	17.2	23.9	15.9								
	24	28.1	18.7	25.4	16.9								

Other Constants and Properties						
$b_y \times 10^3$, (kip-ft)$^{-1}$	39.6	26.4	64.3	42.8	81.2	54.0
$t_y \times 10^3$, (kips)$^{-1}$	3.77	2.51	4.34	2.89	5.15	3.42
$t_r \times 10^3$, (kips)$^{-1}$	4.64	3.09	5.33	3.56	6.32	4.21
r_x/r_y	3.85		5.23		5.33	
r_y, in.	1.49		1.08		1.04	

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W12

Shape		W12×											
		336[h]				305[h]				279[h]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.338	0.225	0.591	0.393	0.373	0.248	0.663	0.441	0.408	0.271	0.741	0.493
	6	0.349	0.232	0.591	0.393	0.385	0.256	0.663	0.441	0.422	0.280	0.741	0.493
	7	0.352	0.235	0.591	0.393	0.390	0.259	0.663	0.441	0.427	0.284	0.741	0.493
	8	0.357	0.238	0.591	0.393	0.395	0.263	0.663	0.441	0.433	0.288	0.741	0.493
	9	0.363	0.241	0.591	0.393	0.401	0.267	0.663	0.441	0.439	0.292	0.741	0.493
	10	0.369	0.245	0.591	0.393	0.408	0.272	0.663	0.441	0.447	0.298	0.741	0.493
	11	0.375	0.250	0.591	0.393	0.416	0.277	0.663	0.441	0.456	0.303	0.741	0.493
	12	0.383	0.255	0.591	0.393	0.425	0.283	0.663	0.441	0.466	0.310	0.741	0.493
	13	0.391	0.260	0.592	0.394	0.435	0.289	0.666	0.443	0.477	0.317	0.744	0.495
	14	0.401	0.267	0.594	0.395	0.445	0.296	0.668	0.444	0.489	0.325	0.746	0.497
	15	0.411	0.274	0.596	0.397	0.457	0.304	0.670	0.446	0.502	0.334	0.749	0.499
	16	0.422	0.281	0.598	0.398	0.470	0.313	0.673	0.448	0.516	0.344	0.752	0.500
	17	0.435	0.289	0.600	0.399	0.484	0.322	0.675	0.449	0.532	0.354	0.755	0.502
	18	0.448	0.298	0.602	0.400	0.500	0.332	0.677	0.451	0.550	0.366	0.758	0.504
	19	0.463	0.308	0.604	0.402	0.516	0.344	0.680	0.452	0.569	0.378	0.761	0.506
	20	0.479	0.319	0.606	0.403	0.535	0.356	0.682	0.454	0.590	0.392	0.764	0.508
	22	0.516	0.343	0.610	0.406	0.577	0.384	0.687	0.457	0.637	0.424	0.770	0.512
	24	0.559	0.372	0.614	0.408	0.627	0.417	0.692	0.461	0.693	0.461	0.776	0.516
	26	0.610	0.406	0.618	0.411	0.686	0.456	0.697	0.464	0.760	0.506	0.782	0.520
	28	0.670	0.446	0.622	0.414	0.756	0.503	0.702	0.467	0.840	0.559	0.788	0.524
	30	0.742	0.494	0.626	0.417	0.839	0.558	0.708	0.471	0.935	0.622	0.795	0.529
	32	0.827	0.550	0.630	0.419	0.938	0.624	0.713	0.474	1.05	0.698	0.801	0.533
	34	0.930	0.619	0.635	0.422	1.06	0.704	0.718	0.478	1.18	0.788	0.808	0.537
	36	1.04	0.694	0.639	0.425	1.19	0.789	0.724	0.481	1.33	0.883	0.814	0.542
	38	1.16	0.773	0.644	0.428	1.32	0.879	0.729	0.485	1.48	0.984	0.821	0.546
	40	1.29	0.856	0.648	0.431	1.46	0.974	0.735	0.489	1.64	1.09	0.828	0.551
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.30		0.865		1.46		0.971		1.62		1.08	
$t_y \times 10^3$, (kips)$^{-1}$		0.338		0.225		0.373		0.248		0.408		0.271	
$t_r \times 10^3$, (kips)$^{-1}$		0.415		0.277		0.458		0.306		0.501		0.334	
r_x/r_y		1.85				1.84				1.82			
r_y, in.		3.47				3.42				3.38			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

W12

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		252[h]				230[h]				210			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.451	0.300	0.832	0.554	0.493	0.328	0.923	0.614	0.540	0.360	1.02	0.681
	6	0.466	0.310	0.832	0.554	0.511	0.340	0.923	0.614	0.560	0.372	1.02	0.681
	7	0.472	0.314	0.832	0.554	0.517	0.344	0.923	0.614	0.567	0.377	1.02	0.681
	8	0.479	0.319	0.832	0.554	0.525	0.349	0.923	0.614	0.575	0.383	1.02	0.681
	9	0.487	0.324	0.832	0.554	0.533	0.355	0.923	0.614	0.585	0.389	1.02	0.681
	10	0.495	0.330	0.832	0.554	0.543	0.361	0.923	0.614	0.596	0.397	1.02	0.681
	11	0.505	0.336	0.832	0.554	0.554	0.369	0.923	0.614	0.608	0.405	1.02	0.681
	12	0.516	0.344	0.833	0.554	0.567	0.377	0.924	0.615	0.622	0.414	1.03	0.683
	13	0.529	0.352	0.837	0.557	0.580	0.386	0.928	0.618	0.638	0.424	1.03	0.686
	14	0.542	0.361	0.840	0.559	0.596	0.396	0.933	0.621	0.655	0.436	1.04	0.689
	15	0.557	0.371	0.844	0.561	0.612	0.407	0.937	0.623	0.674	0.448	1.04	0.693
	16	0.574	0.382	0.847	0.564	0.631	0.420	0.941	0.626	0.694	0.462	1.05	0.696
	17	0.592	0.394	0.851	0.566	0.651	0.433	0.946	0.629	0.717	0.477	1.05	0.700
	18	0.612	0.407	0.854	0.568	0.674	0.448	0.950	0.632	0.742	0.494	1.06	0.703
	19	0.634	0.422	0.858	0.571	0.698	0.464	0.954	0.635	0.769	0.512	1.06	0.707
	20	0.657	0.437	0.862	0.573	0.725	0.482	0.959	0.638	0.799	0.532	1.07	0.710
	22	0.712	0.474	0.869	0.578	0.786	0.523	0.968	0.644	0.868	0.577	1.08	0.718
	24	0.776	0.516	0.877	0.583	0.858	0.571	0.977	0.650	0.950	0.632	1.09	0.725
	26	0.853	0.568	0.884	0.588	0.945	0.629	0.986	0.656	1.05	0.697	1.10	0.733
	28	0.945	0.629	0.892	0.594	1.05	0.697	0.996	0.663	1.16	0.775	1.11	0.741
	30	1.05	0.701	0.900	0.599	1.17	0.780	1.01	0.669	1.30	0.868	1.13	0.749
	32	1.19	0.790	0.908	0.604	1.32	0.880	1.02	0.676	1.48	0.982	1.14	0.757
	34	1.34	0.891	0.916	0.610	1.49	0.993	1.03	0.682	1.67	1.11	1.15	0.765
	36	1.50	0.999	0.925	0.615	1.67	1.11	1.04	0.689	1.87	1.24	1.16	0.774
	38	1.67	1.11	0.933	0.621	1.87	1.24	1.05	0.696	2.08	1.38	1.18	0.782
	40	1.85	1.23	0.942	0.627	2.07	1.37	1.06	0.704	2.31	1.53	1.19	0.791
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		1.82		1.21		2.01		1.34		2.24		1.49	
$t_y \times 10^3$, (kips)$^{-1}$		0.451		0.300		0.493		0.328		0.540		0.360	
$t_r \times 10^3$, (kips)$^{-1}$		0.554		0.369		0.606		0.404		0.664		0.443	
r_x/r_y		1.81				1.80				1.80			
r_y, in.		3.34				3.31				3.28			

