TABLE 1. THERMODYNAMIC PROPERTIES OF MOIST AIR[a] (STANDARD ATMOSPHERIC PRESSURE, 29.921 IN. HG)

FAHR. TEMP. t(F)	HUMIDITY RATIO $W_s \times 10^5$	VOLUME CU FT/LB DRY AIR v_a	v_{as}	v_s	ENTHALPY BTU/LB DRY AIR h_a	h_{as}	h_s	ENTROPY BTU PER (°F) (LB DRY AIR) s_a	s_{as}	s_s	CONDENSED WATER Enthalpy Btu/Lb h_w	Entropy Btu/(Lb) (°F) s_w	Vap. Press In. Hg $p_s \times 10^5$	FAHR. TEMP. t(F)
−160	0.2120	7.520	0.000	7.520	−38.504	0.000	−38.504	−0.10300	0.00000	−0.10300	−222.00	−0.4907	0.1009	−160
−159	0.2394	7.545	0.000	7.545	−38.262	0.000	−38.262	−0.10219	0.00000	−0.10219	−221.68	−0.4896	0.1139	−159
−158	0.2703	7.571	0.000	7.571	−38.021	0.000	−38.021	−0.10139	0.00000	−0.10139	−221.36	−0.4885	0.1286	−158
−157	0.3049	7.596	0.000	7.596	−37.779	0.000	−37.779	−0.10059	0.00000	−0.10059	−221.04	−0.4874	0.1450	−157
−156	0.3435	7.622	0.000	7.622	−37.538	0.000	−37.538	−0.09980	0.00000	−0.09980	−220.72	−0.4864	0.1635	−156
−155	0.3869	7.647	0.000	7.647	−37.296	0.000	−37.296	−0.09901	0.00000	−0.09901	−220.40	−0.4853	0.1842	−155
−154	0.4354	7.673	0.000	7.673	−37.055	0.000	−37.055	−0.09822	0.00000	−0.09822	−220.07	−0.4843	0.2073	−154
−153	0.4897	7.699	0.000	7.699	−36.813	0.000	−36.813	−0.09743	0.00000	−0.09743	−219.75	−0.4832	0.2331	−153
−152	0.5502	7.724	0.000	7.724	−36.572	0.000	−36.572	−0.09664	0.00000	−0.09664	−219.42	−0.4822	0.2620	−152
−151	0.6178	7.750	0.000	7.750	−36.330	0.000	−36.330	−0.09586	0.00000	−0.09586	−219.10	−0.4811	0.2942	−151
−150	0.6932	7.775	0.000	7.775	−36.088	0.000	−36.088	−0.09508	0.00000	−0.09508	−218.77	−0.4800	0.3301	−150
−149	0.7772	7.801	0.000	7.801	−35.847	0.000	−35.847	−0.09430	0.00000	−0.09430	−218.44	−0.4789	0.3701	−149
−148	0.8709	7.826	0.000	7.826	−35.606	0.000	−35.606	−0.09352	0.00000	−0.09352	−218.11	−0.4779	0.4146	−148
−147	0.9750	7.851	0.000	7.851	−35.364	0.000	−35.364	−0.09274	0.00000	−0.09274	−217.78	−0.4768	0.4641	−147
−146	1.091	7.876	0.000	7.876	−35.123	0.000	−35.123	−0.09198	0.00000	−0.09198	−217.45	−0.4758	0.5194	−146
−145	1.219	7.902	0.000	7.902	−34.881	0.000	−34.881	−0.09121	0.00000	−0.09121	−217.12	−0.4747	0.5807	−145
−144	1.362	7.927	0.000	7.927	−34.640	0.000	−34.640	−0.09044	0.00000	−0.09044	−216.78	−0.4737	0.6488	−144
−143	1.521	7.953	0.000	7.953	−34.399	0.000	−34.399	−0.08967	0.00000	−0.08967	−216.45	−0.4726	0.7243	−143
−142	1.698	7.978	0.000	7.978	−34.157	0.000	−34.157	−0.08892	0.00000	−0.08892	−216.11	−0.4716	0.8082	−142
−141	1.893	8.004	0.000	8.004	−33.916	0.000	−33.916	−0.08816	0.00000	−0.08816	−215.78	−0.4705	0.9011	−141
−140	2.109	8.029	0.000	8.029	−33.674	0.000	−33.674	−0.08740	0.00000	−0.08740	−215.44	−0.4695	1.004	−140
−139	2.348	8.054	0.000	8.054	−33.433	0.000	−33.433	−0.08664	0.00000	−0.08664	−215.11	−0.4684	1.118	−139
−138	2.613	8.079	0.000	8.079	−33.192	0.000	−33.192	−0.08589	0.00000	−0.08589	−214.77	−0.4674	1.244	−138
−137	2.906	8.105	0.000	8.105	−32.951	0.000	−32.951	−0.08514	0.00000	−0.08514	−214.43	−0.4663	1.383	−137
−136	3.229	8.130	0.000	8.130	−32.709	0.000	−32.709	−0.08440	0.00000	−0.08440	−214.09	−0.4653	1.537	−136
−135	3.586	8.156	0.000	8.156	−32.468	0.000	−32.468	−0.08365	0.00000	−0.08365	−213.75	−0.4642	1.707	−135
−134	3.980	8.181	0.000	8.181	−32.226	0.000	−32.226	−0.08291	0.00000	−0.08291	−213.41	−0.4632	1.895	−134
−133	4.414	8.207	0.000	8.207	−31.985	0.000	−31.985	−0.08217	0.00000	−0.08217	−213.07	−0.4621	2.102	−133
−132	4.893	8.232	0.000	8.232	−31.744	0.000	−31.744	−0.08144	0.00000	−0.08144	−212.72	−0.4611	2.330	−132
−131	5.419	8.258	0.000	8.258	−31.503	0.000	−31.503	−0.08070	0.00000	−0.08070	−212.38	−0.4600	2.581	−131
−130	6.000	8.283	0.000	8.283	−31.262	0.000	−31.262	−0.07997	0.00000	−0.07997	−212.03	−0.4590	2.858	−130
−129	0.637	8.309	0.000	8.309	−31.021	0.000	−31.021	−0.07924	0.00000	−0.07924	−211.68	−0.4579	3.182	−129

