

TABLE 3. THERMODYNAMIC PROPERTIES OF WATER AT SATURATION*

FAHR. TEMP. (°F)	ABSOLUTE PRESSURE PS X 10 ³		SPECIFIC VOLUME, CU FT PER LB					ENTHALPY, BTU PER LB				ENTROPY, BTU PER (LB) (°F)				FAHR. TEMP. (°F)
	Lb/Sq In.	In. Hg	Sat. Solid v ₁	Evap. v _{1g} X 10 ⁻³	Sat. Vapor v _g X 10 ⁻³	Sat. Vapor h _g	Sat. Solid h ₁	Evap. h _{1g}	Sat. Vapor h _g	Sat. Solid s ₁	Evap. s _{1g}	Sat. Vapor s _g				
-160	0.000449	0.01008	0.01723	38070	38070	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-160	3.5849	-160	
-155	0.000440	0.01008	0.01723	38065	38065	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-155	3.5849	-155	
-150	0.000440	0.01008	0.01723	38060	38060	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-150	3.5849	-150	
-145	0.000440	0.01008	0.01723	38055	38055	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-145	3.5849	-145	
-140	0.000440	0.01008	0.01723	38050	38050	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-140	3.5849	-140	
-135	0.000440	0.01008	0.01723	38045	38045	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-135	3.5849	-135	
-130	0.000440	0.01008	0.01723	38040	38040	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-130	3.5849	-130	
-125	0.000440	0.01008	0.01723	38035	38035	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-125	3.5849	-125	
-120	0.000440	0.01008	0.01723	38030	38030	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-120	3.5849	-120	
-115	0.000440	0.01008	0.01723	38025	38025	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-115	3.5849	-115	
-110	0.000440	0.01008	0.01723	38020	38020	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-110	3.5849	-110	
-105	0.000440	0.01008	0.01723	38015	38015	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-105	3.5849	-105	
-100	0.000440	0.01008	0.01723	38010	38010	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-100	3.5849	-100	
-95	0.000440	0.01008	0.01723	38005	38005	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-95	3.5849	-95	
-90	0.000440	0.01008	0.01723	38000	38000	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-90	3.5849	-90	
-85	0.000440	0.01008	0.01723	37995	37995	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-85	3.5849	-85	
-80	0.000440	0.01008	0.01723	37990	37990	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-80	3.5849	-80	
-75	0.000440	0.01008	0.01723	37985	37985	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-75	3.5849	-75	
-70	0.000440	0.01008	0.01723	37980	37980	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-70	3.5849	-70	
-65	0.000440	0.01008	0.01723	37975	37975	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-65	3.5849	-65	
-60	0.000440	0.01008	0.01723	37970	37970	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-60	3.5849	-60	
-55	0.000440	0.01008	0.01723	37965	37965	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-55	3.5849	-55	
-50	0.000440	0.01008	0.01723	37960	37960	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-50	3.5849	-50	
-45	0.000440	0.01008	0.01723	37955	37955	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-45	3.5849	-45	
-40	0.000440	0.01008	0.01723	37950	37950	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-40	3.5849	-40	
-35	0.000440	0.01008	0.01723	37945	37945	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-35	3.5849	-35	
-30	0.000440	0.01008	0.01723	37940	37940	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-30	3.5849	-30	
-25	0.000440	0.01008	0.01723	37935	37935	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-25	3.5849	-25	
-20	0.000440	0.01008	0.01723	37930	37930	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-20	3.5849	-20	
-15	0.000440	0.01008	0.01723	37925	37925	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-15	3.5849	-15	
-10	0.000440	0.01008	0.01723	37920	37920	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-10	3.5849	-10	
-5	0.000440	0.01008	0.01723	37915	37915	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	-5	3.5849	-5	
0	0.000440	0.01008	0.01723	37910	37910	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	0	3.5849	0	
5	0.000440	0.01008	0.01723	37905	37905	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	5	3.5849	5	
10	0.000440	0.01008	0.01723	37900	37900	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	10	3.5849	10	
15	0.000440	0.01008	0.01723	37895	37895	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	15	3.5849	15	
20	0.000440	0.01008	0.01723	37890	37890	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	20	3.5849	20	
25	0.000440	0.01008	0.01723	37885	37885	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	25	3.5849	25	
30	0.000440	0.01008	0.01723	37880	37880	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	30	3.5849	30	
35	0.000440	0.01008	0.01723	37875	37875	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	35	3.5849	35	
40	0.000440	0.01008	0.01723	37870	37870	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	40	3.5849	40	
45	0.000440	0.01008	0.01723	37865	37865	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	45	3.5849	45	
50	0.000440	0.01008	0.01723	37860	37860	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	50	3.5849	50	
55	0.000440	0.01008	0.01723	37855	37855	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	55	3.5849	55	
60	0.000440	0.01008	0.01723	37850	37850	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	60	3.5849	60	
65	0.000440	0.01008	0.01723	37845	37845	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	65	3.5849	65	
70	0.000440	0.01008	0.01723	37840	37840	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	70	3.5849	70	
75	0.000440	0.01008	0.01723	37835	37835	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	75	3.5849	75	
80	0.000440	0.01008	0.01723	37830	37830	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	80	3.5849	80	
85	0.000440	0.01008	0.01723	37825	37825	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	85	3.5849	85	
90	0.000440	0.01008	0.01723	37820	37820	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	90	3.5849	90	
95	0.000440	0.01008	0.01723	37815	37815	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	95	3.5849	95	
100	0.000440	0.01008	0.01723	37810	37810	1212.43	-223.05	1212.43	990.38	-0.4607	4.0456	3.5849	100	3.5849	100	

* Compiled by John A. Goff and B. Gratch.