[h] Flange thickness greater than 2 in. Special requirements may apply per AISC *Specification* Section A3.1c.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W12×											
		190				170				152			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.596	0.397	1.15	0.762	0.668	0.444	1.30	0.862	0.747	0.497	1.47	0.975
	6	0.618	0.411	1.15	0.762	0.693	0.461	1.30	0.862	0.776	0.516	1.47	0.975
	7	0.626	0.417	1.15	0.762	0.702	0.467	1.30	0.862	0.786	0.523	1.47	0.975
	8	0.636	0.423	1.15	0.762	0.713	0.474	1.30	0.862	0.798	0.531	1.47	0.975
	9	0.647	0.430	1.15	0.762	0.725	0.483	1.30	0.862	0.813	0.541	1.47	0.975
	10	0.659	0.438	1.15	0.762	0.739	0.492	1.30	0.862	0.829	0.551	1.47	0.975
	11	0.673	0.448	1.15	0.762	0.755	0.503	1.30	0.862	0.847	0.563	1.47	0.975
	12	0.688	0.458	1.15	0.764	0.773	0.514	1.30	0.865	0.867	0.577	1.47	0.980
	13	0.706	0.470	1.16	0.768	0.793	0.528	1.31	0.870	0.890	0.592	1.48	0.987
	14	0.725	0.482	1.16	0.773	0.815	0.542	1.32	0.876	0.915	0.609	1.49	0.994
	15	0.746	0.497	1.17	0.777	0.839	0.559	1.32	0.881	0.943	0.627	1.50	1.00
	16	0.770	0.512	1.17	0.781	0.866	0.576	1.33	0.887	0.974	0.648	1.51	1.01
	17	0.796	0.529	1.18	0.786	0.896	0.596	1.34	0.892	1.01	0.670	1.52	1.01
	18	0.824	0.548	1.19	0.790	0.928	0.618	1.35	0.898	1.04	0.695	1.54	1.02
	19	0.855	0.569	1.19	0.794	0.964	0.641	1.36	0.903	1.09	0.722	1.55	1.03
	20	0.889	0.591	1.20	0.799	1.00	0.667	1.37	0.909	1.13	0.752	1.56	1.04
	22	0.966	0.643	1.21	0.808	1.09	0.727	1.38	0.921	1.23	0.820	1.58	1.05
	24	1.06	0.705	1.23	0.817	1.20	0.798	1.40	0.932	1.36	0.902	1.60	1.07
	26	1.17	0.778	1.24	0.827	1.33	0.883	1.42	0.945	1.50	1.00	1.63	1.08
	28	1.30	0.867	1.26	0.837	1.48	0.985	1.44	0.957	1.68	1.12	1.65	1.10
	30	1.46	0.973	1.27	0.847	1.67	1.11	1.46	0.970	1.90	1.26	1.68	1.12
	32	1.66	1.10	1.29	0.857	1.89	1.26	1.48	0.983	2.16	1.43	1.70	1.13
	34	1.87	1.25	1.30	0.867	2.14	1.42	1.50	0.997	2.43	1.62	1.73	1.15
	36	2.10	1.40	1.32	0.878	2.39	1.59	1.52	1.01	2.73	1.82	1.76	1.17
	38	2.34	1.56	1.34	0.889	2.67	1.78	1.54	1.03	3.04	2.02	1.79	1.19
	40	2.59	1.72	1.35	0.900	2.96	1.97	1.56	1.04	3.37	2.24	1.82	1.21
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		2.49		1.66		2.83		1.88		3.21		2.14	
$t_y \times 10^3$, (kips)$^{-1}$		0.596		0.397		0.668		0.444		0.747		0.497	
$t_r \times 10^3$, (kips)$^{-1}$		0.733		0.488		0.821		0.547		0.918		0.612	
r_x/r_y		1.79				1.78				1.77			
r_y, in.		3.25				3.22				3.19			

W12

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		136				120				106			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	0.837	0.557	1.66	1.11	0.949	0.631	1.92	1.27	1.07	0.712	2.17	1.45
	6	0.869	0.578	1.66	1.11	0.986	0.656	1.92	1.27	1.11	0.741	2.17	1.45
	7	0.881	0.586	1.66	1.11	1.00	0.665	1.92	1.27	1.13	0.751	2.17	1.45
	8	0.896	0.596	1.66	1.11	1.02	0.676	1.92	1.27	1.15	0.764	2.17	1.45
	9	0.912	0.607	1.66	1.11	1.04	0.689	1.92	1.27	1.17	0.778	2.17	1.45
	10	0.930	0.619	1.66	1.11	1.06	0.703	1.92	1.27	1.19	0.794	2.17	1.45
	11	0.951	0.633	1.66	1.11	1.08	0.719	1.92	1.27	1.22	0.813	2.17	1.45
	12	0.974	0.648	1.68	1.11	1.11	0.737	1.93	1.28	1.25	0.833	2.19	1.46
	13	1.00	0.666	1.69	1.12	1.14	0.757	1.95	1.30	1.29	0.856	2.22	1.47
	14	1.03	0.685	1.70	1.13	1.17	0.779	1.96	1.31	1.33	0.882	2.24	1.49
	15	1.06	0.706	1.71	1.14	1.21	0.804	1.98	1.32	1.37	0.910	2.26	1.50
	16	1.10	0.730	1.73	1.15	1.25	0.831	2.00	1.33	1.41	0.941	2.28	1.52
	17	1.14	0.755	1.74	1.16	1.29	0.861	2.02	1.34	1.47	0.976	2.31	1.53
	18	1.18	0.784	1.76	1.17	1.34	0.894	2.04	1.35	1.52	1.01	2.33	1.55
	19	1.22	0.815	1.77	1.18	1.40	0.931	2.05	1.37	1.59	1.06	2.35	1.57
	20	1.28	0.849	1.78	1.19	1.46	0.970	2.07	1.38	1.65	1.10	2.38	1.58
	22	1.39	0.928	1.81	1.21	1.60	1.06	2.11	1.41	1.81	1.21	2.43	1.62
	24	1.54	1.02	1.84	1.23	1.76	1.17	2.15	1.43	2.00	1.33	2.48	1.65
	26	1.71	1.14	1.87	1.25	1.96	1.31	2.19	1.46	2.23	1.49	2.54	1.69
	28	1.91	1.27	1.91	1.27	2.20	1.47	2.24	1.49	2.51	1.67	2.60	1.73
	30	2.16	1.44	1.94	1.29	2.50	1.66	2.28	1.52	2.86	1.90	2.66	1.77
	32	2.46	1.64	1.97	1.31	2.84	1.89	2.33	1.55	3.25	2.16	2.72	1.81
	34	2.78	1.85	2.01	1.34	3.21	2.14	2.38	1.58	3.67	2.44	2.79	1.86
	36	3.12	2.07	2.05	1.36	3.60	2.40	2.43	1.62	4.11	2.74	2.86	1.90
	38	3.47	2.31	2.09	1.39	4.01	2.67	2.48	1.65	4.58	3.05	2.93	1.95
	40	3.85	2.56	2.13	1.41	4.44	2.96	2.54	1.69	5.08	3.38	3.01	2.00
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		3.64		2.42		4.17		2.78		4.74		3.16	
$t_y \times 10^3$, (kips)$^{-1}$		0.837		0.557		0.949		0.631		1.07		0.712	
$t_r \times 10^3$, (kips)$^{-1}$		1.03		0.685		1.17		0.777		1.31		0.877	
r_x/r_y		1.77				1.76				1.76			
r_y, in.		3.16				3.13				3.11			