[a]Compiled by John A. Goff and S. Gratch.

TABLE 1. THERMODYNAMIC PROPERTIES OF MOIST AIR[a] (STANDARD ATMOSPHERIC PRESSURE, 29.921 IN. HG) (Continued)

FAHR. TEMP. t(F)	HUMIDITY RATIO $W_s \times 10^7$	VOLUME CU FT/LB DRY AIR v_a	v_{as}	v_s	ENTHALPY BTU/LB DRY AIR h_a	h_{as}	h_s	ENTROPY BTU PER (°F) (LB DRY AIR) s_a	s_{as}	s_s	CONDENSED WATER Enthalpy Btu/Lb h_w	Entropy Btu/(Lb) (°F) s_w	Vap. Press In. Hg $p_s \times 10^5$	FAHR. TEMP. t(F)
−128	0.7339	8.334	0.000	8.334	−30.780	0.000	−30.780	−0.07851	0.00000	−0.07851	−211.33	−0.4569	0.3492	−128
−127	0.8111	8.360	0.000	8.360	−30.539	0.000	−30.539	−0.07778	0.00000	−0.07778	−210.98	−0.4559	0.3863	−127
−126	0.8958	8.385	0.000	8.385	−30.298	0.000	−30.298	−0.07707	0.00000	−0.07707	−210.63	−0.4548	0.4267	−126
−125	0.9887	8.411	0.000	8.411	−30.057	0.000	−30.057	−0.07634	0.00000	−0.07634	−210.28	−0.4538	0.4710	−125
−124	1.091	8.436	0.000	8.436	−29.816	0.000	−29.816	−0.07562	0.00000	−0.07562	−209.93	−0.4527	0.5197	−124
−123	1.202	8.461	0.000	8.461	−29.575	0.000	−29.575	−0.07490	0.00000	−0.07490	−209.58	−0.4517	0.5730	−123
−122	1.325	8.486	0.000	8.486	−29.334	0.000	−29.334	−0.07419	0.00000	−0.07419	−209.23	−0.4506	0.6314	−122
−121	1.459	8.512	0.000	8.512	−29.093	0.000	−29.093	−0.07348	0.00000	−0.07348	−208.88	−0.4496	0.6953	−121
−120	1.606	8.537	0.000	8.537	−28.852	0.000	−28.852	−0.07277	0.00000	−0.07277	−208.52	−0.4485	0.7653	−120
−119	1.767	8.563	0.000	8.563	−28.611	0.000	−28.611	−0.07206	0.00000	−0.07206	−208.17	−0.4475	0.8419	−119
−118	1.942	8.588	0.000	8.588	−28.370	0.000	−28.370	−0.07135	0.00000	−0.07135	−207.81	−0.4464	0.9256	−118
−117	2.134	8.613	0.000	8.613	−28.129	0.000	−28.129	−0.07064	0.00000	−0.07064	−207.45	−0.4454	1.017	−117
−116	2.343	8.639	0.000	8.639	−27.889	0.000	−27.889	−0.06994	0.00000	−0.06994	−207.09	−0.4444	1.117	−116
−115	2.571	8.664	0.000	8.664	−27.648	0.000	−27.648	−0.06924	0.00000	−0.06924	−206.73	−0.4433	1.226	−115