TABLE 3. THERMODYNAMIC PROPERTIES OF WATER AT SATURATION* (Continued)

FAHR. TEMP. (°F)	ABSOLUTE PRESSURE PS X 10 ³		SPECIFIC VOLUME, CU FT PER LB					ENTHALPY, BTU PER LB					ENTROPY, BTU PER (LB) (°F)					FAHR. TEMP. (°F)
	Lb/Sq In.	In. Hg	Sat. Solid v ₁	Evap. v _{1g} X 10 ⁻³	Sat. Vapor v _g X 10 ⁻³	Sat. Solid h ₁	Evap. h _{1g}	Sat. Vapor h _g	Sat. Solid s ₁	Evap. s _{1g}	Sat. Vapor s _g							
-80	0.3440	0.7003	0.01728	7.441	7.441	-172.68	1220.52	1047.84	-0.3552	2.8408	2.4853	-80	2.4853	-80				
-75	0.3275	0.6823	0.01728	7.441	7.441	-172.68	1220.52	1047.84	-0.3552	2.8408	2.4853	-75	2.4853	-75				
-70	0.3110	0.6643	0.01728	7.441	7.441	-170.91	1220.51	1046.40	-0.3511	2.8413	2.4848	-70	2.4848	-70				
-65	0.2945	0.6463	0.01728	7.441	7.441	-170.91	1220.50	1046.40	-0.3460	2.8413	2.4823	-65	2.4823	-65				
-60	0.2780	0.6283	0.01728	7.441	7.441	-169.12	1220.49	1045.37	-0.3410	2.8418	2.4818	-60	2.4818	-60				
-55	0.2615	0.6103	0.01728	7.441	7.441	-169.12	1220.47	1045.37	-0.3360	2.8423	2.4813	-55	2.4813	-55				
-50	0.2450	0.5923	0.01728	7.441	7.441	-167.31	1220.45	1045.14	-0.3320	2.8428	2.4808	-50	2.4808	-50				
-45	0.2285	0.5743	0.01728	7.441	7.441	-167.31	1220.45	1045.14	-0.3270	2.8433	2.4803	-45	2.4803	-45				
-40	0.2120	0.5563	0.01728	7.441	7.441	-165.58	1220.43	1044.92	-0.3230	2.8438	2.4798	-40	2.4798	-40				
-35	0.1955	0.5383	0.01728	7.441	7.441	-165.58	1220.43	1044.92	-0.3180	2.8443	2.4793	-35	2.4793	-35				
-30	0.1790	0.5203	0.01728	7.441	7.441	-163.84	1220.39	1044.71	-0.3140	2.8448	2.4788	-30	2.4788	-30				
-25	0.1625	0.5023	0.01728	7.441	7.441	-163.84	1220.39	1044.71	-0.3090	2.8453	2.4783	-25	2.4783	-25				
-20	0.1460	0.4843	0.01728	7.441	7.441	-162.03	1220.38	1044.55	-0.3050	2.8458	2.4778	-20	2.4778	-20				
-15	0.1295	0.4663	0.01728	7.441	7.441	-162.03	1220.38	1044.55	-0.3000	2.8463	2.4773	-15	2.4773	-15				
-10	0.1130	0.4483	0.01728	7.441	7.441	-160.22	1220.36	1044.38	-0.2960	2.8468	2.4768	-10	2.4768	-10				
-5	0.0965	0.4303	0.01728	7.441	7.441	-160.22	1220.36	1044.38	-0.2910	2.8473	2.4763	-5	2.4763	-5				
0	0.0800	0.4123	0.01728	7.441	7.441	-158.41	1220.35	1044.22	-0.2870	2.8478	2.4758	0	2.4758	0				
5	0.0635	0.3943	0.01728	7.441	7.441	-158.41	1220.35	1044.22	-0.2820	2.8483	2.4753	5	2.4753	5				
10	0.0470	0.3763	0.01728	7.441	7.441	-156.60	1220.33	1044.05	-0.2780	2.8488	2.4748	10	2.4748	10				
15	0.0305	0.3583	0.01728	7.441	7.441	-156.60	1220.33	1044.05	-0.2730	2.8493	2.4743	15	2.4743	15				
20	0.0140	0.3403	0.01728	7.441	7.441	-154.79	1220.32	1043.88	-0.2690	2.8498	2.4738	20	2.4738	20				
25	0.0075	0.3223	0.01728	7.441	7.441	-154.79	1220.32	1043.88	-0.2640	2.8503	2.4733	25	2.4733	25				
30	0.0010	0.3043	0.01728	7.441	7.441	-152.98	1220.31	1043.72	-0.2600	2.8508	2.4728	30	2.4728	30				
