ITTC Quality System Manual

Recommended Procedures and Guidelines

Procedure

Fresh Water and Seawater Properties

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Updated / Edited by	Approved
Quality Systems Group of the 28th ITTC	26th ITTC 2011
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Fresh Water and Seawater Properties

1. INTRODUCTION

The international standard for the properties of fresh water and seawater are specified by the International Association for the Properties of Water and Steam (IAPWS). The properties available include density, viscosity, thermal conductivity, index of refraction, vapour pressure, speed of sound, and surface tension. Those of liquid water are described in IAPWS (2008a). For this procedure, only the following properties are provided: density, absolute viscosity, kinematic viscosity, and vapour pressure.

In general, the water properties are a function of temperature (t), pressure (p), and absolute salinity (S_A). For fresh water, S_A = 0.0. In this procedure, data are provided at standard pressure of 0.101325 MPa and as a function of temperature. The temperature scale is the International Temperature Scale 1990 (ITS-90). At non-standard conditions, water properties should be computed from computer codes described in the following paragraphs.

The values for fresh water were computed via a computer code from NIST (National Institute of Standards and Technology), the National Metrology Institute (NMI) for the United States. Harvey, et al. (2008) is the manual for the computer code. The sensitivity coefficients are also provided so that the uncertainty in the property may be computed from the uncertainty in temperature per the 25th ITTC procedure on uncertainty analysis. The uncertainties in the IAPWS equations are also provided.

IAWPS (2008b) is the new international standard for seawater properties. The new standard for seawater has been developed by a group at the United Nations and UNESCO (United Nations Educational, Scientific, and Cultural Organization) and several other international organizations. The latest standard for seawater properties is the International Thermodynamic Equation Of Seawater: 2010 (TEOS-10). IOC, et al. (2010) is the manual for the computer code. The code currently calculates thermodynamic properties such as density and vapour pressure. IAWPS (2010) has certified a research need for transport properties such as viscosity. In the meantime for this procedure, viscosity and vapour pressure recommended by Sharqawy, et al. (2010) is adopted. Another source of seawater properties is the SIA (Sea-Ice-Air) library described by Feistel, et al. (2010) and Wright, et al. (2010).

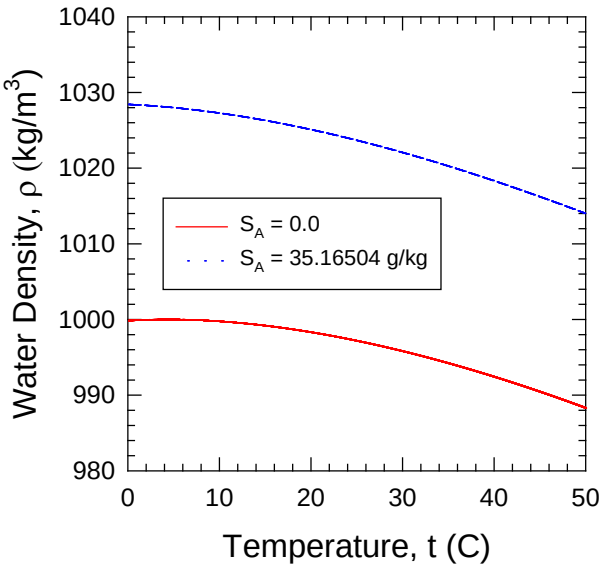
2. FRESH WATER PROPERTIES

Fresh water properties were computed at the standard pressure of 0.101325 MPa. The results for density, absolute viscosity, kinematic viscosity, vapour pressure, and their sensitivity coefficients are shown in the following graphically in Figure 1 through Figure 4 as S_A = 0.0. The properties were produced from the NIST code of Harvey, et al. (2008) from 0.1 to 50 °C in 0.1 °C steps, and the sensitivity coefficients were computed by a central finite-differencing method from ISO (2008) given by:

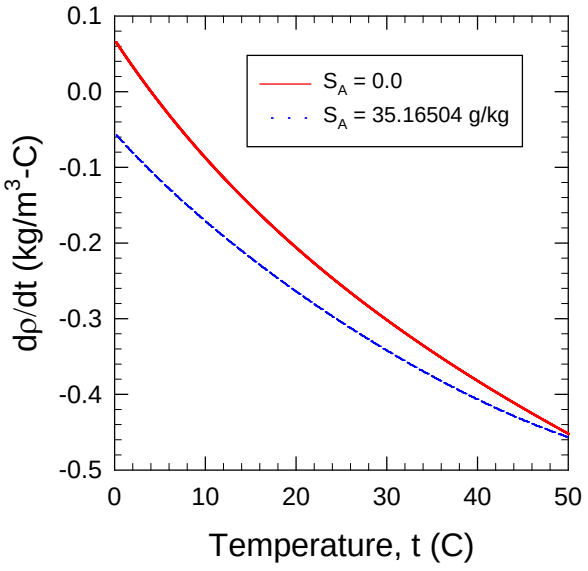
$$dx / dt \approx (x_{i+1} - x_{i-1}) / (2\Delta t) \qquad (1)$$

where x is a water property, t is the temperature in °C, and Δt = 0.1 °C.

Water property numerical values at 1 °C increment from 10 to 40 °C are listed in Table 1. A more detailed list at 0.1 °C increments from 0.1 to 50 °C is located in Appendix A.

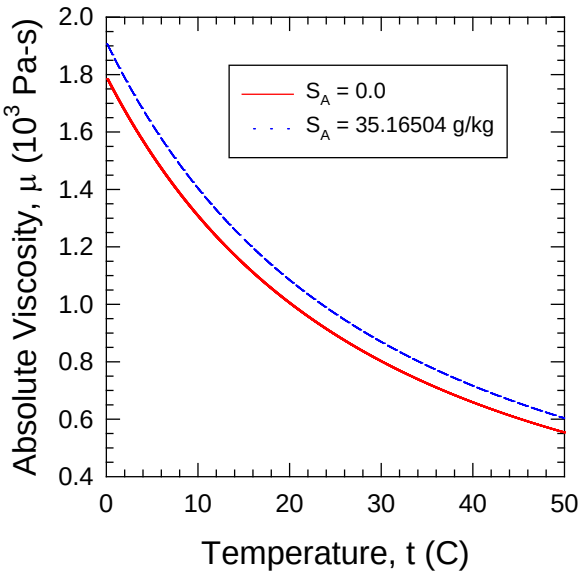


a. Density

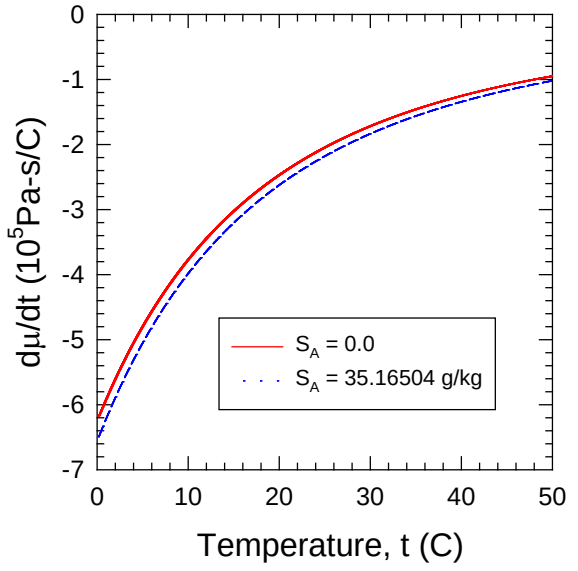


b. Sensitivity coefficient

Figure 1: Fresh water and standard seawater density

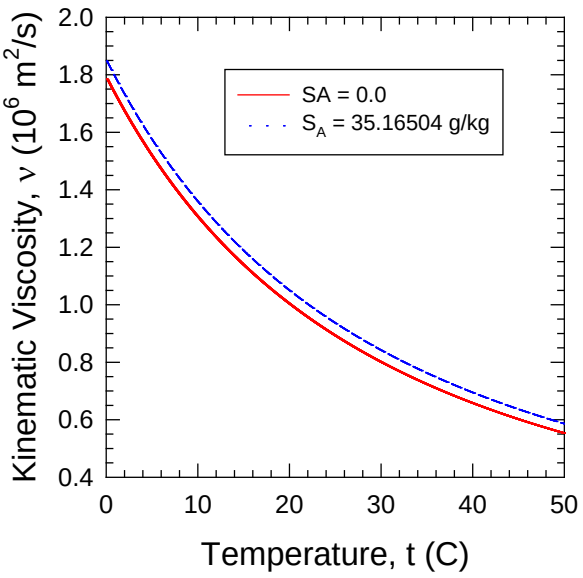


a. Absolute viscosity

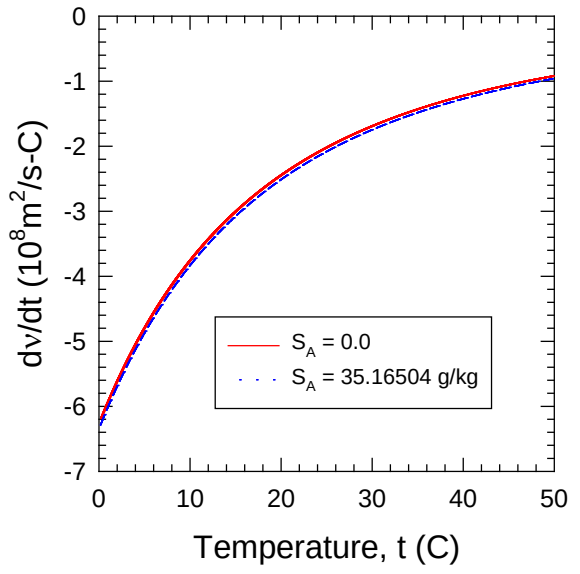


b. Sensitivity coefficient

Figure 2: Fresh water and standard seawater absolute viscosity

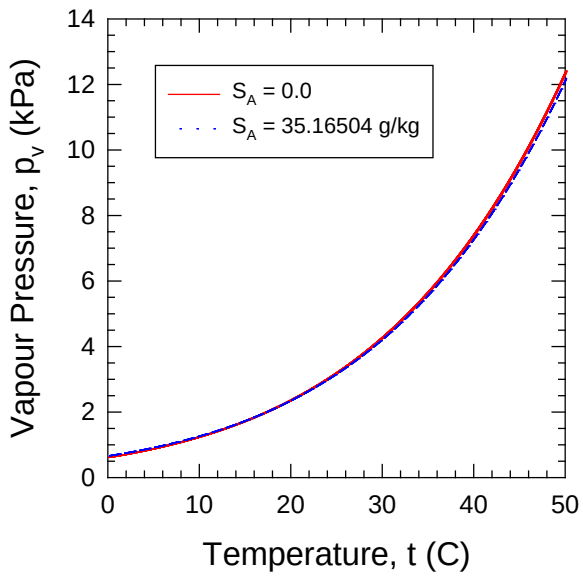


a. Kinematic viscosity

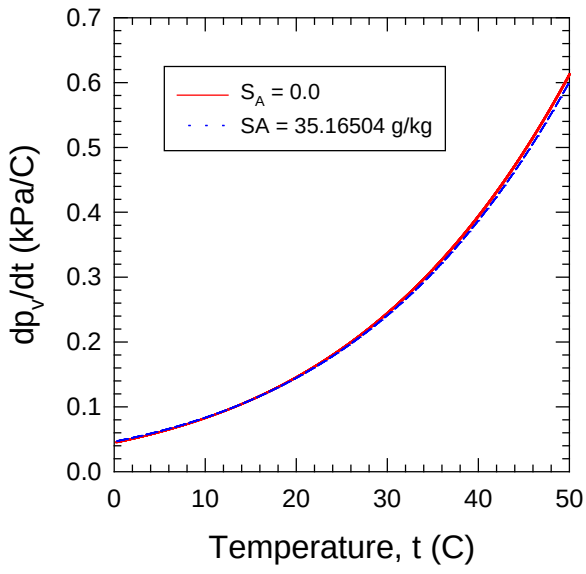


b. Sensitivity coefficient

Figure 3: Fresh water and standard seawater kinematic viscosity



a. Vapour pressure



b. Sensitivity coefficient

Figure 4: Fresh water and standard seawater vapour pressure

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
10	999.7025	-0.08791	0.001306	-3.760E-05	1.3063E-06	-3.749E-08	1.2282E-03	8.230E-05
11	999.6079	-0.10112	0.001269	-3.591E-05	1.2697E-06	-3.580E-08	1.3130E-03	8.728E-05
12	999.5004	-0.11399	0.001234	-3.433E-05	1.2347E-06	-3.420E-08	1.4028E-03	9.252E-05
13	999.3801	-0.12653	0.001200	-3.284E-05	1.2012E-06	-3.271E-08	1.4981E-03	9.802E-05
14	999.2474	-0.13877	0.001168	-3.144E-05	1.1692E-06	-3.130E-08	1.5990E-03	1.038E-04
15	999.1026	-0.15071	0.001138	-3.012E-05	1.1386E-06	-2.997E-08	1.7058E-03	1.099E-04
16	998.9461	-0.16237	0.001108	-2.887E-05	1.1093E-06	-2.872E-08	1.8188E-03	1.162E-04
17	998.7780	-0.17376	0.001080	-2.769E-05	1.0811E-06	-2.754E-08	1.9384E-03	1.229E-04
18	998.5986	-0.18489	0.001053	-2.658E-05	1.0542E-06	-2.642E-08	2.0647E-03	1.299E-04
19	998.4083	-0.19578	0.001027	-2.553E-05	1.0283E-06	-2.537E-08	2.1983E-03	1.372E-04
20	998.2072	-0.20644	0.001002	-2.453E-05	1.0034E-06	-2.437E-08	2.3393E-03	1.449E-04
21	997.9955	-0.21687	0.000978	-2.359E-05	9.7950E-07	-2.343E-08	2.4882E-03	1.530E-04
22	997.7735	-0.22708	0.000954	-2.270E-05	9.5653E-07	-2.253E-08	2.6453E-03	1.614E-04
23	997.5414	-0.23709	0.000932	-2.185E-05	9.3442E-07	-2.168E-08	2.8111E-03	1.702E-04
24	997.2994	-0.24691	0.000911	-2.104E-05	9.1315E-07	-2.088E-08	2.9858E-03	1.794E-04
25	997.0476	-0.25653	0.000890	-2.028E-05	8.9266E-07	-2.011E-08	3.1699E-03	1.890E-04
26	996.7864	-0.26597	0.000870	-1.955E-05	8.7291E-07	-1.938E-08	3.3639E-03	1.990E-04
27	996.5158	-0.27524	0.000851	-1.886E-05	8.5388E-07	-1.869E-08	3.5681E-03	2.095E-04
28	996.2360	-0.28434	0.000832	-1.820E-05	8.3552E-07	-1.803E-08	3.7831E-03	2.205E-04
29	995.9471	-0.29327	0.000814	-1.757E-05	8.1781E-07	-1.740E-08	4.0092E-03	2.319E-04
30	995.6495	-0.30206	0.000797	-1.697E-05	8.0071E-07	-1.681E-08	4.2470E-03	2.438E-04
31	995.3431	-0.31069	0.000781	-1.640E-05	7.8419E-07	-1.624E-08	4.4969E-03	2.562E-04
32	995.0281	-0.31918	0.000764	-1.586E-05	7.6823E-07	-1.569E-08	4.7596E-03	2.692E-04
33	994.7048	-0.32753	0.000749	-1.534E-05	7.5280E-07	-1.517E-08	5.0354E-03	2.826E-04
34	994.3731	-0.33574	0.000734	-1.484E-05	7.3788E-07	-1.467E-08	5.3251E-03	2.967E-04
35	994.0333	-0.34383	0.000719	-1.436E-05	7.2344E-07	-1.420E-08	5.6290E-03	3.113E-04
36	993.6855	-0.35179	0.000705	-1.391E-05	7.0947E-07	-1.375E-08	5.9479E-03	3.265E-04
37	993.3298	-0.35963	0.000691	-1.347E-05	6.9595E-07	-1.331E-08	6.2823E-03	3.424E-04
38	992.9663	-0.36736	0.000678	-1.305E-05	6.8285E-07	-1.289E-08	6.6328E-03	3.588E-04
39	992.5951	-0.37497	0.000665	-1.265E-05	6.7015E-07	-1.250E-08	7.0002E-03	3.759E-04
40	992.2164	-0.38248	0.000653	-1.227E-05	6.5785E-07	-1.211E-08	7.3849E-03	3.937E-04

Table 1: Fresh water properties at 1 °C increment

2.1 Uncertainty estimates for fresh water properties

The uncertainties in the IAWPS equations are summarized in Table 2 for an expanded uncertainty with a coverage factor of 2. For density and viscosity, the uncertainties are from IAWPS (2008a). The uncertainty in vapour pressure is from Harvey, et al. (2008) Figure B-4. The value of ±0.02 % is actually the maximum value over the ambient temperature range and is recommended for simplicity.

Property	Symbol	U_{95}	Units
Density	ρ	1	ppm
Viscosity	μ	1	%
Vapour Pressure	p_v	0.02	%

Table 2: Uncertainty in water properties at 95 % confidence limit [ppm: parts per million (0.0001 %)]

The combined uncertainty then includes both the influence of the uncertainty in temperature and the uncertainty in the IAWPS equations. The combined expanded uncertainty is then

$$U_c = \sqrt{U_x^2 + (c_{x,t}U_t)^2} \quad (2)$$

where U_x is the uncertainty in the water property equation from Table 2, U_t the uncertainty in temperature, and $c_{x,t} = \partial x/\partial t$ the sensitivity coefficient from Table 1 or Appendix A. The uncertainty in temperature should include both Type A and Type B uncertainty estimates from ISO (2008).