−114	2.820	8.690	0.000	8.690	−27.407	0.000	−27.407	−0.06854	0.00000	−0.06854	−206.37	−0.4423	1.345	−114
−113	3.092	8.715	0.000	8.715	−27.166	0.000	−27.166	−0.06784	0.00000	−0.06784	−206.01	−0.4412	1.475	−113
−112	3.388	8.741	0.000	8.741	−26.926	0.000	−26.926	−0.06715	0.00000	−0.06715	−205.65	−0.4402	1.617	−112
−111	3.711	8.766	0.000	8.766	−26.685	0.000	−26.685	−0.06646	0.00000	−0.06646	−205.29	−0.4392	1.771	−111
−110	4.063	8.792	0.000	8.792	−26.444	0.000	−26.444	−0.06577	0.00000	−0.06577	−204.92	−0.4381	1.939	−110
−109	4.445	8.817	0.000	8.817	−26.204	0.000	−26.204	−0.06508	0.00000	−0.06508	−204.46	−0.4371	2.121	−109
−108	4.861	8.842	0.000	8.842	−25.963	0.001	−25.962	−0.06439	0.00000	−0.06439	−204.19	−0.4360	2.320	−108
−107	5.314	8.868	0.000	8.868	−25.772	0.001	−25.721	−0.06370	0.00000	−0.06370	−203.83	−0.4350	2.536	−107
−106	5.806	8.893	0.000	8.893	−25.481	0.001	−25.480	−0.06302	0.00000	−0.06302	−203.46	−0.4339	2.771	−106
−105	6.340	8.919	0.000	8.919	−25.240	0.001	−25.239	−0.06234	0.00000	−0.06234	−203.09	−0.4329	3.026	−105
−104	6.920	8.944	0.000	8.944	−25.000	0.001	−24.999	−0.06167	0.00000	−0.06167	−202.72	−0.4318	3.303	−104
−103	7.549	8.970	0.000	8.970	−24.759	0.001	−24.758	−0.06099	0.00000	−0.06099	−202.35	−0.4308	3.603	−103
−102	8.232	8.995	0.000	8.995	−24.518	0.001	−24.517	−0.06032	0.00000	−0.06032	−201.98	−0.4298	3.929	−102
−101	8.972	9.020	0.000	9.020	−24.278	0.001	−24.277	−0.05964	0.00000	−0.05964	−201.61	−0.4287	4.283	−101
−100	9.772	9.046	0.000	9.046	−24.037	0.001	−24.036	−0.05897	0.00000	−0.05897	−201.23	−0.4277	4.666	−100
−99	10.63	9.071	0.000	9.071	−23.797	0.001	−23.796	−0.05830	0.00000	−0.05830	−200.86	−0.4266	5.081	−99
−98	11.57	9.097	0.000	9.097	−23.556	0.001	−23.555	−0.05764	0.00000	−0.05764	−200.48	−0.4256	5.530	−98
−97	12.59	9.122	0.000	9.122	−23.316	0.001	−23.315	−0.05697	0.00000	−0.05697	−200.11	−0.4245	6.016	−97

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