

Table 2 Thermodynamic Properties of Water at Saturation, SI Units

Temp °C	Absolute Pressure kPa p	Specific Volume, m ³ /kg			Enthalpy, kJ/kg			Entropy, kJ/kg · K			Temp °C
		Sat. Solid v_f	Evap. v_{fg}	Sat. Vapor v_g	h_f	Evap. h_{fg}	Sat. Vapor h_g	Sat. Solid s_f	Evap. s_{fg}	Sat. Vapor s_g	
-60	0.00108	0.001082	90942.00	90942.00	-446.40	2836.27	2389.87	-1.6854	13.3065	11.6211	-60
-59	0.00124	0.001082	79858.69	79858.69	-444.74	2836.46	2391.72	-1.6776	13.2452	11.5677	-59
-58	0.00141	0.001082	70212.37	70212.37	-443.06	2836.64	2393.57	-1.6698	13.1845	11.5147	-58
-57	0.00161	0.001082	61805.35	61805.35	-441.38	2836.81	2395.43	-1.6620	13.1243	11.4623	-57
-56	0.00184	0.001082	54469.39	54469.39	-439.69	2836.97	2397.28	-1.6542	13.0646	11.4104	-56
-55	0.00209	0.001082	48061.05	48061.05	-438.00	2837.13	2399.13	-1.6464	13.0054	11.3590	-55
-54	0.00238	0.001082	42455.57	42455.57	-436.29	2837.27	2400.98	-1.6386	12.9468	11.3082	-54
-53	0.00271	0.001083	37546.09	37546.09	-434.59	2837.42	2402.83	-1.6308	12.8886	11.2578	-53
-52	0.00307	0.001083	33242.14	33242.14	-432.87	2837.55	2404.68	-1.6230	12.8309	11.2079	-52
-51	0.00348	0.001083	29464.67	29464.67	-431.14	2837.68	2406.53	-1.6153	12.7738	11.1585	-51
-50	0.00394	0.001083	26145.01	26145.01	-429.41	2837.80	2408.39	-1.6075	12.7170	11.1096	-50
-49	0.00445	0.001083	23223.69	23223.70	-427.67	2837.91	2410.24	-1.5997	12.6608	11.0611	-49
-48	0.00503	0.001083	20651.68	20651.69	-425.93	2838.02	2412.09	-1.5919	12.6051	11.0131	-48
-47	0.00568	0.001083	18383.50	18383.51	-424.17	2838.12	2413.94	-1.5842	12.5498	10.9656	-47
-46	0.00640	0.001083	16381.35	16381.36	-422.41	2838.21	2415.79	-1.5764	12.4949	10.9185	-46
-45	0.00721	0.001084	14612.35	14612.36	-420.65	2838.29	2417.65	-1.5686	12.4405	10.8719	-45
-44	0.00811	0.001084	13047.65	13047.66	-418.87	2838.37	2419.50	-1.5609	12.3866	10.8257	-44
-43	0.00911	0.001084	11661.85	11661.85	-417.09	2838.44	2421.35	-1.5531	12.3330	10.7799	-43
-42	0.01022	0.001084	10433.85	10433.85	-415.30	2838.50	2423.20	-1.5453	12.2799	10.7346	-42
-41	0.01147	0.001084	9344.25	9344.25	-413.50	2838.55	2425.05	-1.5376	12.2273	10.6897	-41
-40	0.01285	0.001084	8376.33	8376.33	-411.70	2838.60	2426.90	-1.5298	12.1750	10.6452	-40
-39	0.01438	0.001085	7515.86	7515.87	-409.88	2838.64	2428.76	-1.5221	12.1232	10.6011	-39
-38	0.01608	0.001085	6750.36	6750.36	-408.07	2838.67	2430.61	-1.5143	12.0718	10.5575	-38
-37	0.01796	0.001085	6068.16	6068.17	-406.24	2838.70	2432.46	-1.5066	12.0208	10.5142	-37
-36	0.02005	0.001085	5459.82	5459.82	-404.40	2838.71	2434.31	-1.4988	11.9702	10.4713	-36
-35	0.02235	0.001085	4917.09	4917.10	-402.56	2838.73	2436.16	-1.4911	11.9199	10.4289	-35
-34	0.02490	0.001085	4432.36	4432.37	-400.72	2838.73	2438.01	-1.4833	11.8701	10.3868	-34