2.1.1 Example uncertainty calculation of fresh water properties

From the previous section, the following are specific examples of fresh water properties at 20 °C.

For U_t = ±1.0 °C:

- Density: 998.21 ±0.21 kg/m^3 (±0.021 %)
- Absolute viscosity: 0.001002 ± 0.000026 Pa·s (±2.6 %)
- Kinematic viscosity: (1.003 ±0.026) x 10^{-6} m^2/s (±2.6 %)
- Vapour pressure: 2.34 ±0.14 kPa (6.2 %)

In this example, most of the uncertainty is from the uncertainty in temperature.

For U_t = ±0.10 °C:

- Density: 998.207 ±0.021 kg/m^3 (±0.0021 %)
- Absolute viscosity: 0.001002 ± 0.000010 Pa·s (±1.0 %)
- Kinematic viscosity: (1.003 ±0.010) x 10^{-6} m^2/s (±1.0 %)
- Vapour pressure: 2.339 ±0.014 kPa (0.62 %)

In this case, most of the uncertainty in density and vapour pressure is from temperature while most of the uncertainty in viscosity is from the viscosity equation (±1.0 %).

3. SALTWATER PROPERTIES

In the new international standard for seawater properties, IOC, et al. (2010) absolute salinity is mass based. In the previous standard, salinity was practical salinity, S_P, which is measured as conductivity and has no units. The practical salinity scale is valid over the range, $2 < S_P < 42$. For standard seawater, practical salinity

has a value of 35 while absolute salinity has a value of 35.16504 ±0.007 g/kg. Reference salinity is defined as

$$S_R = (35.16504/35)S_P \quad (3)$$

Absolute Salinity may then be computed from a conductivity measurement

$$S_A = S_R + \delta S_A \quad (4)$$

where δS_A is the absolute salinity anomaly. In general, the absolute salinity anomaly is a function of latitude, longitude, and pressure. Additional details are described in IOC, et al. (2010).

3.1 Properties at standard salinity and varying temperature.

Saltwater properties were computed at the standard pressure of 0.101325 MPa and standard absolute salinity, S_A = 35.16504 ±0.007 g/kg. The results for density, absolute viscosity, kinematic viscosity, vapour pressure, and their sensitivity coefficients for temperature are presented in Figure 1 through Figure 4. The density was computed from the TEOS-10 code MatLab Version 2, IOC, et al. (2010) while viscosity and vapour pressure were computed from Sharqawy, et al. (2010) from 0.1 to 50 °C in 0.1 °C steps, and the sensitivity coefficients were computed by the central finite differencing method of Equation (1) with Δt = 0.1 °C.

From Sharqawy, et al. (2010) the equation for absolute viscosity is

$$\mu_{sw} = \mu_{fw}(1 + AS_A + BS_A) \quad (5)$$

where

$$A = 1.541 + 0.01998t - 9.52\times10^{-5}t^2$$

$$B = 7.974 - 0.07561t + 4.724\times10^{-5}t^2$$

The equation for vapour pressure is

$$p_{v,fw} / p_{v,sw} = 1 + 0.57357\left[S_A / (1000 - S_A)\right] \quad (6)$$

The fresh water properties (fw) are computed from Harvey, et al. (2008) as described in Section 2. When S_A = 0.0, the values of vapour pressure and absolute viscosity in Equations (5) and (6) are the same as in Section 2.

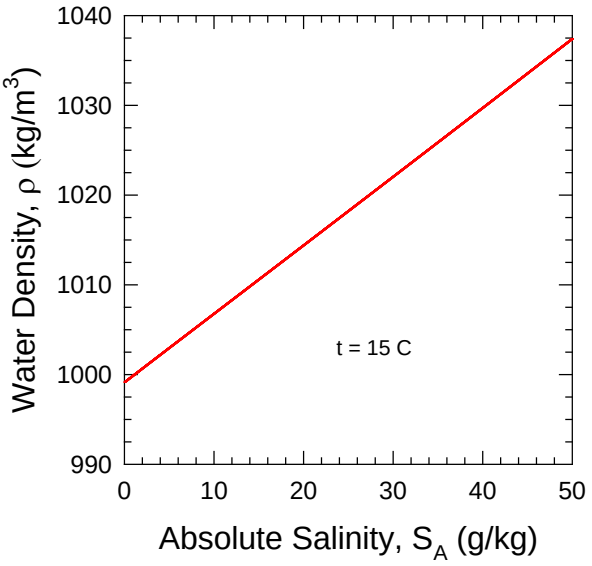
Seawater property numerical values at 1 °C increment from 1 to 30 °C are listed in Table 3. A more detailed list at 0.1 °C increments from 0.1 to 50 °C is located in Appendix B.

3.2 Properties at 15 °C and varying salinity

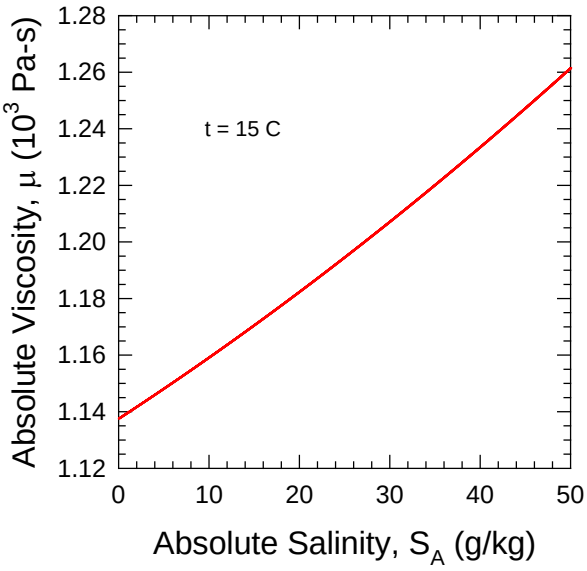
As an example and for comparison, results for varying absolute salinity and temperature of 15 °C are presented in Figure 5 through Figure 8 and Table 4. The derivatives of absolute salinity were computed from Equation (1) with ΔS_A = 0.1 g/kg substituted for temperature.

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
1	1028.0941	-0.0680	0.001843	-6.186E-05	1.7926E-06	-6.005E-08	6.4363E-04	4.639E-05
2	1028.0197	-0.0810	0.001783	-5.862E-05	1.7341E-06	-5.689E-08	6.9153E-04	4.944E-05
3	1027.9327	-0.0930	0.001726	-5.561E-05	1.6787E-06	-5.395E-08	7.4256E-04	5.265E-05
4	1027.8336	-0.1050	0.001671	-5.282E-05	1.6262E-06	-5.122E-08	7.9689E-04	5.604E-05
5	1027.7225	-0.1170	0.001620	-5.021E-05	1.5762E-06	-4.867E-08	8.5471E-04	5.962E-05
6	1027.6000	-0.1280	0.001571	-4.777E-05	1.5288E-06	-4.630E-08	9.1620E-04	6.340E-05
7	1027.4662	-0.1390	0.001524	-4.549E-05	1.4836E-06	-4.408E-08	9.8157E-04	6.738E-05
8	1027.3214	-0.1500	0.001480	-4.337E-05	1.4406E-06	-4.200E-08	1.0510E-03	7.156E-05
9	1027.1659	-0.1605	0.001438	-4.137E-05	1.3995E-06	-4.006E-08	1.1248E-03	7.597E-05
10	1027.0000	-0.1710	0.001397	-3.950E-05	1.3604E-06	-3.823E-08	1.2030E-03	8.061E-05
11	1026.8238	-0.1815	0.001359	-3.774E-05	1.3230E-06	-3.652E-08	1.2861E-03	8.550E-05
12	1026.6376	-0.1915	0.001322	-3.609E-05	1.2873E-06	-3.492E-08	1.3741E-03	9.063E-05
13	1026.4416	-0.2010	0.001286	-3.454E-05	1.2532E-06	-3.341E-08	1.4674E-03	9.601E-05
14	1026.2360	-0.2105	0.001252	-3.308E-05	1.2205E-06	-3.198E-08	1.5662E-03	1.017E-04
15	1026.0210	-0.2195	0.001220	-3.170E-05	1.1892E-06	-3.064E-08	1.6709E-03	1.076E-04
16	1025.7967	-0.2290	0.001189	-3.040E-05	1.1592E-06	-2.938E-08	1.7816E-03	1.139E-04
17	1025.5633	-0.2380	0.001159	-2.918E-05	1.1304E-06	-2.819E-08	1.8987E-03	1.204E-04
18	1025.3210	-0.2470	0.001131	-2.801E-05	1.1028E-06	-2.706E-08	2.0225E-03	1.272E-04
19	1025.0700	-0.2555	0.001103	-2.692E-05	1.0763E-06	-2.599E-08	2.1533E-03	1.344E-04
20	1024.8103	-0.2640	0.001077	-2.588E-05	1.0508E-06	-2.498E-08	2.2914E-03	1.419E-04
21	1024.5421	-0.2725	0.001051	-2.489E-05	1.0263E-06	-2.402E-08	2.4373E-03	1.498E-04
22	1024.2656	-0.2805	0.001027	-2.396E-05	1.0027E-06	-2.312E-08	2.5912E-03	1.581E-04
23	1023.9808	-0.2890	0.001004	-2.307E-05	9.8002E-07	-2.226E-08	2.7535E-03	1.667E-04
24	1023.6881	-0.2970	0.000981	-2.223E-05	9.5818E-07	-2.144E-08	2.9247E-03	1.757E-04
25	1023.3873	-0.3050	0.000959	-2.143E-05	9.3713E-07	-2.066E-08	3.1050E-03	1.851E-04
26	1023.0788	-0.3125	0.000938	-2.067E-05	9.1683E-07	-1.993E-08	3.2950E-03	1.949E-04
27	1022.7626	-0.3200	0.000918	-1.995E-05	8.9726E-07	-1.922E-08	3.4950E-03	2.052E-04
28	1022.4389	-0.3275	0.000898	-1.926E-05	8.7837E-07	-1.856E-08	3.7056E-03	2.159E-04
29	1022.1078	-0.3345	0.000879	-1.860E-05	8.6014E-07	-1.792E-08	3.9271E-03	2.271E-04
30	1021.7694	-0.3420	0.000861	-1.798E-05	8.4253E-07	-1.731E-08	4.1600E-03	2.388E-04

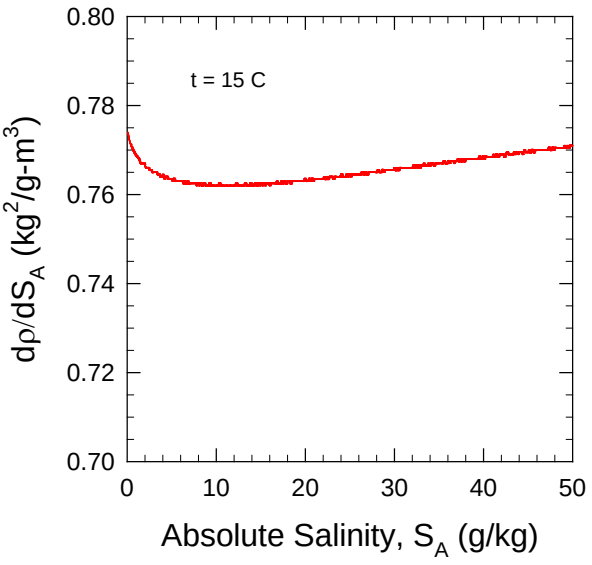
Table 3: Standard seawater properties at 1 °C increment