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

W12

Shape		W12×											
		96				87				79			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.18	0.788	2.42	1.61	1.30	0.868	2.70	1.80	1.44	0.958	2.99	1.99
	6	1.23	0.820	2.42	1.61	1.36	0.904	2.70	1.80	1.50	0.998	2.99	1.99
	7	1.25	0.832	2.42	1.61	1.38	0.917	2.70	1.80	1.52	1.01	2.99	1.99
	8	1.27	0.846	2.42	1.61	1.40	0.932	2.70	1.80	1.55	1.03	2.99	1.99
	9	1.30	0.862	2.42	1.61	1.43	0.950	2.70	1.80	1.58	1.05	2.99	1.99
	10	1.32	0.880	2.42	1.61	1.46	0.971	2.70	1.80	1.61	1.07	2.99	1.99
	11	1.35	0.901	2.43	1.61	1.49	0.994	2.70	1.80	1.65	1.10	3.00	2.00
	12	1.39	0.924	2.45	1.63	1.53	1.02	2.74	1.82	1.69	1.13	3.04	2.02
	13	1.43	0.949	2.48	1.65	1.58	1.05	2.77	1.84	1.74	1.16	3.08	2.05
	14	1.47	0.978	2.50	1.67	1.62	1.08	2.80	1.86	1.80	1.20	3.12	2.08
	15	1.52	1.01	2.53	1.68	1.68	1.12	2.84	1.89	1.86	1.24	3.16	2.11
	16	1.57	1.05	2.56	1.70	1.74	1.16	2.87	1.91	1.92	1.28	3.21	2.13
	17	1.63	1.08	2.59	1.72	1.80	1.20	2.91	1.93	2.00	1.33	3.25	2.16
	18	1.69	1.13	2.62	1.74	1.87	1.25	2.94	1.96	2.08	1.38	3.30	2.19
	19	1.76	1.17	2.65	1.76	1.95	1.30	2.98	1.98	2.17	1.44	3.34	2.22
	20	1.84	1.22	2.68	1.78	2.04	1.36	3.02	2.01	2.26	1.51	3.39	2.26
	22	2.02	1.34	2.74	1.83	2.24	1.49	3.10	2.06	2.49	1.66	3.49	2.32
	24	2.24	1.49	2.81	1.87	2.48	1.65	3.19	2.12	2.76	1.84	3.60	2.40
	26	2.50	1.66	2.88	1.92	2.78	1.85	3.28	2.18	3.09	2.06	3.71	2.47
	28	2.81	1.87	2.95	1.97	3.13	2.08	3.37	2.24	3.50	2.33	3.84	2.55
	30	3.20	2.13	3.03	2.02	3.57	2.38	3.47	2.31	4.00	2.66	3.96	2.64
	32	3.64	2.42	3.11	2.07	4.07	2.71	3.58	2.38	4.55	3.02	4.10	2.73
	34	4.11	2.74	3.20	2.13	4.59	3.05	3.69	2.46	5.13	3.41	4.25	2.83
	36	4.61	3.07	3.29	2.19	5.15	3.42	3.81	2.54	5.75	3.83	4.41	2.93
	38	5.14	3.42	3.39	2.26	5.73	3.81	3.94	2.62	6.41	4.26	4.58	3.05
	40	5.69	3.79	3.49	2.32	6.35	4.23	4.08	2.72	7.10	4.73	4.78	3.18
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		5.28		3.51		5.90		3.92		6.56		4.37	
$t_y \times 10^3$, (kips)$^{-1}$		1.18		0.788		1.30		0.868		1.44		0.958	
$t_r \times 10^3$, (kips)$^{-1}$		1.45		0.970		1.60		1.07		1.77		1.18	
r_x/r_y		1.76				1.75				1.75			
r_y, in.		3.09				3.07				3.05			

W12

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		72				65[f]				58			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.58	1.05	3.30	2.19	1.75	1.16	3.75	2.50	1.96	1.31	4.12	2.74
	6	1.65	1.10	3.30	2.19	1.82	1.21	3.75	2.50	2.09	1.39	4.12	2.74
	7	1.67	1.11	3.30	2.19	1.85	1.23	3.75	2.50	2.13	1.42	4.12	2.74
	8	1.70	1.13	3.30	2.19	1.88	1.25	3.75	2.50	2.19	1.45	4.12	2.74
	9	1.74	1.16	3.30	2.19	1.92	1.28	3.75	2.50	2.25	1.50	4.13	2.75
	10	1.77	1.18	3.30	2.19	1.96	1.31	3.75	2.50	2.32	1.54	4.21	2.80
	11	1.82	1.21	3.31	2.20	2.01	1.34	3.75	2.50	2.41	1.60	4.28	2.85
	12	1.87	1.24	3.36	2.23	2.06	1.37	3.75	2.50	2.50	1.66	4.36	2.90
	13	1.92	1.28	3.40	2.27	2.13	1.41	3.81	2.54	2.61	1.73	4.45	2.96
	14	1.98	1.32	3.45	2.30	2.19	1.46	3.87	2.58	2.73	1.81	4.53	3.02
	15	2.05	1.36	3.50	2.33	2.27	1.51	3.93	2.62	2.86	1.90	4.62	3.07
	16	2.12	1.41	3.56	2.37	2.35	1.56	4.00	2.66	3.01	2.01	4.71	3.14
	17	2.20	1.46	3.61	2.40	2.44	1.62	4.06	2.70	3.18	2.12	4.81	3.20
	18	2.29	1.52	3.67	2.44	2.54	1.69	4.13	2.75	3.38	2.25	4.91	3.27
	19	2.39	1.59	3.72	2.48	2.65	1.77	4.20	2.80	3.59	2.39	5.01	3.34
	20	2.50	1.66	3.78	2.52	2.77	1.85	4.27	2.84	3.83	2.55	5.12	3.41
	22	2.75	1.83	3.91	2.60	3.06	2.03	4.43	2.95	4.41	2.94	5.36	3.56
	24	3.05	2.03	4.04	2.69	3.40	2.26	4.59	3.06	5.15	3.43	5.61	3.74
	26	3.42	2.28	4.18	2.78	3.82	2.54	4.77	3.17	6.05	4.02	5.90	3.92
	28	3.87	2.57	4.33	2.88	4.32	2.88	4.96	3.30	7.01	4.67	6.21	4.13
	30	4.42	2.94	4.49	2.99	4.95	3.29	5.17	3.44	8.05	5.36	6.57	4.37
	32	5.03	3.35	4.67	3.10	5.63	3.75	5.39	3.59	9.16	6.09	7.12	4.74
	34	5.68	3.78	4.86	3.23	6.36	4.23	5.64	3.75	10.3	6.88	7.66	5.10
	36	6.37	4.24	5.06	3.37	7.13	4.74	5.97	3.98	11.6	7.71	8.21	5.46
	38	7.09	4.72	5.32	3.54	7.94	5.28	6.39	4.25	12.9	8.59	8.75	5.82
	40	7.86	5.23	5.66	3.76	8.80	5.85	6.81	4.53	14.3	9.52	9.29	6.18
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		7.24		4.82		8.31		5.53		11.0		7.29	
$t_y \times 10^3$, (kips)$^{-1}$		1.58		1.05		1.75		1.16		1.96		1.31	
$t_r \times 10^3$, (kips)$^{-1}$		1.94		1.30		2.15		1.43		2.41		1.61	
r_x/r_y		1.75				1.75				2.10			
r_y, in.		3.04				3.02				2.51			

[f] Shape does not meet compact limit for flexure with $F_y = 50$ ksi.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W12×											
		53				50				45			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.14	1.42	4.57	3.04	2.29	1.52	4.96	3.30	2.55	1.70	5.55	3.69
	6	2.28	1.52	4.57	3.04	2.52	1.68	4.96	3.30	2.82	1.87	5.55	3.69
	7	2.33	1.55	4.57	3.04	2.62	1.74	4.96	3.30	2.92	1.94	5.56	3.70
	8	2.39	1.59	4.57	3.04	2.73	1.81	5.08	3.38	3.04	2.03	5.70	3.79
	9	2.46	1.64	4.59	3.06	2.86	1.90	5.19	3.46	3.19	2.12	5.84	3.89
	10	2.54	1.69	4.68	3.12	3.01	2.00	5.32	3.54	3.36	2.24	6.00	3.99
	11	2.63	1.75	4.77	3.18	3.19	2.12	5.45	3.62	3.56	2.37	6.15	4.09
	12	2.74	1.82	4.87	3.24	3.39	2.26	5.58	3.72	3.80	2.53	6.32	4.21
	13	2.86	1.90	4.97	3.31	3.64	2.42	5.73	3.81	4.07	2.71	6.50	4.32
	14	2.99	1.99	5.07	3.38	3.91	2.60	5.88	3.91	4.39	2.92	6.69	4.45
	15	3.15	2.09	5.18	3.45	4.24	2.82	6.04	4.02	4.75	3.16	6.88	4.58
	16	3.32	2.21	5.29	3.52	4.61	3.07	6.20	4.13	5.18	3.45	7.09	4.72
	17	3.51	2.34	5.41	3.60	5.05	3.36	6.38	4.25	5.68	3.78	7.32	4.87
	18	3.73	2.48	5.53	3.68	5.56	3.70	6.57	4.37	6.25	4.16	7.56	5.03
	19	3.97	2.64	5.66	3.77	6.17	4.10	6.77	4.50	6.94	4.62	7.81	5.20
	20	4.25	2.83	5.80	3.86	6.83	4.55	6.98	4.64	7.69	5.12	8.08	5.38
	22	4.90	3.26	6.09	4.05	8.27	5.50	7.45	4.95	9.31	6.19	8.69	5.78
	24	5.75	3.83	6.41	4.26	9.84	6.55	8.01	5.33	11.1	7.37	9.66	6.43
	26	6.75	4.49	6.77	4.50	11.5	7.68	8.84	5.88	13.0	8.65	10.7	7.11
	28	7.83	5.21	7.16	4.77	13.4	8.91	9.67	6.44	15.1	10.0	11.7	7.80
	30	8.99	5.98	7.81	5.20	15.4	10.2	10.5	6.99	17.3	11.5	12.8	8.48
	32	10.2	6.80	8.48	5.64	17.5	11.6	11.3	7.53	19.7	13.1	13.8	9.16
	34	11.5	7.68	9.15	6.09								
	36	12.9	8.61	9.81	6.53								
	38	14.4	9.59	10.5	6.97								
	40	16.0	10.6	11.1	7.41								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		12.2		8.15		16.7		11.1		18.8		12.5	
$t_y \times 10^3$, (kips)$^{-1}$		2.14		1.42		2.29		1.52		2.55		1.70	
$t_r \times 10^3$, (kips)$^{-1}$		2.63		1.75		2.81		1.87		3.13		2.09	
r_x/r_y		2.11				2.64				2.64			
r_y, in.		2.48				1.96				1.95			

