

SELECTED W SHAPES: DIMENSIONS AND PROPERTIES

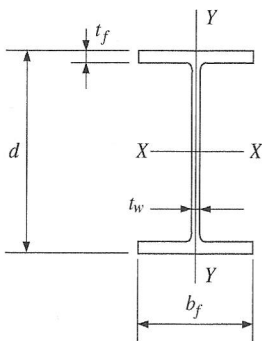


TABLE A.1 U.S. Customary units

Designation	A in. ²	d in.	t_w in.	b_f in.	t_f in.	I_x in. ⁴	S_x in. ³	r_x in.	Z_x in. ³	I_y in. ⁴	S_y in. ³	r_y in.
W40 × 277	81.5	39.7	0.830	15.8	1.58	21,900	1100	16.4	1250	1040	132	3.58
W36 × 302	89.0	37.3	0.945	16.7	1.68	21,100	1130	15.4	1280	1300	156	3.82
W36 × 194	57.0	36.5	0.765	12.1	1.26	12,100	664	14.6	767	375	61.9	2.56
W36 × 150	44.3	35.9	0.625	12.0	0.94	9040	504	14.3	581	270	45.1	2.47
W33 × 118	34.7	32.9	0.550	11.5	0.74	5900	359	13.0	415	187	32.6	2.32
W30 × 108	31.7	29.8	0.545	10.5	0.76	4470	299	11.9	346	146	27.9	2.15
W30 × 99	29.0	29.7	0.520	10.5	0.67	3990	269	11.7	312	128	24.5	2.1
W27 × 114	33.6	27.3	0.570	10.1	0.93	4080	299	11.0	343	159	31.5	2.18
W27 × 94	27.6	26.9	0.490	10.0	0.745	3270	243	10.9	278	124	24.8	2.12
W24 × 162	47.8	25.0	0.705	13.0	1.22	5170	414	10.4	468	443	68.4	3.05
W24 × 104	30.7	24.1	0.500	12.8	0.75	3100	258	10.1	289	259	40.7	2.91
W24 × 84	24.7	24.1	0.470	9.02	0.77	2370	196	9.79	224	94.4	20.9	1.95
W24 × 76	22.4	23.9	0.440	8.99	0.68	2100	176	9.69	200	82.5	18.4	1.92
W21 × 83	24.4	21.4	0.515	8.36	0.835	1830	171	8.67	196	81.4	19.5	1.83
W21 × 73	21.5	21.2	0.455	8.3	0.74	1600	151	8.64	172	70.6	17.0	1.81
W21 × 62	18.3	21.0	0.400	8.24	0.615	1330	127	8.54	144	57.5	14.0	1.77
W21 × 50	14.7	20.8	0.380	6.53	0.535	984	94.5	8.18	110	24.9	7.64	1.3
W18 × 71	20.9	18.5	0.495	7.64	0.81	1170	127	7.5	146	60.3	15.8	1.7
W18 × 60	17.6	18.2	0.415	7.56	0.695	984	108	7.47	123	50.1	13.3	1.68
W18 × 50	14.7	18.0	0.355	7.5	0.57	800	88.9	7.38	101	40.1	10.7	1.65
W18 × 40	11.8	17.9	0.315	6.02	0.525	612	68.4	7.21	78.4	19.1	6.35	1.27
W16 × 100	29.4	17.0	0.585	10.4	0.985	1490	175	7.1	198	186	35.7	2.51
W16 × 45	13.3	16.1	0.345	7.04	0.565	586	72.7	6.65	82.3	32.8	9.34	1.57
W16 × 36	10.6	15.9	0.295	6.99	0.43	448	56.5	6.51	64.0	24.5	7.0	1.52
W16 × 26	7.68	15.7	0.250	5.5	0.345	301	38.4	6.26	44.2	9.59	3.49	1.12

TABLE A.1 U.S. Customary units (Continued)

