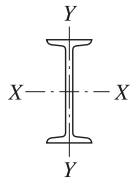

TABLE B-2 *Properties of Wide-Flange Sections (W-Shapes): SI Units*

Designation	Mass (kg/m)	Area (mm^2)	Depth (mm)	Flange		Web thickness (mm)	Axis X-X			Axis Y-Y		
				Width (mm)	Thickness (mm)		I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)	I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)
W920 × 449	449	57 300	947	424	42.7	24.0	8 780	18 500	391	541	2 560	97.0
× 420	420	53 500	942	422	39.9	22.5	8 160	17 200	391	499	2 360	96.5
× 390	390	49 700	937	422	36.6	21.3	7 450	15 900	389	454	2 160	95.5
× 368	368	46 800	932	419	34.3	20.3	6 950	15 000	386	420	2 020	95.0
× 344	344	43 900	927	419	32.0	19.3	6 490	14 000	384	391	1 870	94.2
× 381	381	48 600	951	310	43.9	24.4	6 990	14 700	378	220	1 420	67.3
× 345	345	43 900	943	307	39.9	22.1	6 240	13 300	376	195	1 270	66.5
× 313	313	39 900	932	310	34.5	21.1	5 490	11 800	371	171	1 110	65.5
× 289	289	36 800	927	307	32.0	19.4	5 040	10 900	371	156	1 010	65.0
× 271	271	34 600	922	307	30.0	18.4	4 700	10 200	368	144	944	64.8
× 253	253	32 300	919	305	27.9	17.3	4 370	9 520	368	133	872	64.3
× 238	238	30 300	914	305	25.9	16.5	4 060	8 880	366	123	805	63.5
× 223	223	28 500	912	305	23.9	15.9	3 760	8 260	363	112	739	62.7
× 201	201	25 600	904	305	20.1	15.2	3 250	7 190	356	93.7	618	60.5
W840 × 359	359	45 800	869	404	35.6	21.1	5 910	13 600	358	388	1 930	91.9
× 329	329	42 100	861	401	32.5	19.7	5 370	12 400	358	350	1 740	91.2
× 299	299	38 200	856	399	29.2	18.2	4 830	11 200	356	312	1 560	90.4
× 226	226	28 900	851	295	26.9	16.1	3 400	7 980	343	114	773	62.7
× 210	210	26 800	846	292	24.4	15.4	3 100	7 340	340	102	700	61.7
× 193	193	24 700	841	292	21.7	14.7	2 790	6 650	335	90.7	621	60.7
× 176	176	22 400	836	292	18.8	14.0	2 460	5 880	330	77.8	534	58.9
W760 × 314	314	40 100	785	384	33.5	19.7	4 290	10 900	328	315	1 640	88.6
× 284	284	36 300	780	381	30.2	18.0	3 830	9 830	325	280	1 470	87.9
× 257	257	32 900	772	381	27.2	16.6	3 430	8 870	323	249	1 310	86.9
× 220	220	28 100	780	267	30.0	16.5	2 780	7 140	315	94.5	710	57.9
× 196	196	25 100	770	267	25.4	15.6	2 400	6 230	310	81.6	610	57.2
× 185	185	23 500	767	267	23.6	14.9	2 230	5 820	307	75.3	564	56.6
× 173	173	22 100	762	267	21.6	14.4	2 050	5 360	305	68.3	513	55.6
× 161	161	20 500	757	267	19.3	13.8	1 860	4 900	302	60.8	457	54.6
× 147	147	18 800	754	267	17.0	13.2	1 660	4 410	297	53.3	401	53.3

W690 × 265	265	33 900	706	358	30.2	18.4	2 920	8 280	295	231	1 290	82.6
× 240	240	30 700	701	356	27.4	16.8	2 630	7 510	292	207	1 160	82.0
× 217	217	27 800	696	356	24.8	15.4	2 360	6 780	292	184	1 040	81.3
× 192	192	24 400	701	254	27.9	15.5	1 980	5 650	284	76.6	603	56.1
× 170	170	21 600	693	257	23.6	14.5	1 700	4 900	279	66.2	516	55.4
× 152	152	19 400	688	254	21.1	13.1	1 510	4 380	279	57.9	456	54.6
× 140	140	17 900	683	254	18.9	12.4	1 360	3 980	277	51.6	406	53.8
× 125	125	16 000	678	254	16.3	11.7	1 190	3 490	272	44.1	347	52.6
W610 × 241	241	30 800	635	330	31.0	17.9	2 150	6 780	264	184	1 120	77.5
× 217	217	27 700	627	328	27.7	16.5	1 910	6 080	262	163	991	76.5
× 195	195	24 800	622	328	24.4	15.4	1 670	5 390	259	142	869	75.4
× 174	174	22 200	617	325	21.6	14.0	1 470	4 770	257	124	762	74.7
× 155	155	19 700	612	325	19.1	12.7	1 290	4 230	257	108	667	73.9
× 153	153	19 500	622	229	24.9	14.0	1 250	4 010	254	49.5	434	50.5
× 140	140	17 900	617	230	22.2	13.1	1 120	3 640	251	45.4	393	50.3
× 125	125	15 900	612	229	19.6	11.9	986	3 210	249	39.3	342	49.5
× 113	113	14 500	607	228	17.3	11.2	874	2 880	246	34.3	302	48.8
× 101	101	13 000	602	228	14.9	10.5	762	2 520	243	29.3	257	47.5
× 92	92.0	11 700	602	179	15.0	10.9	645	2 150	234	14.4	161	35.1
× 82	82.0	10 500	599	178	12.8	10.0	562	1 870	231	12.1	136	34.0
W530 × 219	219	27 900	561	318	29.2	18.3	1 510	5 390	233	157	985	74.9
× 196	196	25 000	554	315	26.4	16.5	1 340	4 830	232	139	877	74.4
× 182	182	23 200	551	315	24.4	15.2	1 230	4 470	231	127	806	74.2
× 165	165	21 100	546	312	22.2	14.0	1 110	4 080	230	114	729	73.7
× 150	150	19 200	544	312	20.3	12.7	1 010	3 720	229	103	660	73.4
× 138	138	17 600	549	214	23.6	14.7	862	3 150	221	38.7	362	46.7
× 123	123	15 700	544	212	21.2	13.1	762	2 800	220	33.9	320	46.5
× 109	109	13 900	538	211	18.8	11.6	666	2 470	219	29.4	279	46.0
× 101	101	12 900	536	210	17.4	10.9	616	2 290	218	26.9	257	45.7
× 92	92.0	11 800	533	209	15.6	10.2	554	2 080	217	23.9	229	45.0
× 82	82.0	10 500	528	209	13.3	9.53	475	1 800	213	20.1	193	43.9
× 72	72.0	9 100	523	207	10.9	8.89	399	1 520	209	16.1	156	42.2
× 85	85.0	10 800	536	167	16.5	10.3	487	1 820	212	12.7	153	34.3
× 74	74.0	9 480	528	166	13.6	9.65	410	1 550	208	10.4	125	33.0
× 66	66.0	8 390	526	165	11.4	8.89	351	1 340	205	8.62	104	32.0

