

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

FAHR. TEMP. (°F)	ABSOLUTE PRESSURE P_a		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_f	Evap. v_{fg}	Sat. Vapor v_g	Sat. Solid h_f	Evap. h_{fg}	Sat. Vapor h_g	Sat. Solid s_f	Evap. s_{fg}	Sat. Vapor s_g				
7	0.0263	0.05402	0.01743	10480	10480	-155.46	1219.84	1064.18	-0.3172	2.6138	2.2968	7			
8	0.0270	0.05475	0.01743	9979	9979	-155.18	1219.80	1064.32	-0.3162	2.6081	2.2949	8			
9	0.0277	0.05548	0.01744	9507	9507	-154.70	1219.76	1065.06	-0.3152	2.6025	2.2931	9			
10	0.0285	0.05626	0.01744	9060	9060	-154.22	1219.72	1065.50	-0.3142	2.5969	2.2917	10			
11	0.0293	0.05705	0.01744	8636	8636	-153.74	1219.68	1065.94	-0.3131	2.5912	2.2781	11			
12	0.0301	0.05784	0.01744	8234	8234	-153.26	1219.64	1066.38	-0.3121	2.5857	2.2736	12			
13	0.0309	0.05864	0.01744	7851	7851	-152.77	1219.59	1066.82	-0.3111	2.5801	2.2690	13			
14	0.0317	0.05946	0.01744	7489	7489	-152.29	1219.55	1067.26	-0.3101	2.5746	2.2645	14			
15	0.0325	0.06029	0.01744	7144	7144	-151.80	1219.50	1067.70	-0.3090	2.5690	2.2600	15			
16	0.0333	0.06113	0.01745	6817	6817	-151.32	1219.46	1068.14	-0.3080	2.5635	2.2554	16			
17	0.0341	0.06198	0.01745	6505	6505	-150.83	1219.41	1068.58	-0.3070	2.5581	2.2511	17			
18	0.0349	0.06284	0.01745	6210	6210	-150.34	1219.36	1069.02	-0.3060	2.5528	2.2468	18			
19	0.0357	0.06371	0.01745	5929	5929	-149.85	1219.31	1069.46	-0.3049	2.5471	2.2423	19			
20	0.0365	0.06459	0.01745	5662	5662	-149.36	1219.26	1069.90	-0.3039	2.5417	2.2378	20			
21	0.0373	0.06548	0.01745	5408	5408	-148.87	1219.21	1070.34	-0.3029	2.5364	2.2335	21			
22	0.0381	0.06638	0.01746	5166	5166	-148.38	1219.16	1070.78	-0.3019	2.5310	2.2291	22			
23	0.0389	0.06729	0.01746	4936	4936	-147.88	1219.10	1071.22	-0.3008	2.5256	2.2248	23			
24	0.0397	0.06821	0.01746	4717	4717	-147.39	1219.05	1071.66	-0.2998	2.5203	2.2205	24			
25	0.0405	0.06914	0.01746	4509	4509	-146.89	1218.98	1072.09	-0.2988	2.5150	2.2163	25			
26	0.0413	0.07008	0.01746	4311	4311	-146.40	1218.93	1072.53	-0.2978	2.5097	2.2121	26			
27	0.0421	0.07103	0.01746	4122	4122	-145.90	1218.87	1072.97	-0.2968	2.5045	2.2077	27			
28	0.0429	0.07200	0.01746	3943	3943	-145.41	1218.81	1073.41	-0.2958	2.4991	2.2034	28			
29	0.0437	0.07298	0.01747	3771	3771	-144.90	1218.75	1073.85	-0.2947	2.4939	2.1992	29			
30	0.0445	0.07398	0.01747	3608	3608	-144.40	1218.69	1074.29	-0.2937	2.4887	2.1950	30			
31	0.0453	0.07499	0.01747	3453	3453	-143.90	1218.63	1074.73	-0.2927	2.4835	2.1908	31			
32	0.0461	0.07601	0.01747	3305	3305	-143.40	1218.58	1075.16	-0.2916	2.4783	2.1867	32			
33	0.0469	0.07704	0.01748	3164	3164	-142.90	1218.52	1075.60	-0.2906	2.4731	2.1825	33			