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

W12

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×											
		40				35[c]				30[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.85	1.90	6.25	4.16	3.25	2.17	6.96	4.63	3.94	2.62	8.27	5.50
	6	3.16	2.10	6.25	4.16	3.80	2.53	7.09	4.72	4.54	3.02	8.46	5.63
	7	3.27	2.18	6.27	4.17	4.03	2.68	7.34	4.89	4.79	3.19	8.79	5.85
	8	3.41	2.27	6.44	4.29	4.31	2.87	7.61	5.07	5.10	3.39	9.14	6.08
	9	3.58	2.38	6.62	4.40	4.65	3.09	7.90	5.26	5.50	3.66	9.53	6.34
	10	3.78	2.51	6.80	4.53	5.05	3.36	8.22	5.47	5.99	3.99	9.94	6.62
	11	4.00	2.66	7.00	4.66	5.55	3.69	8.56	5.69	6.60	4.39	10.4	6.92
	12	4.27	2.84	7.21	4.79	6.15	4.09	8.93	5.94	7.32	4.87	10.9	7.25
	13	4.58	3.05	7.43	4.94	6.87	4.57	9.33	6.21	8.21	5.46	11.5	7.62
	14	4.94	3.29	7.66	5.10	7.74	5.15	9.77	6.50	9.28	6.18	12.1	8.02
	15	5.36	3.56	7.91	5.26	8.82	5.87	10.3	6.82	10.6	7.06	12.7	8.48
	16	5.84	3.89	8.18	5.44	10.0	6.68	10.8	7.18	12.1	8.04	13.7	9.13
	17	6.41	4.26	8.46	5.63	11.3	7.54	11.5	7.66	13.6	9.07	15.0	10.0
	18	7.07	4.70	8.77	5.83	12.7	8.45	12.5	8.30	15.3	10.2	16.4	10.9
	19	7.85	5.23	9.10	6.05	14.2	9.42	13.4	8.94	17.0	11.3	17.7	11.8
	20	8.70	5.79	9.45	6.29	15.7	10.4	14.4	9.59	18.9	12.6	19.0	12.7
	22	10.5	7.01	10.5	6.96	19.0	12.6	16.3	10.9	22.8	15.2	21.7	14.5
	24	12.5	8.34	11.8	7.83	22.6	15.0	18.3	12.2	27.2	18.1	24.4	16.3
	26	14.7	9.79	13.1	8.69								
	28	17.1	11.3	14.4	9.56								
	30	19.6	13.0	15.7	10.4								
	32	22.3	14.8	16.9	11.3								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		21.2		14.1		31.0		20.6		37.3		24.8	
$t_y \times 10^3$, (kips)$^{-1}$		2.85		1.90		3.24		2.16		3.80		2.53	
$t_r \times 10^3$, (kips)$^{-1}$		3.51		2.34		3.98		2.66		4.67		3.11	
r_x/r_y		2.64				3.41				3.43			
r_y, in.		1.94				1.54				1.52			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W12×											
		26[c]				22[c]				19[c]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.66	3.10	9.58	6.37	5.42	3.60	12.2	8.09	6.52	4.34	14.4	9.60
	1	4.67	3.11	9.58	6.37	5.48	3.65	12.2	8.09	6.60	4.39	14.4	9.60
	2	4.73	3.14	9.58	6.37	5.68	3.78	12.2	8.09	6.84	4.55	14.4	9.60
	3	4.82	3.21	9.58	6.37	6.03	4.01	12.2	8.09	7.28	4.84	14.5	9.66
	4	4.95	3.29	9.58	6.37	6.58	4.38	13.0	8.65	7.95	5.29	15.6	10.4
	5	5.13	3.41	9.58	6.37	7.43	4.95	14.0	9.28	8.97	5.97	16.9	11.2
	6	5.36	3.56	9.83	6.54	8.73	5.81	15.1	10.0	10.5	6.99	18.4	12.2
	7	5.64	3.75	10.2	6.81	10.6	7.03	16.4	10.9	12.9	8.56	20.2	13.4
	8	6.00	3.99	10.7	7.11	13.2	8.75	17.9	11.9	16.3	10.8	22.3	14.9
	9	6.43	4.28	11.2	7.43	16.7	11.1	19.8	13.1	20.6	13.7	25.7	17.1
	10	6.97	4.64	11.7	7.79	20.6	13.7	23.0	15.3	25.5	16.9	30.4	20.2
	11	7.64	5.08	12.3	8.17	24.9	16.5	26.5	17.6	30.8	20.5	35.2	23.4
	12	8.49	5.65	12.9	8.60	29.6	19.7	30.0	20.0	36.7	24.4	40.1	26.7
	13	9.53	6.34	13.6	9.08	34.7	23.1	33.5	22.3	43.0	28.6	45.1	30.0
	14	10.8	7.18	14.4	9.61	40.3	26.8	37.1	24.7				
	15	12.4	8.22	15.4	10.3								
	16	14.1	9.36	17.1	11.4								
	17	15.9	10.6	18.8	12.5								
	18	17.8	11.8	20.6	13.7								
	19	19.8	13.2	22.3	14.9								
	20	22.0	14.6	24.1	16.0								
	21	24.2	16.1	25.9	17.2								
	22	26.6	17.7	27.7	18.4								
	23	29.1	19.3	29.5	19.6								
	24	31.6	21.0	31.3	20.8								
	25	34.3	22.8	33.1	22.0								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		43.6		29.0		97.3		64.8		120		79.5	
$t_y \times 10^3$, (kips)$^{-1}$		4.37		2.90		5.15		3.43		6.00		3.99	
$t_r \times 10^3$, (kips)$^{-1}$		5.36		3.58		6.33		4.22		7.37		4.91	
r_x/r_y		3.42				5.79				5.86			
r_y, in.		1.51				0.848				0.822			

[c] Shape is slender for compression with $F_y = 50$ ksi.

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

W12

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W12×							
		16[c]				14[c, v]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	7.98	5.31	17.7	11.8	9.39	6.24	20.5	13.6
	1	8.08	5.38	17.7	11.8	9.50	6.32	20.5	13.6
	2	8.39	5.59	17.7	11.8	9.88	6.57	20.5	13.6
	3	8.97	5.96	18.1	12.0	10.5	7.02	21.0	14.0
	4	9.87	6.57	19.6	13.1	11.6	7.73	22.9	15.2
	5	11.3	7.49	21.4	14.3	13.3	8.83	25.1	16.7
	6	13.4	8.91	23.6	15.7	15.8	10.5	27.8	18.5
	7	16.8	11.2	26.3	17.5	19.9	13.3	31.2	20.7
	8	21.8	14.5	29.6	19.7	26.0	17.3	36.4	24.2
	9	27.6	18.3	36.1	24.0	32.9	21.9	44.6	29.7
	10	34.0	22.6	42.9	28.5	40.6	27.0	53.3	35.5
	11	41.2	27.4	50.0	33.3	49.1	32.7	62.4	41.5
	12	49.0	32.6	57.2	38.1	58.5	38.9	71.8	47.8

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	158	105	188	125
$t_y \times 10^3$, (kips)$^{-1}$	7.09	4.72	8.03	5.34
$t_r \times 10^3$, (kips)$^{-1}$	8.71	5.81	9.86	6.57
r_x/r_y	6.04		6.14	
r_y, in.	0.773		0.753	