a. Density

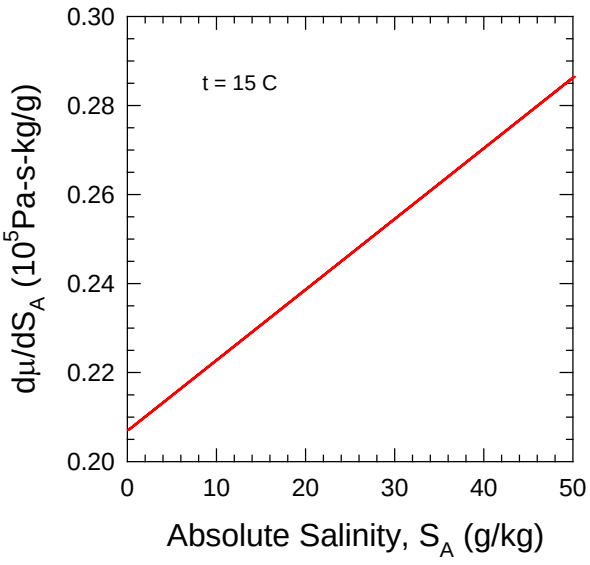


a. Absolute viscosity



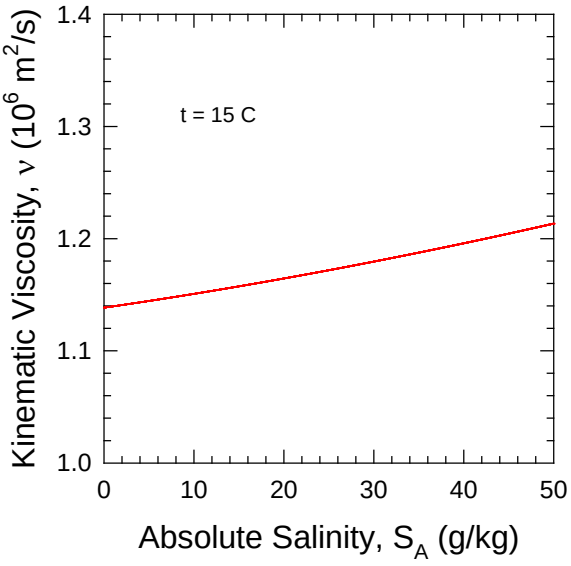
b. Sensitivity coefficient

Figure 5: Seawater density at 15 °C

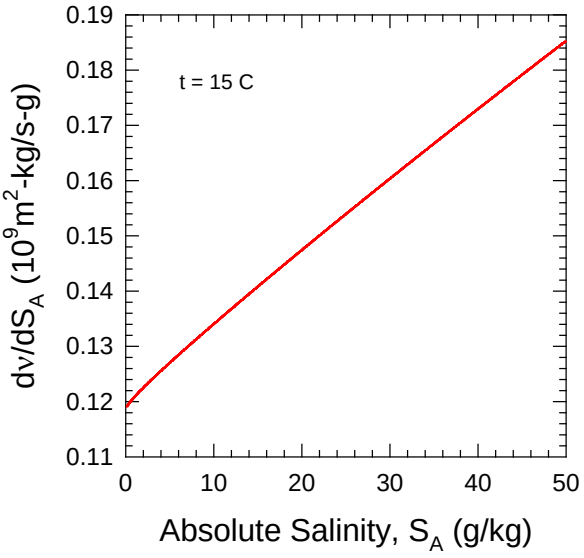


b. Sensitivity coefficient

Figure 6: Seawater absolute viscosity at 15 °C

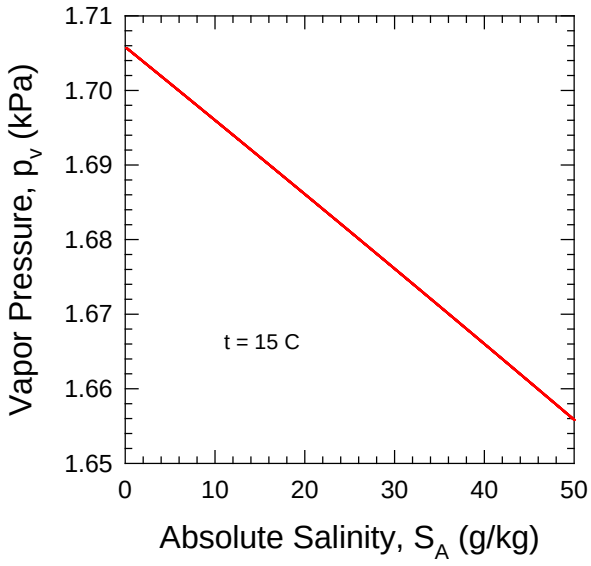


a. Kinematic viscosity

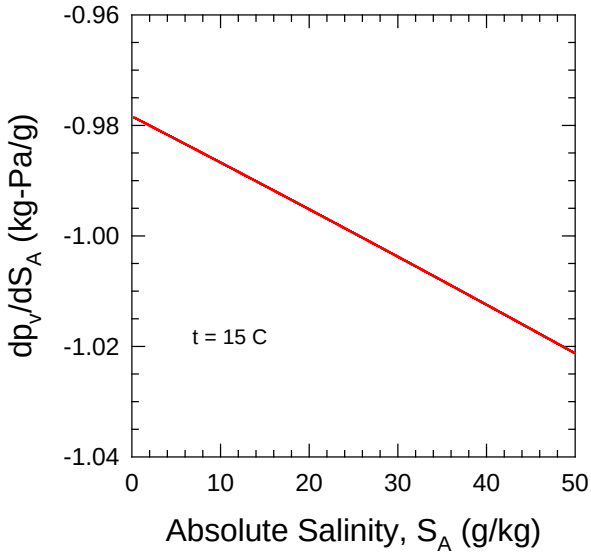


b. Sensitivity coefficient

Figure 7: Seawater kinematic viscosity, 15 °C



a. Vapour pressure



b. Sensitivity coefficient

Figure 8: Seawater vapour pressure at 15 °C

S_A	Density ρ	$\partial\rho/\partial S_A$	Viscos μ	$\partial\mu/\partial S_A$	$\nu = \mu/\rho$	$\partial\nu/\partial S_A$	Press p_v	$\partial p_v/\partial S_A$
(g/kg)	(kg/m^3)	(kg^2/g·m^3)	(Pa·s)	(kg·Pa·s/g)	(m^2/s)	(kg·m^2/g·s)	(MPa)	(kg·MPa/g)
10	1006.7950	0.76200	0.001159	2.228E-06	1.1512E-06	1.341E-09	1.6960E-03	-9.868E-07
11	1007.5571	0.76200	0.001161	2.243E-06	1.1526E-06	1.355E-09	1.6950E-03	-9.876E-07
12	1008.3191	0.76200	0.001164	2.259E-06	1.1539E-06	1.369E-09	1.6940E-03	-9.885E-07
13	1009.0812	0.76200	0.001166	2.275E-06	1.1553E-06	1.382E-09	1.6930E-03	-9.893E-07
14	1009.8434	0.76200	0.001168	2.291E-06	1.1567E-06	1.396E-09	1.6920E-03	-9.902E-07
15	1010.6056	0.76250	0.001170	2.307E-06	1.1581E-06	1.409E-09	1.6910E-03	-9.910E-07
16	1011.3680	0.76200	0.001173	2.322E-06	1.1595E-06	1.423E-09	1.6900E-03	-9.919E-07
17	1012.1305	0.76250	0.001175	2.338E-06	1.1610E-06	1.436E-09	1.6890E-03	-9.927E-07
18	1012.8932	0.76300	0.001177	2.354E-06	1.1624E-06	1.448E-09	1.6880E-03	-9.936E-07
19	1013.6561	0.76300	0.001180	2.370E-06	1.1638E-06	1.462E-09	1.6871E-03	-9.944E-07
20	1014.4192	0.76350	0.001182	2.386E-06	1.1653E-06	1.475E-09	1.6861E-03	-9.953E-07
21	1015.1824	0.76350	0.001185	2.401E-06	1.1668E-06	1.488E-09	1.6851E-03	-9.962E-07
22	1015.9459	0.76350	0.001187	2.417E-06	1.1683E-06	1.501E-09	1.6841E-03	-9.970E-07
23	1016.7097	0.76400	0.001189	2.433E-06	1.1698E-06	1.514E-09	1.6831E-03	-9.979E-07
24	1017.4736	0.76450	0.001192	2.449E-06	1.1713E-06	1.527E-09	1.6821E-03	-9.987E-07
25	1018.2379	0.76450	0.001194	2.465E-06	1.1729E-06	1.540E-09	1.6811E-03	-9.996E-07
26	1019.0023	0.76450	0.001197	2.480E-06	1.1744E-06	1.553E-09	1.6801E-03	-1.000E-06
27	1019.7670	0.76450	0.001199	2.496E-06	1.1760E-06	1.566E-09	1.6791E-03	-1.001E-06
28	1020.5320	0.76500	0.001202	2.512E-06	1.1775E-06	1.579E-09	1.6781E-03	-1.002E-06
29	1021.2973	0.76550	0.001204	2.528E-06	1.1791E-06	1.591E-09	1.6771E-03	-1.003E-06
30	1022.0628	0.76600	0.001207	2.544E-06	1.1807E-06	1.604E-09	1.6761E-03	-1.004E-06
31	1022.8286	0.76600	0.001209	2.559E-06	1.1823E-06	1.617E-09	1.6751E-03	-1.005E-06
32	1023.5946	0.76600	0.001212	2.575E-06	1.1839E-06	1.630E-09	1.6741E-03	-1.006E-06
33	1024.3609	0.76650	0.001214	2.591E-06	1.1856E-06	1.642E-09	1.6730E-03	-1.007E-06
34	1025.1275	0.76650	0.001217	2.607E-06	1.1872E-06	1.655E-09	1.6720E-03	-1.007E-06
35	1025.8944	0.76700	0.001220	2.623E-06	1.1889E-06	1.668E-09	1.6710E-03	-1.008E-06
36	1026.6615	0.76750	0.001222	2.638E-06	1.1906E-06	1.680E-09	1.6700E-03	-1.009E-06
37	1027.4289	0.76750	0.001225	2.654E-06	1.1923E-06	1.693E-09	1.6690E-03	-1.010E-06
38	1028.1966	0.76800	0.001228	2.670E-06	1.1940E-06	1.705E-09	1.6680E-03	-1.011E-06
39	1028.9646	0.76800	0.001230	2.686E-06	1.1957E-06	1.718E-09	1.6670E-03	-1.012E-06
40	1029.7328	0.76850	0.001233	2.702E-06	1.1974E-06	1.730E-09	1.6660E-03	-1.013E-06

Table 4: Seawater properties at 15 °C and 1 g/kg increment of absolute salinity

3.3 Uncertainty estimates for saltwater properties

The uncertainties in the seawater properties are summarized in Table 5 for an expanded uncertainty with a coverage factor of 2. The uncertainty in density is from IAPWS (2008b) while the uncertainty in vapour pressure and viscosity is from Sharqawy, et al. (2010).

Property	Symbol	U_{95}	Units
Density	ρ	8	ppm
Viscosity	μ	1.5	%
Vapour Pressure	p_v	0.1	%

Table 5: Uncertainty in seawater properties at 95 % confidence limit. ppm: parts per million (0.0001 %)

The combined uncertainty in this case includes the uncertainty in the equations, absolute salinity and temperature. Equation (2) then becomes

$$U_c = \sqrt{U_x^2 + (c_{x,t}U_t)^2 + (c_{x,S}U_S)^2} \qquad (7)$$

where $c_{x,S} = \partial x/\partial S_A$ is the sensitivity coefficient for salinity. Its value may be obtained from Table 4 at 15 °C; otherwise, the sensitivity coefficients must be computed for a specific absolute salinity and temperature by the methods outlined in this procedure.

3.3.1 Example uncertainty calculation of saltwater properties

For evaluation of full-scale ship performance, standard seawater properties are applied at 15 °C. From the previous section, the following are specific examples of standard seawater properties at 15 °C. From IOC, et al. (2010) the estimated uncertainty in standard absolute salinity is ±0.007 g/kg.

For U_t = ±1.0 °C:

- Density: 1026.02 ±0.22 kg/m^3 (±0.021 %)
- Absolute viscosity: 0.001220 ±0.000037 Pa·s (±3.0 %)
- Kinematic viscosity: (1.189 ±0.036) x 10^{-6} m^2/s (±3.0 %)
- Vapour pressure: 1.67 ±0.11 kPa (6.4 %)

In this example, most of the uncertainty is from the uncertainty in temperature.

For U_t = ±0.10 °C:

- Density: 1026.021 ±0.024 kg/m^3 (±0.0023 %)
- Absolute viscosity: 0.001220 ± 0.000019 Pa·s (±1.5 %)
- Kinematic viscosity: (1.189 ±0.018) x 10^{-6} m^2/s (±1.5 %)
- Vapour pressure: 1.671 ±0.011 kPa (0.65 %)

In this case, most of the uncertainty in density and vapour pressure is from temperature while most of the uncertainty in viscosity is from the viscosity equation (±1.5 %). The uncertainty estimates are similar to those of fresh water but slightly higher.

4. SUMMARY

This procedure outlines some properties of fresh water and seawater from the latest international standards. Examples in this procedure include density, absolute viscosity, kinematic viscosity, and vapour pressure. Other properties are available. The latest fresh water properties are defined by IAWPS (2008a) at standard pressure. The results presented in this procedure are from Harvey, et al. (2008). For conditions other than standard pressure, the properties should be

computed from Harvey, et al. (2008). Property data and their sensitivity coefficients are presented for the temperature range of 0.1 to 50 °C and standard pressure.

The latest seawater properties are from IOC, et al. (2010) and IAPWS (2008b). Transport properties are not yet available, and this procedure should be updated when they become available. In the meantime, the transport properties from Sharqawy, et al. (2010) are recommended.

Specific results are presented for standard seawater and standard pressure for the temperature range of 0.1 to 50 °C and for seawater at standard pressure and 15 °C over the absolute salinity range of 10 to 40 g/kg. For other conditions, the recommended computer codes should be applied on the basis of this procedure. For example, the seawater properties in the prediction of submarine performance should be determined from conditions at operating depth such as temperature, pressure, and salinity.

Fresh water property data were provided at the standard laboratory temperature of 20 °C and standard pressure. Example uncertainty estimates are provided for an uncertainty in temperature of ±1.0 and ±0.10 °C. Similarly seawater properties were provided for the standard at sea temperature of 15 °C, standard absolute salinity, and standard pressure. Uncertainty estimates in the properties were also provided for an uncertainty in temperature at ±1.0 and ±0.10 °C. The uncertainty estimates were similar to those for fresh water but slightly higher. For both fresh water and saltwater, the dominant term in the uncertainty estimate is temperature at an uncertainty in temperature of ±1.0 °C while at ±0.10 °C uncertainty the uncertainty in the equation is dominant for viscosity.

For fresh water, application of Harvey, et al. (2008) is recommended rather than IOC, et al. (2010) at S_A = 0.0. At 25 °C, the values from Harvey, et al. (2008) are in agreement with the check values in Table 8 of IAWPS (2008a) for density and viscosity. However, a slight discrepancy exists for standard seawater and fresh water in Table 8 at 0 °C of IAWPS (2008b) in comparison with the MatLab code version 2 from IOC, et al. (2010). The value of fresh water density differs by 52 ppm, and seawater by 47 ppm, when the stated uncertainty in the equations is 8 ppm. The fresh water check value at 0 °C from IAPWS (2008b) does agree with the value from Harvey, et al. (2008). However, the discrepancy is still small in comparison to the uncertainty contribution from temperature. In general, future international developments in seawater properties for TEOS-10 and IAWPS should be monitored and adopted.

Finally, seawater properties are provided in the following figures, Figure 9 through Figure 12, as functions of both absolute salinity and temperature in increments of 1 °C in temperature and 1 g/kg for absolute salinity as three-dimensional plots. These results are at one standard atmosphere, 0.101325 MPa.

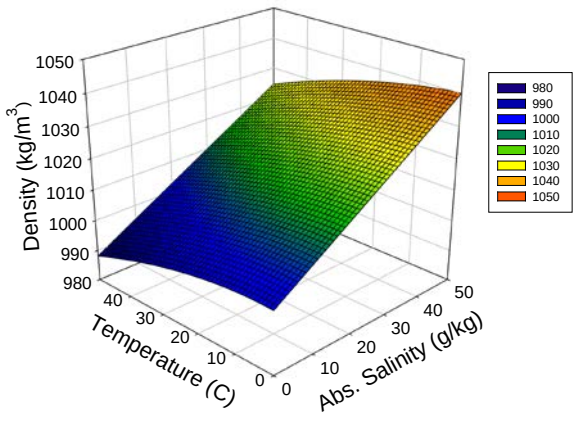


Figure 9: Seawater density

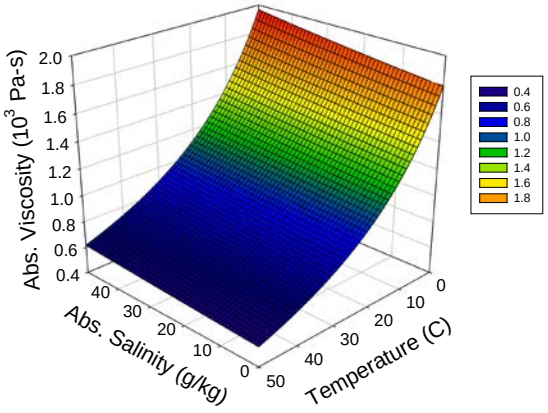


Figure 10: Seawater absolute viscosity

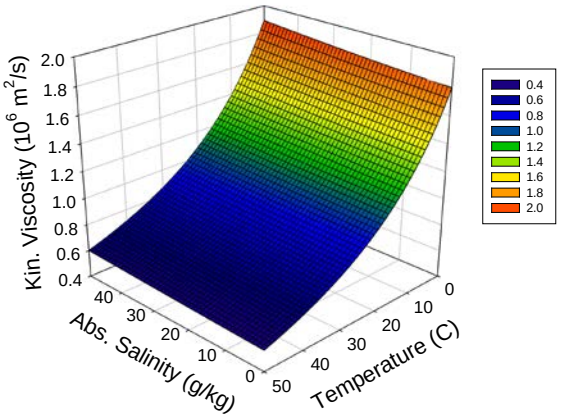


Figure 11: Seawater kinematic viscosity

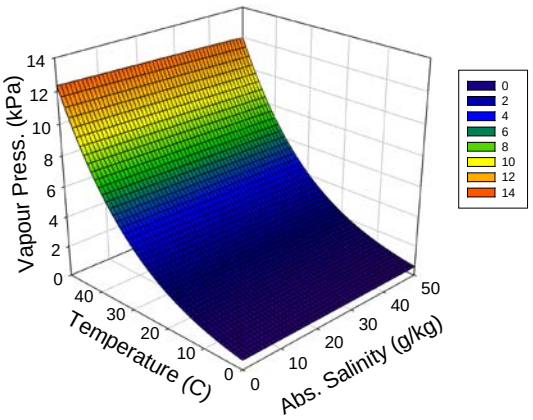


Figure 12: Seawater vapour pressure

5. REFERENCES

Feistel, R., Wright, D. G., Jackett, D. R. Miyagawa, K., Reissmann, J. H., Wagner, W., Overhoff, U., Guder, C., Feistel, A., and Marion, G. M., 2010, "Numerical implementation and oceanographic application of the thermodynamic potentials of liquid water, water vapour, ice, seawater and humid air – Part 1: Background and equations," Ocean Science, Vol. 6, pp. 633-677.

Harvey, A. H., Peskin, A. P., and Klein, S. A., 2008, "NIST/ASME Steam Properties Version 2.22: Users' Guide," National Institute for Standards and Technology, Gaithersburg, Maryland, USA.

IAPWS, 2008a, "Supplementary Release on Properties of Liquid Water at 0.1 MPa," The International Association for the Properties of Water and Steam, Berlin.

IAPWS, 2008b, "Release on the IAPWS Formulation 2008 for the Thermodynamic Properties of Seawater" The International Association for the Properties of Water and Steam, Berlin.

IAPWS, 2010, "IAPWS Certified Research Need – ICRN," The International Association for the Properties of Water and Steam, Berlin.

IOC, SCOR, and IAPSO, 2010, "The international thermodynamic equations of seawater – 2010: Calculation and use of thermodynamic properties," Intergovernmental Oceanographic Commission, Manuals and Guides No. 56, UNESCO, 196 pp.

ISO, 2008, "Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM: 1995), International Organization for Standardization, Geneva, Switzerland.

Sharqawy, Mostafa H., Lienhard V, John H., and Zubair, Syed M., 2010, "Thermophysical properties of seawater: a review of existing correlations and data," Desalination and Water Treatment, Vol. 16, pp. 354-380.

Wright, D. G., Feistel, R., Miyagawa, K., Reissmann, J. H., Jackett, D. R., Wagner, W., Overhoff, U., Guder, C., Feistel, A., and Marion, G. M., 2010, "Numerical implementation and oceanographic application of the thermodynamic potentials of liquid water, water vapour, ice, seawater and humid air – Part 2: The library routines," Ocean Science, Vol. 6, pp. 695-718.