(continues)

TABLE B-2 *Properties of Wide-Flange Sections (W-Shapes): SI Units (continued)*

Designation	Mass (kg/m)	Area (mm^2)	Depth (mm)	Flange Width (mm)	Flange Thickness (mm)	Web thickness (mm)	Axis X-X I (10^6 mm^4)	Axis X-X $S = I/c$ (10^3 mm^3)	Axis X-X $r = \sqrt{I/A}$ (mm)	Axis Y-Y I (10^6 mm^4)	Axis Y-Y $S = I/c$ (10^3 mm^3)	Axis Y-Y $r = \sqrt{I/A}$ (mm)
W460 × 177	177	22 600	483	287	26.9	16.6	912	3 790	201	105	736	68.3
× 158	158	20 100	475	284	23.9	15.0	795	3 340	199	91.6	646	67.6
× 144	144	18 400	472	282	22.1	13.6	728	3 080	199	83.7	592	67.3
× 128	128	16 300	467	282	19.6	12.2	637	2 720	197	72.8	518	66.8
× 113	113	14 400	462	279	17.3	10.8	554	2 390	196	63.3	452	66.3
× 106	106	13 400	470	194	20.6	12.6	487	2 080	191	25.1	259	43.2
× 97	97.0	12 300	467	193	19.1	11.4	445	1 920	190	22.8	236	42.9
× 89	89.0	11 400	462	192	17.7	10.5	410	1 770	190	20.9	218	42.7
× 82	82.0	10 500	460	191	16.0	9.91	370	1 610	188	18.7	195	42.4
× 74	74.0	9 480	457	191	14.5	9.02	333	1 460	187	16.7	175	41.9
× 68	68.0	8 710	460	154	15.4	9.14	296	1 290	184	9.37	122	32.8
× 60	60.0	7 610	455	153	13.3	8.00	255	1 120	183	7.95	104	32.3
× 52	52.0	6 650	450	152	10.8	7.62	212	944	179	6.37	83.9	31.0
W410 × 149	149	19 000	432	264	25.0	14.9	620	2 870	180	77.4	585	63.8
× 132	132	16 900	427	264	22.2	13.3	541	2 540	179	67.8	515	63.2
× 114	114	14 600	419	262	19.3	11.6	462	2 200	178	57.4	441	62.7
× 100	100	12 700	414	259	16.9	10.0	397	1 920	177	49.5	380	62.5
× 85	85.0	10 800	417	181	18.2	10.9	316	1 510	171	17.9	198	40.6
× 75	75.0	9 480	414	180	16.0	9.65	274	1 330	170	15.5	172	40.4
× 67	67.0	8 580	409	179	14.4	8.76	244	1 190	169	13.7	153	39.9
× 60	60.0	7 610	406	178	12.8	7.75	216	1 060	168	12.0	135	39.9
× 53	53.0	6 840	404	178	10.9	7.49	186	926	165	10.2	115	38.6
× 46.1	46.1	5 890	404	140	11.2	6.99	156	773	163	5.16	73.6	29.7
× 38.8	38.8	4 950	399	140	8.76	6.35	125	629	159	3.99	57.2	28.4
W360 × 1086	1 090	139 000	569	455	125	78.0	5 950	21 000	208	1 960	8 640	119
× 990	990	126 000	549	450	115	71.9	5 160	18 800	203	1 740	7 730	117
× 900	900	115 000	531	442	106	66.0	4 500	17 000	198	1 530	6 930	116
× 818	818	105 000	513	437	97.0	60.5	3 930	15 300	194	1 350	6 190	114
× 744	744	94 800	498	432	88.9	55.6	3 420	13 700	190	1 200	5 560	113
× 677	677	86 500	483	427	81.5	51.3	2 990	12 400	186	1 070	4 980	111
× 634	634	80 600	475	424	77.2	47.8	2 750	11 600	184	982	4 640	110
× 592	592	75 500	465	422	72.4	45.0	2 500	10 700	182	903	4 290	109
× 551	551	70 300	455	419	67.6	42.2	2 260	9 950	180	828	3 950	108
× 509	509	65 200	445	417	62.7	39.1	2 040	9 140	177	753	3 620	108
× 463	463	59 000	434	411	57.4	35.8	1 800	8 290	175	670	3 260	107
× 421	421	53 700	424	409	52.6	32.8	1 600	7 520	172	599	2 930	106
× 382	382	48 800	417	406	48.0	30.0	1 420	6 800	170	537	2 640	105
× 347	347	44 200	406	404	43.7	27.2	1 250	6 150	168	479	2 380	104
× 314	314	40 000	399	401	39.6	24.9	1 110	5 540	166	429	2 130	103
× 287	287	36 600	394	399	36.6	22.6	999	5 080	165	388	1 950	103