[c] Shape is slender for compression with F_y = 50 ksi.
[v] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(a) with F_y = 50 ksi; therefore, ϕ_v = 0.90 and Ω_v = 1.67.
Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W10×											
		112				100				88			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.02	0.675	2.42	1.61	1.14	0.758	2.74	1.82	1.28	0.855	3.15	2.10
	6	1.07	0.712	2.42	1.61	1.20	0.800	2.74	1.82	1.36	0.903	3.15	2.10
	7	1.09	0.726	2.42	1.61	1.23	0.816	2.74	1.82	1.38	0.921	3.15	2.10
	8	1.12	0.742	2.42	1.61	1.25	0.835	2.74	1.82	1.42	0.942	3.15	2.10
	9	1.14	0.761	2.42	1.61	1.29	0.856	2.74	1.82	1.45	0.967	3.15	2.10
	10	1.18	0.782	2.43	1.62	1.32	0.881	2.75	1.83	1.50	0.995	3.17	2.11
	11	1.21	0.807	2.45	1.63	1.37	0.909	2.78	1.85	1.54	1.03	3.20	2.13
	12	1.25	0.834	2.47	1.64	1.41	0.941	2.80	1.86	1.60	1.06	3.23	2.15
	13	1.30	0.865	2.49	1.66	1.47	0.977	2.82	1.88	1.66	1.11	3.27	2.17
	14	1.35	0.900	2.51	1.67	1.53	1.02	2.85	1.90	1.73	1.15	3.30	2.19
	15	1.41	0.939	2.53	1.68	1.60	1.06	2.87	1.91	1.81	1.20	3.33	2.22
	16	1.48	0.983	2.55	1.69	1.67	1.11	2.90	1.93	1.90	1.26	3.36	2.24
	17	1.55	1.03	2.56	1.71	1.76	1.17	2.92	1.94	1.99	1.33	3.40	2.26
	18	1.63	1.09	2.59	1.72	1.85	1.23	2.95	1.96	2.10	1.40	3.43	2.28
	19	1.72	1.15	2.61	1.73	1.96	1.30	2.98	1.98	2.23	1.48	3.47	2.31
	20	1.82	1.21	2.63	1.75	2.08	1.38	3.00	2.00	2.36	1.57	3.50	2.33
	22	2.06	1.37	2.67	1.78	2.36	1.57	3.06	2.03	2.68	1.79	3.58	2.38
	24	2.36	1.57	2.71	1.80	2.70	1.80	3.11	2.07	3.09	2.05	3.65	2.43
	26	2.74	1.82	2.76	1.83	3.15	2.09	3.17	2.11	3.60	2.40	3.73	2.48
	28	3.18	2.11	2.80	1.87	3.65	2.43	3.23	2.15	4.18	2.78	3.82	2.54
	30	3.65	2.43	2.85	1.90	4.19	2.79	3.30	2.19	4.79	3.19	3.90	2.60
	32	4.15	2.76	2.90	1.93	4.77	3.17	3.36	2.24	5.46	3.63	4.00	2.66
	34	4.69	3.12	2.95	1.97	5.38	3.58	3.43	2.28	6.16	4.10	4.09	2.72
	36	5.25	3.50	3.01	2.00	6.03	4.01	3.50	2.33	6.90	4.59	4.19	2.79
	38	5.85	3.90	3.06	2.04	6.72	4.47	3.58	2.38	7.69	5.12	4.30	2.86
	40	6.49	4.32	3.12	2.08	7.45	4.96	3.66	2.43	8.52	5.67	4.41	2.94
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		5.15		3.43		5.84		3.89		6.71		4.46	
$t_y \times 10^3$, (kips)$^{-1}$		1.02		0.675		1.14		0.758		1.28		0.855	
$t_r \times 10^3$, (kips)$^{-1}$		1.25		0.831		1.40		0.933		1.58		1.05	
r_x/r_y		1.74				1.74				1.73			
r_y, in.		2.68				2.65				2.63			

W10

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		77				68				60			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.47	0.979	3.65	2.43	1.68	1.12	4.18	2.78	1.89	1.26	4.78	3.18
	6	1.56	1.04	3.65	2.43	1.78	1.18	4.18	2.78	2.00	1.33	4.78	3.18
	7	1.59	1.06	3.65	2.43	1.81	1.21	4.18	2.78	2.04	1.36	4.78	3.18
	8	1.63	1.08	3.65	2.43	1.86	1.23	4.18	2.78	2.09	1.39	4.78	3.18
	9	1.67	1.11	3.65	2.43	1.91	1.27	4.18	2.78	2.15	1.43	4.78	3.18
	10	1.72	1.14	3.68	2.45	1.96	1.31	4.22	2.81	2.21	1.47	4.84	3.22
	11	1.78	1.18	3.72	2.48	2.03	1.35	4.27	2.84	2.29	1.52	4.90	3.26
	12	1.84	1.23	3.76	2.50	2.10	1.40	4.32	2.88	2.37	1.58	4.97	3.31
	13	1.91	1.27	3.80	2.53	2.19	1.46	4.38	2.91	2.47	1.64	5.04	3.36
	14	2.00	1.33	3.85	2.56	2.28	1.52	4.44	2.95	2.58	1.72	5.12	3.41
	15	2.09	1.39	3.89	2.59	2.39	1.59	4.49	2.99	2.70	1.80	5.19	3.46
	16	2.19	1.46	3.94	2.62	2.51	1.67	4.55	3.03	2.84	1.89	5.27	3.51
	17	2.31	1.54	3.98	2.65	2.64	1.76	4.61	3.07	2.99	1.99	5.35	3.56
	18	2.44	1.62	4.03	2.68	2.79	1.86	4.67	3.11	3.16	2.10	5.43	3.62
	19	2.58	1.72	4.08	2.71	2.96	1.97	4.74	3.15	3.36	2.23	5.52	3.67
	20	2.74	1.83	4.13	2.74	3.14	2.09	4.80	3.20	3.57	2.38	5.61	3.73
	22	3.13	2.08	4.23	2.81	3.59	2.39	4.94	3.29	4.08	2.72	5.79	3.85
	24	3.61	2.40	4.33	2.88	4.15	2.76	5.08	3.38	4.73	3.14	5.99	3.99
	26	4.22	2.81	4.45	2.96	4.85	3.23	5.24	3.49	5.54	3.69	6.20	4.13
	28	4.89	3.26	4.56	3.04	5.63	3.74	5.40	3.59	6.42	4.27	6.43	4.28
	30	5.62	3.74	4.69	3.12	6.46	4.30	5.57	3.71	7.38	4.91	6.67	4.44
	32	6.39	4.25	4.82	3.21	7.35	4.89	5.76	3.83	8.39	5.58	6.94	4.61
	34	7.22	4.80	4.96	3.30	8.30	5.52	5.96	3.96	9.47	6.30	7.22	4.80
	36	8.09	5.38	5.11	3.40	9.30	6.19	6.17	4.10	10.6	7.07	7.53	5.01
	38	9.02	6.00	5.26	3.50	10.4	6.90	6.40	4.26	11.8	7.87	7.96	5.30
	40	9.99	6.65	5.43	3.61	11.5	7.64	6.64	4.42	13.1	8.72	8.43	5.61
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		7.76		5.16		8.88		5.91		10.2		6.77	
$t_y \times 10^3$, (kips)$^{-1}$		1.47		0.979		1.68		1.12		1.89		1.26	
$t_r \times 10^3$, (kips)$^{-1}$		1.81		1.20		2.06		1.37		2.32		1.55	
r_x/r_y		1.73				1.71				1.71			
r_y, in.		2.60				2.59				2.57			