6. LIST OF SYMBOLS

k	Coverage factor, usually $k = 2$	
p	Pressure	MPa
p_v	Vapour pressure	MPa
S_A	Absolute salinity	g/kg
S_P	Practical salinity	1
S_R	Reference salinity	g/kg
t	Water temperature	°C
u_c	Combined standard uncertainty	
U	Expanded uncertainty, $U = ku_c$	
μ	Absolute viscosity	kg/(m·s) or Pa·s
ν	Kinematic viscosity, $\nu = \mu/\rho$	m^2/s
ρ	Water density	kg/m^3

Appendix A : FRESH WATER PROPERTIES 0.1 TO 50 °C IN 0.1 °C INCREMENTS

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
0.1	999.8498	0.06593	0.001786		1.7858E-06		6.1567E-04	
0.2	999.8563	0.06412	0.001779	-6.174E-05	1.7796E-06	-6.186E-08	6.2015E-04	4.499E-05
0.3	999.8626	0.06232	0.001773	-6.140E-05	1.7734E-06	-6.152E-08	6.2467E-04	4.528E-05
0.4	999.8687	0.06052	0.001767	-6.106E-05	1.7673E-06	-6.118E-08	6.2921E-04	4.557E-05
0.5	999.8747	0.05873	0.001761	-6.072E-05	1.7612E-06	-6.084E-08	6.3378E-04	4.587E-05
0.6	999.8805	0.05694	0.001755	-6.039E-05	1.7551E-06	-6.050E-08	6.3838E-04	4.616E-05
0.7	999.8861	0.05516	0.001749	-6.006E-05	1.7491E-06	-6.016E-08	6.4301E-04	4.646E-05
0.8	999.8915	0.05339	0.001743	-5.973E-05	1.7431E-06	-5.983E-08	6.4767E-04	4.676E-05
0.9	999.8968	0.05162	0.001737	-5.940E-05	1.7371E-06	-5.950E-08	6.5236E-04	4.706E-05
1.0	999.9018	0.04986	0.001731	-5.908E-05	1.7312E-06	-5.917E-08	6.5709E-04	4.736E-05
1.1	999.9067	0.04810	0.001725	-5.876E-05	1.7253E-06	-5.885E-08	6.6184E-04	4.766E-05
1.2	999.9115	0.04635	0.001719	-5.844E-05	1.7194E-06	-5.852E-08	6.6662E-04	4.797E-05
1.3	999.9160	0.04461	0.001713	-5.812E-05	1.7136E-06	-5.820E-08	6.7143E-04	4.828E-05
1.4	999.9204	0.04287	0.001708	-5.781E-05	1.7078E-06	-5.789E-08	6.7627E-04	4.858E-05
1.5	999.9246	0.04114	0.001702	-5.750E-05	1.7020E-06	-5.757E-08	6.8115E-04	4.889E-05
1.6	999.9286	0.03942	0.001696	-5.719E-05	1.6963E-06	-5.726E-08	6.8605E-04	4.921E-05
1.7	999.9325	0.03770	0.001690	-5.688E-05	1.6906E-06	-5.695E-08	6.9099E-04	4.952E-05
1.8	999.9362	0.03598	0.001685	-5.657E-05	1.6849E-06	-5.664E-08	6.9596E-04	4.983E-05
1.9	999.9397	0.03427	0.001679	-5.627E-05	1.6792E-06	-5.633E-08	7.0095E-04	5.015E-05
2.0	999.9430	0.03257	0.001674	-5.597E-05	1.6736E-06	-5.603E-08	7.0599E-04	5.047E-05
2.1	999.9462	0.03087	0.001668	-5.567E-05	1.6680E-06	-5.573E-08	7.1105E-04	5.079E-05
2.2	999.9492	0.02918	0.001662	-5.538E-05	1.6625E-06	-5.543E-08	7.1614E-04	5.111E-05
2.3	999.9520	0.02749	0.001657	-5.508E-05	1.6569E-06	-5.513E-08	7.2127E-04	5.144E-05
2.4	999.9547	0.02581	0.001651	-5.479E-05	1.6514E-06	-5.483E-08	7.2643E-04	5.176E-05
2.5	999.9572	0.02414	0.001646	-5.450E-05	1.6460E-06	-5.454E-08	7.3162E-04	5.209E-05
2.6	999.9595	0.02247	0.001640	-5.421E-05	1.6405E-06	-5.425E-08	7.3685E-04	5.242E-05
2.7	999.9617	0.02080	0.001635	-5.392E-05	1.6351E-06	-5.396E-08	7.4211E-04	5.275E-05
2.8	999.9637	0.01915	0.001630	-5.364E-05	1.6297E-06	-5.367E-08	7.4740E-04	5.308E-05
2.9	999.9655	0.01749	0.001624	-5.336E-05	1.6244E-06	-5.339E-08	7.5272E-04	5.342E-05
3.0	999.9672	0.01584	0.001619	-5.308E-05	1.6191E-06	-5.311E-08	7.5808E-04	5.375E-05
3.1	999.9687	0.01420	0.001614	-5.280E-05	1.6138E-06	-5.283E-08	7.6347E-04	5.409E-05
3.2	999.9700	0.01256	0.001608	-5.253E-05	1.6085E-06	-5.255E-08	7.6890E-04	5.443E-05
3.3	999.9712	0.01093	0.001603	-5.225E-05	1.6033E-06	-5.227E-08	7.7436E-04	5.477E-05

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
3.4	999.9722	0.00931	0.001598	-5.198E-05	1.5980E-06	-5.200E-08	7.7985E-04	5.511E-05
3.5	999.9730	0.00768	0.001593	-5.171E-05	1.5929E-06	-5.172E-08	7.8538E-04	5.546E-05
3.6	999.9737	0.00607	0.001588	-5.144E-05	1.5877E-06	-5.145E-08	7.9094E-04	5.581E-05
3.7	999.9743	0.00446	0.001583	-5.118E-05	1.5826E-06	-5.118E-08	7.9654E-04	5.616E-05
3.8	999.9746	0.00285	0.001577	-5.091E-05	1.5775E-06	-5.092E-08	8.0218E-04	5.651E-05
3.9	999.9748	0.00125	0.001572	-5.065E-05	1.5724E-06	-5.065E-08	8.0784E-04	5.686E-05
4.0	999.9749	-0.00035	0.001567	-5.039E-05	1.5673E-06	-5.039E-08	8.1355E-04	5.722E-05
4.1	999.9748	-0.00194	0.001562	-5.013E-05	1.5623E-06	-5.013E-08	8.1929E-04	5.757E-05
4.2	999.9745	-0.00353	0.001557	-4.987E-05	1.5573E-06	-4.987E-08	8.2506E-04	5.793E-05
4.3	999.9741	-0.00511	0.001552	-4.962E-05	1.5523E-06	-4.961E-08	8.3087E-04	5.829E-05
4.4	999.9735	-0.00668	0.001547	-4.936E-05	1.5474E-06	-4.935E-08	8.3672E-04	5.865E-05
4.5	999.9727	-0.00826	0.001542	-4.911E-05	1.5425E-06	-4.910E-08	8.4260E-04	5.902E-05
4.6	999.9718	-0.00982	0.001538	-4.886E-05	1.5376E-06	-4.885E-08	8.4853E-04	5.939E-05
4.7	999.9708	-0.01138	0.001533	-4.861E-05	1.5327E-06	-4.860E-08	8.5448E-04	5.975E-05
4.8	999.9695	-0.01294	0.001528	-4.837E-05	1.5278E-06	-4.835E-08	8.6048E-04	6.012E-05
4.9	999.9682	-0.01449	0.001523	-4.812E-05	1.5230E-06	-4.810E-08	8.6651E-04	6.050E-05
5.0	999.9666	-0.01604	0.001518	-4.788E-05	1.5182E-06	-4.786E-08	8.7258E-04	6.087E-05
5.1	999.9650	-0.01758	0.001513	-4.764E-05	1.5135E-06	-4.761E-08	8.7868E-04	6.125E-05
5.2	999.9631	-0.01912	0.001509	-4.740E-05	1.5087E-06	-4.737E-08	8.8482E-04	6.163E-05
5.3	999.9611	-0.02066	0.001504	-4.716E-05	1.5040E-06	-4.713E-08	8.9101E-04	6.201E-05
5.4	999.9590	-0.02218	0.001499	-4.692E-05	1.4993E-06	-4.689E-08	8.9723E-04	6.239E-05
5.5	999.9567	-0.02371	0.001495	-4.669E-05	1.4946E-06	-4.666E-08	9.0348E-04	6.277E-05
5.6	999.9542	-0.02523	0.001490	-4.646E-05	1.4899E-06	-4.642E-08	9.0978E-04	6.316E-05
5.7	999.9517	-0.02674	0.001485	-4.622E-05	1.4853E-06	-4.619E-08	9.1612E-04	6.355E-05
5.8	999.9489	-0.02825	0.001481	-4.599E-05	1.4807E-06	-4.596E-08	9.2249E-04	6.394E-05
5.9	999.9460	-0.02976	0.001476	-4.577E-05	1.4761E-06	-4.572E-08	9.2890E-04	6.433E-05
6.0	999.9429	-0.03126	0.001471	-4.554E-05	1.4716E-06	-4.550E-08	9.3536E-04	6.472E-05
6.1	999.9397	-0.03276	0.001467	-4.531E-05	1.4670E-06	-4.527E-08	9.4185E-04	6.512E-05
6.2	999.9364	-0.03425	0.001462	-4.509E-05	1.4625E-06	-4.504E-08	9.4838E-04	6.552E-05
6.3	999.9329	-0.03574	0.001458	-4.487E-05	1.4580E-06	-4.482E-08	9.5495E-04	6.592E-05
6.4	999.9292	-0.03722	0.001453	-4.465E-05	1.4535E-06	-4.460E-08	9.6156E-04	6.632E-05
6.5	999.9255	-0.03870	0.001449	-4.443E-05	1.4491E-06	-4.437E-08	9.6822E-04	6.673E-05
6.6	999.9215	-0.04018	0.001445	-4.421E-05	1.4447E-06	-4.416E-08	9.7491E-04	6.713E-05
6.7	999.9174	-0.04165	0.001440	-4.399E-05	1.4403E-06	-4.394E-08	9.8164E-04	6.754E-05
6.8	999.9132	-0.04311	0.001436	-4.378E-05	1.4359E-06	-4.372E-08	9.8842E-04	6.796E-05

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
6.9	999.9088	-0.04458	0.001431	-4.357E-05	1.4315E-06	-4.351E-08	9.9523E-04	6.837E-05
7.0	999.9043	-0.04603	0.001427	-4.335E-05	1.4272E-06	-4.329E-08	1.0021E-03	6.878E-05
7.1	999.8996	-0.04749	0.001423	-4.314E-05	1.4229E-06	-4.308E-08	1.0090E-03	6.920E-05
7.2	999.8948	-0.04894	0.001418	-4.293E-05	1.4186E-06	-4.287E-08	1.0159E-03	6.962E-05
7.3	999.8898	-0.05038	0.001414	-4.273E-05	1.4143E-06	-4.266E-08	1.0229E-03	7.004E-05
7.4	999.8847	-0.05182	0.001410	-4.252E-05	1.4100E-06	-4.245E-08	1.0299E-03	7.047E-05
7.5	999.8794	-0.05326	0.001406	-4.231E-05	1.4058E-06	-4.224E-08	1.0370E-03	7.090E-05
7.6	999.8740	-0.05469	0.001401	-4.211E-05	1.4016E-06	-4.204E-08	1.0441E-03	7.132E-05
7.7	999.8685	-0.05612	0.001397	-4.191E-05	1.3974E-06	-4.183E-08	1.0513E-03	7.175E-05
7.8	999.8628	-0.05755	0.001393	-4.171E-05	1.3932E-06	-4.163E-08	1.0585E-03	7.219E-05
7.9	999.8570	-0.05897	0.001389	-4.151E-05	1.3891E-06	-4.143E-08	1.0657E-03	7.262E-05
8.0	999.8510	-0.06039	0.001385	-4.131E-05	1.3849E-06	-4.123E-08	1.0730E-03	7.306E-05
8.1	999.8449	-0.06180	0.001381	-4.111E-05	1.3808E-06	-4.103E-08	1.0803E-03	7.350E-05
8.2	999.8387	-0.06321	0.001377	-4.092E-05	1.3767E-06	-4.083E-08	1.0877E-03	7.394E-05
8.3	999.8323	-0.06461	0.001372	-4.072E-05	1.3727E-06	-4.064E-08	1.0951E-03	7.439E-05
8.4	999.8257	-0.06601	0.001368	-4.053E-05	1.3686E-06	-4.044E-08	1.1026E-03	7.483E-05
8.5	999.8191	-0.06741	0.001364	-4.033E-05	1.3646E-06	-4.025E-08	1.1101E-03	7.528E-05
8.6	999.8123	-0.06880	0.001360	-4.014E-05	1.3605E-06	-4.006E-08	1.1176E-03	7.574E-05
8.7	999.8053	-0.07019	0.001356	-3.995E-05	1.3566E-06	-3.987E-08	1.1252E-03	7.619E-05
8.8	999.7982	-0.07158	0.001352	-3.977E-05	1.3526E-06	-3.968E-08	1.1329E-03	7.664E-05
8.9	999.7910	-0.07296	0.001348	-3.958E-05	1.3486E-06	-3.949E-08	1.1406E-03	7.710E-05
9.0	999.7836	-0.07434	0.001344	-3.939E-05	1.3447E-06	-3.930E-08	1.1483E-03	7.756E-05
9.1	999.7761	-0.07571	0.001340	-3.921E-05	1.3408E-06	-3.911E-08	1.1561E-03	7.803E-05
9.2	999.7685	-0.07708	0.001337	-3.902E-05	1.3369E-06	-3.893E-08	1.1639E-03	7.849E-05
9.3	999.7607	-0.07845	0.001333	-3.884E-05	1.3330E-06	-3.875E-08	1.1718E-03	7.896E-05
9.4	999.7528	-0.07981	0.001329	-3.866E-05	1.3291E-06	-3.856E-08	1.1797E-03	7.943E-05
9.5	999.7447	-0.08117	0.001325	-3.848E-05	1.3253E-06	-3.838E-08	1.1877E-03	7.990E-05
9.6	999.7366	-0.08252	0.001321	-3.830E-05	1.3214E-06	-3.820E-08	1.1957E-03	8.038E-05
9.7	999.7282	-0.08387	0.001317	-3.812E-05	1.3176E-06	-3.802E-08	1.2037E-03	8.085E-05
9.8	999.7198	-0.08522	0.001313	-3.795E-05	1.3138E-06	-3.785E-08	1.2118E-03	8.133E-05
9.9	999.7112	-0.08657	0.001310	-3.777E-05	1.3100E-06	-3.767E-08	1.2200E-03	8.182E-05
10.0	999.7025	-0.08791	0.001306	-3.760E-05	1.3063E-06	-3.749E-08	1.2282E-03	8.230E-05
10.1	999.6936	-0.08924	0.001302	-3.742E-05	1.3025E-06	-3.732E-08	1.2365E-03	8.279E-05
10.2	999.6846	-0.09058	0.001298	-3.725E-05	1.2988E-06	-3.715E-08	1.2448E-03	8.328E-05
10.3	999.6755	-0.09191	0.001295	-3.708E-05	1.2951E-06	-3.697E-08	1.2531E-03	8.377E-05