34	0.0477	0.07808	0.01748	3030	3030	-142.40	1218.46	1076.04	-0.2896	2.4679	2.1783	34			
35	0.0485	0.07913	0.01748	2902	2902	-141.90	1218.40	1076.48	-0.2886	2.4627	2.1741	35			
36	0.0493	0.08019	0.01748	2779	2779	-141.40	1218.34	1076.92	-0.2876	2.4575	2.1699	36			
37	0.0501	0.08126	0.01748	2661	2661	-140.90	1218.28	1077.36	-0.2866	2.4523	2.1657	37			
38	0.0509	0.08234	0.01748	2548	2548	-140.40	1218.22	1077.80	-0.2856	2.4471	2.1615	38			
39	0.0517	0.08343	0.01748	2439	2439	-140.00	1218.16	1078.24	-0.2846	2.4419	2.1573	39			
40	0.0525	0.08453	0.01748	2335	2335	-139.50	1218.10	1078.68	-0.2836	2.4367	2.1531	40			
41	0.0533	0.08564	0.01748	2235	2235	-139.00	1218.04	1079.11	-0.2826	2.4315	2.1489	41			
42	0.0541	0.08676	0.01748	2139	2139	-138.50	1217.98	1079.55	-0.2816	2.4263	2.1447	42			
43	0.0549	0.08789	0.01748	2047	2047	-138.00	1217.92	1080.00	-0.2806	2.4211	2.1405	43			
44	0.0557	0.08903	0.01748	1959	1959	-137.50	1217.86	1080.44	-0.2796	2.4159	2.1363	44			
45	0.0565	0.09018	0.01748	1875	1875	-137.00	1217.80	1080.88	-0.2786	2.4107	2.1321	45			
46	0.0573	0.09134	0.01748	1794	1794	-136.50	1217.74	1081.32	-0.2776	2.4055	2.1279	46			
47	0.0581	0.09251	0.01748	1716	1716	-136.00	1217.68	1081.76	-0.2766	2.4003	2.1237	47			
48	0.0589	0.09369	0.01748	1641	1641	-135.50	1217.62	1082.20	-0.2756	2.3951	2.1195	48			
49	0.0597	0.09488	0.01748	1569	1569	-135.00	1217.56	1082.64	-0.2746	2.3899	2.1153	49			
50	0.0605	0.09608	0.01748	1500	1500	-134.50	1217.50	1083.08	-0.2736	2.3847	2.1111	50			
51	0.0613	0.09729	0.01748	1434	1434	-134.00	1217.44	1083.52	-0.2726	2.3795	2.1069	51			
52	0.0621	0.09851	0.01748	1371	1371	-133.50	1217.38	1083.96	-0.2716	2.3743	2.1027	52			
53	0.0629	0.09974	0.01748	1311	1311	-133.00	1217.32	1084.40	-0.2706	2.3691	2.1011	53			
54	0.0637	0.10098	0.01748	1254	1254	-132.50	1217.26	1084.84	-0.2696	2.3639	2.1011	54			
55	0.0645	0.10223	0.01748	1200	1200	-132.00	1217.20	1085.28	-0.2686	2.3587	2.1011	55			
56	0.0653	0.10349	0.01748	1149	1149	-131.50	1217.14	1085.72	-0.2676	2.3535	2.1011	56			
57	0.0661	0.10476	0.01748	1101	1101	-131.00	1217.08	1086.16	-0.2666	2.3483	2.1011	57			
58	0.0669	0.10604	0.01748	1055	1055	-130.50	1217.02	1086.60	-0.2656	2.3431	2.1011	58			
59	0.0677	0.10733	0.01748	1011	1011	-130.00	1216.96	1087.04	-0.2646	2.3379	2.1011	59			
60	0.0685	0.10863	0.01748	969	969	-129.50	1216.90	1087.48	-0.2636	2.3327	2.1011	60			
61	0.0693	0.10994	0.01748	929	929	-129.00	1216.84	1087.92	-0.2626	2.3275	2.1011	61			
62	0.0701	0.11126	0.01748	891	891	-128.50	1216.78	1088.36	-0.2616	2.3223	2.1011	62			
63	0.0709	0.11259	0.01748	854	854	-128.00	1216.72	1088.80	-0.2606	2.3171	2.1011	63			