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W10×											
		54				49				45			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.11	1.41	5.35	3.56	2.32	1.54	5.90	3.92	2.51	1.67	6.49	4.32
	6	2.24	1.49	5.35	3.56	2.46	1.64	5.90	3.92	2.76	1.84	6.49	4.32
	7	2.29	1.52	5.35	3.56	2.51	1.67	5.90	3.92	2.85	1.90	6.49	4.32
	8	2.34	1.56	5.35	3.56	2.57	1.71	5.90	3.92	2.97	1.97	6.60	4.39
	9	2.41	1.60	5.35	3.56	2.65	1.76	5.90	3.93	3.10	2.06	6.73	4.48
	10	2.48	1.65	5.43	3.61	2.73	1.82	6.00	3.99	3.26	2.17	6.87	4.57
	11	2.57	1.71	5.51	3.67	2.83	1.88	6.10	4.06	3.44	2.29	7.00	4.66
	12	2.66	1.77	5.60	3.72	2.93	1.95	6.20	4.13	3.65	2.43	7.15	4.76
	13	2.77	1.85	5.69	3.78	3.06	2.03	6.31	4.20	3.90	2.60	7.30	4.86
	14	2.90	1.93	5.78	3.85	3.19	2.12	6.42	4.27	4.19	2.78	7.46	4.96
	15	3.03	2.02	5.88	3.91	3.35	2.23	6.54	4.35	4.51	3.00	7.63	5.07
	16	3.19	2.12	5.97	3.97	3.52	2.34	6.66	4.43	4.89	3.26	7.80	5.19
	17	3.36	2.24	6.08	4.04	3.72	2.47	6.78	4.51	5.33	3.55	7.98	5.31
	18	3.56	2.37	6.18	4.11	3.94	2.62	6.91	4.60	5.84	3.89	8.17	5.44
	19	3.78	2.51	6.29	4.19	4.18	2.78	7.04	4.69	6.44	4.28	8.37	5.57
	20	4.02	2.67	6.40	4.26	4.46	2.96	7.18	4.78	7.13	4.75	8.58	5.71
	22	4.60	3.06	6.64	4.42	5.11	3.40	7.48	4.98	8.63	5.74	9.03	6.01
	24	5.33	3.55	6.90	4.59	5.94	3.95	7.80	5.19	10.3	6.83	9.53	6.34
	26	6.25	4.16	7.18	4.78	6.97	4.64	8.15	5.42	12.1	8.02	10.1	6.71
	28	7.25	4.83	7.48	4.98	8.08	5.38	8.53	5.68	14.0	9.30	10.9	7.22
	30	8.33	5.54	7.81	5.20	9.28	6.17	8.95	5.96	16.0	10.7	11.7	7.82
	32	9.47	6.30	8.17	5.43	10.6	7.03	9.47	6.30	18.3	12.1	12.6	8.41
	34	10.7	7.12	8.60	5.72	11.9	7.93	10.2	6.77				
	36	12.0	7.98	9.19	6.11	13.4	8.89	10.9	7.24				
	38	13.4	8.89	9.77	6.50	14.9	9.91	11.6	7.71				
	40	14.8	9.85	10.4	6.89	16.5	11.0	12.3	8.18				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		11.4		7.57		12.6		8.38		17.6		11.7	
$t_y \times 10^3$, (kips)$^{-1}$		2.11		1.41		2.32		1.54		2.51		1.67	
$t_r \times 10^3$, (kips)$^{-1}$		2.60		1.73		2.85		1.90		3.08		2.06	
r_x/r_y		1.71				1.71				2.15			
r_y, in.		2.56				2.54				2.01			

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

W10

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		39				33				30			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.90	1.93	7.61	5.06	3.44	2.29	9.18	6.11	3.78	2.51	9.73	6.48
	6	3.20	2.13	7.61	5.06	3.80	2.53	9.18	6.11	4.62	3.08	10.1	6.74
	7	3.31	2.20	7.61	5.07	3.95	2.62	9.22	6.13	4.97	3.31	10.5	6.99
	8	3.45	2.29	7.78	5.18	4.11	2.74	9.45	6.29	5.41	3.60	10.9	7.25
	9	3.61	2.40	7.96	5.29	4.31	2.87	9.70	6.45	5.95	3.96	11.3	7.53
	10	3.80	2.53	8.14	5.41	4.55	3.03	9.96	6.62	6.62	4.41	11.8	7.84
	11	4.02	2.67	8.33	5.54	4.83	3.21	10.2	6.81	7.45	4.96	12.3	8.17
	12	4.28	2.84	8.53	5.67	5.15	3.42	10.5	7.00	8.47	5.64	12.8	8.54
	13	4.57	3.04	8.74	5.81	5.52	3.67	10.8	7.20	9.76	6.49	13.4	8.93
	14	4.92	3.27	8.96	5.96	5.95	3.96	11.2	7.42	11.3	7.53	14.1	9.37
	15	5.31	3.54	9.19	6.12	6.45	4.29	11.5	7.65	13.0	8.64	14.8	9.85
	16	5.78	3.84	9.44	6.28	7.04	4.68	11.9	7.89	14.8	9.83	15.6	10.4
	17	6.31	4.20	9.70	6.45	7.72	5.14	12.3	8.15	16.7	11.1	16.8	11.2
	18	6.93	4.61	9.97	6.63	8.51	5.67	12.7	8.43	18.7	12.4	18.1	12.1
	19	7.67	5.10	10.3	6.82	9.46	6.30	13.1	8.73	20.8	13.9	19.4	12.9
	20	8.50	5.66	10.6	7.03	10.5	6.98	13.6	9.05	23.1	15.4	20.7	13.8
	22	10.3	6.84	11.2	7.47	12.7	8.44	14.8	9.82	27.9	18.6	23.2	15.4
	24	12.2	8.14	12.0	7.98	15.1	10.0	16.5	11.0				
	26	14.4	9.56	13.2	8.77	17.7	11.8	18.3	12.2				
	28	16.7	11.1	14.4	9.58	20.6	13.7	20.1	13.4				
	30	19.1	12.7	15.6	10.4	23.6	15.7	21.9	14.5				
	32	21.8	14.5	16.8	11.2	26.8	17.9	23.6	15.7				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		20.7		13.8		25.4		16.9		40.3		26.8	
$t_y \times 10^3$, (kips)$^{-1}$		2.90		1.93		3.44		2.29		3.78		2.51	
$t_r \times 10^3$, (kips)$^{-1}$		3.57		2.38		4.23		2.82		4.64		3.09	
r_x/r_y		2.16				2.16				3.20			
r_y, in.		1.98				1.94				1.37			

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W10×											
		26				22[c]				19			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.39	2.92	11.4	7.57	5.19	3.45	13.7	9.12	5.94	3.95	16.5	11.0
	1	4.41	2.94	11.4	7.57	5.22	3.47	13.7	9.12	6.03	4.01	16.5	11.0
	2	4.49	2.99	11.4	7.57	5.30	3.53	13.7	9.12	6.28	4.18	16.5	11.0
	3	4.62	3.07	11.4	7.57	5.44	3.62	13.7	9.12	6.73	4.48	16.5	11.0
	4	4.81	3.20	11.4	7.57	5.66	3.77	13.7	9.12	7.41	4.93	17.4	11.6
	5	5.06	3.37	11.5	7.63	5.97	3.97	13.9	9.23	8.39	5.58	18.6	12.4
	6	5.39	3.58	11.9	7.93	6.38	4.24	14.5	9.64	9.76	6.49	19.9	13.2
	7	5.80	3.86	12.4	8.25	6.89	4.58	15.1	10.1	11.7	7.77	21.4	14.3
	8	6.32	4.20	12.9	8.59	7.53	5.01	15.9	10.6	14.4	9.55	23.2	15.4
	9	6.96	4.63	13.5	8.97	8.33	5.55	16.7	11.1	18.1	12.0	25.3	16.8
	10	7.76	5.16	14.1	9.38	9.33	6.21	17.6	11.7	22.3	14.8	28.2	18.8
	11	8.74	5.81	14.8	9.84	10.6	7.04	18.5	12.3	27.0	18.0	32.3	21.5
	12	9.96	6.63	15.5	10.3	12.1	8.07	19.6	13.1	32.1	21.4	36.4	24.2
	13	11.5	7.65	16.4	10.9	14.1	9.38	20.9	13.9	37.7	25.1	40.5	26.9
	14	13.3	8.88	17.3	11.5	16.4	10.9	22.5	15.0	43.7	29.1	44.6	29.7
	15	15.3	10.2	18.4	12.2	18.8	12.5	25.0	16.6				
	16	17.4	11.6	20.1	13.4	21.4	14.2	27.4	18.2				
	17	19.7	13.1	21.8	14.5	24.1	16.0	29.9	19.9				
	18	22.1	14.7	23.6	15.7	27.0	18.0	32.4	21.6				
	19	24.6	16.3	25.3	16.8	30.1	20.0	34.9	23.2				
	20	27.2	18.1	27.0	18.0	33.4	22.2	37.4	24.9				
	21	30.0	20.0	28.7	19.1	36.8	24.5	39.9	26.5				
	22	32.9	21.9	30.5	20.3	40.4	26.9	42.4	28.2				
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		47.5		31.6		58.4		38.9		106		70.8	
$t_y \times 10^3$, (kips)$^{-1}$		4.39		2.92		5.15		3.42		5.94		3.95	
$t_r \times 10^3$, (kips)$^{-1}$		5.39		3.59		6.32		4.21		7.30		4.87	
r_x/r_y		3.20				3.21				4.74			
r_y, in.		1.36				1.33				0.874			

[c] Shape is slender for compression with F_y = 50 ksi.