Designation	A in. ²	d in.	t _w in.	b _f in.	t _f in.	I _x in. ⁴	S _x in. ³	r _x in.	Z _x in. ³	I _y in. ⁴	S _y in. ³	r _y in.
W14 × 132	38.8	14.7	0.645	14.7	1.03	1530	209	6.28	234	548	74.5	3.76
W14 × 109	32.0	14.3	0.525	14.6	0.86	1240	173	6.22	192	447	61.2	3.73
W14 × 90	26.5	14.0	0.440	14.5	0.71	999	143	6.14	157	362	49.9	3.7
W14 × 74	21.8	14.2	0.450	10.1	0.785	795	112	6.04	126	134	26.6	2.48
W14 × 61	17.9	13.9	0.375	10.0	0.645	640	92.1	5.98	102	107	21.5	2.45
W14 × 48	14.1	13.8	0.340	8.03	0.595	484	70.2	5.85	78.4	51.4	12.8	1.91
W14 × 34	10.0	14.0	0.285	6.75	0.455	340	48.6	5.83	54.6	23.3	6.91	1.53
W14 × 30	8.85	13.8	0.270	6.73	0.385	291	42.0	5.73	47.3	19.6	5.82	1.49
W14 × 22	6.49	13.7	0.230	5.0	0.335	199	29.0	5.54	33.2	7.0	2.8	1.04
W12 × 96	28.2	12.7	0.550	12.2	0.9	833	131	5.44	147	270	44.4	3.09
W12 × 72	21.1	12.3	0.430	12.0	0.67	597	97.4	5.31	108	195	32.4	3.04
W12 × 58	17.0	12.2	0.360	10.0	0.64	475	78.0	5.28	86.4	107	21.4	2.51
W12 × 50	14.6	12.2	0.370	8.08	0.64	391	64.2	5.18	71.9	56.3	13.9	1.96
W12 × 40	11.7	11.9	0.295	8.01	0.515	307	51.5	5.13	57.0	44.1	11.0	1.94
W12 × 30	8.79	12.3	0.260	6.52	0.44	238	38.6	5.21	43.1	20.3	6.24	1.52
W12 × 22	6.48	12.3	0.260	4.03	0.425	156	25.4	4.91	29.3	4.66	2.31	0.848
W12 × 16	4.71	12.0	0.220	3.99	0.265	103	17.1	4.67	20.1	2.82	1.41	0.773
W10 × 112	32.9	11.4	0.755	10.4	1.25	716	126	4.66	147	236	45.3	2.68
W10 × 68	19.9	10.4	0.470	10.1	0.77	394	75.7	4.44	85.3	134	26.4	2.59
W10 × 54	15.8	10.1	0.370	10.0	0.615	303	60.0	4.37	66.6	103	20.6	2.56
W10 × 45	13.3	10.1	0.350	8.02	0.62	248	49.1	4.32	54.9	53.4	13.3	2.01
W10 × 33	9.71	9.73	0.290	7.96	0.435	171	35.0	4.19	38.8	36.6	9.2	1.94
W10 × 22	6.49	10.2	0.240	5.75	0.36	118	23.2	4.27	26	11.4	3.97	1.33
W10 × 12	3.54	9.87	0.190	3.96	0.21	53.8	10.9	3.9	12.6	2.18	1.1	0.785
W8 × 40	11.7	8.25	0.360	8.07	0.56	146	35.5	3.53	39.8	49.1	12.2	2.04
W8 × 31	9.13	8.00	0.285	8.0	0.435	110	27.5	3.47	30.4	37.1	9.27	2.02
W8 × 24	7.08	7.93	0.245	6.5	0.4	82.7	20.9	3.42	23.1	18.3	5.63	1.61
W8 × 13	3.84	7.99	0.230	4.0	0.255	39.6	9.91	3.21	11.4	2.73	1.37	0.843
W6 × 25	7.34	6.38	0.320	6.08	0.455	53.4	16.7	2.7	18.9	17.1	5.61	1.52
W6 × 12	3.55	6.03	0.230	4.0	0.28	22.1	7.31	2.49	8.3	2.99	1.50	0.918
W4 × 13	3.83	4.16	0.280	4.06	0.345	11.3	5.46	1.72	6.28	3.86	1.90	1.00