35	0.0005	0.2863	0.01728	7.441	7.441	-152.98	1220.31	1043.72	-0.2550	2.8513	2.4723	35	2.4723	35				
40	0.0000	0.2683	0.01728	7.441	7.441	-151.17	1220.30	1043.56	-0.2510	2.8518	2.4718	40	2.4718	40				
45	0.0000	0.2503	0.01728	7.441	7.441	-151.17	1220.30	1043.56	-0.2460	2.8523	2.4713	45	2.4713	45				
50	0.0000	0.2323	0.01728	7.441	7.441	-149.36	1220.28	1043.40	-0.2420	2.8528	2.4708	50	2.4708	50				
55	0.0000	0.2143	0.01728	7.441	7.441	-149.36	1220.28	1043.40	-0.2370	2.8533	2.4703	55	2.4703	55				
60	0.0000	0.1963	0.01728	7.441	7.441	-147.55	1220.26	1043.24	-0.2330	2.8538	2.4698	60	2.4698	60				
65	0.0000	0.1783	0.01728	7.441	7.441	-147.55	1220.26	1043.24	-0.2280	2.8543	2.4693	65	2.4693	65				
70	0.0000	0.1603	0.01728	7.441	7.441	-145.74	1220.25	1043.08	-0.2240	2.8548	2.4688	70	2.4688	70				
75	0.0000	0.1423	0.01728	7.441	7.441	-145.74	1220.25	1043.08	-0.2190	2.8553	2.4683	75	2.4683	75				
80	0.0000	0.1243	0.01728	7.441	7.441	-143.93	1220.23	1042.92	-0.2150	2.8558	2.4678	80	2.4678	80				
85	0.0000	0.1063	0.01728	7.441	7.441	-143.93	1220.23	1042.92	-0.2100	2.8563	2.4673	85	2.4673	85				
90	0.0000	0.0883	0.01728	7.441	7.441	-142.12	1220.22	1042.76	-0.2060	2.8568	2.4668	90	2.4668	90				
95	0.0000	0.0703	0.01728	7.441	7.441	-142.12	1220.22	1042.76	-0.2010	2.8573	2.4663	95	2.4663	95				
100	0.0000	0.0523	0.01728	7.441	7.441	-140.31	1220.21	1042.60	-0.1970	2.8578	2.4658	100	2.4658	100				
105	0.0000	0.0343	0.01728	7.441	7.441	-140.31	1220.21	1042.60	-0.1920	2.8583	2.4653	105	2.4653	105				
110	0.0000	0.0163	0.01728	7.441	7.441	-138.50	1220.20	1042.44	-0.1880	2.8588	2.4648	110	2.4648	110				
115	0.0000	0.0083	0.01728	7.441	7.441	-138.50	1220.20	1042.44	-0.1830	2.8593	2.4643	115	2.4643	115				
120	0.0000	0.0003	0.01728	7.441	7.441	-136.69	1220.19	1042.28	-0.1790	2.8598	2.4638	120	2.4638	120				
125	0.0000	0.0000	0.01728	7.441	7.441	-136.69	1220.19	1042.28	-0.1740	2.8603	2.4633	125	2.4633	125				
130	0.0000	0.0000	0.01728	7.441	7.441	-134.88	1220.18	1042.12	-0.1700	2.8608	2.4628	130	2.4628	130				
135	0.0000	0.0000	0.01728	7.441	7.441	-134.88	1220.18	1042.12	-0.1650	2.8613	2.4623	135	2.4623	135				
140	0.0000	0.0000	0.01728	7.441	7.441	-133.07	1220.17	1041.96	-0.1610	2.8618	2.4618	140	2.4618	140				
145	0.0000	0.0000	0.01728	7.441	7.441	-133.07	1220.17	1041.96	-0.1560	2.8623	2.4613	145	2.4613	145				
150	0.0000	0.0000	0.01728	7.441	7.441	-131.26	1220.16	1041.80	-0.1520	2.8628	2.4608	150	2.4608	150				
155	0.0000	0.0000	0.01728	7.441	7.441	-131.26	1220.16	1041.80	-0.1470	2.8633	2.4603	155	2.4603	155				
160	0.0000	0.0000	0.01728	7.441	7.441	-129.45	1220.15	1041.64	-0.1430	2.8638	2.4598	160	2.4598	160				