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
10.4	999.6662	-0.09323	0.001291	-3.691E-05	1.2914E-06	-3.680E-08	1.2615E-03	8.426E-05
10.5	999.6569	-0.09456	0.001287	-3.674E-05	1.2878E-06	-3.663E-08	1.2700E-03	8.476E-05
10.6	999.6473	-0.09588	0.001284	-3.657E-05	1.2841E-06	-3.646E-08	1.2785E-03	8.526E-05
10.7	999.6377	-0.09719	0.001280	-3.641E-05	1.2805E-06	-3.629E-08	1.2870E-03	8.576E-05
10.8	999.6279	-0.09850	0.001276	-3.624E-05	1.2768E-06	-3.613E-08	1.2956E-03	8.627E-05
10.9	999.6180	-0.09981	0.001273	-3.608E-05	1.2732E-06	-3.596E-08	1.3043E-03	8.677E-05
11.0	999.6079	-0.10112	0.001269	-3.591E-05	1.2697E-06	-3.580E-08	1.3130E-03	8.728E-05
11.1	999.5978	-0.10242	0.001266	-3.575E-05	1.2661E-06	-3.563E-08	1.3217E-03	8.779E-05
11.2	999.5874	-0.10372	0.001262	-3.559E-05	1.2625E-06	-3.547E-08	1.3305E-03	8.831E-05
11.3	999.5770	-0.10502	0.001258	-3.543E-05	1.2590E-06	-3.531E-08	1.3394E-03	8.883E-05
11.4	999.5664	-0.10631	0.001255	-3.527E-05	1.2555E-06	-3.515E-08	1.3483E-03	8.935E-05
11.5	999.5558	-0.10760	0.001251	-3.511E-05	1.2520E-06	-3.499E-08	1.3573E-03	8.987E-05
11.6	999.5449	-0.10888	0.001248	-3.495E-05	1.2485E-06	-3.483E-08	1.3663E-03	9.039E-05
11.7	999.5340	-0.11016	0.001244	-3.479E-05	1.2450E-06	-3.467E-08	1.3753E-03	9.092E-05
11.8	999.5229	-0.11144	0.001241	-3.464E-05	1.2415E-06	-3.452E-08	1.3845E-03	9.145E-05
11.9	999.5117	-0.11272	0.001237	-3.448E-05	1.2381E-06	-3.436E-08	1.3936E-03	9.198E-05
12.0	999.5004	-0.11399	0.001234	-3.433E-05	1.2347E-06	-3.420E-08	1.4028E-03	9.252E-05
12.1	999.4889	-0.11526	0.001231	-3.417E-05	1.2312E-06	-3.405E-08	1.4121E-03	9.306E-05
12.2	999.4773	-0.11652	0.001227	-3.402E-05	1.2279E-06	-3.390E-08	1.4215E-03	9.360E-05
12.3	999.4656	-0.11779	0.001224	-3.387E-05	1.2245E-06	-3.375E-08	1.4308E-03	9.414E-05
12.4	999.4537	-0.11904	0.001220	-3.372E-05	1.2211E-06	-3.359E-08	1.4403E-03	9.469E-05
12.5	999.4418	-0.12030	0.001217	-3.357E-05	1.2177E-06	-3.344E-08	1.4498E-03	9.524E-05
12.6	999.4297	-0.12155	0.001214	-3.342E-05	1.2144E-06	-3.329E-08	1.4593E-03	9.579E-05
12.7	999.4175	-0.12280	0.001210	-3.328E-05	1.2111E-06	-3.315E-08	1.4689E-03	9.634E-05
12.8	999.4051	-0.12405	0.001207	-3.313E-05	1.2078E-06	-3.300E-08	1.4786E-03	9.690E-05
12.9	999.3927	-0.12529	0.001204	-3.298E-05	1.2045E-06	-3.285E-08	1.4883E-03	9.746E-05
13.0	999.3801	-0.12653	0.001200	-3.284E-05	1.2012E-06	-3.271E-08	1.4981E-03	9.802E-05
13.1	999.3673	-0.12777	0.001197	-3.269E-05	1.1979E-06	-3.256E-08	1.5079E-03	9.859E-05
13.2	999.3545	-0.12900	0.001194	-3.255E-05	1.1947E-06	-3.242E-08	1.5178E-03	9.916E-05
13.3	999.3415	-0.13024	0.001191	-3.241E-05	1.1915E-06	-3.228E-08	1.5278E-03	9.973E-05
13.4	999.3285	-0.13146	0.001187	-3.227E-05	1.1882E-06	-3.213E-08	1.5378E-03	1.003E-04
13.5	999.3153	-0.13269	0.001184	-3.213E-05	1.1850E-06	-3.199E-08	1.5478E-03	1.009E-04
13.6	999.3019	-0.13391	0.001181	-3.199E-05	1.1818E-06	-3.185E-08	1.5579E-03	1.015E-04
13.7	999.2885	-0.13513	0.001178	-3.185E-05	1.1787E-06	-3.171E-08	1.5681E-03	1.020E-04
13.8	999.2749	-0.13634	0.001175	-3.171E-05	1.1755E-06	-3.157E-08	1.5783E-03	1.026E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
13.9	999.2612	-0.13756	0.001171	-3.157E-05	1.1724E-06	-3.144E-08	1.5886E-03	1.032E-04
14.0	999.2474	-0.13877	0.001168	-3.144E-05	1.1692E-06	-3.130E-08	1.5990E-03	1.038E-04
14.1	999.2335	-0.13997	0.001165	-3.130E-05	1.1661E-06	-3.116E-08	1.6094E-03	1.044E-04
14.2	999.2194	-0.14118	0.001162	-3.117E-05	1.1630E-06	-3.103E-08	1.6199E-03	1.050E-04
14.3	999.2052	-0.14238	0.001159	-3.103E-05	1.1599E-06	-3.089E-08	1.6304E-03	1.056E-04
14.4	999.1909	-0.14358	0.001156	-3.090E-05	1.1568E-06	-3.076E-08	1.6410E-03	1.062E-04
14.5	999.1765	-0.14477	0.001153	-3.077E-05	1.1537E-06	-3.062E-08	1.6516E-03	1.068E-04
14.6	999.1620	-0.14597	0.001150	-3.064E-05	1.1507E-06	-3.049E-08	1.6623E-03	1.074E-04
14.7	999.1473	-0.14716	0.001147	-3.050E-05	1.1476E-06	-3.036E-08	1.6731E-03	1.080E-04
14.8	999.1325	-0.14834	0.001144	-3.037E-05	1.1446E-06	-3.023E-08	1.6839E-03	1.086E-04
14.9	999.1176	-0.14953	0.001141	-3.024E-05	1.1416E-06	-3.010E-08	1.6948E-03	1.092E-04
15.0	999.1026	-0.15071	0.001138	-3.012E-05	1.1386E-06	-2.997E-08	1.7058E-03	1.099E-04
15.1	999.0875	-0.15189	0.001135	-2.999E-05	1.1356E-06	-2.984E-08	1.7168E-03	1.105E-04
15.2	999.0722	-0.15306	0.001132	-2.986E-05	1.1326E-06	-2.971E-08	1.7279E-03	1.111E-04
15.3	999.0569	-0.15423	0.001129	-2.973E-05	1.1297E-06	-2.959E-08	1.7390E-03	1.117E-04
15.4	999.0414	-0.15540	0.001126	-2.961E-05	1.1267E-06	-2.946E-08	1.7502E-03	1.124E-04
15.5	999.0258	-0.15657	0.001123	-2.948E-05	1.1238E-06	-2.934E-08	1.7615E-03	1.130E-04
15.6	999.0101	-0.15774	0.001120	-2.936E-05	1.1208E-06	-2.921E-08	1.7728E-03	1.136E-04
15.7	998.9943	-0.15890	0.001117	-2.924E-05	1.1179E-06	-2.909E-08	1.7842E-03	1.143E-04
15.8	998.9783	-0.16006	0.001114	-2.911E-05	1.1150E-06	-2.896E-08	1.7957E-03	1.149E-04
15.9	998.9622	-0.16121	0.001111	-2.899E-05	1.1121E-06	-2.884E-08	1.8072E-03	1.156E-04
16.0	998.9461	-0.16237	0.001108	-2.887E-05	1.1093E-06	-2.872E-08	1.8188E-03	1.162E-04
16.1	998.9298	-0.16352	0.001105	-2.875E-05	1.1064E-06	-2.860E-08	1.8305E-03	1.169E-04
16.2	998.9134	-0.16467	0.001102	-2.863E-05	1.1035E-06	-2.848E-08	1.8422E-03	1.175E-04
16.3	998.8968	-0.16581	0.001099	-2.851E-05	1.1007E-06	-2.836E-08	1.8540E-03	1.182E-04
16.4	998.8802	-0.16695	0.001097	-2.839E-05	1.0979E-06	-2.824E-08	1.8658E-03	1.189E-04
16.5	998.8634	-0.16809	0.001094	-2.827E-05	1.0950E-06	-2.812E-08	1.8778E-03	1.195E-04
16.6	998.8466	-0.16923	0.001091	-2.815E-05	1.0922E-06	-2.800E-08	1.8897E-03	1.202E-04
16.7	998.8296	-0.17037	0.001088	-2.804E-05	1.0894E-06	-2.789E-08	1.9018E-03	1.209E-04
16.8	998.8125	-0.17150	0.001085	-2.792E-05	1.0867E-06	-2.777E-08	1.9139E-03	1.215E-04
16.9	998.7953	-0.17263	0.001083	-2.781E-05	1.0839E-06	-2.765E-08	1.9261E-03	1.222E-04
17.0	998.7780	-0.17376	0.001080	-2.769E-05	1.0811E-06	-2.754E-08	1.9384E-03	1.229E-04
17.1	998.7606	-0.17488	0.001077	-2.758E-05	1.0784E-06	-2.742E-08	1.9507E-03	1.236E-04
17.2	998.7430	-0.17600	0.001074	-2.747E-05	1.0756E-06	-2.731E-08	1.9631E-03	1.243E-04
17.3	998.7254	-0.17712	0.001072	-2.735E-05	1.0729E-06	-2.720E-08	1.9755E-03	1.250E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
17.4	998.7076	-0.17824	0.001069	-2.724E-05	1.0702E-06	-2.708E-08	1.9881E-03	1.257E-04
17.5	998.6897	-0.17936	0.001066	-2.713E-05	1.0675E-06	-2.697E-08	2.0007E-03	1.264E-04
17.6	998.6717	-0.18047	0.001063	-2.702E-05	1.0648E-06	-2.686E-08	2.0133E-03	1.271E-04
17.7	998.6536	-0.18158	0.001061	-2.691E-05	1.0621E-06	-2.675E-08	2.0261E-03	1.278E-04
17.8	998.6354	-0.18268	0.001058	-2.680E-05	1.0595E-06	-2.664E-08	2.0389E-03	1.285E-04
17.9	998.6171	-0.18379	0.001055	-2.669E-05	1.0568E-06	-2.653E-08	2.0518E-03	1.292E-04
18.0	998.5986	-0.18489	0.001053	-2.658E-05	1.0542E-06	-2.642E-08	2.0647E-03	1.299E-04
18.1	998.5801	-0.18599	0.001050	-2.647E-05	1.0515E-06	-2.631E-08	2.0778E-03	1.306E-04
18.2	998.5614	-0.18709	0.001047	-2.637E-05	1.0489E-06	-2.621E-08	2.0909E-03	1.313E-04
18.3	998.5427	-0.18818	0.001045	-2.626E-05	1.0463E-06	-2.610E-08	2.1040E-03	1.321E-04
18.4	998.5238	-0.18928	0.001042	-2.615E-05	1.0437E-06	-2.599E-08	2.1173E-03	1.328E-04
18.5	998.5048	-0.19037	0.001040	-2.605E-05	1.0411E-06	-2.589E-08	2.1306E-03	1.335E-04
18.6	998.4857	-0.19145	0.001037	-2.594E-05	1.0385E-06	-2.578E-08	2.1440E-03	1.343E-04
18.7	998.4665	-0.19254	0.001034	-2.584E-05	1.0359E-06	-2.568E-08	2.1574E-03	1.350E-04
18.8	998.4472	-0.19362	0.001032	-2.574E-05	1.0334E-06	-2.558E-08	2.1710E-03	1.357E-04
18.9	998.4278	-0.19470	0.001029	-2.563E-05	1.0308E-06	-2.547E-08	2.1846E-03	1.365E-04
19.0	998.4083	-0.19578	0.001027	-2.553E-05	1.0283E-06	-2.537E-08	2.1983E-03	1.372E-04
19.1	998.3887	-0.19686	0.001024	-2.543E-05	1.0257E-06	-2.527E-08	2.2120E-03	1.380E-04
19.2	998.3689	-0.19793	0.001022	-2.533E-05	1.0232E-06	-2.517E-08	2.2259E-03	1.387E-04
19.3	998.3491	-0.19900	0.001019	-2.523E-05	1.0207E-06	-2.506E-08	2.2398E-03	1.395E-04
19.4	998.3291	-0.20007	0.001016	-2.513E-05	1.0182E-06	-2.496E-08	2.2538E-03	1.403E-04
19.5	998.3091	-0.20114	0.001014	-2.503E-05	1.0157E-06	-2.486E-08	2.2678E-03	1.410E-04
19.6	998.2889	-0.20220	0.001011	-2.493E-05	1.0132E-06	-2.476E-08	2.2820E-03	1.418E-04
19.7	998.2686	-0.20326	0.001009	-2.483E-05	1.0108E-06	-2.466E-08	2.2962E-03	1.426E-04
19.8	998.2482	-0.20432	0.001007	-2.473E-05	1.0083E-06	-2.457E-08	2.3105E-03	1.433E-04
19.9	998.2277	-0.20538	0.001004	-2.463E-05	1.0058E-06	-2.447E-08	2.3249E-03	1.441E-04
20.0	998.2072	-0.20644	0.001002	-2.453E-05	1.0034E-06	-2.437E-08	2.3393E-03	1.449E-04
20.1	998.1865	-0.20749	0.000999	-2.444E-05	1.0010E-06	-2.427E-08	2.3538E-03	1.457E-04
20.2	998.1657	-0.20854	0.000997	-2.434E-05	9.9854E-07	-2.418E-08	2.3685E-03	1.465E-04
20.3	998.1448	-0.20959	0.000994	-2.425E-05	9.9613E-07	-2.408E-08	2.3831E-03	1.473E-04
20.4	998.1237	-0.21063	0.000992	-2.415E-05	9.9372E-07	-2.399E-08	2.3979E-03	1.481E-04
20.5	998.1026	-0.21168	0.000989	-2.406E-05	9.9133E-07	-2.389E-08	2.4128E-03	1.489E-04
20.6	998.0814	-0.21272	0.000987	-2.396E-05	9.8895E-07	-2.380E-08	2.4277E-03	1.497E-04
20.7	998.0601	-0.21376	0.000985	-2.387E-05	9.8657E-07	-2.370E-08	2.4427E-03	1.505E-04
20.8	998.0387	-0.21480	0.000982	-2.378E-05	9.8420E-07	-2.361E-08	2.4578E-03	1.513E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
20.9	998.0171	-0.21583	0.000980	-2.368E-05	9.8185E-07	-2.352E-08	2.4730E-03	1.521E-04
21.0	997.9955	-0.21687	0.000978	-2.359E-05	9.7950E-07	-2.343E-08	2.4882E-03	1.530E-04
21.1	997.9737	-0.21790	0.000975	-2.350E-05	9.7716E-07	-2.333E-08	2.5036E-03	1.538E-04
21.2	997.9519	-0.21893	0.000973	-2.341E-05	9.7483E-07	-2.324E-08	2.5190E-03	1.546E-04
21.3	997.9300	-0.21995	0.000971	-2.332E-05	9.7251E-07	-2.315E-08	2.5345E-03	1.554E-04
21.4	997.9079	-0.22098	0.000968	-2.323E-05	9.7020E-07	-2.306E-08	2.5501E-03	1.563E-04
21.5	997.8858	-0.22200	0.000966	-2.314E-05	9.6790E-07	-2.297E-08	2.5657E-03	1.571E-04
21.6	997.8635	-0.22302	0.000964	-2.305E-05	9.6561E-07	-2.288E-08	2.5815E-03	1.580E-04
21.7	997.8412	-0.22404	0.000961	-2.296E-05	9.6332E-07	-2.279E-08	2.5973E-03	1.588E-04
21.8	997.8187	-0.22506	0.000959	-2.287E-05	9.6105E-07	-2.271E-08	2.6132E-03	1.596E-04
21.9	997.7962	-0.22607	0.000957	-2.279E-05	9.5878E-07	-2.262E-08	2.6293E-03	1.605E-04
22.0	997.7735	-0.22708	0.000954	-2.270E-05	9.5653E-07	-2.253E-08	2.6453E-03	1.614E-04
22.1	997.7507	-0.22809	0.000952	-2.261E-05	9.5428E-07	-2.244E-08	2.6615E-03	1.622E-04
22.2	997.7279	-0.22910	0.000950	-2.252E-05	9.5204E-07	-2.236E-08	2.6778E-03	1.631E-04
22.3	997.7049	-0.23011	0.000948	-2.244E-05	9.4981E-07	-2.227E-08	2.6941E-03	1.640E-04
22.4	997.6819	-0.23111	0.000945	-2.235E-05	9.4758E-07	-2.219E-08	2.7106E-03	1.648E-04
22.5	997.6587	-0.23211	0.000943	-2.227E-05	9.4537E-07	-2.210E-08	2.7271E-03	1.657E-04
22.6	997.6354	-0.23311	0.000941	-2.218E-05	9.4316E-07	-2.202E-08	2.7437E-03	1.666E-04
22.7	997.6121	-0.23411	0.000939	-2.210E-05	9.4097E-07	-2.193E-08	2.7604E-03	1.675E-04
22.8	997.5886	-0.23511	0.000937	-2.202E-05	9.3878E-07	-2.185E-08	2.7772E-03	1.684E-04
22.9	997.5650	-0.23610	0.000934	-2.193E-05	9.3660E-07	-2.176E-08	2.7941E-03	1.693E-04
23.0	997.5414	-0.23709	0.000932	-2.185E-05	9.3442E-07	-2.168E-08	2.8111E-03	1.702E-04
23.1	997.5176	-0.23808	0.000930	-2.177E-05	9.3226E-07	-2.160E-08	2.8281E-03	1.711E-04
23.2	997.4938	-0.23907	0.000928	-2.169E-05	9.3010E-07	-2.152E-08	2.8453E-03	1.720E-04
23.3	997.4698	-0.24006	0.000926	-2.160E-05	9.2796E-07	-2.144E-08	2.8625E-03	1.729E-04
23.4	997.4458	-0.24104	0.000923	-2.152E-05	9.2582E-07	-2.135E-08	2.8799E-03	1.738E-04
23.5	997.4216	-0.24202	0.000921	-2.144E-05	9.2368E-07	-2.127E-08	2.8973E-03	1.747E-04