W360 × 262	262	33 400	386	399	33.3	21.1	891	4 600	163	349	1 750	102
× 237	237	30 100	381	396	30.2	18.9	791	4 160	162	311	1 580	102
× 216	216	27 500	376	394	27.7	17.3	712	3 800	161	282	1 430	101
× 196	196	25 000	373	373	26.2	16.4	637	3 420	160	228	1 220	95.5
× 179	179	22 800	368	373	23.9	15.0	574	3 110	158	206	1 110	95.0
× 162	162	20 600	363	371	21.8	13.3	516	2 830	158	186	1 000	94.7
× 147	147	18 800	361	371	19.8	12.3	462	2 570	157	167	905	94.2
× 134	134	17 100	356	368	18.0	11.2	416	2 340	156	151	818	94.0
× 122	122	15 500	363	257	21.7	13.0	367	2 020	154	61.6	480	63.0
× 110	110	14 100	361	257	19.9	11.4	331	1 840	153	55.8	436	63.0
× 101	101	12 900	356	254	18.3	10.5	301	1 690	153	50.4	397	62.5
× 91	91.0	11 500	353	254	16.4	9.53	266	1 510	152	44.5	352	62.2
× 79	79.0	10 100	353	205	16.8	9.40	225	1 270	150	24.0	234	48.8
× 72	72.0	9 100	351	204	15.1	8.64	201	1 150	149	21.4	210	48.5
× 64	64.0	8 130	348	203	13.5	7.75	178	1 030	148	18.8	185	48.0
× 57.8	57.8	7 230	358	172	13.1	7.87	160	895	149	11.1	129	39.4
× 51	51.0	6 450	356	171	11.6	7.24	142	796	148	9.70	113	38.9
× 44	44.0	5 710	351	171	9.78	6.86	121	688	146	8.16	95.4	37.8
× 39	39.0	4 960	353	128	10.7	6.48	102	578	144	3.71	58.2	27.4
× 32.9	32.9	4 190	348	127	8.51	5.84	82.8	475	141	2.91	45.9	26.4
W310 × 500	500	63 700	427	340	75.2	45.2	1 690	7 910	163	495	2 900	88.1
× 454	454	57 800	414	335	68.8	41.4	1 480	7 130	160	437	2 610	86.9
× 415	415	52 800	404	333	62.7	38.9	1 290	6 440	156	390	2 340	85.9
× 375	375	47 700	391	330	57.2	35.6	1 130	5 780	154	345	2 080	84.8
× 342	342	43 700	384	328	52.6	32.8	1 010	5 260	152	309	1 880	84.1
× 313	313	39 900	373	325	48.3	30.0	891	4 790	150	276	1 700	83.3
× 283	283	36 000	366	323	44.2	26.9	787	4 310	148	245	1 520	82.6
× 253	253	32 300	356	320	39.6	24.4	687	3 850	146	215	1 350	81.8
× 226	226	28 800	348	318	35.6	22.1	595	3 420	144	189	1 190	81.0
× 202	202	25 700	340	315	31.8	20.1	516	3 050	142	166	1 050	80.3
× 179	179	22 800	333	312	28.2	18.0	445	2 670	140	144	918	79.5
× 158	158	20 100	328	310	25.1	15.5	388	2 380	139	125	808	79.0
× 143	143	18 200	323	310	22.9	14.0	347	2 150	138	112	728	78.5
× 129	129	16 500	318	307	20.6	13.1	308	1 930	137	100	651	78.0
× 117	117	15 000	315	307	18.7	11.9	276	1 750	136	89.9	587	77.5
× 107	107	13 600	312	305	17.0	10.9	248	1 600	135	81.2	531	77.2
× 97	97.0	12 300	307	305	15.4	9.91	222	1 440	134	72.4	477	76.7
× 86	86.0	11 000	310	254	16.3	9.14	198	1 280	134	44.5	351	63.8
× 79	79.0	10 100	307	254	14.6	8.76	177	1 160	133	39.9	315	63.0
× 74	74.0	9 420	310	205	16.3	9.40	163	1 050	132	23.4	228	49.8
× 67	67.0	8 450	307	204	14.6	8.51	145	946	131	20.8	203	49.5

(continues)

