

STANDARD DENSITY OF WATER

This table gives the density ρ of water in the temperature range from 0 °C to 100 °C at a pressure of 101325 Pa (one standard atmosphere). Temperatures are given on the ITS-90 scale. From 0 °C to 40 °C the values are taken from the publication in Reference 1 and refer to standard mean ocean water (SMOW), free from dissolved salts and gases. SMOW is a standard water sample of high purity and known isotopic composition. Methods of correcting for different isotopic compositions are discussed in Ref. 2. The remaining values are calculated from the NIST REFPROP program, Ref. 3, which obtains thermodynamic properties from the equation of state of Wagner and Pruss given in Ref. 4.

References

1. Tanaka, M., Girard, G., Davis, R., Peuto, A., and Bignell, N., *Metrologia* 38, 301, 2001.
2. Marsh, K. N., Ed., *Recommended Reference Materials for the Realization of Physicochemical Properties*, Blackwell Scientific Publications, Oxford, 1987.
3. Lemmon, E.W., Huber, M.L., and McLinden, M.O., NIST Standard Reference Database 23: Reference Fluid Thermodynamic and Transport Properties-REFPROP, Version 9.0, National Institute of Standards and Technology, Standard Reference Data Program, Gaithersburg, Maryland, 2010 (www.nist.gov/srd/nist23.cfm).
4. Wagner, W., and Pruss, A., *J. Phys. Chem. Ref. Data* 31, 387, 2002.

$t/^\circ\text{C}$	$\rho/\text{g cm}^{-3}$	$t/^\circ\text{C}$	$\rho/\text{g cm}^{-3}$	$t/^\circ\text{C}$	$\rho/\text{g cm}^{-3}$	$t/^\circ\text{C}$	$\rho/\text{g cm}^{-3}$	$t/^\circ\text{C}$	$\rho/\text{g cm}^{-3}$
0.1	0.9998495	4.1	0.9999748	8.1	0.9998452	12.1	0.9994890	16.1	0.9989296
0.2	0.9998560	4.2	0.9999746	8.2	0.9998389	12.2	0.9994774	16.2	0.9989132
0.3	0.9998624	4.3	0.9999742	8.3	0.9998325	12.3	0.9994657	16.3	0.9988967
0.4	0.9998685	4.4	0.9999736	8.4	0.9998260	12.4	0.9994539	16.4	0.9988800
0.5	0.9998745	4.5	0.9999728	8.5	0.9998193	12.5	0.9994419	16.5	0.9988633
0.6	0.9998803	4.6	0.9999719	8.6	0.9998125	12.6	0.9994298	16.6	0.9988464
0.7	0.9998859	4.7	0.9999709	8.7	0.9998056	12.7	0.9994176	16.7	0.9988294
0.8	0.9998913	4.8	0.9999697	8.8	0.9997985	12.8	0.9994052	16.8	0.9988123
0.9	0.9998966	4.9	0.9999683	8.9	0.9997912	12.9	0.9993927	16.9	0.9987951