-33	0.02772	0.001085	3998.71	3998.71	-398.86	2838.72	2439.86	-1.4756	11.8207	10.3451	-33
-32	0.03082	0.001086	3610.71	3610.71	-397.00	2838.71	2441.72	-1.4678	11.7716	10.3037	-32
-31	0.03425	0.001086	3263.20	3263.20	-395.12	2838.69	2443.57	-1.4601	11.7229	10.2628	-31
-30	0.03802	0.001086	2951.64	2951.64	-393.25	2838.66	2445.42	-1.4524	11.6746	10.2222	-30
-29	0.04217	0.001086	2672.03	2672.03	-391.36	2838.63	2447.27	-1.4446	11.6266	10.1820	-29
-28	0.04673	0.001086	2420.89	2420.89	-389.47	2838.59	2449.12	-1.4369	11.5790	10.1421	-28
-27	0.05175	0.001086	2195.23	2195.23	-387.57	2838.53	2450.97	-1.4291	11.5318	10.1026	-27
-26	0.05725	0.001087	1992.15	1992.15	-385.66	2838.48	2452.82	-1.4214	11.4849	10.0634	-26
-25	0.06329	0.001087	1809.35	1809.35	-383.74	2838.41	2454.67	-1.4137	11.4383	10.0246	-25
-24	0.06991	0.001087	1644.59	1644.59	-381.82	2838.34	2456.52	-1.4059	11.3921	9.9862	-24
-23	0.07716	0.001087	1495.98	1495.98	-379.89	2838.26	2458.37	-1.3982	11.3462	9.9480	-23
-22	0.08510	0.001087	1361.94	1361.94	-377.95	2838.17	2460.22	-1.3905	11.3007	9.9102	-22
-21	0.09378	0.001087	1240.77	1240.77	-376.01	2838.07	2462.06	-1.3828	11.2555	9.8728	-21
-20	0.10326	0.001087	1131.27	1131.27	-374.06	2837.97	2463.91	-1.3750	11.2106	9.8356	-20
-19	0.11362	0.001088	1032.18	1032.18	-372.10	2837.86	2465.76	-1.3673	11.1661	9.7988	-19
-18	0.12492	0.001088	942.46	942.47	-370.13	2837.74	2467.61	-1.3596	11.1218	9.7623	-18
-17	0.13725	0.001088	861.17	861.18	-368.15	2837.61	2469.46	-1.3518	11.0779	9.7261	-17
-16	0.15068	0.001088	787.48	787.49	-366.17	2837.47	2471.30	-1.3441	11.0343	9.6902	-16
-15	0.16530	0.001088	720.59	720.59	-364.18	2837.33	2473.15	-1.3364	10.9910	9.6546	-15
-14	0.18122	0.001088	659.86	659.86	-362.18	2837.18	2474.99	-1.3287	10.9480	9.6193	-14
-13	0.19852	0.001089	604.65	604.65	-360.18	2837.02	2476.84	-1.3210	10.9053	9.5844	-13
-12	0.21732	0.001089	554.45	554.45	-358.17	2836.85	2478.68	-1.3132	10.8629	9.5497	-12
-11	0.23775	0.001089	508.75	508.75	-356.15	2836.68	2480.53	-1.3055	10.8208	9.5153	-11
-10	0.25991	0.001089	467.14	467.14	-354.12	2836.49	2482.37	-1.2978	10.7790	9.4812	-10
-9	0.28395	0.001090	429.21	429.21	-352.08	2836.30	2484.22	-1.2901	10.7375	9.4474	-9
-8	0.30999	0.001090	394.64	394.64	-350.04	2836.10	2486.06	-1.2824	10.6962	9.4139	-8
-7	0.33821	0.001090	363.07	363.07	-347.99	2835.89	2487.90	-1.2746	10.6552	9.3806	-7
-6	0.36874	0.001090	334.25	334.25	-345.93	2835.68	2489.74	-1.2669	10.6145	9.3476	-6
-5	0.40178	0.001090	307.91	307.91	-343.87	2835.45	2491.58	-1.2592	10.5741	9.3149	-5
-4	0.43748	0.001090	283.83	283.83	-341.80	2835.22	2493.42	-1.2515	10.5340	9.2825	-4
-3	0.47606	0.001090	261.79	261.79	-339.72	2834.98	2495.26	-1.2438	10.4941	9.2503	-3