23.6	997.3974	-0.24300	0.000919	-2.136E-05	9.2156E-07	-2.119E-08	2.9148E-03	1.756E-04
23.7	997.3730	-0.24398	0.000917	-2.128E-05	9.1945E-07	-2.111E-08	2.9324E-03	1.766E-04
23.8	997.3486	-0.24496	0.000915	-2.120E-05	9.1734E-07	-2.103E-08	2.9501E-03	1.775E-04
23.9	997.3240	-0.24593	0.000913	-2.112E-05	9.1524E-07	-2.095E-08	2.9679E-03	1.784E-04
24.0	997.2994	-0.24691	0.000911	-2.104E-05	9.1315E-07	-2.088E-08	2.9858E-03	1.794E-04
24.1	997.2746	-0.24788	0.000909	-2.097E-05	9.1106E-07	-2.080E-08	3.0038E-03	1.803E-04
24.2	997.2498	-0.24885	0.000906	-2.089E-05	9.0899E-07	-2.072E-08	3.0219E-03	1.812E-04
24.3	997.2249	-0.24981	0.000904	-2.081E-05	9.0692E-07	-2.064E-08	3.0400E-03	1.822E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
24.4	997.1998	-0.25078	0.000902	-2.073E-05	9.0486E-07	-2.056E-08	3.0583E-03	1.832E-04
24.5	997.1747	-0.25174	0.000900	-2.066E-05	9.0281E-07	-2.049E-08	3.0767E-03	1.841E-04
24.6	997.1495	-0.25270	0.000898	-2.058E-05	9.0076E-07	-2.041E-08	3.0951E-03	1.851E-04
24.7	997.1242	-0.25366	0.000896	-2.051E-05	8.9872E-07	-2.034E-08	3.1137E-03	1.860E-04
24.8	997.0988	-0.25462	0.000894	-2.043E-05	8.9669E-07	-2.026E-08	3.1323E-03	1.870E-04
24.9	997.0732	-0.25558	0.000892	-2.035E-05	8.9467E-07	-2.018E-08	3.1511E-03	1.880E-04
25.0	997.0476	-0.25653	0.000890	-2.028E-05	8.9266E-07	-2.011E-08	3.1699E-03	1.890E-04
25.1	997.0219	-0.25748	0.000888	-2.021E-05	8.9065E-07	-2.004E-08	3.1889E-03	1.900E-04
25.2	996.9961	-0.25843	0.000886	-2.013E-05	8.8865E-07	-1.996E-08	3.2079E-03	1.909E-04
25.3	996.9703	-0.25938	0.000884	-2.006E-05	8.8666E-07	-1.989E-08	3.2271E-03	1.919E-04
25.4	996.9443	-0.26033	0.000882	-1.998E-05	8.8467E-07	-1.981E-08	3.2463E-03	1.929E-04
25.5	996.9182	-0.26127	0.000880	-1.991E-05	8.8270E-07	-1.974E-08	3.2657E-03	1.939E-04
25.6	996.8920	-0.26222	0.000878	-1.984E-05	8.8072E-07	-1.967E-08	3.2851E-03	1.949E-04
25.7	996.8657	-0.26316	0.000876	-1.977E-05	8.7876E-07	-1.960E-08	3.3046E-03	1.960E-04
25.8	996.8394	-0.26410	0.000874	-1.970E-05	8.7681E-07	-1.953E-08	3.3243E-03	1.970E-04
25.9	996.8129	-0.26503	0.000872	-1.962E-05	8.7486E-07	-1.945E-08	3.3440E-03	1.980E-04
26.0	996.7864	-0.26597	0.000870	-1.955E-05	8.7291E-07	-1.938E-08	3.3639E-03	1.990E-04
26.1	996.7597	-0.26691	0.000868	-1.948E-05	8.7098E-07	-1.931E-08	3.3838E-03	2.000E-04
26.2	996.7330	-0.26784	0.000866	-1.941E-05	8.6905E-07	-1.924E-08	3.4039E-03	2.011E-04
26.3	996.7062	-0.26877	0.000864	-1.934E-05	8.6713E-07	-1.917E-08	3.4241E-03	2.021E-04
26.4	996.6792	-0.26970	0.000862	-1.927E-05	8.6522E-07	-1.910E-08	3.4443E-03	2.032E-04
26.5	996.6522	-0.27063	0.000860	-1.920E-05	8.6331E-07	-1.903E-08	3.4647E-03	2.042E-04
26.6	996.6251	-0.27155	0.000859	-1.913E-05	8.6141E-07	-1.896E-08	3.4852E-03	2.053E-04
26.7	996.5979	-0.27248	0.000857	-1.906E-05	8.5952E-07	-1.889E-08	3.5057E-03	2.063E-04
26.8	996.5706	-0.27340	0.000855	-1.900E-05	8.5763E-07	-1.883E-08	3.5264E-03	2.074E-04
26.9	996.5432	-0.27432	0.000853	-1.893E-05	8.5575E-07	-1.876E-08	3.5472E-03	2.084E-04
27.0	996.5158	-0.27524	0.000851	-1.886E-05	8.5388E-07	-1.869E-08	3.5681E-03	2.095E-04
27.1	996.4882	-0.27616	0.000849	-1.879E-05	8.5202E-07	-1.862E-08	3.5891E-03	2.106E-04
27.2	996.4605	-0.27707	0.000847	-1.873E-05	8.5016E-07	-1.856E-08	3.6102E-03	2.117E-04
27.3	996.4328	-0.27799	0.000845	-1.866E-05	8.4830E-07	-1.849E-08	3.6314E-03	2.127E-04
27.4	996.4049	-0.27890	0.000843	-1.859E-05	8.4646E-07	-1.842E-08	3.6528E-03	2.138E-04
27.5	996.3770	-0.27981	0.000842	-1.853E-05	8.4462E-07	-1.836E-08	3.6742E-03	2.149E-04
27.6	996.3490	-0.28072	0.000840	-1.846E-05	8.4279E-07	-1.829E-08	3.6958E-03	2.160E-04
27.7	996.3209	-0.28162	0.000838	-1.840E-05	8.4096E-07	-1.823E-08	3.7174E-03	2.171E-04
27.8	996.2926	-0.28253	0.000836	-1.833E-05	8.3914E-07	-1.816E-08	3.7392E-03	2.182E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
27.9	996.2643	-0.28343	0.000834	-1.827E-05	8.3733E-07	-1.810E-08	3.7611E-03	2.193E-04
28.0	996.2360	-0.28434	0.000832	-1.820E-05	8.3552E-07	-1.803E-08	3.7831E-03	2.205E-04
28.1	996.2075	-0.28524	0.000831	-1.814E-05	8.3372E-07	-1.797E-08	3.8052E-03	2.216E-04
28.2	996.1789	-0.28614	0.000829	-1.807E-05	8.3193E-07	-1.790E-08	3.8274E-03	2.227E-04
28.3	996.1503	-0.28704	0.000827	-1.801E-05	8.3014E-07	-1.784E-08	3.8497E-03	2.238E-04
28.4	996.1215	-0.28793	0.000825	-1.795E-05	8.2836E-07	-1.778E-08	3.8721E-03	2.250E-04
28.5	996.0927	-0.28883	0.000823	-1.788E-05	8.2659E-07	-1.771E-08	3.8947E-03	2.261E-04
28.6	996.0637	-0.28972	0.000822	-1.782E-05	8.2482E-07	-1.765E-08	3.9174E-03	2.273E-04
28.7	996.0347	-0.29061	0.000820	-1.776E-05	8.2306E-07	-1.759E-08	3.9401E-03	2.284E-04
28.8	996.0056	-0.29150	0.000818	-1.770E-05	8.2130E-07	-1.753E-08	3.9630E-03	2.296E-04
28.9	995.9764	-0.29239	0.000816	-1.763E-05	8.1955E-07	-1.747E-08	3.9860E-03	2.307E-04
29.0	995.9471	-0.29327	0.000814	-1.757E-05	8.1781E-07	-1.740E-08	4.0092E-03	2.319E-04
29.1	995.9178	-0.29416	0.000813	-1.751E-05	8.1607E-07	-1.734E-08	4.0324E-03	2.330E-04
29.2	995.8883	-0.29504	0.000811	-1.745E-05	8.1434E-07	-1.728E-08	4.0558E-03	2.342E-04
29.3	995.8588	-0.29593	0.000809	-1.739E-05	8.1261E-07	-1.722E-08	4.0793E-03	2.354E-04
29.4	995.8291	-0.29681	0.000808	-1.733E-05	8.1089E-07	-1.716E-08	4.1029E-03	2.366E-04
29.5	995.7994	-0.29768	0.000806	-1.727E-05	8.0918E-07	-1.710E-08	4.1266E-03	2.378E-04
29.6	995.7696	-0.29856	0.000804	-1.721E-05	8.0747E-07	-1.704E-08	4.1504E-03	2.390E-04
29.7	995.7397	-0.29944	0.000802	-1.715E-05	8.0577E-07	-1.698E-08	4.1744E-03	2.402E-04
29.8	995.7097	-0.30031	0.000801	-1.709E-05	8.0408E-07	-1.692E-08	4.1985E-03	2.414E-04
29.9	995.6796	-0.30119	0.000799	-1.703E-05	8.0239E-07	-1.686E-08	4.2227E-03	2.426E-04
30.0	995.6495	-0.30206	0.000797	-1.697E-05	8.0071E-07	-1.681E-08	4.2470E-03	2.438E-04
30.1	995.6192	-0.30293	0.000796	-1.692E-05	7.9903E-07	-1.675E-08	4.2714E-03	2.450E-04
30.2	995.5889	-0.30380	0.000794	-1.686E-05	7.9736E-07	-1.669E-08	4.2960E-03	2.462E-04
30.3	995.5585	-0.30466	0.000792	-1.680E-05	7.9569E-07	-1.663E-08	4.3207E-03	2.475E-04
30.4	995.5279	-0.30553	0.000790	-1.674E-05	7.9403E-07	-1.657E-08	4.3455E-03	2.487E-04
30.5	995.4973	-0.30639	0.000789	-1.669E-05	7.9237E-07	-1.652E-08	4.3704E-03	2.499E-04
30.6	995.4667	-0.30725	0.000787	-1.663E-05	7.9073E-07	-1.646E-08	4.3955E-03	2.512E-04
30.7	995.4359	-0.30812	0.000785	-1.657E-05	7.8908E-07	-1.640E-08	4.4206E-03	2.524E-04
30.8	995.4050	-0.30897	0.000784	-1.651E-05	7.8745E-07	-1.635E-08	4.4459E-03	2.537E-04
30.9	995.3741	-0.30983	0.000782	-1.646E-05	7.8581E-07	-1.629E-08	4.4714E-03	2.549E-04
31.0	995.3431	-0.31069	0.000781	-1.640E-05	7.8419E-07	-1.624E-08	4.4969E-03	2.562E-04
31.1	995.3120	-0.31154	0.000779	-1.635E-05	7.8257E-07	-1.618E-08	4.5226E-03	2.575E-04
31.2	995.2808	-0.31240	0.000777	-1.629E-05	7.8095E-07	-1.612E-08	4.5484E-03	2.588E-04
31.3	995.2495	-0.31325	0.000776	-1.624E-05	7.7934E-07	-1.607E-08	4.5744E-03	2.600E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
31.4	995.2181	-0.31410	0.000774	-1.618E-05	7.7774E-07	-1.601E-08	4.6004E-03	2.613E-04
31.5	995.1867	-0.31495	0.000772	-1.613E-05	7.7614E-07	-1.596E-08	4.6266E-03	2.626E-04
31.6	995.1551	-0.31580	0.000771	-1.607E-05	7.7455E-07	-1.591E-08	4.6530E-03	2.639E-04
31.7	995.1235	-0.31665	0.000769	-1.602E-05	7.7296E-07	-1.585E-08	4.6794E-03	2.652E-04
31.8	995.0918	-0.31749	0.000768	-1.596E-05	7.7138E-07	-1.580E-08	4.7060E-03	2.665E-04
31.9	995.0600	-0.31834	0.000766	-1.591E-05	7.6980E-07	-1.574E-08	4.7327E-03	2.678E-04
32.0	995.0281	-0.31918	0.000764	-1.586E-05	7.6823E-07	-1.569E-08	4.7596E-03	2.692E-04
32.1	994.9962	-0.32002	0.000763	-1.580E-05	7.6666E-07	-1.564E-08	4.7866E-03	2.705E-04
32.2	994.9641	-0.32086	0.000761	-1.575E-05	7.6510E-07	-1.559E-08	4.8137E-03	2.718E-04
32.3	994.9320	-0.32170	0.000760	-1.570E-05	7.6354E-07	-1.553E-08	4.8409E-03	2.732E-04
32.4	994.8998	-0.32253	0.000758	-1.565E-05	7.6199E-07	-1.548E-08	4.8683E-03	2.745E-04
32.5	994.8675	-0.32337	0.000757	-1.560E-05	7.6045E-07	-1.543E-08	4.8958E-03	2.758E-04
32.6	994.8351	-0.32420	0.000755	-1.554E-05	7.5891E-07	-1.538E-08	4.9235E-03	2.772E-04
32.7	994.8026	-0.32504	0.000753	-1.549E-05	7.5737E-07	-1.532E-08	4.9513E-03	2.785E-04
32.8	994.7701	-0.32587	0.000752	-1.544E-05	7.5584E-07	-1.527E-08	4.9792E-03	2.799E-04
32.9	994.7375	-0.32670	0.000750	-1.539E-05	7.5432E-07	-1.522E-08	5.0072E-03	2.813E-04
33.0	994.7048	-0.32753	0.000749	-1.534E-05	7.5280E-07	-1.517E-08	5.0354E-03	2.826E-04
33.1	994.6720	-0.32836	0.000747	-1.529E-05	7.5128E-07	-1.512E-08	5.0638E-03	2.840E-04
33.2	994.6391	-0.32918	0.000746	-1.524E-05	7.4977E-07	-1.507E-08	5.0922E-03	2.854E-04
33.3	994.6061	-0.33001	0.000744	-1.519E-05	7.4827E-07	-1.502E-08	5.1208E-03	2.868E-04
33.4	994.5731	-0.33083	0.000743	-1.514E-05	7.4677E-07	-1.497E-08	5.1496E-03	2.882E-04
33.5	994.5400	-0.33165	0.000741	-1.509E-05	7.4528E-07	-1.492E-08	5.1785E-03	2.896E-04
33.6	994.5068	-0.33247	0.000740	-1.504E-05	7.4379E-07	-1.487E-08	5.2075E-03	2.910E-04
33.7	994.4735	-0.33329	0.000738	-1.499E-05	7.4230E-07	-1.482E-08	5.2367E-03	2.924E-04
33.8	994.4401	-0.33411	0.000737	-1.494E-05	7.4082E-07	-1.477E-08	5.2660E-03	2.938E-04
33.9	994.4067	-0.33493	0.000735	-1.489E-05	7.3935E-07	-1.472E-08	5.2955E-03	2.953E-04
34.0	994.3731	-0.33574	0.000734	-1.484E-05	7.3788E-07	-1.467E-08	5.3251E-03	2.967E-04
34.1	994.3395	-0.33656	0.000732	-1.479E-05	7.3641E-07	-1.463E-08	5.3548E-03	2.981E-04
34.2	994.3058	-0.33737	0.000731	-1.474E-05	7.3495E-07	-1.458E-08	5.3847E-03	2.996E-04
34.3	994.2720	-0.33818	0.000729	-1.469E-05	7.3350E-07	-1.453E-08	5.4147E-03	3.010E-04
34.4	994.2382	-0.33899	0.000728	-1.465E-05	7.3205E-07	-1.448E-08	5.4449E-03	3.025E-04
34.5	994.2042	-0.33980	0.000726	-1.460E-05	7.3060E-07	-1.443E-08	5.4752E-03	3.039E-04
34.6	994.1702	-0.34061	0.000725	-1.455E-05	7.2916E-07	-1.439E-08	5.5057E-03	3.054E-04
34.7	994.1361	-0.34142	0.000723	-1.450E-05	7.2772E-07	-1.434E-08	5.5363E-03	3.069E-04
34.8	994.1019	-0.34222	0.000722	-1.446E-05	7.2629E-07	-1.429E-08	5.5671E-03	3.083E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
34.9	994.0677	-0.34303	0.000721	-1.441E-05	7.2486E-07	-1.425E-08	5.5980E-03	3.098E-04
35.0	994.0333	-0.34383	0.000719	-1.436E-05	7.2344E-07	-1.420E-08	5.6290E-03	3.113E-04
35.1	993.9989	-0.34463	0.000718	-1.432E-05	7.2202E-07	-1.415E-08	5.6602E-03	3.128E-04
35.2	993.9644	-0.34543	0.000716	-1.427E-05	7.2061E-07	-1.411E-08	5.6916E-03	3.143E-04
35.3	993.9298	-0.34623	0.000715	-1.422E-05	7.1920E-07	-1.406E-08	5.7231E-03	3.158E-04
35.4	993.8951	-0.34703	0.000713	-1.418E-05	7.1780E-07	-1.401E-08	5.7547E-03	3.173E-04
35.5	993.8604	-0.34783	0.000712	-1.413E-05	7.1640E-07	-1.397E-08	5.7866E-03	3.189E-04
35.6	993.8256	-0.34862	0.000711	-1.409E-05	7.1501E-07	-1.392E-08	5.8185E-03	3.204E-04
35.7	993.7907	-0.34942	0.000709	-1.404E-05	7.1362E-07	-1.388E-08	5.8506E-03	3.219E-04
35.8	993.7557	-0.35021	0.000708	-1.400E-05	7.1223E-07	-1.383E-08	5.8829E-03	3.234E-04
35.9	993.7206	-0.35100	0.000706	-1.395E-05	7.1085E-07	-1.379E-08	5.9153E-03	3.250E-04
36.0	993.6855	-0.35179	0.000705	-1.391E-05	7.0947E-07	-1.375E-08	5.9479E-03	3.265E-04
36.1	993.6503	-0.35258	0.000704	-1.386E-05	7.0810E-07	-1.370E-08	5.9806E-03	3.281E-04
36.2	993.6150	-0.35337	0.000702	-1.382E-05	7.0673E-07	-1.366E-08	6.0135E-03	3.297E-04
36.3	993.5796	-0.35416	0.000701	-1.377E-05	7.0537E-07	-1.361E-08	6.0466E-03	3.312E-04
36.4	993.5442	-0.35494	0.000699	-1.373E-05	7.0401E-07	-1.357E-08	6.0798E-03	3.328E-04
36.5	993.5086	-0.35573	0.000698	-1.369E-05	7.0265E-07	-1.353E-08	6.1131E-03	3.344E-04
36.6	993.4730	-0.35651	0.000697	-1.364E-05	7.0130E-07	-1.348E-08	6.1466E-03	3.360E-04
36.7	993.4373	-0.35729	0.000695	-1.360E-05	6.9996E-07	-1.344E-08	6.1803E-03	3.376E-04
36.8	993.4015	-0.35808	0.000694	-1.356E-05	6.9862E-07	-1.340E-08	6.2141E-03	3.392E-04