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

W10

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W10×											
		17[c]				15[c]				12[c, f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	6.77	4.50	19.1	12.7	7.77	5.17	22.3	14.8	10.3	6.87	28.5	19.0
	1	6.85	4.56	19.1	12.7	7.87	5.24	22.3	14.8	10.5	6.96	28.5	19.0
	2	7.11	4.73	19.1	12.7	8.19	5.45	22.3	14.8	10.9	7.24	28.5	19.0
	3	7.64	5.09	19.1	12.7	8.76	5.83	22.5	15.0	11.6	7.74	28.8	19.1
	4	8.47	5.64	20.4	13.6	9.79	6.51	24.2	16.1	12.8	8.52	31.1	20.7
	5	9.68	6.44	21.9	14.5	11.3	7.53	26.1	17.4	14.6	9.73	33.9	22.6
	6	11.4	7.57	23.6	15.7	13.5	8.98	28.4	18.9	17.5	11.6	37.3	24.8
	7	13.8	9.17	25.6	17.0	16.6	11.1	31.2	20.7	21.8	14.5	41.3	27.5
	8	17.2	11.4	28.0	18.6	21.2	14.1	34.5	22.9	28.1	18.7	46.4	30.9
	9	21.8	14.5	30.9	20.6	26.8	17.8	39.6	26.4	35.6	23.7	56.5	37.6
	10	26.9	17.9	36.0	23.9	33.1	22.0	46.8	31.1	43.9	29.2	67.2	44.7
	11	32.5	21.6	41.4	27.5	40.1	26.7	54.0	35.9	53.1	35.4	78.3	52.1
	12	38.7	25.8	46.8	31.2	47.7	31.7	61.4	40.9	63.2	42.1	89.6	59.6
	13	45.4	30.2	52.3	34.8	56.0	37.2	68.8	45.8	74.2	49.4	101	67.3
	14	52.7	35.1	57.8	38.5								

Other Constants and Properties							
$b_y \times 10^3$, (kip-ft)$^{-1}$	127	84.7	155	103	207	138
$t_y \times 10^3$, (kips)$^{-1}$	6.69	4.45	7.57	5.04	9.44	6.28
$t_r \times 10^3$, (kips)$^{-1}$	8.22	5.48	9.30	6.20	11.6	7.73
r_x/r_y	4.79		4.88		4.97	
r_y, in.	0.845		0.810		0.785	

[c] Shape is slender for compression with $F_y = 50$ ksi.

[f] Shape does not meet compact limit for flexure with $F_y = 50$ ksi.

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W8×											
		67				58				48			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	1.70	1.13	5.08	3.38	1.95	1.30	5.96	3.96	2.37	1.58	7.27	4.84
	6	1.84	1.23	5.08	3.38	2.13	1.42	5.96	3.96	2.59	1.72	7.27	4.84
	7	1.90	1.27	5.08	3.38	2.20	1.46	5.96	3.96	2.67	1.78	7.27	4.84
	8	1.97	1.31	5.11	3.40	2.28	1.51	6.00	3.99	2.77	1.84	7.34	4.88
	9	2.05	1.36	5.16	3.43	2.37	1.58	6.07	4.04	2.88	1.92	7.44	4.95
	10	2.14	1.43	5.21	3.47	2.48	1.65	6.14	4.08	3.02	2.01	7.55	5.02
	11	2.25	1.50	5.27	3.50	2.61	1.73	6.21	4.13	3.18	2.12	7.65	5.09
	12	2.38	1.58	5.32	3.54	2.75	1.83	6.29	4.18	3.36	2.24	7.77	5.17
	13	2.52	1.68	5.38	3.58	2.92	1.95	6.36	4.23	3.57	2.38	7.88	5.24
	14	2.68	1.79	5.43	3.61	3.12	2.08	6.44	4.29	3.82	2.54	8.00	5.32
	15	2.87	1.91	5.49	3.65	3.34	2.22	6.52	4.34	4.10	2.73	8.12	5.41
	16	3.09	2.05	5.55	3.69	3.60	2.39	6.61	4.40	4.42	2.94	8.25	5.49
	17	3.34	2.22	5.61	3.73	3.89	2.59	6.69	4.45	4.79	3.18	8.38	5.58
	18	3.62	2.41	5.67	3.77	4.23	2.82	6.78	4.51	5.21	3.47	8.52	5.67
	19	3.95	2.63	5.74	3.82	4.62	3.08	6.87	4.57	5.70	3.79	8.66	5.76
	20	4.33	2.88	5.80	3.86	5.08	3.38	6.96	4.63	6.28	4.18	8.80	5.85
	22	5.24	3.48	5.93	3.95	6.15	4.09	7.15	4.76	7.60	5.06	9.10	6.06
	24	6.23	4.15	6.07	4.04	7.32	4.87	7.35	4.89	9.05	6.02	9.43	6.27
	26	7.31	4.87	6.22	4.14	8.59	5.71	7.57	5.03	10.6	7.06	9.77	6.50
	28	8.48	5.64	6.38	4.24	9.96	6.63	7.79	5.19	12.3	8.19	10.1	6.75
	30	9.74	6.48	6.54	4.35	11.4	7.61	8.03	5.35	14.1	9.40	10.6	7.02
	32	11.1	7.37	6.71	4.46	13.0	8.66	8.29	5.52	16.1	10.7	11.0	7.31
	34	12.5	8.32	6.89	4.58	14.7	9.77	8.56	5.70	18.2	12.1	11.5	7.63
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		10.9		7.25		12.8		8.50		15.6		10.4	
$t_y \times 10^3$, (kips)$^{-1}$		1.70		1.13		1.95		1.30		2.37		1.58	
$t_r \times 10^3$, (kips)$^{-1}$		2.08		1.39		2.40		1.60		2.91		1.94	
r_x/r_y		1.75				1.74				1.74			
r_y, in.		2.12				2.10				2.08			

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

W8

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W8×							
		40				35			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	2.85	1.90	8.95	5.96	3.24	2.16	10.3	6.83
	6	3.13	2.08	8.95	5.96	3.56	2.37	10.3	6.83
	7	3.23	2.15	8.95	5.96	3.68	2.45	10.3	6.83
	8	3.36	2.23	9.07	6.03	3.82	2.54	10.4	6.94
	9	3.50	2.33	9.22	6.14	3.99	2.65	10.6	7.07
	10	3.68	2.45	9.38	6.24	4.19	2.79	10.8	7.21
	11	3.88	2.58	9.55	6.35	4.42	2.94	11.1	7.36
	12	4.11	2.73	9.72	6.47	4.68	3.12	11.3	7.51
	13	4.38	2.91	9.90	6.59	4.99	3.32	11.5	7.67
	14	4.69	3.12	10.1	6.71	5.35	3.56	11.8	7.83
	15	5.04	3.36	10.3	6.84	5.76	3.83	12.0	8.00
	16	5.46	3.63	10.5	6.97	6.24	4.15	12.3	8.18
	17	5.93	3.95	10.7	7.11	6.79	4.51	12.6	8.37
	18	6.48	4.31	10.9	7.25	7.42	4.94	12.9	8.56
	19	7.12	4.73	11.1	7.40	8.16	5.43	13.2	8.77
	20	7.87	5.24	11.4	7.55	9.03	6.01	13.5	8.99
	22	9.52	6.34	11.8	7.88	10.9	7.27	14.2	9.45
	24	11.3	7.54	12.4	8.24	13.0	8.65	15.0	9.97
	26	13.3	8.85	13.0	8.64	15.3	10.2	15.8	10.5
	28	15.4	10.3	13.6	9.07	17.7	11.8	17.0	11.3
	30	17.7	11.8	14.4	9.57	20.3	13.5	18.4	12.3
	32	20.1	13.4	15.4	10.3	23.1	15.4	19.8	13.2
	34	22.7	15.1	16.5	11.0				

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	19.3	12.8	22.1	14.7
$t_y \times 10^3$, (kips)$^{-1}$	2.85	1.90	3.24	2.16
$t_r \times 10^3$, (kips)$^{-1}$	3.51	2.34	3.98	2.66
r_x/r_y	1.73		1.73	
r_y, in.	2.04		2.03	