-2	0.51773	0.001091	241.60	241.60	-337.63	2834.72	2497.10	-1.2361	10.4544	9.2184	-2
-1	0.56268	0.001091	223.11	223.11	-335.53	2834.47	2498.93	-1.2284	10.4151	9.1867	-1
0	0.61117	0.001091	206.16	206.16	-333.43	2834.20	2500.77	-1.2206	10.3760	9.1553	0
0	0.6112	0.001000	206.141	206.143	-0.04	2500.81	2500.77	-0.0001	9.1554	9.1553	0
1	0.6571	0.001000	192.455	192.456	4.18	2498.43	2502.61	0.0153	9.1134	9.1286	1
2	0.7060	0.001000	179.769	179.770	8.39	2496.05	2504.44	0.0306	9.0716	9.1022	2
3	0.7581	0.001000	168.026	168.027	12.60	2493.68	2506.28	0.0459	9.0301	9.0761	3
4	0.8135	0.001000	157.137	157.138	16.81	2491.31	2508.12	0.0611	8.9890	9.0501	4
5	0.8725	0.001000	147.032	147.033	21.02	2488.94	2509.95	0.0762	8.9482	9.0244	5
6	0.9353	0.001000	137.653	137.654	25.22	2486.57	2511.79	0.0913	8.9076	8.9990	6
7	1.0020	0.001000	128.947	128.948	29.42	2484.20	2513.62	0.1064	8.8674	8.9738	7
8	1.0729	0.001000	120.850	120.851	33.62	2481.84	2515.46	0.1213	8.8274	8.9488	8
9	1.1481	0.001000	113.326	113.327	37.82	2479.47	2517.29	0.1362	8.7878	8.9240	9
10	1.2280	0.001000	106.328	106.329	42.01	2477.11	2519.12	0.1511	8.7484	8.8995	10
11	1.3128	0.001001	99.807	99.808	46.21	2474.74	2520.95	0.1659	8.7093	8.8751	11
12	1.4026	0.001001	93.740	93.741	50.40	2472.38	2522.78	0.1806	8.6705	8.8510	12
13	1.4979	0.001001	88.084	88.085	54.59	2470.02	2524.61	0.1953	8.6319	8.8272	13
14	1.5987	0.001001	82.812	82.813	58.78	2467.66	2526.44	0.2099	8.5936	8.8035	14
15	1.7055	0.001001	77.895	77.896	62.97	2465.30	2528.26	0.2244	8.5556	8.7800	15
16	1.8185	0.001001	73.305	73.306	67.16	2462.93	2530.09	0.2389	8.5178	8.7568	16
17	1.9380	0.001001	69.020	69.021	71.34	2460.57	2531.91	0.2534	8.4803	8.7337	17

Table 2 Thermodynamic Properties of Water at Saturation, SI Units (Continued)

Temp °C	Absolute Pressure kPa p	Specific Volume, m ³ /kg			Enthalpy, kJ/kg			Entropy, kJ/kg · K			Temp °C
		Sat. Solid v_f	Evap. v_{fg}	Sat. Vapor v_g	h_f	Evap. h_{fg}	Sat. Vapor h_g	Sat. Solid s_f	Evap. s_{fg}	Sat. Vapor s_g	
18	2.0643	0.001001	65.015	65.016	75.53	2458.21	2533.74	0.2678	8.4431	8.7109	18
19	2.1979	0.001002	61.272	61.273	79.71	2455.85	2535.56	0.2821	8.4061	8.6883	19
20	2.3389	0.001002	57.772	57.773	83.90	2453.48	2537.38	0.2965	8.3694	8.6658	20
21	2.4878	0.001002	54.497	54.498	88.08	2451.12	2539.20	0.3107	8.3329	8.6436	21
22	2.6448	0.001002	51.432	51.433	92.27	2448.75	2541.02	0.3249	8.2966	8.6215	22
23	2.8105	0.001003	48.560	48.561	96.45	2446.39	2542.84	0.3390	8.2606	8.5996	23
24	2.9852	0.001003	45.870	45.871	100.63	2444.02	2544.65	0.3531	8.2249	8.5780	24
25	3.1693	0.001003	43.349	43.350	104.81	2441.65	2546.47	0.3672	8.1893	8.5565	25
26	3.3633	0.001003	40.983	40.984	108.99	2439.29	2548.28	0.3812	8.1540	8.5352	26
27	3.5674	0.001004	38.764	38.765	113.17	2436.92	2550.09	0.3951	8.1190	8.5141	27
