TABLES OF PROPERTY VALUES FOR MOIST AIR

(in addition to: Herrmann, S., H.-J. Kretzschmar, and D.P. Gatley. 2009. Thermodynamic Properties of Real Moist Air, Dry Air, Steam, Water, and Ice. *HVAC&R Research* 15(5):961–86)

1 Psychrometric Properties of Moist Air at 101.325 kPa (SI Units) (-60°C to 90°C)

Table 1: Tabulated values for the saturated properties of moist air at atmospheric pressure (101.325 kPa) from –60 to 0°C in SI units.

t	W_s	v_s	h_s	s_s
°C	kg_w / kg_a	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
–60	0.0000067	0.6027	–60.325	–0.2494
–55	0.0000129	0.6169	–55.280	–0.2260
–50	0.0000243	0.6312	–50.222	–0.2030
–45	0.0000445	0.6454	–45.144	–0.1805
–40	0.0000793	0.6597	–40.031	–0.1583
–35	0.0001379	0.6740	–34.859	–0.1364
–30	0.0002345	0.6883	–29.593	–0.1145
–25	0.0003905	0.7027	–24.181	–0.0924
–20	0.0006373	0.7172	–18.542	–0.0699
–15	0.0010207	0.7319	–12.560	–0.0465
–10	0.0016062	0.7468	–6.070	–0.0215
–5	0.0024863	0.7622	1.164	0.0057
0	0.0037900	0.7780	9.475	0.0364

Table 2: Tabulated values for the saturated properties of moist air at atmospheric pressure (101.325 kPa) from 0 to 90°C in SI units.

t	W_s	v_s	h_s	s_s
°C	kg_w / kg_a	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0	0.0037900	0.7780	9.475	0.0364
5	0.0054247	0.7944	18.639	0.0697
10	0.0076627	0.8116	29.354	0.1079
15	0.0106938	0.8299	42.115	0.1525
20	0.0147605	0.8498	57.558	0.2057
25	0.0201734	0.8716	76.503	0.2699
30	0.0273329	0.8961	100.009	0.3482
35	0.0367601	0.9241	129.458	0.4448
40	0.0491445	0.9567	166.685	0.5650
45	0.0654161	0.9955	214.169	0.7162
50	0.0868629	1.0425	275.349	0.9081
55	0.1153262	1.1009	355.144	1.1549
60	0.1535447	1.1752	460.880	1.4775
65	0.2057937	1.2726	603.993	1.9084
70	0.2791669	1.4049	803.464	2.5011
75	0.3863985	1.5935	1093.367	3.3517
80	0.5529261	1.8809	1541.765	4.6511
85	0.8381055	2.3665	2307.476	6.8430
90	1.4202354	3.3487	3867.556	11.2558

2 Psychrometric Properties of Moist Air at 14.696 psia (I-P Units) (-80°F to 200°F)

Table 3: Tabulated values for the saturated properties of moist air at atmospheric pressure (14.696 psia) from –80 to 32°F in I-P units.

t	W_s	v_s	h_s	s_s
°F	lb_w / lb_a	ft^3 / lb_a	Btu / lb_a	$Btu /(lb_a\ R)$
–80	0.000005	9.5528	–19.213	–0.0459
–72	0.000009	9.7557	–17.286	–0.0409
–64	0.000016	9.9585	–15.356	–0.0360
–56	0.000028	10.1613	–13.422	–0.0311
–48	0.000047	10.3643	–11.479	–0.0264
–40	0.000079	10.5674	–9.524	–0.0217
–32	0.000130	10.7708	–7.550	–0.0170
–24	0.000209	10.9747	–5.545	–0.0123
–16	0.000330	11.1794	–3.495	–0.0077
–8	0.000514	11.3853	–1.378	–0.0029
0	0.000787	11.5930	0.835	0.0019
8	0.001189	11.8032	3.187	0.0070
16	0.001772	12.0171	5.735	0.0124
24	0.002607	12.2363	8.557	0.0183
32	0.003790	12.4629	11.759	0.0249

Table 4: Tabulated values for the saturated properties of moist air at atmospheric pressure (14.696 psia) from 32 to 200°F in I-P units.