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W8×							
		31[f]				28			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y, or Unbraced Length, L_b (ft), for X-X axis bending	0	3.66	2.43	11.7	7.80	4.05	2.69	13.1	8.71
	6	4.01	2.67	11.7	7.80	4.68	3.11	13.2	8.77
	7	4.15	2.76	11.7	7.80	4.93	3.28	13.5	9.00
	8	4.32	2.87	11.9	7.94	5.23	3.48	13.9	9.23
	9	4.51	3.00	12.2	8.11	5.60	3.73	14.2	9.48
	10	4.74	3.15	12.5	8.29	6.05	4.02	14.6	9.74
	11	5.00	3.33	12.7	8.48	6.58	4.38	15.0	10.0
	12	5.30	3.53	13.0	8.67	7.21	4.80	15.5	10.3
	13	5.66	3.76	13.3	8.88	7.98	5.31	15.9	10.6
	14	6.07	4.04	13.7	9.09	8.89	5.91	16.4	10.9
	15	6.54	4.35	14.0	9.32	9.98	6.64	17.0	11.3
	16	7.08	4.71	14.4	9.56	11.3	7.54	17.5	11.7
	17	7.71	5.13	14.7	9.81	12.8	8.51	18.1	12.0
	18	8.44	5.62	15.1	10.1	14.3	9.54	18.7	12.5
	19	9.29	6.18	15.6	10.3	16.0	10.6	19.4	12.9
	20	10.3	6.84	16.0	10.6	17.7	11.8	20.2	13.4
	22	12.4	8.28	17.0	11.3	21.4	14.2	22.1	14.7
	24	14.8	9.86	18.0	12.0	25.5	17.0	24.5	16.3
	26	17.4	11.6	19.6	13.1	29.9	19.9	26.9	17.9
	28	20.2	13.4	21.4	14.3				
	30	23.1	15.4	23.3	15.5				
	32	26.3	17.5	25.1	16.7				
Other Constants and Properties									
$b_y \times 10^3$, (kip-ft)$^{-1}$		25.3		16.8		35.3		23.5	
$t_y \times 10^3$, (kips)$^{-1}$		3.66		2.43		4.05		2.69	
$t_r \times 10^3$, (kips)$^{-1}$		4.49		3.00		4.97		3.32	
r_x/r_y		1.72				2.13			
r_y, in.		2.02				1.62			

[f] Shape does not meet compact limit for flexure with $F_y = 50$ ksi.

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

W8

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

F_y = 50 ksi

Shape		W8×											
		24				21				18			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	4.72	3.14	15.4	10.3	5.42	3.61	17.5	11.6	6.35	4.22	21.0	13.9
	1	4.74	3.15	15.4	10.3	5.46	3.63	17.5	11.6	6.39	4.25	21.0	13.9
	2	4.79	3.19	15.4	10.3	5.57	3.70	17.5	11.6	6.53	4.34	21.0	13.9
	3	4.89	3.26	15.4	10.3	5.76	3.83	17.5	11.6	6.76	4.50	21.0	13.9
	4	5.03	3.35	15.4	10.3	6.03	4.01	17.5	11.6	7.10	4.72	21.0	13.9
	5	5.22	3.47	15.4	10.3	6.40	4.26	17.8	11.9	7.56	5.03	21.5	14.3
	6	5.46	3.63	15.6	10.4	6.88	4.58	18.5	12.3	8.16	5.43	22.5	15.0
	7	5.76	3.83	16.0	10.6	7.50	4.99	19.2	12.8	8.93	5.94	23.5	15.6
	8	6.12	4.07	16.5	11.0	8.29	5.51	20.0	13.3	9.91	6.60	24.6	16.4
	9	6.56	4.36	17.0	11.3	9.28	6.17	20.9	13.9	11.2	7.42	25.9	17.2
	10	7.08	4.71	17.5	11.7	10.5	7.00	21.9	14.5	12.7	8.47	27.3	18.1
	11	7.71	5.13	18.1	12.0	12.1	8.05	22.9	15.2	14.7	9.81	28.8	19.2
	12	8.47	5.63	18.7	12.4	14.1	9.39	24.1	16.0	17.3	11.5	30.5	20.3
	13	9.37	6.24	19.3	12.9	16.6	11.0	25.3	16.8	20.3	13.5	32.5	21.6
	14	10.5	6.96	20.0	13.3	19.2	12.8	26.7	17.8	23.6	15.7	35.3	23.5
	15	11.8	7.83	20.8	13.8	22.0	14.7	28.5	18.9	27.1	18.0	38.8	25.8
	16	13.4	8.89	21.6	14.4	25.1	16.7	30.9	20.6	30.8	20.5	42.4	28.2
	17	15.1	10.0	22.5	14.9	28.3	18.8	33.4	22.2	34.8	23.1	45.9	30.5
	18	16.9	11.3	23.4	15.6	31.7	21.1	35.9	23.9	39.0	26.0	49.4	32.9
	19	18.8	12.5	24.5	16.3	35.4	23.5	38.3	25.5	43.5	28.9	52.9	35.2
	20	20.9	13.9	26.1	17.4	39.2	26.1	40.7	27.1	48.2	32.0	56.4	37.5
	21	23.0	15.3	27.8	18.5	43.2	28.7	43.2	28.7				
	22	25.3	16.8	29.4	19.6								
	23	27.6	18.4	31.0	20.6								
	24	30.1	20.0	32.6	21.7								
	25	32.6	21.7	34.2	22.8								
Other Constants and Properties													
$b_y \times 10^3$, (kip-ft)$^{-1}$		41.6		27.7		62.6		41.7		76.5		50.9	
$t_y \times 10^3$, (kips)$^{-1}$		4.72		3.14		5.42		3.61		6.35		4.22	
$t_r \times 10^3$, (kips)$^{-1}$		5.79		3.86		6.66		4.44		7.80		5.20	
r_x/r_y		2.12				2.77				2.79			
r_y, in.		1.61				1.26				1.23			

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

F_y = 50 ksi

Table 6-1 (continued)
Combined Flexure and Axial Force
W-Shapes

Shape		W8×											
		15				13				10[c, f]			
Design		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$		$p \times 10^3$ (kips)$^{-1}$		$b_x \times 10^3$ (kip-ft)$^{-1}$	
		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, or Unbraced Length, L_b (ft), for X-X axis bending	0	7.52	5.01	26.2	17.4	8.70	5.79	31.3	20.8	11.7	7.78	40.6	27.0
	1	7.63	5.07	26.2	17.4	8.83	5.87	31.3	20.8	11.8	7.88	40.6	27.0
	2	7.95	5.29	26.2	17.4	9.23	6.14	31.3	20.8	12.3	8.18	40.6	27.0
	3	8.51	5.66	26.2	17.4	9.94	6.61	31.3	20.8	13.1	8.71	40.6	27.0
	4	9.37	6.23	27.6	18.4	11.0	7.34	33.4	22.2	14.3	9.55	43.2	28.8
	5	10.6	7.05	29.4	19.5	12.6	8.38	35.7	23.8	16.4	10.9	46.7	31.1
	6	12.3	8.20	31.3	20.8	14.8	9.86	38.5	25.6	19.3	12.8	50.8	33.8
	7	14.7	9.80	33.6	22.4	18.0	12.0	41.7	27.7	23.4	15.6	55.7	37.0
	8	18.1	12.0	36.2	24.1	22.5	14.9	45.4	30.2	29.3	19.5	61.6	41.0
	9	22.8	15.2	39.3	26.1	28.4	18.9	50.0	33.2	37.1	24.7	71.3	47.4
	10	28.1	18.7	42.9	28.6	35.1	23.4	57.4	38.2	45.8	30.4	84.3	56.1
	11	34.0	22.6	48.9	32.5	42.5	28.3	65.8	43.8	55.4	36.8	97.6	64.9
	12	40.5	26.9	54.9	36.5	50.6	33.6	74.3	49.4	65.9	43.8	111	73.9
	13	47.5	31.6	60.9	40.5	59.3	39.5	82.7	55.0	77.3	51.5	125	83.0
	14	55.1	36.7	66.9	44.5	68.8	45.8	91.2	60.7	89.7	59.7	139	92.2

Other Constants and Properties

$b_y \times 10^3$, (kip-ft)$^{-1}$	133	88.8	166	110	218	145
$t_y \times 10^3$, (kips)$^{-1}$	7.52	5.01	8.70	5.79	11.3	7.51
$t_r \times 10^3$, (kips)$^{-1}$	9.24	6.16	10.7	7.12	13.9	9.24
r_x/r_y	3.76		3.81		3.83	
r_y, in.	0.876		0.843		0.841	

[c] Shape is slender for compression with $F_y = 50$ ksi.

[f] Shape does not meet compact limit for flexure with $F_y = 50$ ksi.

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