TABLE B-2 *Properties of Wide-Flange Sections (W-Shapes): SI Units (continued)*

Designation	Mass (kg/m)	Area (mm^2)	Depth (mm)	Flange Width (mm)	Flange Thickness (mm)	Web thickness (mm)	Axis X-X I (10^6 mm^4)	Axis X-X $S = I/c$ (10^3 mm^3)	Axis X-X $r = \sqrt{I/A}$ (mm)	Axis Y-Y I (10^6 mm^4)	Axis Y-Y $S = I/c$ (10^3 mm^3)	Axis Y-Y $r = \sqrt{I/A}$ (mm)
W310 × 60	60.0	7 550	302	203	13.1	7.49	128	844	130	18.4	180	49.3
× 52	52.0	6 650	318	167	13.2	7.62	119	747	133	10.2	122	39.1
× 44.5	44.5	5 670	312	166	11.2	6.60	99.1	633	132	8.45	102	38.6
× 38.7	38.7	4 940	310	165	9.65	5.84	84.9	547	131	7.20	87.5	38.4
× 32.7	32.7	4 180	312	102	10.8	6.60	64.9	416	125	1.94	37.9	21.5
× 28.3	28.3	3 590	310	102	8.89	5.97	54.1	349	122	1.57	30.8	20.9
× 23.8	23.8	3 040	305	101	6.73	5.59	42.9	280	119	1.17	23.1	19.6
× 21	21.0	2 680	302	101	5.72	5.08	36.9	244	117	0.982	19.5	19.1
W250 × 167	167	21 200	290	264	31.8	19.2	298	2 060	118	98.2	742	68.1
× 149	149	19 000	282	262	28.4	17.3	259	1 840	117	86.2	655	67.3
× 131	131	16 700	274	262	25.1	15.4	222	1 610	115	74.5	570	66.8
× 115	115	14 600	269	259	22.1	13.5	189	1 410	114	64.1	493	66.0
× 101	101	12 900	264	257	19.6	11.9	164	1 240	113	55.8	433	65.8
× 89	89.0	11 400	259	257	17.3	10.7	142	1 090	112	48.3	377	65.3
× 80	80.0	10 200	257	254	15.6	9.40	126	983	111	42.9	338	65.0
× 73	73.0	9 290	254	254	14.2	8.64	113	895	110	38.9	306	64.5
× 67	67.0	8 580	257	204	15.7	8.89	103	805	110	22.2	218	51.1
× 58	58.0	7 420	252	203	13.5	8.00	87.0	690	108	18.7	185	50.3
× 49.1	49.1	6 260	247	202	11.0	7.37	71.2	574	106	15.2	151	49.3
× 44.8	44.8	5 700	267	148	13.0	7.62	70.8	531	111	6.95	94.2	34.8
× 38.5	38.5	4 910	262	147	11.2	6.60	59.9	457	110	5.87	80.1	34.5
× 32.7	32.7	4 190	259	146	9.14	6.10	49.1	380	108	4.75	65.1	33.8
× 28.4	28.4	3 630	259	102	10.0	6.35	40.1	308	105	1.79	35.1	22.2
× 25.3	25.3	3 220	257	102	8.38	6.10	34.1	265	103	1.48	29.2	21.5
× 22.3	22.3	2 850	254	102	6.86	5.84	28.7	226	100	1.20	23.8	20.6
× 17.9	17.9	2 280	251	101	5.33	4.83	22.4	179	99.1	0.907	18.0	19.9
W200 × 100	100	12 700	229	210	23.7	14.5	113	990	94.5	36.9	351	53.8
× 86	86.0	11 000	222	209	20.6	13.0	94.9	852	92.7	31.3	300	53.3
× 71	71.0	9 100	216	206	17.4	10.2	76.6	708	91.7	25.3	246	52.8
× 59	59.0	7 550	210	205	14.2	9.14	60.8	582	89.7	20.4	200	51.8
× 52	52.0	6 650	206	204	12.6	7.87	52.9	511	89.2	17.7	174	51.6
× 46.1	46.1	5 880	203	203	11.0	7.24	45.8	451	88.1	15.4	152	51.3
× 41.7	41.7	5 320	205	166	11.8	7.24	40.8	398	87.6	9.03	109	41.1
× 35.9	35.9	4 570	201	165	10.2	6.22	34.4	342	86.9	7.62	92.3	40.9
× 31.3	31.3	3 970	210	134	10.2	6.35	31.3	298	88.6	4.07	60.8	32.0
× 26.6	26.6	3 390	207	133	8.38	5.84	25.8	249	87.1	3.32	49.8	31.2
× 22.5	22.5	2 860	206	102	8.00	6.22	20.0	193	83.6	1.42	27.9	22.3
× 19.3	19.3	2 480	203	102	6.48	5.84	16.5	162	81.5	1.14	22.5	21.4
× 15	15.0	1 910	200	100	5.21	4.32	12.8	128	81.8	0.870	17.4	21.4

W150 × 37.1	37.1	4 740	162	154	11.6	8.13	22.2	274	68.6	7.12	91.9	38.6
× 29.8	29.8	3 790	157	153	9.27	6.60	17.2	220	67.6	5.54	72.3	38.1
× 22.5	22.5	2 860	152	152	6.60	5.84	12.1	159	65.0	3.88	51.0	36.8
× 24	24.0	3 060	160	102	10.3	6.60	13.4	167	66.0	1.84	36.1	24.6
× 18	18.0	2 290	153	102	7.11	5.84	9.20	120	63.2	1.24	24.6	23.3
× 13.5	13.5	1 730	150	100	5.46	4.32	6.83	91.1	62.7	0.916	18.2	23.0
× 13	13.0	1 630	148	100	4.95	4.32	6.20	83.6	61.7	0.828	16.6	22.6
W130 × 28.1	28.1	3 590	131	128	10.9	6.86	10.9	167	55.1	3.80	59.5	32.5
× 23.8	23.8	3 040	127	127	9.14	6.10	8.91	140	54.1	3.13	49.2	32.0
W100 × 19.3	19.3	2 470	106	103	8.76	7.11	4.70	89.5	43.7	1.61	31.1	25.4

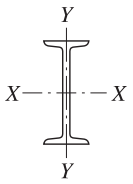

TABLE B-3 *Properties of I-Beam Sections (S-Shapes): SI Units*

Designation	Mass (kg/m)	Area (mm^2)	Depth (mm)	Flange		Web thickness (mm)	Axis *X-X*			Axis *Y-Y*		
				Width (mm)	Thickness (mm)		I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)	I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)
S610 × 180	180	22 900	622	204	27.7	20.3	1 320	4 230	240	34.5	338	38.9
× 158	158	20 100	622	200	27.7	15.7	1 220	3 930	247	32.0	320	39.9
× 149	149	18 900	610	184	22.1	18.9	991	3 260	229	19.7	215	32.3
× 134	134	17 100	610	181	22.1	15.9	937	3 060	234	18.6	205	33.0
× 119	119	15 200	610	178	22.1	12.7	874	2 870	241	17.5	197	34.0
S510 × 143	143	18 200	516	183	23.4	20.3	695	2 700	196	20.8	228	33.8
× 128	128	16 300	516	179	23.4	16.8	653	2 540	200	19.4	216	34.5
× 112	112	14 200	508	162	20.2	16.1	533	2 100	194	12.3	152	29.5
× 98.2	98.2	12 500	508	159	20.2	12.8	495	1 950	199	11.4	144	30.2
S460 × 104	104	13 200	457	159	17.6	18.1	384	1 690	170	10.0	126	27.4
× 81.4	81.4	10 300	457	152	17.6	11.7	333	1 460	180	8.62	113	29.0
S380 × 74	74.0	9 480	381	143	15.8	14.0	202	1 060	146	6.49	90.6	26.2
× 64	64.0	8 130	381	140	15.8	10.4	186	973	151	5.95	85.0	26.9
S310 × 74	74.0	9 420	305	139	16.7	17.4	126	829	116	6.49	93.2	26.2
× 60.7	60.7	7 680	305	133	16.7	11.7	112	739	121	5.62	84.1	26.9
× 52	52.0	6 580	305	129	13.8	10.9	94.9	624	120	4.10	63.6	24.9
× 47.3	47.3	6 010	305	127	13.8	8.89	90.3	593	123	3.88	61.1	25.4
S250 × 52	52.0	6 650	254	125	12.5	15.1	61.2	482	96.0	3.45	55.1	22.8
× 37.8	37.8	4 810	254	118	12.5	7.90	51.2	403	103	2.80	47.4	24.1
S200 × 34	34.0	4 360	203	106	10.8	11.2	26.9	265	78.5	1.78	33.6	20.2
× 27.4	27.4	3 480	203	102	10.8	6.88	23.9	236	82.8	1.54	30.2	21.0
S150 × 25.7	25.7	3 260	152	90.7	9.12	11.8	10.9	143	57.9	0.953	21.0	17.1
× 18.6	18.6	2 360	152	84.6	9.12	5.89	9.16	120	62.2	0.749	17.7	17.8
S130 × 15	15.0	1 890	127	76.2	8.28	5.44	5.12	80.3	52.1	0.495	13.0	16.2
S100 × 14.1	14.1	1 800	102	71.1	7.44	8.28	2.81	55.4	39.6	0.369	10.4	14.3
× 11.5	11.5	1 460	102	67.6	7.44	4.90	2.52	49.7	41.7	0.311	9.21	14.6
S75 × 11.2	11.2	1 420	76.2	63.8	6.60	8.86	1.21	31.8	29.2	0.241	7.55	13.0
× 8.5	8.50	1 070	76.2	59.2	6.60	4.32	1.04	27.4	31.2	0.186	6.28	13.2