36.9	993.3657	-0.35886	0.000693	-1.351E-05	6.9728E-07	-1.335E-08	6.2481E-03	3.408E-04
37.0	993.3298	-0.35963	0.000691	-1.347E-05	6.9595E-07	-1.331E-08	6.2823E-03	3.424E-04
37.1	993.2938	-0.36041	0.000690	-1.343E-05	6.9462E-07	-1.327E-08	6.3166E-03	3.440E-04
37.2	993.2577	-0.36119	0.000689	-1.339E-05	6.9329E-07	-1.323E-08	6.3511E-03	3.456E-04
37.3	993.2215	-0.36196	0.000687	-1.334E-05	6.9197E-07	-1.318E-08	6.3857E-03	3.472E-04
37.4	993.1853	-0.36274	0.000686	-1.330E-05	6.9066E-07	-1.314E-08	6.4205E-03	3.489E-04
37.5	993.1490	-0.36351	0.000685	-1.326E-05	6.8934E-07	-1.310E-08	6.4555E-03	3.505E-04
37.6	993.1126	-0.36428	0.000683	-1.322E-05	6.8804E-07	-1.306E-08	6.4906E-03	3.522E-04
37.7	993.0761	-0.36505	0.000682	-1.318E-05	6.8673E-07	-1.302E-08	6.5259E-03	3.538E-04
37.8	993.0396	-0.36582	0.000681	-1.314E-05	6.8543E-07	-1.298E-08	6.5614E-03	3.555E-04
37.9	993.0030	-0.36659	0.000679	-1.309E-05	6.8414E-07	-1.293E-08	6.5970E-03	3.572E-04
38.0	992.9663	-0.36736	0.000678	-1.305E-05	6.8285E-07	-1.289E-08	6.6328E-03	3.588E-04
38.1	992.9295	-0.36813	0.000677	-1.301E-05	6.8156E-07	-1.285E-08	6.6688E-03	3.605E-04
38.2	992.8926	-0.36889	0.000675	-1.297E-05	6.8027E-07	-1.281E-08	6.7049E-03	3.622E-04
38.3	992.8557	-0.36966	0.000674	-1.293E-05	6.7900E-07	-1.277E-08	6.7412E-03	3.639E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
38.4	992.8187	-0.37042	0.000673	-1.289E-05	6.7772E-07	-1.273E-08	6.7777E-03	3.656E-04
38.5	992.7816	-0.37118	0.000672	-1.285E-05	6.7645E-07	-1.269E-08	6.8144E-03	3.673E-04
38.6	992.7445	-0.37194	0.000670	-1.281E-05	6.7518E-07	-1.265E-08	6.8512E-03	3.690E-04
38.7	992.7072	-0.37270	0.000669	-1.277E-05	6.7392E-07	-1.261E-08	6.8882E-03	3.707E-04
38.8	992.6699	-0.37346	0.000668	-1.273E-05	6.7266E-07	-1.257E-08	6.9253E-03	3.725E-04
38.9	992.6326	-0.37422	0.000666	-1.269E-05	6.7140E-07	-1.253E-08	6.9627E-03	3.742E-04
39.0	992.5951	-0.37497	0.000665	-1.265E-05	6.7015E-07	-1.250E-08	7.0002E-03	3.759E-04
39.1	992.5576	-0.37573	0.000664	-1.262E-05	6.6890E-07	-1.246E-08	7.0378E-03	3.777E-04
39.2	992.5199	-0.37648	0.000663	-1.258E-05	6.6766E-07	-1.242E-08	7.0757E-03	3.794E-04
39.3	992.4823	-0.37724	0.000661	-1.254E-05	6.6642E-07	-1.238E-08	7.1137E-03	3.812E-04
39.4	992.4445	-0.37799	0.000660	-1.250E-05	6.6518E-07	-1.234E-08	7.1519E-03	3.830E-04
39.5	992.4067	-0.37874	0.000659	-1.246E-05	6.6395E-07	-1.230E-08	7.1903E-03	3.847E-04
39.6	992.3688	-0.37949	0.000658	-1.242E-05	6.6272E-07	-1.226E-08	7.2289E-03	3.865E-04
39.7	992.3308	-0.38024	0.000656	-1.238E-05	6.6150E-07	-1.223E-08	7.2676E-03	3.883E-04
39.8	992.2927	-0.38099	0.000655	-1.235E-05	6.6028E-07	-1.219E-08	7.3066E-03	3.901E-04
39.9	992.2546	-0.38173	0.000654	-1.231E-05	6.5906E-07	-1.215E-08	7.3457E-03	3.919E-04
40.0	992.2164	-0.38248	0.000653	-1.227E-05	6.5785E-07	-1.211E-08	7.3849E-03	3.937E-04
40.1	992.1781	-0.38322	0.000652	-1.223E-05	6.5664E-07	-1.208E-08	7.4244E-03	3.955E-04
40.2	992.1397	-0.38397	0.000650	-1.220E-05	6.5543E-07	-1.204E-08	7.4640E-03	3.974E-04
40.3	992.1013	-0.38471	0.000649	-1.216E-05	6.5423E-07	-1.200E-08	7.5039E-03	3.992E-04
40.4	992.0628	-0.38545	0.000648	-1.212E-05	6.5303E-07	-1.196E-08	7.5439E-03	4.010E-04
40.5	992.0242	-0.38619	0.000647	-1.208E-05	6.5184E-07	-1.193E-08	7.5841E-03	4.029E-04
40.6	991.9855	-0.38693	0.000645	-1.205E-05	6.5065E-07	-1.189E-08	7.6245E-03	4.047E-04
40.7	991.9468	-0.38767	0.000644	-1.201E-05	6.4946E-07	-1.185E-08	7.6650E-03	4.066E-04
40.8	991.9080	-0.38841	0.000643	-1.197E-05	6.4828E-07	-1.182E-08	7.7058E-03	4.084E-04
40.9	991.8691	-0.38914	0.000642	-1.194E-05	6.4710E-07	-1.178E-08	7.7467E-03	4.103E-04
41.0	991.8302	-0.38988	0.000641	-1.190E-05	6.4592E-07	-1.175E-08	7.7878E-03	4.122E-04
41.1	991.7911	-0.39061	0.000639	-1.187E-05	6.4475E-07	-1.171E-08	7.8292E-03	4.141E-04
41.2	991.7520	-0.39135	0.000638	-1.183E-05	6.4358E-07	-1.167E-08	7.8707E-03	4.160E-04
41.3	991.7129	-0.39208	0.000637	-1.180E-05	6.4241E-07	-1.164E-08	7.9123E-03	4.179E-04
41.4	991.6736	-0.39281	0.000636	-1.176E-05	6.4125E-07	-1.160E-08	7.9542E-03	4.198E-04
41.5	991.6343	-0.39354	0.000635	-1.172E-05	6.4009E-07	-1.157E-08	7.9963E-03	4.217E-04
41.6	991.5949	-0.39427	0.000634	-1.169E-05	6.3894E-07	-1.153E-08	8.0386E-03	4.236E-04
41.7	991.5555	-0.39500	0.000632	-1.165E-05	6.3779E-07	-1.150E-08	8.0810E-03	4.255E-04
41.8	991.5159	-0.39573	0.000631	-1.162E-05	6.3664E-07	-1.146E-08	8.1237E-03	4.275E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
41.9	991.4763	-0.39645	0.000630	-1.158E-05	6.3549E-07	-1.143E-08	8.1665E-03	4.294E-04
42.0	991.4366	-0.39718	0.000629	-1.155E-05	6.3435E-07	-1.139E-08	8.2096E-03	4.314E-04
42.1	991.3969	-0.39790	0.000628	-1.151E-05	6.3321E-07	-1.136E-08	8.2528E-03	4.333E-04
42.2	991.3571	-0.39863	0.000627	-1.148E-05	6.3208E-07	-1.133E-08	8.2962E-03	4.353E-04
42.3	991.3172	-0.39935	0.000625	-1.145E-05	6.3095E-07	-1.129E-08	8.3399E-03	4.373E-04
42.4	991.2772	-0.40007	0.000624	-1.141E-05	6.2982E-07	-1.126E-08	8.3837E-03	4.393E-04
42.5	991.2371	-0.40079	0.000623	-1.138E-05	6.2870E-07	-1.122E-08	8.4277E-03	4.412E-04
42.6	991.1970	-0.40151	0.000622	-1.134E-05	6.2758E-07	-1.119E-08	8.4719E-03	4.432E-04
42.7	991.1568	-0.40223	0.000621	-1.131E-05	6.2646E-07	-1.116E-08	8.5164E-03	4.452E-04
42.8	991.1166	-0.40295	0.000620	-1.128E-05	6.2535E-07	-1.112E-08	8.5610E-03	4.472E-04
42.9	991.0762	-0.40366	0.000619	-1.124E-05	6.2423E-07	-1.109E-08	8.6058E-03	4.493E-04
43.0	991.0358	-0.40438	0.000618	-1.121E-05	6.2313E-07	-1.106E-08	8.6508E-03	4.513E-04
43.1	990.9954	-0.40509	0.000616	-1.118E-05	6.2202E-07	-1.102E-08	8.6961E-03	4.533E-04
43.2	990.9548	-0.40581	0.000615	-1.114E-05	6.2092E-07	-1.099E-08	8.7415E-03	4.554E-04
43.3	990.9142	-0.40652	0.000614	-1.111E-05	6.1982E-07	-1.096E-08	8.7871E-03	4.574E-04
43.4	990.8735	-0.40723	0.000613	-1.108E-05	6.1873E-07	-1.093E-08	8.8330E-03	4.595E-04
43.5	990.8328	-0.40794	0.000612	-1.105E-05	6.1764E-07	-1.089E-08	8.8790E-03	4.615E-04
43.6	990.7919	-0.40866	0.000611	-1.101E-05	6.1655E-07	-1.086E-08	8.9253E-03	4.636E-04
43.7	990.7510	-0.40936	0.000610	-1.098E-05	6.1547E-07	-1.083E-08	8.9717E-03	4.657E-04
43.8	990.7101	-0.41007	0.000609	-1.095E-05	6.1439E-07	-1.080E-08	9.0184E-03	4.678E-04
43.9	990.6690	-0.41078	0.000608	-1.092E-05	6.1331E-07	-1.076E-08	9.0653E-03	4.699E-04
44.0	990.6279	-0.41149	0.000606	-1.088E-05	6.1223E-07	-1.073E-08	9.1124E-03	4.720E-04
44.1	990.5867	-0.41219	0.000605	-1.085E-05	6.1116E-07	-1.070E-08	9.1597E-03	4.741E-04
44.2	990.5455	-0.41290	0.000604	-1.082E-05	6.1009E-07	-1.067E-08	9.2072E-03	4.762E-04
44.3	990.5041	-0.41360	0.000603	-1.079E-05	6.0903E-07	-1.064E-08	9.2549E-03	4.783E-04
44.4	990.4627	-0.41430	0.000602	-1.076E-05	6.0797E-07	-1.061E-08	9.3029E-03	4.804E-04
44.5	990.4213	-0.41501	0.000601	-1.073E-05	6.0691E-07	-1.058E-08	9.3510E-03	4.826E-04
44.6	990.3797	-0.41571	0.000600	-1.069E-05	6.0585E-07	-1.054E-08	9.3994E-03	4.847E-04
44.7	990.3381	-0.41641	0.000599	-1.066E-05	6.0480E-07	-1.051E-08	9.4480E-03	4.869E-04
44.8	990.2965	-0.41711	0.000598	-1.063E-05	6.0375E-07	-1.048E-08	9.4968E-03	4.890E-04
44.9	990.2547	-0.41780	0.000597	-1.060E-05	6.0270E-07	-1.045E-08	9.5458E-03	4.912E-04
45.0	990.2129	-0.41850	0.000596	-1.057E-05	6.0166E-07	-1.042E-08	9.5950E-03	4.934E-04
45.1	990.1710	-0.41920	0.000595	-1.054E-05	6.0062E-07	-1.039E-08	9.6444E-03	4.956E-04
45.2	990.1291	-0.41989	0.000594	-1.051E-05	5.9958E-07	-1.036E-08	9.6941E-03	4.978E-04
45.3	990.0870	-0.42059	0.000593	-1.048E-05	5.9855E-07	-1.033E-08	9.7440E-03	5.000E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
45.4	990.0449	-0.42128	0.000592	-1.045E-05	5.9751E-07	-1.030E-08	9.7941E-03	5.022E-04
45.5	990.0028	-0.42198	0.000591	-1.042E-05	5.9649E-07	-1.027E-08	9.8444E-03	5.044E-04
45.6	989.9606	-0.42267	0.000589	-1.039E-05	5.9546E-07	-1.024E-08	9.8950E-03	5.066E-04
45.7	989.9182	-0.42336	0.000588	-1.036E-05	5.9444E-07	-1.021E-08	9.9458E-03	5.089E-04
45.8	989.8759	-0.42405	0.000587	-1.033E-05	5.9342E-07	-1.018E-08	9.9968E-03	5.111E-04
45.9	989.8334	-0.42474	0.000586	-1.030E-05	5.9240E-07	-1.015E-08	1.0048E-02	5.134E-04
46.0	989.7909	-0.42543	0.000585	-1.027E-05	5.9139E-07	-1.012E-08	1.0099E-02	5.156E-04
46.1	989.7484	-0.42612	0.000584	-1.024E-05	5.9038E-07	-1.009E-08	1.0151E-02	5.179E-04
46.2	989.7057	-0.42680	0.000583	-1.021E-05	5.8937E-07	-1.006E-08	1.0203E-02	5.202E-04
46.3	989.6630	-0.42749	0.000582	-1.018E-05	5.8836E-07	-1.003E-08	1.0255E-02	5.225E-04
46.4	989.6202	-0.42817	0.000581	-1.015E-05	5.8736E-07	-1.000E-08	1.0308E-02	5.247E-04
46.5	989.5774	-0.42886	0.000580	-1.012E-05	5.8636E-07	-9.976E-09	1.0360E-02	5.270E-04
46.6	989.5344	-0.42954	0.000579	-1.010E-05	5.8537E-07	-9.948E-09	1.0413E-02	5.294E-04
46.7	989.4915	-0.43022	0.000578	-1.007E-05	5.8437E-07	-9.918E-09	1.0466E-02	5.317E-04
46.8	989.4484	-0.43091	0.000577	-1.004E-05	5.8338E-07	-9.890E-09	1.0519E-02	5.340E-04
46.9	989.4053	-0.43159	0.000576	-1.001E-05	5.8240E-07	-9.862E-09	1.0573E-02	5.363E-04
47.0	989.3621	-0.43227	0.000575	-9.981E-06	5.8141E-07	-9.834E-09	1.0627E-02	5.387E-04
47.1	989.3188	-0.43295	0.000574	-9.951E-06	5.8043E-07	-9.805E-09	1.0680E-02	5.410E-04
47.2	989.2755	-0.43363	0.000573	-9.924E-06	5.7945E-07	-9.777E-09	1.0735E-02	5.434E-04
47.3	989.2321	-0.43430	0.000572	-9.895E-06	5.7847E-07	-9.749E-09	1.0789E-02	5.457E-04
47.4	989.1886	-0.43498	0.000571	-9.868E-06	5.7750E-07	-9.721E-09	1.0844E-02	5.481E-04
47.5	989.1451	-0.43566	0.000570	-9.840E-06	5.7653E-07	-9.694E-09	1.0899E-02	5.505E-04
47.6	989.1015	-0.43633	0.000569	-9.811E-06	5.7556E-07	-9.666E-09	1.0954E-02	5.529E-04
47.7	989.0578	-0.43701	0.000568	-9.784E-06	5.7460E-07	-9.638E-09	1.1009E-02	5.553E-04
47.8	989.0141	-0.43768	0.000567	-9.757E-06	5.7363E-07	-9.611E-09	1.1065E-02	5.577E-04
47.9	988.9703	-0.43835	0.000566	-9.729E-06	5.7267E-07	-9.584E-09	1.1121E-02	5.601E-04
48.0	988.9264	-0.43902	0.000565	-9.701E-06	5.7172E-07	-9.556E-09	1.1177E-02	5.626E-04
48.1	988.8825	-0.43970	0.000564	-9.674E-06	5.7076E-07	-9.529E-09	1.1233E-02	5.650E-04
48.2	988.8385	-0.44037	0.000563	-9.647E-06	5.6981E-07	-9.502E-09	1.1290E-02	5.674E-04
48.3	988.7944	-0.44103	0.000562	-9.620E-06	5.6886E-07	-9.475E-09	1.1347E-02	5.699E-04
48.4	988.7503	-0.44170	0.000562	-9.593E-06	5.6792E-07	-9.448E-09	1.1404E-02	5.723E-04
48.5	988.7061	-0.44237	0.000561	-9.566E-06	5.6697E-07	-9.422E-09	1.1461E-02	5.748E-04
48.6	988.6618	-0.44304	0.000560	-9.539E-06	5.6603E-07	-9.395E-09	1.1519E-02	5.773E-04
48.7	988.6175	-0.44371	0.000559	-9.513E-06	5.6509E-07	-9.368E-09	1.1577E-02	5.798E-04
48.8	988.5731	-0.44437	0.000558	-9.486E-06	5.6416E-07	-9.342E-09	1.1635E-02	5.823E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscosity μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
48.9	988.5286	-0.44504	0.000557	-9.459E-06	5.6323E-07	-9.316E-09	1.1693E-02	5.848E-04
49.0	988.4841	-0.44570	0.000556	-9.433E-06	5.6229E-07	-9.289E-09	1.1752E-02	5.873E-04
49.1	988.4395	-0.44636	0.000555	-9.407E-06	5.6137E-07	-9.264E-09	1.1811E-02	5.898E-04
49.2	988.3948	-0.44703	0.000554	-9.381E-06	5.6044E-07	-9.238E-09	1.1870E-02	5.924E-04
49.3	988.3500	-0.44769	0.000553	-9.355E-06	5.5952E-07	-9.212E-09	1.1929E-02	5.949E-04
49.4	988.3052	-0.44835	0.000552	-9.329E-06	5.5860E-07	-9.186E-09	1.1989E-02	5.974E-04
49.5	988.2604	-0.44901	0.000551	-9.303E-06	5.5768E-07	-9.160E-09	1.2049E-02	6.000E-04
49.6	988.2154	-0.44967	0.000550	-9.277E-06	5.5677E-07	-9.134E-09	1.2109E-02	6.026E-04
49.7	988.1704	-0.45033	0.000549	-9.252E-06	5.5586E-07	-9.109E-09	1.2169E-02	6.051E-04
49.8	988.1254	-0.45098	0.000548	-9.226E-06	5.5495E-07	-9.084E-09	1.2230E-02	6.077E-04
49.9	988.0802	-0.45164	0.000547	-9.200E-06	5.5404E-07	-9.058E-09	1.2291E-02	6.103E-04
50.0	988.0351	-0.45230	0.000547		5.5313E-07		1.2352E-02	