28	3.7823	0.001004	36.681	36.682	117.36	2434.55	2551.90	0.4090	8.0841	8.4932	28
29	4.0084	0.001004	34.725	34.726	121.54	2432.17	2553.71	0.4229	8.0495	8.4724	29
30	4.2462	0.001004	32.886	32.887	125.72	2429.80	2555.52	0.4367	8.0151	8.4518	30
31	4.4961	0.001005	31.158	31.159	129.90	2427.43	2557.32	0.4505	7.9810	8.4314	31
32	4.7586	0.001005	29.534	29.535	134.08	2425.05	2559.13	0.4642	7.9470	8.4112	32
33	5.0345	0.001005	28.005	28.006	138.26	2422.67	2560.93	0.4779	7.9133	8.3912	33
34	5.3242	0.001006	26.565	26.566	142.44	2420.29	2562.73	0.4915	7.8798	8.3713	34
35	5.6280	0.001006	25.211	25.212	146.62	2417.91	2564.53	0.5051	7.8465	8.3516	35
36	5.9468	0.001006	23.935	23.936	150.80	2415.53	2566.33	0.5186	7.8134	8.3320	36
37	6.2812	0.001007	22.732	22.733	154.98	2413.14	2568.12	0.5321	7.7805	8.3126	37
38	6.6315	0.001007	21.598	21.599	159.16	2410.76	2569.91	0.5456	7.7478	8.2934	38
39	6.9988	0.001008	20.529	20.530	163.34	2408.37	2571.71	0.5590	7.7154	8.2743	39
40	7.3838	0.001008	19.519	19.520	167.52	2405.98	2573.49	0.5724	7.6831	8.2554	40
41	7.7866	0.001008	18.566	18.567	171.70	2403.58	2575.28	0.5857	7.6510	8.2367	41
42	8.2081	0.001009	17.667	17.668	175.88	2401.19	2577.07	0.5990	7.6191	8.2181	42
43	8.6495	0.001009	16.817	16.818	180.06	2398.79	2578.85	0.6122	7.5874	8.1996	43
44	9.1110	0.001010	16.014	16.015	184.24	2396.39	2580.63	0.6254	7.5559	8.1813	44
45	9.5935	0.001010	15.255	15.256	188.42	2393.99	2582.41	0.6386	7.5246	8.1632	45
46	10.0982	0.001010	14.536	14.537	192.60	2391.58	2584.19	0.6517	7.4935	8.1452	46
47	10.6250	0.001011	13.857	13.858	196.78	2389.18	2585.96	0.6648	7.4626	8.1274	47
48	11.1754	0.001011	13.214	13.215	200.97	2386.77	2587.73	0.6778	7.4318	8.1097	48
49	11.7502	0.001012	12.605	12.606	205.15	2384.36	2589.50	0.6908	7.4013	8.0921	49
50	12.3503	0.001012	12.028	12.029	209.33	2381.94	2591.27	0.7038	7.3709	8.0747	50
51	12.9764	0.001013	11.482	11.483	213.51	2379.52	2593.04	0.7167	7.3407	8.0574	51
52	13.6293	0.001013	10.964	10.965	217.70	2377.10	2594.80	0.7296	7.3107	8.0403	52
53	14.3108	0.001014	10.473	10.474	221.88	2374.68	2596.56	0.7424	7.2808	8.0232	53
54	15.0205	0.001014	10.007	10.008	226.06	2372.25	2598.32	0.7552	7.2512	8.0064	54
55	15.7601	0.001015	9.565	9.566	230.25	2369.83	2600.07	0.7680	7.2217	7.9897	55
56	16.5311	0.001015	9.145	9.146	234.43	2367.39	2601.82	0.7807	7.1923	7.9730	56
57	17.3337	0.001016	8.747	8.748	238.61	2364.96	2603.57	0.7934	7.1632	7.9566	57
58	18.1691	0.001016	8.369	8.370	242.80	2362.52	2605.32	0.8061	7.1342	7.9402	58
59	19.0393	0.001017	8.009	8.010	246.98	2360.08	2607.06	0.8187	7.1053	7.9240	59
60	19.9444	0.001017	7.6676	7.6686	251.17	2357.63	2608.80	0.8313	7.0767	7.9079	60
61	20.886	0.001018	7.3426	7.3436	255.36	2355.18	2610.54	0.8438	7.0482	7.8920	61