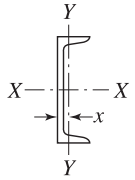

TABLE B-4 *Properties of Channel Sections: SI Units*

Designation	Mass (kg/m)	Area (mm^2)	Depth (mm)	Flange Width (mm)	Flange Thickness (mm)	Web thickness (mm)	Axis X-X I (10^6 mm^4)	Axis X-X $S = I/c$ (10^3 mm^3)	Axis X-X $r = \sqrt{I/A}$ (mm)	Axis Y-Y I (10^6 mm^4)	Axis Y-Y $S = I/c$ (10^3 mm^3)	Axis Y-Y $r = \sqrt{I/A}$ (mm)	x (mm)
C380 × 74	74.0	9 480	381	94.5	16.5	18.2	168	882	133	4.58	61.8	22.0	20.3
× 60	60.0	7 610	381	89.4	16.5	13.2	145	762	138	3.82	54.7	22.4	19.8
× 50.4	50.4	6 450	381	86.4	16.5	10.2	131	688	143	3.36	50.6	22.9	20.0
C310 × 45	45.0	5 680	305	80.5	12.7	13.0	67.4	442	109	2.13	33.6	19.4	17.1
× 37	37.0	4 740	305	77.5	12.7	9.83	59.9	393	113	1.85	30.6	19.8	17.1
× 30.8	30.8	3 920	305	74.7	12.7	7.16	53.7	352	117	1.61	28.2	20.2	17.7
C250 × 45	45.0	5 680	254	77.0	11.1	17.1	42.9	339	86.9	1.64	27.0	17.0	16.5
× 37	37.0	4 740	254	73.4	11.1	13.4	37.9	298	89.4	1.39	24.1	17.1	15.7
× 30	30.0	3 790	254	69.6	11.1	9.63	32.8	259	93.0	1.17	21.5	17.5	15.4
× 22.8	22.8	2 890	254	66.0	11.1	6.10	28.0	221	98.3	0.945	18.8	18.1	16.1
C230 × 30	30.0	3 790	229	67.3	10.5	11.4	25.3	221	81.8	1.00	19.2	16.3	14.8
× 22	22.0	2 850	229	63.2	10.5	7.24	21.2	185	86.4	0.795	16.6	16.7	14.9
× 19.9	19.9	2 540	229	61.7	10.5	5.92	19.9	174	88.6	0.728	15.6	16.9	15.3
C200 × 27.9	27.9	3 550	203	64.3	9.91	12.4	18.3	180	71.6	0.820	16.6	15.2	14.4
× 20.5	20.5	2 610	203	59.4	9.91	7.70	15.0	148	75.9	0.633	13.9	15.6	14.1
× 17.1	17.1	2 170	203	57.4	9.91	5.59	13.5	133	79.0	0.545	12.7	15.8	14.5
C180 × 22	22.0	2 790	178	58.4	9.30	10.6	11.3	127	63.8	0.570	12.7	14.2	13.5
× 18.2	18.2	2 320	178	55.6	9.30	7.70	10.1	113	66.0	0.483	11.4	14.4	13.3
× 14.6	14.6	1 850	178	53.1	9.30	5.33	8.82	100	69.1	0.398	10.1	14.7	13.7
C150 × 19.3	19.3	2 460	152	54.9	8.71	11.1	7.20	94.7	54.1	0.437	10.5	13.3	13.1
× 15.6	15.6	1 990	152	51.6	8.71	7.98	6.29	82.6	56.4	0.358	9.19	13.4	12.7
× 12.2	12.2	1 540	152	48.8	8.71	5.08	5.45	71.3	59.4	0.286	8.00	13.6	13.0
C130 × 13	13.0	1 700	127	48.0	8.13	8.26	3.70	58.3	46.5	0.260	7.28	12.3	12.1
× 10.4	10.4	1 270	127	44.5	8.13	4.83	3.11	49.0	49.5	0.196	6.10	12.4	12.3
C100 × 10.8	10.8	1 370	102	43.7	7.52	8.15	1.91	37.5	37.3	0.177	5.52	11.4	11.7
× 8	8.00	1 020	102	40.1	7.52	4.67	1.60	31.5	39.6	0.130	4.54	11.3	11.6
× 6.7	6.70	890	102	40.1	7.52	3.18	1.52	30.0	41.4	0.120	4.34	11.6	12.5
C75 × 8.9	8.90	1 140	76.2	40.6	6.93	9.04	0.862	22.6	27.4	0.125	4.31	10.5	11.6
× 7.4	7.40	948	76.2	38.1	6.93	6.55	0.770	20.2	28.4	0.100	3.74	10.3	11.2
× 6.1	6.10	774	76.2	35.8	6.93	4.32	0.687	18.0	29.7	0.0795	3.21	10.1	11.1
× 5.2	5.20	703	76.2	34.8	6.93	3.35	0.653	17.0	30.5	0.0703	2.98	10.0	11.3