1.0	0.9999017	5.0	0.9999668	9.0	0.9997839	13.0	0.9993801	17.0	0.9987778
1.1	0.9999066	5.1	0.9999651	9.1	0.9997764	13.1	0.9993674	17.1	0.9987603
1.2	0.9999113	5.2	0.9999633	9.2	0.9997687	13.2	0.9993546	17.2	0.9987428
1.3	0.9999158	5.3	0.9999613	9.3	0.9997610	13.3	0.9993416	17.3	0.9987251
1.4	0.9999202	5.4	0.9999592	9.4	0.9997530	13.4	0.9993285	17.4	0.9987073
1.5	0.9999244	5.5	0.9999569	9.5	0.9997450	13.5	0.9993153	17.5	0.9986895
1.6	0.9999285	5.6	0.9999544	9.6	0.9997368	13.6	0.9993020	17.6	0.9986715
1.7	0.9999323	5.7	0.9999518	9.7	0.9997285	13.7	0.9992885	17.7	0.9986534
1.8	0.9999360	5.8	0.9999491	9.8	0.9997200	13.8	0.9992749	17.8	0.9986351
1.9	0.9999396	5.9	0.9999462	9.9	0.9997114	13.9	0.9992612	17.9	0.9986168
2.0	0.9999429	6.0	0.9999431	10.0	0.9997027	14.0	0.9992474	18.0	0.9985984
2.1	0.9999461	6.1	0.9999400	10.1	0.9996938	14.1	0.9992335	18.1	0.9985798
2.2	0.9999491	6.2	0.9999366	10.2	0.9996848	14.2	0.9992194	18.2	0.9985611
2.3	0.9999519	6.3	0.9999331	10.3	0.9996757	14.3	0.9992052	18.3	0.9985424
2.4	0.9999546	6.4	0.9999295	10.4	0.9996665	14.4	0.9991909	18.4	0.9985235
2.5	0.9999571	6.5	0.9999257	10.5	0.9996571	14.5	0.9991765	18.5	0.9985045
2.6	0.9999595	6.6	0.9999217	10.6	0.9996475	14.6	0.9991619	18.6	0.9984854
2.7	0.9999616	6.7	0.9999176	10.7	0.9996379	14.7	0.9991473	18.7	0.9984662
2.8	0.9999636	6.8	0.9999134	10.8	0.9996281	14.8	0.9991325	18.8	0.9984469
2.9	0.9999655	6.9	0.9999090	10.9	0.9996182	14.9	0.9991176	18.9	0.9984275
3.0	0.9999672	7.0	0.9999045	11.0	0.9996081	15.0	0.9991026	19.0	0.9984079
3.1	0.9999687	7.1	0.9998998	11.1	0.9995979	15.1	0.9990874	19.1	0.9983883
3.2	0.9999700	7.2	0.9998950	11.2	0.9995876	15.2	0.9990722	19.2	0.9983686
3.3	0.9999712	7.3	0.9998900	11.3	0.9995772	15.3	0.9990568	19.3	0.9983487
3.4	0.9999722	7.4	0.9998849	11.4	0.9995666	15.4	0.9990413	19.4	0.9983287
3.5	0.9999731	7.5	0.9998797	11.5	0.9995559	15.5	0.9990257	19.5	0.9983087
3.6	0.9999738	7.6	0.9998743	11.6	0.9995451	15.6	0.9990100	19.6	0.9982885
3.7	0.9999743	7.7	0.9998687	11.7	0.9995341	15.7	0.9989942	19.7	0.9982682
3.8	0.9999747	7.8	0.9998631	11.8	0.9995230	15.8	0.9989782	19.8	0.9982478
3.9	0.9999749	7.9	0.9998572	11.9	0.9995118	15.9	0.9989621	19.9	0.9982273
4.0	0.9999749	8.0	0.9998513	12.0	0.9995005	16.0	0.9989459	20.0	0.9982067

