

Boiling Point of Water. The boiling point of water varies with the pressure; it is lower at higher altitudes. A change in pressure will always be accompanied by a change in the boiling point, and there will be a corresponding change in the latent heat of evaporation. These values are given in Table 8.

Specific Heat. The specific heat of water, or the amount of heat (Btu) required to raise the temperature of one pound of water one degree Fahrenheit, varies with the temperature, but it is commonly assumed to be

TABLE 7. THERMAL PROPERTIES OF WATER

TEMPERATURE DEG F	SAT. PRESS. LB PER SQ IN.	VOLUME CU FT PER LB	WEIGHT LB PER CU FT	SPECIFIC HEAT
32	0.0887	0.01602	62.42	1.0093
40	0.1217	0.01602	62.42	1.0048
50	0.1780	0.01602	62.42	1.0015
60	0.2561	0.01603	62.38	0.9995
70	0.3628	0.01605	62.31	0.9982
80	0.5067	0.01607	62.23	0.9975
90	0.6980	0.01610	62.11	0.9971
100	0.9487	0.01613	62.00	0.9970
110	1.274	0.01616	61.88	0.9971
120	1.692	0.01620	61.73	0.9974
130	2.221	0.01625	61.54	0.9978
140	2.887	0.01629	61.39	0.9984
150	3.716	0.01634	61.20	0.9990
160	4.739	0.01639	61.01	0.9998
170	5.990	0.01645	60.79	1.0007
180	7.510	0.01650	60.61	1.0017
190	9.336	0.01656	60.39	1.0028
200	11.525	0.01663	60.13	1.0039
210	14.123	0.01669	59.92	1.0052
212	14.696	0.01670	59.88	1.0055
220	17.188	0.01676	59.66	1.0068
240	24.97	0.01690	59.17	1.0104
260	35.43	0.01706	58.62	1.0148
280	49.20	0.01723	58.04	1.0200
300	67.01	0.01742	57.41	1.0260
350	134.62	0.01797	55.65	1.0440
400	247.25	0.01865	53.62	1.0670
450	422.61	0.01950	51.30	1.0950
500	681.09	0.02050	48.80	1.1300
550	1045.4	0.02190	45.70	1.2000
600	1544.6	0.02410	41.50	1.3620
700	3096.4	0.03940	25.40	-----

unity at all temperatures. Steam tables are based on exact values, however. The specific heat of ice at 32 F is 0.492 Btu per pound. The amount of heat required to raise one pound of water at 32 F through a known temperature interval depends on the average specific heat for the temperature range.

Sensible and Latent Heat. The heat necessary to raise the temperature of one pound of water from 32 F to the boiling point is known as the *heat of the liquid or sensible heat*. When more heat is added, the water begins to evaporate and expand at constant temperature until the water is entirely changed into steam. The heat thus added is known as the *latent heat of evaporation*.