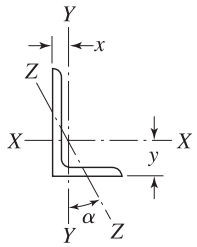

TABLE B-5 *Properties of Equal and Unequal Angle Sections: SI Units*

Size and thickness (mm)	Mass (kg/m)	Area (mm^2)	Axis X-X				Axis Y-Y				Axis Z-Z	
			I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)	y (mm)	I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)	x (mm)	$r = \sqrt{I/A}$ (mm)	tan α
L203 × 203 × 28.6	84.7	10800	40.8	287	61.2	61.0	40.8	287	61.2	61.0	39.6	1.00
× 25.4	75.9	9680	37.1	259	61.7	59.9	37.1	259	61.7	59.9	39.6	1.00
× 22.2	67.0	8520	33.2	229	62.2	58.7	33.2	229	62.2	58.7	39.9	1.00
× 19	57.9	7350	29.1	200	62.5	57.4	29.1	200	62.5	57.4	39.9	1.00
× 15.9	48.7	6200	24.8	169	63.0	56.1	24.8	169	63.0	56.1	40.1	1.00
× 14.3	44.0	5600	22.6	153	63.2	55.6	22.6	153	63.2	55.6	40.1	1.00
× 12.7	39.3	5000	20.3	137	63.2	55.1	20.3	137	63.2	55.1	40.4	1.00
L203 × 152 × 25.4	65.5	8390	33.7	247	63.2	67.3	16.1	146	43.7	41.9	32.5	0.542
× 22.2	57.9	7420	30.1	220	63.5	66.0	14.5	130	44.2	40.6	32.5	0.546
× 19	50.1	6410	26.4	192	64.0	64.8	12.8	113	44.5	39.6	32.8	0.550
× 15.9	42.2	5390	22.6	162	64.5	63.5	11.0	96.4	45.0	38.4	32.8	0.554
× 14.3	38.1	4880	20.6	147	64.8	63.0	10.0	87.5	45.2	37.8	33.0	0.556
× 12.7	34.1	4350	18.5	131	64.8	62.5	9.03	78.5	45.5	37.1	33.0	0.557
× 11.1	29.9	3830	16.4	116	65.0	61.7	8.03	69.3	45.7	36.6	33.3	0.559
L203 × 102 × 25.4	55.4	7100	29.0	229	63.8	77.0	4.83	64.6	26.2	26.4	21.4	0.247
× 22.2	49.3	6280	26.1	205	64.3	75.9	4.37	57.5	26.4	25.3	21.5	0.252
× 19	42.5	5450	22.9	179	64.8	74.7	3.90	50.3	26.7	24.1	21.6	0.257
× 15.9	36.0	4590	19.6	151	65.0	73.4	3.38	42.9	26.9	22.9	21.7	0.262
× 14.3	32.4	4150	17.9	137	65.3	72.6	3.10	39.0	27.2	22.3	21.8	0.264
× 12.7	29.0	3710	16.1	123	65.5	72.1	2.81	35.2	27.4	21.7	21.9	0.266
× 11.1	25.6	3260	14.2	108	65.8	71.4	2.51	31.1	27.7	21.1	22.0	0.268
L178 × 102 × 19	38.8	4960	15.7	137	56.1	63.5	3.75	49.3	27.4	25.4	21.7	0.324
× 15.9	32.7	4180	13.5	117	56.6	62.2	3.24	42.0	27.9	24.3	21.8	0.329
× 12.7	26.5	3390	11.1	94.9	57.2	61.0	2.70	34.4	28.2	23.1	22.0	0.334
× 11.1	23.4	2980	9.82	83.7	57.4	60.5	2.41	30.5	28.4	22.5	22.1	0.337
× 9.5	20.2	2570	8.53	72.4	57.7	59.7	2.11	26.4	28.4	21.9	22.2	0.339