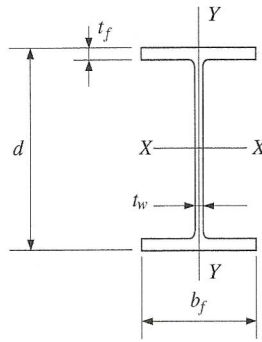


TABLE A.2 SI units

Designation mm × kg/m	A mm ²	d mm	t _w mm	b _f mm ^a	t _f mm ^a	I _x 10 ⁶ mm ⁴	S _x 10 ³ mm ³	r _x mm	Z _x × 10 ³ mm ³	I _y 10 ⁶ mm ⁴	S _y 10 ³ mm ³	r _y mm
W1000 × 222	28,300	970	16.0	298	21.1	4080	8410	381	9800	95.3	636	58.2
W920 × 390	49,800	937	21.30	419	36.6	7450	15,900	389	18,000	454	2160	95.5
W840 × 329	42,100	861	19.7	400	32.5	5370	12,400	358	14,000	350	1740	91.2
W610 × 153	19,500	622	14.0	229	24.9	1250	4010	254	4590	49.5	434	50.5
W610 × 113	14,500	607	11.2	229	17.3	874	2880	246	3280	34.3	302	48.8
W530 × 138	17,600	549	14.7	213	23.6	862	3150	221	3620	38.7	362	46.7
W530 × 101	12,900	536	10.9	210	17.4	616	2290	218	2620	26.9	257	45.7
W530 × 72	9100	523	8.89	206	10.9	399	1520	209	1750	16.1	156	42.2
W460 × 60	7610	455	8.00	152	13.3	255	1120	183	1280	7.95	104	32.3
W410 × 100	12,600	414	10.0	260	16.9	397	1920	177	2130	49.5	380	62.5
W360 × 110	14,100	361	11.4	257	19.9	331	1840	153	2060	55.8	436	63
W310 × 202	25,700	340	20.1	314	31.8	516	3050	142	3510	166	1050	80.3
W310 × 107	13,600	312	10.9	305	17.0	248	1600	135	1770	81.2	531	77.2
W310 × 97	12,300	307	9.91	305	15.4	222	1440	134	1590	72.4	477	76.7
W310 × 38.7	4940	310	5.84	165	9.65	84.9	547	131	610	7.2	87.5	38.4
W250 × 115	14,600	269	13.5	260	22.1	189	1410	114	1600	64.1	493	66
W250 × 73	9290	254	8.64	254	14.2	113	895	110	990	38.9	306	64.5
W200 × 59	7550	210	9.14	206	14.2	60.8	582	89.7	652	20.4	200	51.8
W150 × 24	3060	160	6.60	102	10.3	13.4	167	66	192	1.84	36.1	24.6

^aFlange and web thicknesses may vary due to mill rolling practices.

SELECTED PIPES: DIMENSIONS AND PROPERTIES

TABLE B.1 U.S. Customary units

Nominal Diameter in.	Outside Diameter in.	Inside Diameter in.	Wall Thickness in.	Weight lb/ft	A in. ²	I in. ⁴	S in. ³	r in.
Standard Weight								
2	2.38	2.07	0.154	3.66	1.02	0.627	0.528	0.791
3	3.50	3.07	0.216	7.58	2.07	2.85	1.63	1.17
3.5	4.00	3.55	0.226	9.12	2.50	4.52	2.26	1.34
4	4.50	4.03	0.237	10.80	2.96	6.82	3.03	1.51
5	5.56	5.05	0.258	14.60	4.01	14.3	5.14	1.88
6	6.63	6.07	0.28	19.0	5.2	26.5	7.99	2.25
Extra Strong								
3.5	4.00	3.36	0.318	12.5	3.43	5.94	2.97	1.31
4	4.50	3.83	0.337	15.0	4.14	9.12	4.05	1.48
5	5.56	4.81	0.375	20.8	5.73	19.5	7.02	1.85
6	6.63	5.76	0.432	28.6	7.83	38.3	11.6	2.20
8	8.63	7.63	0.500	43.4	11.90	100	23.1	2.89

TABLE B.2 SI units

Nominal Diameter mm	Outside Diameter mm	Inside Diameter mm	Wall Thickness mm	Mass kg/m	A mm ²	I 10 ⁶ mm ⁴	S 10 ³ mm ³	r mm
Standard Weight								
51	60.50	52.5	3.91	5.44	658	0.261	8.65	20.1
102	114.00	102	6.02	16.10	1910	2.84	49.7	38.4
152	168.00	154	7.11	28.30	3350	11.0	131	57.2
Extra Strong								
76	88.90	73.7	7.62	15.30	1830	1.54	34.6	29.0
102	114.00	97.3	8.56	22.30	2670	3.8	66.4	37.6
127	141.00	122	9.53	30.90	3700	8.12	115	47.0