64	0.0717	0.11393	0.01748	819	819	-127.50	1216.66	1089.24	-0.2596	2.3119	2.1011	64			
65	0.0725	0.11528	0.01748	785	785	-127.00	1216.60	1089.68	-0.2586	2.3067	2.1011	65			
66	0.0733	0.11664	0.01748	752	752	-126.50	1216.54	1090.12	-0.2576	2.3015	2.1011	66			
67	0.0741	0.11801	0.01748	720	720	-126.00	1216.48	1090.56	-0.2566	2.2963	2.1011	67			
68	0.0749	0.11939	0.01748	690	690	-125.50	1216.42	1091.00	-0.2556	2.2911	2.1011	68			
69	0.0757	0.12078	0.01748	661	661	-125.00	1216.36	1091.44	-0.2546	2.2859	2.1011	69			
70	0.0765	0.12218	0.01748	633	633	-124.50	1216.30	1091.88	-0.2536	2.2807	2.1011	70			
71	0.0773	0.12359	0.01748	606	606	-124.00	1216.24	1092.32	-0.2526	2.2755	2.1011	71			
72	0.0781	0.12501	0.01748	581	581	-123.50	1216.18	1092.76	-0.2516	2.2703	2.1011	72			
73	0.0789	0.12644	0.01748	557	557	-123.00	1216.12	1093.20	-0.2506	2.2651	2.1011	73			
74	0.0797	0.12788	0.01748	534	534	-122.50	1216.06	1093.64	-0.2496	2.2599	2.1011	74			
75	0.0805	0.12933	0.01748	512	512	-122.00	1216.00	1094.08	-0.2486	2.2547	2.1011	75			
76	0.0813	0.13079	0.01748	491	491	-121.50	1215.94	1094.52	-0.2476	2.2495	2.1011	76			
77	0.0821	0.13226	0.01748	471	471	-121.00	1215.88	1094.96	-0.2466	2.2443	2.1011	77			
78	0.0829	0.13374	0.01748	452	452	-120.50	1215.82	1095.40	-0.2456	2.2391	2.1011	78			
79	0.0837	0.13523	0.01748	434	434	-120.00	1215.76	1095.84	-0.2446	2.2339	2.1011	79			
80	0.0845	0.13673	0.01748	417	417	-119.50	1215.70	1096.28	-0.2436	2.2287	2.1011	80			
81	0.0853	0.13824	0.01748	401	401	-119.00	1215.64	1096.72	-0.2426	2.2235	2.1011	81			
82	0.0861	0.13976	0.01748	386	386	-118.50	1215.58	1097.16	-0.2416	2.2183	2.1011	82			
83	0.0869	0.14129	0.01748	372	372	-118.00	1215.52	1097.60	-0.2406	2.2131	2.1011	83			
84	0.0877	0.14283	0.01748	359	359	-117.50	1215.46	1098.04	-0.2396	2.2079	2.1011	84			
85	0.0885	0.14438	0.01748	347	347	-117.00	1215.40	1098.48	-0.2386	2.2027	2.1011	85			
86	0.0893	0.14594	0.01748	336	336	-116.50	1215.34	1098.92	-0.2376	2.1975	2.1011	86			
87	0.0901	0.14751	0.01748	326	326	-116.00	1215.28	1099.36	-0.2366	2.1923	2.1011	87			
88	0.0909	0.14909	0.01748	317	317	-115.50	1215.22	1099.80	-0.2356	2.1871	2.1011	88			
89	0.0917	0.15068	0.01748	309	309	-115.00	1215.16	1100.24	-0.2346	2.1819	2.1011	89			
90	0.0925	0.15228	0.01748	302	302	-114.50	1215.10	1100.68	-0.2336	2.1767	2.1011	90			
91	0.0933	0.15389	0.01748	296	296	-114.00	1215.04	1101.12	-0.2326	2.1715	2.1011	91			
92	0.0941	0.15551	0.01748	291	291	-113.50	1214.98	1101.56	-0.2316	2.1663	2.1011	92			
93	0.0949	0.15714	0.01748	286	286	-113.00	1214.92	1102.00	-0.2306	2.1611	2.1011	93			
94	0.0957	0.15878	0.01748												