62	21.865	0.001018	7.0335	7.0345	259.54	2352.73	2612.28	0.8563	7.0198	7.8761	62
63	22.883	0.001019	6.7395	6.7406	263.73	2350.28	2614.01	0.8688	6.9916	7.8604	63
64	23.941	0.001019	6.4597	6.4607	267.92	2347.82	2615.74	0.8812	6.9636	7.8448	64
65	25.040	0.001020	6.1933	6.1943	272.11	2345.36	2617.46	0.8936	6.9357	7.8293	65
66	26.181	0.001020	5.9397	5.9407	276.29	2342.89	2619.18	0.9060	6.9080	7.8140	66
67	27.366	0.001021	5.6980	5.6991	280.48	2340.42	2620.90	0.9183	6.8804	7.7987	67
68	28.597	0.001022	5.4678	5.4688	284.67	2337.95	2622.62	0.9306	6.8530	7.7836	68
69	29.874	0.001022	5.2483	5.2493	288.86	2335.47	2624.33	0.9429	6.8257	7.7686	69
70	31.199	0.001023	5.0391	5.0401	293.06	2332.99	2626.04	0.9551	6.7986	7.7537	70
71	32.573	0.001023	4.8394	4.8405	297.25	2330.50	2627.75	0.9673	6.7716	7.7389	71
72	33.998	0.001024	4.6491	4.6501	301.44	2328.01	2629.45	0.9794	6.7448	7.7242	72
73	35.476	0.001025	4.4673	4.4684	305.63	2325.51	2631.15	0.9916	6.7181	7.7096	73
74	37.006	0.001025	4.2940	4.2950	309.83	2323.02	2632.84	1.0037	6.6915	7.6952	74
75	38.594	0.001026	4.1282	4.1292	314.02	2320.51	2634.53	1.0157	6.6651	7.6808	75
76	40.237	0.001026	3.9701	3.9711	318.22	2318.01	2636.22	1.0278	6.6388	7.6666	76
77	41.939	0.001027	3.8189	3.8200	322.41	2315.49	2637.90	1.0398	6.6127	7.6525	77
78	43.702	0.001028	3.6744	3.6754	326.61	2312.98	2639.58	1.0517	6.5867	7.6384	78
79	45.525	0.001028	3.5364	3.5374	330.80	2310.46	2641.26	1.0636	6.5608	7.6245	79
80	47.414	0.001029	3.4043	3.4053	335.00	2307.93	2642.93	1.0755	6.5351	7.6106	80
81	49.367	0.001030	3.2780	3.2790	339.20	2305.40	2644.60	1.0874	6.5095	7.5969	81
82	51.386	0.001030	3.1572	3.1582	343.40	2302.86	2646.26	1.0993	6.4840	7.5833	82
83	53.475	0.001031	3.0416	3.0426	347.60	2300.32	2647.92	1.1111	6.4587	7.5697	83
84	55.634	0.001032	2.9309	2.9320	351.80	2297.78	2649.58	1.1228	6.4335	7.5563	84
85	57.866	0.001032	2.8249	2.8260	356.00	2295.22	2651.23	1.1346	6.4084	7.5430	85
86	60.173	0.001033	2.7234	2.7245	360.21	2292.67	2652.88	1.1463	6.3834	7.5297	86
87	62.554	0.001034	2.6262	2.6273	364.41	2290.11	2654.52	1.1580	6.3586	7.5165	87
88	65.017	0.001035	2.5330	2.5340	368.62	2287.54	2656.16	1.1696	6.3338	7.5035	88
89	67.558	0.001035	2.4437	2.4447	372.82	2284.97	2657.79	1.1812	6.3093	7.4905	89
90	70.182	0.001036	2.3581	2.3591	377.03	2282.39	2659.42	1.1928	6.2848	7.4776	90
91	72.890	0.001037	2.2760	2.2770	381.24	2279.80	2661.04	1.2044	6.2604	7.4648	91
92	75.685	0.001037	2.1972	2.1983	385.45	2277.22	2662.66	1.2159	6.2362	7.4521	92
93	78.567	0.001038	2.1217	2.1227	389.66	2274.62	2664.28	1.2274	6.2121	7.4395	93
94	81.543	0.001039	2.0491	2.0502	393.87	2272.02	2665.89	1.2389	6.1881	7.4270	94
95	84.609	0.001040	1.9796	1.9806	398.08	2269.41	2667.49	1.2504	6.1642	7.4145	95