t	W_s	v_s	h_s	s_s
°F	lb_w / lb_a	ft^3 / lb_a	Btu / lb_a	$Btu /(lb_a\ R)$
32	0.003790	12.4629	11.759	0.0249
40	0.005216	12.6952	15.232	0.0319
48	0.007104	12.9378	19.214	0.0398
56	0.009582	13.1940	23.850	0.0488
64	0.012807	13.4675	29.317	0.0594
72	0.016979	13.7633	35.841	0.0717
80	0.022343	14.0878	43.701	0.0864
88	0.029210	14.4490	53.250	0.1040
96	0.037975	14.8569	64.939	0.1253
104	0.049144	15.3251	79.347	0.1511
112	0.063380	15.8709	97.234	0.1828
120	0.081566	16.5179	119.614	0.2219
128	0.104913	17.2984	147.878	0.2706
136	0.135126	18.2579	183.986	0.3322
144	0.174698	19.4631	230.803	0.4110
152	0.227431	21.0160	292.705	0.5140
160	0.299448	23.0808	376.735	0.6523
168	0.401305	25.9405	495.035	0.8447
176	0.552923	30.1291	670.521	1.1270
184	0.796992	36.7912	952.304	1.5755
192	1.244629	48.9051	1468.199	2.3880
200	2.304335	77.4201	2688.102	4.2889

3 Psychrometric Properties of Moist Air (SI Units) for 200°C

Table 5: Tabulated values for the properties of moist air at 101.325 kPa and 200°C in SI units.

W	t_{wb}	v	h	s
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0.00	45.07	1.341	202.52	0.5558
0.05	55.38	1.448	346.49	1.0299
0.10	61.85	1.556	490.43	1.4736
0.20	69.95	1.771	778.24	2.3336
0.30	75.00	1.986	1066.00	3.1751
0.40	78.51	2.201	1353.71	4.0059
0.50	81.12	2.416	1641.40	4.8295
0.60	83.14	2.630	1929.06	5.6479
0.70	84.76	2.845	2216.70	6.4623
0.80	86.09	3.060	2504.32	7.2736
0.90	87.20	3.274	2791.94	8.0824
1.00	88.15	3.489	3079.55	8.8890

Table 6: Tabulated values for the properties of moist air at 1,000 kPa and 200°C in SI units.

W	t_{wb}	v	h	s
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0.00	90.47	0.136	201.94	–0.1033
0.05	107.30	0.147	345.59	0.3175
0.10	117.69	0.158	488.96	0.7078
0.20	130.61	0.179	775.06	1.4603
0.30	138.66	0.200	1060.52	2.1936
0.40	144.29	0.222	1345.51	2.9156
0.50	148.49	0.243	1630.14	3.6302
0.60	151.76	0.264	1914.51	4.3393
0.70	154.39	0.284	2198.66	5.0442
0.80	156.56	0.305	2482.65	5.7458
0.90	158.37	0.326	2766.48	6.4447
1.00	159.92	0.347	3050.21	7.1413

Table 7: Tabulated values for the properties of moist air at 2,000 kPa and 200°C in SI units.

W	t_{wb}	v	h	s	φ
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$	%
0.00	105.93	0.068	201.34	–0.3045	0.0000
0.05	125.81	0.074	344.62	0.0999	9.3474
0.10	138.03	0.079	487.33	0.4735	17.4001
0.20	153.19	0.089	771.37	1.1917	30.5663
0.30	162.65	0.100	1054.02	1.8898	40.8763
0.40	169.28	0.110	1335.62	2.5760	49.1686
0.50	174.23	0.120	1616.41	3.2542	55.9827
0.60	178.11	0.130	1896.55	3.9264	61.6816
0.70	181.23	0.140	2176.18	4.5941	66.5182
0.80	183.81	0.150	2455.37	5.2582	70.6745
0.90	185.98	0.160	2734.21	5.9192	74.2847
1.00	187.83	0.169	3012.74	6.5779	77.4497

Table 8: Tabulated values for the properties of moist air at 5,000 kPa and 200°C in SI units.

W	t_{wb}	v	h	s	φ
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$	%
0.00	126.87	0.028	199.72	–0.5738	0.0000
0.05	151.76	0.030	341.85	–0.1919	21.5446
0.10	166.94	0.032	482.36	0.1580	40.1050
0.15	177.63	0.034	621.47	0.4957	56.2610
0.20	185.72	0.036	759.33	0.8256	70.4514
0.25	192.15	0.037	896.07	1.1498	83.0144
0.30	197.42	0.039	1031.81	1.4694	94.2147

Table 9: Tabulated values for the properties of moist air at 10,000 kPa and 200°C in SI units.