L152 × 152 × 25.4	55.7	7100	14.7	140	45.5	47.2	14.7	140	45.5	47.2	29.7	1.00
× 22.2	49.3	6290	13.3	125	46.0	46.0	13.3	125	46.0	46.0	29.7	1.00
× 19	42.7	5460	11.7	109	46.2	45.0	11.7	109	46.2	45.0	29.7	1.00
× 15.9	36.0	4600	10.0	92.4	46.7	43.7	10.0	92.4	46.7	43.7	29.7	1.00
× 14.3	32.6	4160	9.16	83.9	47.0	43.2	9.16	83.9	47.0	43.2	30.0	1.00
× 12.7	29.2	3720	8.28	75.2	47.2	42.4	8.28	75.2	47.2	42.4	30.0	1.00
× 11.1	25.6	3280	7.33	66.5	47.2	41.9	7.33	66.5	47.2	41.9	30.0	1.00
× 9.5	22.2	2830	6.41	57.5	47.5	41.1	6.41	57.5	47.5	41.1	30.2	1.00
× 7.9	18.5	2370	5.41	48.3	47.8	40.6	5.41	48.3	47.8	40.6	30.2	1.00
L152 × 102 × 22.2	40.3	5150	11.5	117	47.2	53.8	4.04	55.2	27.9	28.4	21.7	0.421
× 19	35.0	4480	10.2	102	47.8	52.6	3.59	48.3	28.4	27.2	21.7	0.428
× 15.9	29.6	3780	8.74	86.7	48.0	51.6	3.11	41.3	28.7	26.2	21.8	0.435
× 14.3	26.9	3430	7.99	78.8	48.3	50.8	2.86	37.5	29.0	25.4	21.9	0.438
× 12.7	24.0	3060	7.20	70.6	48.5	50.3	2.59	33.8	29.0	24.9	21.9	0.440
× 11.1	21.2	2700	6.41	62.4	48.8	49.5	2.31	30.0	29.2	24.3	22.0	0.443
× 9.5	18.2	2330	5.58	54.1	49.0	49.0	2.02	25.9	29.5	23.7	22.1	0.446
× 7.9	15.3	1950	4.75	45.4	49.3	48.3	1.72	22.0	29.7	23.1	22.2	0.449
L152 × 89 × 12.7	22.7	2900	6.91	69.3	48.8	52.6	1.76	26.1	24.6	21.1	19.2	0.343
× 9.5	17.3	2210	5.37	52.9	49.0	51.3	1.39	20.0	25.0	19.8	19.4	0.349
× 7.9	14.5	1850	4.54	44.6	49.3	50.8	1.18	16.9	25.2	19.2	19.5	0.352
L127 × 127 × 22.2	40.5	5150	7.41	84.6	37.8	39.6	7.41	84.6	37.8	39.6	24.7	1.00
× 19	35.1	4480	6.53	74.1	38.1	38.6	6.53	74.1	38.1	38.6	24.7	1.00
× 15.9	29.8	3780	5.66	63.1	38.6	37.3	5.66	63.1	38.6	37.3	24.8	1.00
× 12.7	24.1	3060	4.70	51.6	38.9	36.1	4.70	51.6	38.9	36.1	24.9	1.00
× 11.1	21.3	2700	4.16	45.6	39.1	35.6	4.16	45.6	39.1	35.6	25.0	1.00
× 9.5	18.3	2330	3.65	39.5	39.4	34.8	3.65	39.5	39.4	34.8	25.0	1.00
× 7.9	15.3	1950	3.10	33.4	39.6	34.3	3.10	33.4	39.6	34.3	25.1	1.00
L127 × 89 × 19	29.3	3750	5.79	69.8	39.4	44.2	2.30	36.1	24.7	25.2	18.9	0.464
× 15.9	24.9	3170	4.99	59.5	39.6	42.9	2.00	30.8	25.1	24.1	18.9	0.472
× 12.7	20.2	2580	4.15	48.7	40.1	41.9	1.67	25.4	25.4	22.9	19.1	0.479
× 9.5	15.4	1970	3.23	37.4	40.4	40.6	1.31	19.5	25.9	21.7	19.2	0.485
× 7.9	12.9	1650	2.74	31.5	40.6	39.9	1.12	16.6	25.9	21.1	19.3	0.489
× 6.4	10.4	1330	2.23	25.4	40.9	39.4	0.916	13.4	26.2	20.4	19.3	0.491

TABLE B-5 *Properties of Equal and Unequal Angle Sections: SI Units (continued)*

Size and thickness (mm)	Mass (kg/m)	Area (mm^2)	Axis X-X				Axis Y-Y				Axis Z-Z	
			I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)	y (mm)	I (10^6 mm^4)	$S = I/c$ (10^3 mm^3)	$r = \sqrt{I/A}$ (mm)	x (mm)	$r = \sqrt{I/A}$ (mm)	tan α
L127 × 76 × 12.7	19.0	2 420	3.93	47.4	40.1	44.2	1.06	18.5	20.9	18.9	16.3	0.357
× 11.1	16.7	2 140	3.50	42.0	40.4	43.7	0.953	16.4	21.1	18.3	16.4	0.361
× 9.5	14.5	1 850	3.06	36.4	40.6	42.9	0.837	14.3	21.3	17.7	16.4	0.364
× 7.9	12.1	1 550	2.60	30.6	40.9	42.4	0.716	12.1	21.5	17.1	16.5	0.368
× 6.4	9.80	1250	2.12	24.7	41.1	41.7	0.587	9.83	21.7	16.5	16.6	0.371
L102 × 102 × 19	27.5	3 510	3.17	45.7	30.0	32.3	3.17	45.7	30.0	32.3	19.7	1.00
× 15.9	23.4	2 970	2.76	39.0	30.5	31.0	2.76	39.0	30.5	31.0	19.7	1.00
× 12.7	19.0	2 420	2.30	32.1	30.7	30.0	2.30	32.1	30.7	30.0	19.7	1.00
× 11.1	16.8	2 140	2.05	28.3	31.0	29.2	2.05	28.3	31.0	29.2	19.7	1.00
× 9.5	14.6	1 850	1.80	24.6	31.2	28.7	1.80	24.6	31.2	28.7	19.8	1.00
× 7.9	12.2	1 550	1.53	20.8	31.5	28.2	1.53	20.8	31.5	28.2	19.8	1.00
× 6.4	9.80	1 250	1.25	16.9	31.8	27.4	1.25	16.9	31.8	27.4	19.9	1.00
L102 × 89 × 12.7	17.6	2 260	2.21	31.5	31.2	31.5	1.57	24.6	26.4	25.2	18.2	0.750
× 9.5	13.5	1 720	1.73	24.3	31.8	30.5	1.23	19.0	26.7	24.1	18.3	0.755
× 7.9	11.4	1 450	1.47	20.5	31.8	29.7	1.05	16.1	26.9	23.4	18.3	0.757
× 6.4	9.20	1 170	1.20	16.6	32.0	29.0	0.862	13.0	27.2	22.8	18.4	0.759
L102 × 76 × 15.9	20.2	2 510	2.50	37.4	31.2	34.8	1.19	22.0	21.5	22.0	16.0	0.534
× 12.7	16.4	2 100	2.09	30.6	31.5	33.5	0.999	18.0	21.8	20.9	16.1	0.542
× 9.5	12.6	1 600	1.64	23.6	32.0	32.3	0.787	13.9	22.2	19.7	16.2	0.551
× 7.9	10.7	1 350	1.40	20.0	32.3	31.8	0.674	11.8	22.4	19.1	16.2	0.554
× 6.4	8.60	1 090	1.14	16.2	32.3	31.0	0.554	9.59	22.5	18.4	16.2	0.558
L89 × 89 × 12.7	16.5	2 100	1.51	24.3	26.7	26.7	1.51	24.3	26.7	26.7	17.2	1.00
× 11.1	14.6	1 850	1.35	21.6	26.9	26.2	1.35	21.6	26.9	26.2	17.3	1.00
× 9.5	12.6	1 600	1.19	18.8	27.2	25.4	1.19	18.8	27.2	25.4	17.3	1.00
× 7.9	10.7	1 350	1.02	15.9	27.4	24.9	1.02	15.9	27.4	24.9	17.4	1.00
× 6.4	8.60	1 090	0.832	12.9	27.7	24.2	0.832	12.9	27.7	24.2	17.5	1.00
L89 × 76 × 12.7	15.1	1 940	1.44	23.8	27.2	28.4	0.966	17.9	22.3	22.1	15.7	0.713
× 11.1	13.5	1 710	1.29	21.1	27.4	27.7	0.870	15.9	22.5	21.5	15.7	0.717
× 9.5	11.7	1 480	1.14	18.4	27.7	27.2	0.766	13.9	22.7	20.9	15.8	0.720
× 7.9	9.80	1 250	0.970	15.6	27.7	26.7	0.658	11.8	22.9	20.3	15.8	0.722
× 6.4	8.00	1 010	0.799	12.7	27.9	25.9	0.541	9.59	23.1	19.6	16.0	0.725