CHAPTER 1. AIR, WATER AND STEAM

TABLE 8. PROPERTIES OF SATURATED STEAM: PRESSURE TABLE*

ABS. PRESS. IN. HG. p	TEMP F t	SPECIFIC VOLUME		ENTHALPY			ENTROPY			ABS. PRESS. IN. HG. p
		Sat. Liquid V _f	Sat. Vapor V _g	Sat. Liquid h _f	Evap. h _{fg}	Sat. Vapor h _g	Sat. Liquid s _f	Evap. s _{fg}	Sat. Vapor s _g	
0.25	40.23	0.01602	2423.7	8.28	1071.1	1079.4	0.0166	2.1423	2.1589	0.25
0.50	58.80	0.01604	1256.4	26.86	1060.6	1087.5	0.0532	2.0453	2.0985	0.50
0.75	70.43	0.01606	856.1	38.47	1054.0	1092.5	0.0754	1.9881	2.0635	0.75
1.00	79.03	0.01608	652.3	47.05	1049.2	1096.3	0.0914	1.9473	2.0387	1.00
1.5	91.72	0.01611	444.9	59.71	1042.0	1101.7	0.1147	1.8894	2.0041	1.5
2	101.14	0.01614	339.2	69.10	1036.6	1105.7	0.1316	1.8481	1.9797	2.0
4	125.43	0.01622	176.7	93.34	1022.7	1116.0	0.1738	1.7476	1.9214	4.0
6	140.78	0.01630	120.72	108.67	1013.6	1122.3	0.1996	1.6881	1.8877	6
8	152.24	0.01635	92.16	120.13	1006.9	1127.0	0.2186	1.6454	1.8640	8
10	161.49	0.01640	74.76	129.38	1001.4	1130.8	0.2335	1.6121	1.8456	10
12	169.28	0.01644	63.03	137.18	996.7	1133.9	0.2460	1.5847	1.8307	12
14	176.05	0.01648	54.55	143.96	992.6	1136.6	0.2568	1.5613	1.8181	14
16	182.05	0.01652	48.14	149.98	988.9	1138.9	0.2662	1.5410	1.8072	16
18	187.45	0.01655	43.11	155.39	985.7	1141.1	0.2746	1.5231	1.7977	18
20	192.37	0.01658	39.07	160.33	982.7	1143.0	0.2822	1.5069	1.7891	20
22	196.90	0.01661	35.73	164.87	979.8	1144.7	0.2891	1.4923	1.7814	22
24	201.09	0.01664	32.94	169.09	977.2	1146.3	0.2955	1.4789	1.7744	24
26	205.00	0.01667	30.56	173.02	974.8	1147.8	0.3014	1.4665	1.7679	26
28	208.67	0.01669	28.52	176.72	972.5	1149.2	0.3069	1.4550	1.7619	28
30	212.13	0.01672	26.74	180.19	970.3	1150.5	0.3122	1.4442	1.7564	30
Lb										
Sq In.										
14.696	212.00	0.01672	26.80	180.07	970.3	1150.4	0.3120	1.4446	1.7566	14.696
16	216.32	0.01674	24.75	184.42	967.6	1152.0	0.3184	1.4313	1.7497	16
18	222.41	0.01679	22.17	190.56	963.6	1154.2	0.3275	1.4128	1.7403	18
20	227.96	0.01683	20.08	196.16	960.1	1156.3	0.3356	1.3962	1.7319	20
22	233.07	0.01687	18.375	201.33	956.8	1158.1	0.3431	1.3811	1.7242	22
24	237.82	0.01691	16.938	206.14	953.7	1159.8	0.3500	1.3672	1.7172	24
26	242.25	0.01694	15.715	210.62	950.7	1161.3	0.3564	1.3544	1.7108	26
28	246.41	0.01698	14.663	214.83	947.9	1162.7	0.3623	1.3425	1.7048	28
30	250.33	0.01701	13.746	218.82	945.3	1164.1	0.3680	1.3313	1.6993	30
32	254.05	0.01704	12.940	222.59	942.8	1165.4	0.3733	1.3209	1.6941	32
34	257.58	0.01707	12.226	226.18	940.3	1166.5	0.3783	1.3110	1.6893	34
36	260.95	0.01709	11.588	229.60	938.0	1167.6	0.3831	1.3017	1.6848	36
38	264.16	0.01712	11.015	232.89	935.8	1168.7	0.3876	1.2929	1.6805	38
40	267.25	0.01715	10.498	236.03	933.7	1169.7	0.3919	1.2844	1.6763	40
42	270.21	0.01717	10.029	239.04	931.6	1170.7	0.3960	1.2764	1.6724	42
44	273.05	0.01720	9.601	241.95	929.6	1171.6	0.4000	1.2687	1.6687	44
46	275.80	0.01722	9.209	244.75	927.7	1172.4	0.4038	1.2613	1.6652	46
48	278.45	0.01725	8.848	247.47	925.8	1173.3	0.4075	1.2542	1.6617	48
50	281.01	0.01727	8.515	250.09	924.0	1174.1	0.4110	1.2474	1.6585	50
52	283.49	0.01729	8.208	252.63	922.2	1174.8	0.4144	1.2409	1.6553	52
54	285.90	0.01731	7.922	255.09	920.5	1175.6	0.4177	1.2346	1.6523	54
56	288.23	0.01733	7.656	257.50	918.8	1176.3	0.4209	1.2285	1.6494	56
58	290.50	0.01736	7.407	259.82	917.1	1176.9	0.4240	1.2226	1.6466	58
60	292.71	0.01738	7.175	262.09	915.5	1177.6	0.4270	1.2168	1.6438	60
62	294.85	0.01740	6.957	264.30	913.9	1178.2	0.4300	1.2112	1.6412	62
64	296.94	0.01742	6.752	266.45	912.3	1178.8	0.4328	1.2059	1.6387	64
66	298.99	0.01744	6.560	268.55	910.8	1179.4	0.4356	1.2006	1.6362	66
68	300.98	0.01746	6.378	270.60	909.4	1180.0	0.4383	1.1955	1.6338	68
70	302.92	0.01748	6.206	272.61	907.9	1180.6	0.4409	1.1906	1.6315	70
72	304.83	0.01750	6.044	274.57	906.5	1181.1	0.4435	1.1857	1.6292	72
74	306.68	0.01752	5.890	276.49	905.1	1181.6	0.4460	1.1810	1.6270	74
76	308.50	0.01754	5.743	278.37	903.7	1182.1	0.4484	1.1764	1.6248	76
78	310.29	0.01755	5.604	280.21	902.4	1182.6	0.4508	1.1720	1.6228	78
80	312.03	0.01757	5.472	282.02	901.1	1183.1	0.4531	1.1676	1.6207	80
82	313.74	0.01759	5.346	283.79	899.7	1183.5	0.4554	1.1633	1.6187	82
84	315.42	0.01761	5.226	285.53	898.5	1184.0	0.4576	1.1592	1.6168	84
86	317.07	0.01762	5.111	287.24	897.2	1184.4	0.4598	1.1551	1.6149	86
88	318.68	0.01764	5.001	288.91	895.9	1184.8	0.4620	1.1510	1.6130	88
90	320.27	0.01766	4.896	290.56	894.7	1185.3	0.4641	1.1471	1.6112	90
92	321.83	0.01768	4.796	292.18	893.5	1185.7	0.4661	1.1433	1.6094	92
94	323.38	0.01769	4.699	293.78	892.3	1186.1	0.4682	1.1394	1.6076	94
96	324.87	0.01771	4.606	295.34	891.1	1186.4	0.4702	1.1358	1.6059	96
98	326.35	0.01772	4.517	296.89	889.9	1186.8	0.4721	1.1322	1.6043	98

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