165	0.0000	0.0000	0.01728	7.441	7.441	-129.45	1220.15	1041.64	-0.1380	2.8643	2.4593	165	2.4593	165				
170	0.0000	0.0000	0.01728	7.441	7.441	-127.64	1220.14	1041.48	-0.1340	2.8648	2.4588	170	2.4588	170				
175	0.0000	0.0000	0.01728	7.441	7.441	-127.64	1220.14	1041.48	-0.1290	2.8653	2.4583	175	2.4583	175				
180	0.0000	0.0000	0.01728	7.441	7.441	-125.83	1220.13	1041.32	-0.1250	2.8658	2.4578	180	2.4578	180				
185	0.0000	0.0000	0.01728	7.441	7.441	-125.83	1220.13	1041.32	-0.1200	2.8663	2.4573	185	2.4573	185				
190	0.0000	0.0000	0.01728	7.441	7.441	-124.02	1220.12	1041.16	-0.1160	2.8668	2.4568	190	2.4568	190				
195	0.0000	0.0000	0.01728	7.441	7.441	-124.02	1220.12	1041.16	-0.1110	2.8673	2.4563	195	2.4563	195				
200	0.0000	0.0000	0.01728	7.441	7.441	-122.21	1220.11	1041.00	-0.1070	2.8678	2.4558	200	2.4558	200				
205	0.0000	0.0000	0.01728	7.441	7.441	-122.21	1220.11	1041.00	-0.1020	2.8683	2.4553	205	2.4553	205				
210	0.0000	0.0000	0.01728	7.441	7.441	-120.40	1220.10	1040.84	-0.0980	2.8688	2.4548	210	2.4548	210				
215	0.0000	0.0000	0.01728	7.441	7.441	-120.40	1220.10	1040.84	-0.0930	2.8693	2.4543	215	2.4543	215				
220	0.0000	0.0000	0.01728	7.441	7.441	-118.59	1220.09	1040.68	-0.0890	2.8698	2.4538	220	2.4538	220				
225	0.0000	0.0000	0.01728	7.441	7.441	-118.59	1220.09	1040.68	-0.0840	2.8703	2.4533	225	2.4533	225				
230	0.0000	0.0000	0.01728	7.441	7.441	-116.78	1220.08	1040.52	-0.0800	2.8708	2.4528	230	2.4528	230				
235	0.0000	0.0000	0.01728	7.441	7.441	-116.78	1220.08	1040.52	-0.0750	2.8713	2.4523	235	2.4523	235				
240	0.0000	0.0000	0.01728	7.441	7.441	-114.97	1220.07	1040.36	-0.0710	2.8718	2.4518	240	2.4518	240				
245	0.0000	0.0000	0.01728	7.441	7.441	-114.97	1220.07	1040.36	-0.0660	2.8723	2.4513	245	2.4513	245				
250	0.0000	0.0000	0.01728	7.441	7.441	-113.16	1220.06	1040.20	-0.0620	2.8728	2.4508	250	2.4508	250				
255	0.0000	0.0000	0.01728	7.441	7.441	-113.16	1220.06	1040.20	-0.0570	2.8733	2.4503	255	2.4503	255				
260	0.0000	0.0000	0.01728	7.441	7.441	-111.35	1220.05	1040.04	-0.0530	2.8738	2.4498	260	2.4498	260				
265	0.0000	0.0000	0.01728	7.441	7.441	-111.35	1220.05	1040.04	-0.0480	2.8743	2.4493	265	2.4493	265				
270	0.0000	0.0000	0.01728	7.441	7.441	-109.54	1220.04	1039.88	-0.0440	2.8748	2.4488	270	2.4488	270				
275	0.0000	0.0000	0.01728	7.441	7.441	-109.54	1220.04	1039.88	-0.0390	2.8753	2.4483	275	2.4483	275				
280	0.0000	0.0000	0.01728	7.441	7.441	-107.73	1220.03	1039.72	-0.0350	2.8758	2.4478	280	2.4478	280				
285	0.0000	0.0000	0.01728	7.441	7.441	-107.73	1220.03	1039.72	-0.0300	2.8763	2.4473	285	2.4473	285				
290	0.0000	0.0000	0.01728	7.441	7.441	-105.92	1220.02	1039.56	-0.0260	2.8768	2.4468	290	2.4468	290				
295	0.0000	0.0000	0.01728	7.441	7.441	-105.92	1220.02	1039.56	-0									