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20.1	0.9981860	25.3	0.9969696	30.5	0.9954967	35.7	0.9937899	49.0	0.98848
20.2	0.9981652	25.4	0.9969436	30.6	0.9954660	35.8	0.9937549	50.0	0.98804
20.3	0.9981443	25.5	0.9969176	30.7	0.9954352	35.9	0.9937199	51.0	0.98758
20.4	0.9981233	25.6	0.9968914	30.8	0.9954044	36.0	0.9936847	52.0	0.98712
20.5	0.9981022	25.7	0.9968651	30.9	0.9953734	36.1	0.9936495	53.0	0.98665
20.6	0.9980810	25.8	0.9968387	31.0	0.9953424	36.2	0.9936142	54.0	0.98617
20.7	0.9980596	25.9	0.9968123	31.1	0.9953113	36.3	0.9935788	55.0	0.98569
20.8	0.9980382	26.0	0.9967857	31.2	0.9952801	36.4	0.9935434	56.0	0.98521
20.9	0.9980167	26.1	0.9967591	31.3	0.9952488	36.5	0.9935078	57.0	0.98471
21.0	0.9979950	26.2	0.9967324	31.4	0.9952175	36.6	0.9934722	58.0	0.98421
21.1	0.9979733	26.3	0.9967055	31.5	0.9951860	36.7	0.9934365	59.0	0.98371
21.2	0.9979514	26.4	0.9966786	31.6	0.9951545	36.8	0.9934007	60.0	0.98320
21.3	0.9979295	26.5	0.9966516	31.7	0.9951228	36.9	0.9933649	61.0	0.98268
21.4	0.9979074	26.6	0.9966245	31.8	0.9950911	37.0	0.9933290	62.0	0.98216
21.5	0.9978853	26.7	0.9965973	31.9	0.9950593	37.1	0.9932929	63.0	0.98163
21.6	0.9978630	26.8	0.9965700	32.0	0.9950275	37.2	0.9932569	64.0	0.98109
21.7	0.9978407	26.9	0.9965426	32.1	0.9949955	37.3	0.9932207	65.0	0.98055
21.8	0.9978182	27.0	0.9965151	32.2	0.9949635	37.4	0.9931844	66.0	0.98000
21.9	0.9977956	27.1	0.9964875	32.3	0.9949313	37.5	0.9931481	67.0	0.97945
22.0	0.9977730	27.2	0.9964599	32.4	0.9948991	37.6	0.9931117	68.0	0.97890
22.1	0.9977502	27.3	0.9964321	32.5	0.9948668	37.7	0.9930753	69.0	0.97833
22.2	0.9977273	27.4	0.9964043	32.6	0.9948344	37.8	0.9930387	70.0	0.97776
22.3	0.9977044	27.5	0.9963763	32.7	0.9948020	37.9	0.9930021	71.0	0.97719
22.4	0.9976813	27.6	0.9963483	32.8	0.9947694	38.0	0.9929654	72.0	0.97661
22.5	0.9976582	27.7	0.9963202	32.9	0.9947368	38.1	0.9929286	73.0	0.97603
22.6	0.9976349	27.8	0.9962920	33.0	0.9947041	38.2	0.9928917	74.0	0.97544
22.7	0.9976115	27.9	0.9962637	33.1	0.9946713	38.3	0.9928548	75.0	0.97484
22.8	0.9975881	28.0	0.9962353	33.2	0.9946384	38.4	0.9928178	76.0	0.97424
22.9	0.9975645	28.1	0.9962068	33.3	0.9946055	38.5	0.9927807	77.0	0.97364
23.0	0.9975408	28.2	0.9961783	33.4	0.9945724	38.6	0.9927435	78.0	0.97303
23.1	0.9975171	28.3	0.9961496	33.5	0.9945393	38.7	0.9927063	79.0	0.97241
23.2	0.9974932	28.4	0.9961208	33.6	0.9945061	38.8	0.9926689	80.0	0.97179
23.3	0.9974692	28.5	0.9960920	33.7	0.9944728	38.9	0.9926316	81.0	0.97116
23.4	0.9974452	28.6	0.9960631	33.8	0.9944394	39.0	0.9925941	82.0	0.97053
23.5	0.9974210	28.7	0.9960341	33.9	0.9944060	39.1	0.9925565	83.0	0.96990
23.6	0.9973968	28.8	0.9960050	34.0	0.9943724	39.2	0.9925189	84.0	0.96926
23.7	0.9973724	28.9	0.9959758	34.1	0.9943388	39.3	0.9924812	85.0	0.96861
23.8	0.9973480	29.0	0.9959465	34.2	0.9943051	39.4	0.9924434	86.0	0.96796
23.9	0.9973234	29.1	0.9959171	34.3	0.9942713	39.5	0.9924056	87.0	0.96731
24.0	0.9972988	29.2	0.9958876	34.4	0.9942375	39.6	0.9923677	88.0	0.96664
24.1	0.9972740	29.3	0.9958581	34.5	0.9942035	39.7	0.9923297	89.0	0.96598
24.2	0.9972492	29.4	0.9958285	34.6	0.9941695	39.8	0.9922916	90.0	0.96531
24.3	0.9972243	29.5	0.9957987	34.7	0.9941354	39.9	0.9922534	91.0	0.96463
24.4	0.9971992	29.6	0.9957689	34.8	0.9941012	40.0	0.9922152	92.0	0.96396
24.5	0.9971741	29.7	0.9957390	34.9	0.9940669	41.0	0.99183	93.0	0.96327
24.6	0.9971489	29.8	0.9957090	35.0	0.9940326	42.0	0.99144	94.0	0.96258
24.7	0.9971236	29.9	0.9956790	35.1	0.9939982	43.0	0.99104	95.0	0.96189
24.8	0.9970981	30.0	0.9956488	35.2	0.9939637	44.0	0.99063	96.0	0.96119
24.9	0.9970726	30.1	0.9956185	35.3	0.9939291	45.0	0.99021	97.0	0.96049
25.0	0.9970470	30.2	0.9955882	35.4	0.9938944	46.0	0.98979	98.0	0.95978
25.1	0.9970213	30.3	0.9955578	35.5	0.9938597	47.0	0.98936	99.0	0.95907
25.2	0.9969955	30.4	0.9955273	35.6	0.9938248	48.0	0.98893	99.974	0.95837