L89 × 64 × 12.7	13.9	1770	1.35	23.1	27.4	30.5	0.566	12.4	17.8	17.8	13.5	0.485
× 9.5	10.7	1360	1.07	17.9	27.9	29.2	0.454	9.65	18.2	16.6	13.6	0.495
× 7.9	9.00	1150	0.916	15.2	28.2	28.7	0.390	8.21	18.4	16.1	13.7	0.500
× 6.4	7.30	929	0.753	12.3	28.4	27.9	0.323	6.72	18.6	15.4	13.7	0.504
L76 × 76 × 12.7	14.0	1770	0.916	17.4	22.7	23.6	0.916	17.4	22.7	23.6	14.7	1.00
× 11.1	12.4	1570	0.824	15.5	22.9	23.0	0.824	15.5	22.9	23.0	14.7	1.00
× 9.5	10.7	1360	0.728	13.5	23.1	22.5	0.728	13.5	23.1	22.5	14.8	1.00
× 7.9	9.10	1150	0.624	11.5	23.3	21.8	0.624	11.5	23.3	21.8	14.8	1.00
× 6.4	7.30	929	0.512	9.32	23.5	21.2	0.512	9.32	23.5	21.2	14.9	1.00
× 4.8	5.50	703	0.395	7.10	23.7	20.6	0.395	7.10	23.7	20.6	14.9	1.00
L76 × 64 × 12.7	12.6	1 610	0.862	16.9	23.1	25.3	0.537	12.1	18.2	18.9	13.1	0.666
× 11.1	11.3	1 430	0.778	15.1	23.3	24.7	0.487	10.7	18.4	18.4	13.1	0.671
× 9.5	9.80	1240	0.687	13.2	23.5	24.1	0.429	9.39	18.6	17.8	13.1	0.675
× 7.9	8.30	1080	0.587	11.2	23.7	23.5	0.370	7.98	18.8	17.2	13.2	0.679
× 6.4	6.70	845	0.483	9.09	23.9	22.9	0.306	6.51	18.9	16.6	13.2	0.683
× 4.8	5.10	643	0.374	6.93	24.1	22.2	0.236	4.97	19.1	15.9	13.2	0.687
L76 × 51 × 12.7	11.5	1 450	0.799	16.4	23.4	27.4	0.278	7.70	13.8	14.7	10.8	0.413
× 9.5	8.80	1120	0.641	12.8	23.8	26.2	0.224	6.03	14.1	13.6	10.8	0.426
× 7.9	7.40	942	0.549	10.8	24.0	25.7	0.194	5.15	14.3	13.0	10.9	0.432
× 6.4	6.10	768	0.454	8.87	24.2	24.9	0.162	4.23	14.5	12.4	10.9	0.437
× 4.8	4.60	582	0.353	6.78	24.4	24.2	0.127	3.24	14.7	11.7	11.0	0.442
L64 × 64 × 12.7	11.4	1450	0.508	11.7	18.7	20.4	0.508	11.7	18.7	20.4	12.2	1.00
× 9.5	8.70	1120	0.405	9.14	19.0	19.3	0.405	9.14	19.0	19.3	12.2	1.00
× 7.9	7.40	942	0.348	7.77	19.2	18.7	0.348	7.77	19.2	18.7	12.2	1.00
× 6.4	6.10	768	0.288	6.34	19.4	18.1	0.288	6.34	19.4	18.1	12.2	1.00
× 4.8	4.60	581	0.223	4.83	19.6	17.4	0.223	4.83	19.6	17.4	12.2	1.00
L64 × 51 × 9.5	7.90	1000	0.380	8.95	19.5	21.0	0.214	5.92	14.6	14.7	10.6	0.612
× 7.9	6.70	845	0.329	7.62	19.7	20.4	0.186	5.06	14.8	14.1	10.7	0.618
× 6.4	5.40	684	0.273	6.24	19.9	19.8	0.155	4.15	15.0	13.5	10.7	0.624
× 4.8	4.20	522	0.213	4.80	20.1	19.2	0.122	3.20	15.2	12.9	10.8	0.628
L64 × 38 × 6.4	4.80	605	0.247	5.96	20.1	22.0	0.0666	2.33	10.4	9.45	8.15	0.354
× 4.8	3.60	461	0.193	4.59	20.3	21.3	0.0524	1.80	10.6	8.81	8.23	0.360
L51 × 51 × 9.5	7.00	877	0.198	5.70	15.0	16.1	0.198	5.70	15.0	16.1	9.80	1.00
× 7.9	5.80	742	0.172	4.88	15.2	15.5	0.172	4.88	15.2	15.5	9.80	1.00
× 6.4	4.70	605	0.144	4.00	15.4	14.9	0.144	4.00	15.4	14.9	9.83	1.00
× 4.8	3.60	461	0.113	3.08	15.5	14.2	0.113	3.08	15.5	14.2	9.88	1.00
× 3.2	2.40	312	0.0787	2.11	15.7	13.6	0.0787	2.11	15.7	13.6	9.93	1.00