W	t_{wb}	v	h	s	φ
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$	%
0.00	142.19	0.014	197.66	–0.7823	0.0000
0.05	171.31	0.015	337.69	–0.4188	39.4628
0.10	188.92	0.016	473.92	–0.0901	73.4594

4 Psychrometric Properties of Moist Air (SI Units) for 320°C

Table 10: Tabulated values for the properties of moist air at 101.325 kPa and 320°C in SI units.

W	t_{wb}	v	h	s
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0.00	54.90	1.681	326.93	0.7901
0.05	62.07	1.816	482.76	1.2864
0.10	67.00	1.951	638.58	1.7525
0.20	73.54	2.221	950.20	2.6573
0.30	77.79	2.491	1261.79	3.5436
0.40	80.80	2.761	1573.35	4.4191
0.50	83.07	3.030	1884.90	5.2876
0.60	84.85	3.300	2196.45	6.1508
0.70	86.28	3.570	2507.98	7.0101
0.80	87.46	3.840	2819.51	7.8663
0.90	88.45	4.109	3131.03	8.7200
1.00	89.29	4.379	3442.54	9.5715

Table 11: Tabulated values for the properties of moist air at 1,000 kPa and 320°C in SI units.

W	t_{wb}	v	h	s
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0.00	107.70	0.171	326.80	0.1318
0.05	118.99	0.185	482.46	0.5751
0.10	126.74	0.198	637.99	0.9880
0.20	137.03	0.225	948.76	1.7864
0.30	143.73	0.252	1259.25	2.5661
0.40	148.52	0.279	1569.54	3.3349
0.50	152.14	0.306	1879.68	4.0965
0.60	154.99	0.333	2189.71	4.8529
0.70	157.29	0.360	2499.65	5.6052
0.80	159.19	0.387	2809.52	6.3543
0.90	160.79	0.414	3119.33	7.1009
1.00	162.16	0.441	3429.10	7.8453

Table 12: Tabulated values for the properties of moist air at 2,000 kPa and 320°C in SI units.

W	t_{wb}	v	h	s
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0.00	126.92	0.086	326.68	–0.0685
0.05	140.12	0.093	482.14	0.3586
0.10	149.17	0.099	637.34	0.7553
0.20	161.20	0.113	947.16	1.5209
0.30	169.07	0.126	1256.39	2.2674
0.40	174.71	0.140	1565.21	3.0031
0.50	178.98	0.153	1873.73	3.7313
0.60	182.35	0.166	2182.01	4.4542
0.70	185.08	0.179	2490.11	5.1730
0.80	187.34	0.192	2798.06	5.8885
0.90	189.25	0.206	3105.89	6.6014
1.00	190.88	0.219	3413.63	7.3122

Table 13: Tabulated values for the properties of moist air at 5,000 kPa and 320°C in SI units.

W	t_{wb}	v	h	s
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0.00	154.63	0.035	326.46	–0.3351
0.05	170.97	0.037	481.31	0.0702
0.10	182.17	0.040	635.49	0.4447
0.20	197.14	0.045	942.30	1.1653
0.30	206.99	0.050	1247.57	1.8661
0.40	214.10	0.056	1551.71	2.5554
0.50	219.52	0.061	1855.00	3.2368
0.60	223.82	0.066	2157.61	3.9125
0.70	227.33	0.071	2459.68	4.5839
0.80	230.25	0.076	2761.32	5.2518
0.90	232.72	0.081	3062.60	5.9168
1.00	234.85	0.085	3363.58	6.5795

Table 14: Tabulated values for the properties of moist air at 10,000 kPa and 320°C in SI units.

W	t_{wb}	v	h	s
kg_w / kg_a	°C	m^3 / kg_a	kJ / kg_a	$kJ /(kg_a\ K)$
0.00	176.72	0.018	326.51	–0.5397
0.05	195.85	0.019	480.31	–0.1514
0.10	209.00	0.020	632.69	0.2054
0.20	226.64	0.023	934.11	0.8889
0.30	238.33	0.025	1232.07	1.5511
0.40	246.84	0.028	1527.38	2.2005
0.50	253.40	0.030	1820.58	2.8409
0.60	258.63	0.032	2112.05	3.4747
0.70	262.94	0.034	2402.07	4.1033
0.80	266.55	0.036	2690.85	4.7277
0.90	269.63	0.039	2978.55	5.3486
1.00	272.29	0.041	3265.32	5.9666