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

* Extrapolated to represent metastable equilibrium with undercooled liquid.

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

FAHR. TEMP. (°F)	ABSOLUTE PRESSURE P _a		SPECIFIC VOLUME, CU FT PER LB				ENTHALPY, BTU PER LB				ENTROPY, BTU PER (LB) (°F)				FAHR. TEMP. (°F)
	Lb/Sq In.	In. Hg	Sat. Liquid v _f	Evap. v _{fg}	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				
32	0.08589	0.1808	0.01602	3304.6	3304.6	0.00	1075.16	1075.16	0.00000	2.1867	2.1867	2.1867	32		
33	0.08727	0.1813	0.01602	3180.5	3180.5	1.01	1074.99	1075.00	0.00000	2.1811	2.1811	2.1831	33		
34	0.08869	0.1818	0.01602	3061.7	3061.7	2.01	1074.83	1075.04	0.00000	2.1766	2.1766	2.1796	34		
35	0.09015	0.1823	0.01602	2947.8	2947.8	3.02	1074.68	1075.48	0.00012	2.1720	2.1720	2.1761	35		
36	0.09165	0.1828	0.01602	2838.7	2838.7	4.02	1074.50	1076.92	0.00815	2.1674	2.1674	2.1726	36		
37	0.09319	0.1833	0.01602	2734.1	2734.1	5.03	1074.33	1077.36	0.01018	2.1629	2.1629	2.1691	37		
38	0.09477	0.1838	0.01602	2633.8	2633.8	6.03	1074.17	1077.80	0.01220	2.1585	2.1585	2.1657	38		
39	0.09639	0.1843	0.01602	2537.6	2537.6	7.04	1074.01	1078.24	0.01422	2.1542	2.1542	2.1629	39		
40	0.09805	0.1848	0.01602	2445.4	2445.4	8.04	1073.84	1078.68	0.01624	2.1499	2.1499	2.1598	40		
41	0.09975	0.1853	0.01602	2356.9	2356.9	9.05	1073.68	1079.11	0.01824	2.1456	2.1456	2.1564	41		
42	0.10149	0.1858	0.01602	2272.0	2272.0	10.05	1073.50	1079.55	0.02024	2.1413	2.1413	2.1520	42		
43	0.10327	0.1863	0.01602	2190.5	2190.5	11.05	1073.34	1080.00	0.02224	2.1370	2.1370	2.1487	43		
44	0.10509	0.1868	0.01602	2112.3	2112.3	12.06	1073.17	1080.44	0.02423	2.1327	2.1327	2.1453	44		
45	0.10695	0.1873	0.01602	2037.3	2037.3	13.06	1073.01	1080.88	0.02622	2.1284	2.1284	2.1420	45		
46	0.10885	0.1878	0.01602	1965.2	1965.2	14.06	1072.84	1081.32	0.02820	2.1241	2.1241	2.1387	46		
47	0.11079	0.1883	0.01602	1896.0	1896.0	15.09	1072.68	1081.74	0.03018	2.1198	2.1198	2.1354	47		
48	0.11273	0.1888	0.01602	1826.8	1826.8	16.07	1072.51	1082.16	0.03216	2.1155	2.1155	2.1321	48		
49	0.11469	0.1893	0.01602	1757.5	1757.5	17.07	1072.34	1082.58	0.03413	2.1112	2.1112	2.1288	49		
50	0.11667	0.1898	0.01602	1688.2	1688.2	18.07	1072.17	1083.00	0.03610	2.1069	2.1069	2.1256	50		
51	0.11867	0.1903	0.01602	1618.9	1618.9	19.07	1072.00	1083.42	0.03806	2.1026	2.1026	2.1223	51		
52	0.12069	0.1908	0.01602	1549.6	1549.6	20.07	1071.83	1083.83	0.04002	2.0983	2.0983	2.1191	52		
53	0.12273	0.1913	0.01602	1480.3	1480.3	21.07	1071.66	1084.25	0.04197	2.0940	2.0940	2.1159	53		
54	0.12479	0.1918	0.01602	1411.0	1411.0	22.08	1071.49	1084.67	0.04392	2.0897	2.0897	2.1127	54		
55	0.12687	0.1923	0.01602	1341.6	1341.6	23.08	1071.32	1085.08	0.04587	2.0854	2.0854	2.1095	55		
56	0.12896	0.1928	0.01602	1272.3	1272.3	24.08	1071.15	1085.49	0.04781	2.0811	2.0811	2.1063	56		
57	0.13106	0.1933	0.01602	1203.0	1203.0	25.08	1070.98	1085.90	0.04975	2.0768	2.0768	2.1033	57		
58	0.13318	0.1938	0.01602	1133.7	1133.7	26.08	1070.81	1086.32	0.05169	2.0725	2.0725	2.1002	58		
59	0.13531	0.1943	0.01602	1064.4	1064.4	27.08	1070.64	1086.73	0.05363	2.0682	2.0682	2.0970	59		
60	0.13745	0.1948	0.01602	995.1	995.1	28.08	1070.47	1087.15	0.05557	2.0639	2.0639	2.0938	60		
61	0.13960	0.1953	0.01602	925.8	925.8	29.08	1070.30	1087.56	0.05751	2.0596	2.0596	2.0906	61		

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