Appendix B : STANDARD SALTWATER PROPERTIES 0.1 TO 50 °C IN 0.1 °C INCREMENTS

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
0.1	1028.1499		0.001900		1.8480E-06		6.0306E-04	
0.2	1028.1442	-0.0575	0.001894	-6.462E-05	1.8417E-06	-6.275E-08	6.0745E-04	4.407E-05
0.3	1028.1384	-0.0585	0.001887	-6.427E-05	1.8354E-06	-6.240E-08	6.1187E-04	4.436E-05
0.4	1028.1325	-0.0600	0.001881	-6.391E-05	1.8292E-06	-6.206E-08	6.1632E-04	4.464E-05
0.5	1028.1264	-0.0615	0.001874	-6.356E-05	1.8230E-06	-6.172E-08	6.2080E-04	4.493E-05
0.6	1028.1202	-0.0625	0.001868	-6.322E-05	1.8169E-06	-6.138E-08	6.2531E-04	4.522E-05
0.7	1028.1139	-0.0640	0.001862	-6.287E-05	1.8107E-06	-6.104E-08	6.2985E-04	4.551E-05
0.8	1028.1074	-0.0655	0.001855	-6.253E-05	1.8047E-06	-6.071E-08	6.3441E-04	4.580E-05
0.9	1028.1008	-0.0665	0.001849	-6.219E-05	1.7986E-06	-6.038E-08	6.3901E-04	4.609E-05
1.0	1028.0941	-0.0680	0.001843	-6.186E-05	1.7926E-06	-6.005E-08	6.4363E-04	4.639E-05
1.1	1028.0872	-0.0695	0.001837	-6.152E-05	1.7866E-06	-5.972E-08	6.4828E-04	4.669E-05
1.2	1028.0802	-0.0705	0.001831	-6.119E-05	1.7806E-06	-5.940E-08	6.5297E-04	4.699E-05
1.3	1028.0731	-0.0720	0.001825	-6.086E-05	1.7747E-06	-5.907E-08	6.5768E-04	4.729E-05
1.4	1028.0658	-0.0730	0.001818	-6.053E-05	1.7688E-06	-5.876E-08	6.6243E-04	4.759E-05
1.5	1028.0585	-0.0740	0.001812	-6.021E-05	1.7630E-06	-5.844E-08	6.6720E-04	4.789E-05
1.6	1028.0510	-0.0760	0.001806	-5.989E-05	1.7571E-06	-5.812E-08	6.7200E-04	4.820E-05
1.7	1028.0433	-0.0770	0.001800	-5.957E-05	1.7513E-06	-5.781E-08	6.7684E-04	4.850E-05
1.8	1028.0356	-0.0780	0.001795	-5.925E-05	1.7456E-06	-5.750E-08	6.8170E-04	4.881E-05
1.9	1028.0277	-0.0795	0.001789	-5.893E-05	1.7398E-06	-5.719E-08	6.8660E-04	4.912E-05
2.0	1028.0197	-0.0810	0.001783	-5.862E-05	1.7341E-06	-5.689E-08	6.9153E-04	4.944E-05
2.1	1028.0115	-0.0820	0.001777	-5.831E-05	1.7285E-06	-5.658E-08	6.9649E-04	4.975E-05
2.2	1028.0033	-0.0830	0.001771	-5.800E-05	1.7228E-06	-5.628E-08	7.0148E-04	5.006E-05
2.3	1027.9949	-0.0845	0.001765	-5.770E-05	1.7172E-06	-5.598E-08	7.0650E-04	5.038E-05
2.4	1027.9864	-0.0855	0.001760	-5.739E-05	1.7116E-06	-5.569E-08	7.1156E-04	5.070E-05
2.5	1027.9778	-0.0870	0.001754	-5.709E-05	1.7061E-06	-5.539E-08	7.1664E-04	5.102E-05
2.6	1027.9690	-0.0885	0.001748	-5.679E-05	1.7005E-06	-5.510E-08	7.2176E-04	5.134E-05
2.7	1027.9601	-0.0895	0.001742	-5.649E-05	1.6950E-06	-5.481E-08	7.2691E-04	5.167E-05
2.8	1027.9511	-0.0905	0.001737	-5.620E-05	1.6896E-06	-5.452E-08	7.3209E-04	5.199E-05
2.9	1027.9420	-0.0920	0.001731	-5.591E-05	1.6841E-06	-5.424E-08	7.3731E-04	5.232E-05
3.0	1027.9327	-0.0930	0.001726	-5.561E-05	1.6787E-06	-5.395E-08	7.4256E-04	5.265E-05
3.1	1027.9234	-0.0940	0.001720	-5.533E-05	1.6734E-06	-5.367E-08	7.4784E-04	5.298E-05
3.2	1027.9139	-0.0960	0.001715	-5.504E-05	1.6680E-06	-5.339E-08	7.5315E-04	5.331E-05

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
3.3	1027.9042	-0.0970	0.001709	-5.475E-05	1.6627E-06	-5.311E-08	7.5850E-04	5.365E-05
3.4	1027.8945	-0.0980	0.001704	-5.447E-05	1.6574E-06	-5.283E-08	7.6388E-04	5.399E-05
3.5	1027.8846	-0.0990	0.001698	-5.419E-05	1.6521E-06	-5.256E-08	7.6930E-04	5.432E-05
3.6	1027.8747	-0.1000	0.001693	-5.391E-05	1.6469E-06	-5.229E-08	7.7475E-04	5.466E-05
3.7	1027.8646	-0.1015	0.001687	-5.364E-05	1.6416E-06	-5.202E-08	7.8023E-04	5.501E-05
3.8	1027.8544	-0.1030	0.001682	-5.336E-05	1.6365E-06	-5.175E-08	7.8575E-04	5.535E-05
3.9	1027.8440	-0.1040	0.001677	-5.309E-05	1.6313E-06	-5.148E-08	7.9130E-04	5.570E-05
4.0	1027.8336	-0.1050	0.001671	-5.282E-05	1.6262E-06	-5.122E-08	7.9689E-04	5.604E-05
4.1	1027.8230	-0.1065	0.001666	-5.255E-05	1.6211E-06	-5.096E-08	8.0251E-04	5.639E-05
4.2	1027.8123	-0.1075	0.001661	-5.228E-05	1.6160E-06	-5.070E-08	8.0817E-04	5.675E-05
4.3	1027.8015	-0.1085	0.001656	-5.201E-05	1.6109E-06	-5.044E-08	8.1386E-04	5.710E-05
4.4	1027.7906	-0.1100	0.001651	-5.175E-05	1.6059E-06	-5.018E-08	8.1959E-04	5.745E-05
4.5	1027.7795	-0.1110	0.001645	-5.149E-05	1.6009E-06	-4.992E-08	8.2535E-04	5.781E-05
4.6	1027.7684	-0.1120	0.001640	-5.123E-05	1.5959E-06	-4.967E-08	8.3115E-04	5.817E-05
4.7	1027.7571	-0.1135	0.001635	-5.097E-05	1.5909E-06	-4.942E-08	8.3699E-04	5.853E-05
4.8	1027.7457	-0.1145	0.001630	-5.071E-05	1.5860E-06	-4.917E-08	8.4286E-04	5.889E-05
4.9	1027.7342	-0.1160	0.001625	-5.046E-05	1.5811E-06	-4.892E-08	8.4876E-04	5.926E-05
5.0	1027.7225	-0.1170	0.001620	-5.021E-05	1.5762E-06	-4.867E-08	8.5471E-04	5.962E-05
5.1	1027.7108	-0.1180	0.001615	-4.996E-05	1.5714E-06	-4.843E-08	8.6069E-04	5.999E-05
5.2	1027.6989	-0.1190	0.001610	-4.971E-05	1.5665E-06	-4.818E-08	8.6671E-04	6.036E-05
5.3	1027.6870	-0.1200	0.001605	-4.946E-05	1.5617E-06	-4.794E-08	8.7276E-04	6.074E-05
5.4	1027.6749	-0.1215	0.001600	-4.921E-05	1.5570E-06	-4.770E-08	8.7885E-04	6.111E-05
5.5	1027.6627	-0.1225	0.001595	-4.897E-05	1.5522E-06	-4.746E-08	8.8498E-04	6.149E-05
5.6	1027.6504	-0.1240	0.001590	-4.873E-05	1.5475E-06	-4.723E-08	8.9115E-04	6.186E-05
5.7	1027.6379	-0.1250	0.001585	-4.848E-05	1.5428E-06	-4.699E-08	8.9736E-04	6.225E-05
5.8	1027.6254	-0.1260	0.001581	-4.824E-05	1.5381E-06	-4.676E-08	9.0360E-04	6.263E-05
5.9	1027.6127	-0.1270	0.001576	-4.801E-05	1.5334E-06	-4.653E-08	9.0988E-04	6.301E-05
6.0	1027.6000	-0.1280	0.001571	-4.777E-05	1.5288E-06	-4.630E-08	9.1620E-04	6.340E-05
6.1	1027.5871	-0.1295	0.001566	-4.754E-05	1.5241E-06	-4.607E-08	9.2256E-04	6.379E-05
6.2	1027.5741	-0.1305	0.001561	-4.730E-05	1.5195E-06	-4.584E-08	9.2896E-04	6.418E-05
6.3	1027.5610	-0.1315	0.001557	-4.707E-05	1.5150E-06	-4.562E-08	9.3540E-04	6.457E-05
6.4	1027.5478	-0.1330	0.001552	-4.684E-05	1.5104E-06	-4.539E-08	9.4187E-04	6.496E-05
6.5	1027.5344	-0.1340	0.001547	-4.661E-05	1.5059E-06	-4.517E-08	9.4839E-04	6.536E-05
6.6	1027.5210	-0.1345	0.001543	-4.639E-05	1.5014E-06	-4.495E-08	9.5495E-04	6.576E-05
6.7	1027.5075	-0.1360	0.001538	-4.616E-05	1.4969E-06	-4.473E-08	9.6154E-04	6.616E-05

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
6.8	1027.4938	-0.1375	0.001533	-4.594E-05	1.4924E-06	-4.451E-08	9.6818E-04	6.656E-05
6.9	1027.4800	-0.1380	0.001529	-4.572E-05	1.4880E-06	-4.429E-08	9.7485E-04	6.697E-05
7.0	1027.4662	-0.1390	0.001524	-4.549E-05	1.4836E-06	-4.408E-08	9.8157E-04	6.738E-05
7.1	1027.4522	-0.1405	0.001520	-4.528E-05	1.4792E-06	-4.386E-08	9.8833E-04	6.779E-05
7.2	1027.4381	-0.1415	0.001515	-4.506E-05	1.4748E-06	-4.365E-08	9.9513E-04	6.820E-05
7.3	1027.4239	-0.1430	0.001511	-4.484E-05	1.4705E-06	-4.344E-08	1.0020E-03	6.861E-05
7.4	1027.4095	-0.1440	0.001506	-4.463E-05	1.4661E-06	-4.323E-08	1.0089E-03	6.903E-05
7.5	1027.3951	-0.1445	0.001502	-4.441E-05	1.4618E-06	-4.302E-08	1.0158E-03	6.944E-05
7.6	1027.3806	-0.1460	0.001497	-4.420E-05	1.4575E-06	-4.281E-08	1.0227E-03	6.986E-05
7.7	1027.3659	-0.1470	0.001493	-4.399E-05	1.4533E-06	-4.261E-08	1.0297E-03	7.029E-05
7.8	1027.3512	-0.1480	0.001489	-4.378E-05	1.4490E-06	-4.241E-08	1.0368E-03	7.071E-05
7.9	1027.3363	-0.1490	0.001484	-4.357E-05	1.4448E-06	-4.220E-08	1.0439E-03	7.114E-05
8.0	1027.3214	-0.1500	0.001480	-4.337E-05	1.4406E-06	-4.200E-08	1.0510E-03	7.156E-05
8.1	1027.3063	-0.1515	0.001476	-4.316E-05	1.4364E-06	-4.180E-08	1.0582E-03	7.200E-05
8.2	1027.2911	-0.1525	0.001471	-4.296E-05	1.4322E-06	-4.160E-08	1.0654E-03	7.243E-05
8.3	1027.2758	-0.1530	0.001467	-4.275E-05	1.4280E-06	-4.141E-08	1.0727E-03	7.286E-05
8.4	1027.2605	-0.1540	0.001463	-4.255E-05	1.4239E-06	-4.121E-08	1.0800E-03	7.330E-05
8.5	1027.2450	-0.1555	0.001458	-4.235E-05	1.4198E-06	-4.101E-08	1.0873E-03	7.374E-05
8.6	1027.2294	-0.1570	0.001454	-4.215E-05	1.4157E-06	-4.082E-08	1.0947E-03	7.418E-05
8.7	1027.2136	-0.1580	0.001450	-4.196E-05	1.4116E-06	-4.063E-08	1.1022E-03	7.463E-05
8.8	1027.1978	-0.1585	0.001446	-4.176E-05	1.4076E-06	-4.044E-08	1.1097E-03	7.507E-05
8.9	1027.1819	-0.1595	0.001442	-4.156E-05	1.4036E-06	-4.025E-08	1.1172E-03	7.552E-05
9.0	1027.1659	-0.1605	0.001438	-4.137E-05	1.3995E-06	-4.006E-08	1.1248E-03	7.597E-05
9.1	1027.1498	-0.1620	0.001433	-4.118E-05	1.3955E-06	-3.987E-08	1.1324E-03	7.643E-05
9.2	1027.1335	-0.1630	0.001429	-4.099E-05	1.3916E-06	-3.968E-08	1.1401E-03	7.688E-05
9.3	1027.1172	-0.1635	0.001425	-4.080E-05	1.3876E-06	-3.950E-08	1.1478E-03	7.734E-05
9.4	1027.1008	-0.1650	0.001421	-4.061E-05	1.3837E-06	-3.931E-08	1.1555E-03	7.780E-05
9.5	1027.0842	-0.1660	0.001417	-4.042E-05	1.3797E-06	-3.913E-08	1.1633E-03	7.827E-05
9.6	1027.0676	-0.1670	0.001413	-4.023E-05	1.3758E-06	-3.895E-08	1.1712E-03	7.873E-05
9.7	1027.0508	-0.1680	0.001409	-4.005E-05	1.3720E-06	-3.877E-08	1.1791E-03	7.920E-05
9.8	1027.0340	-0.1690	0.001405	-3.987E-05	1.3681E-06	-3.859E-08	1.1870E-03	7.967E-05
9.9	1027.0170	-0.1700	0.001401	-3.968E-05	1.3642E-06	-3.841E-08	1.1950E-03	8.014E-05
10.0	1027.0000	-0.1710	0.001397	-3.950E-05	1.3604E-06	-3.823E-08	1.2030E-03	8.061E-05
10.1	1026.9828	-0.1725	0.001393	-3.932E-05	1.3566E-06	-3.806E-08	1.2111E-03	8.109E-05
10.2	1026.9655	-0.1730	0.001389	-3.914E-05	1.3528E-06	-3.788E-08	1.2193E-03	8.157E-05

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
10.3	1026.9482	-0.1740	0.001385	-3.896E-05	1.3490E-06	-3.771E-08	1.2274E-03	8.205E-05
10.4	1026.9307	-0.1755	0.001381	-3.878E-05	1.3453E-06	-3.754E-08	1.2357E-03	8.254E-05
10.5	1026.9131	-0.1760	0.001378	-3.861E-05	1.3415E-06	-3.737E-08	1.2440E-03	8.302E-05
10.6	1026.8955	-0.1770	0.001374	-3.843E-05	1.3378E-06	-3.720E-08	1.2523E-03	8.351E-05
10.7	1026.8777	-0.1785	0.001370	-3.826E-05	1.3341E-06	-3.703E-08	1.2607E-03	8.401E-05
10.8	1026.8598	-0.1790	0.001366	-3.809E-05	1.3304E-06	-3.686E-08	1.2691E-03	8.450E-05
10.9	1026.8419	-0.1800	0.001362	-3.791E-05	1.3267E-06	-3.669E-08	1.2776E-03	8.500E-05
11.0	1026.8238	-0.1815	0.001359	-3.774E-05	1.3230E-06	-3.652E-08	1.2861E-03	8.550E-05
11.1	1026.8056	-0.1825	0.001355	-3.757E-05	1.3194E-06	-3.636E-08	1.2947E-03	8.600E-05
11.2	1026.7873	-0.1830	0.001351	-3.741E-05	1.3158E-06	-3.620E-08	1.3033E-03	8.650E-05
11.3	1026.7690	-0.1840	0.001347	-3.724E-05	1.3122E-06	-3.603E-08	1.3120E-03	8.701E-05
11.4	1026.7505	-0.1855	0.001344	-3.707E-05	1.3086E-06	-3.587E-08	1.3207E-03	8.752E-05
11.5	1026.7319	-0.1860	0.001340	-3.691E-05	1.3050E-06	-3.571E-08	1.3295E-03	8.803E-05
11.6	1026.7133	-0.1870	0.001336	-3.674E-05	1.3014E-06	-3.555E-08	1.3383E-03	8.854E-05
11.7	1026.6945	-0.1885	0.001333	-3.658E-05	1.2979E-06	-3.539E-08	1.3472E-03	8.906E-05
11.8	1026.6756	-0.1890	0.001329	-3.642E-05	1.2943E-06	-3.523E-08	1.3561E-03	8.958E-05
11.9	1026.6567	-0.1900	0.001325	-3.625E-05	1.2908E-06	-3.507E-08	1.3651E-03	9.010E-05
12.0	1026.6376	-0.1915	0.001322	-3.609E-05	1.2873E-06	-3.492E-08	1.3741E-03	9.063E-05
12.1	1026.6184	-0.1920	0.001318	-3.593E-05	1.2838E-06	-3.476E-08	1.3832E-03	9.115E-05
12.2	1026.5992	-0.1930	0.001314	-3.578E-05	1.2804E-06	-3.461E-08	1.3924E-03	9.168E-05
12.3	1026.5798	-0.1940	0.001311	-3.562E-05	1.2769E-06	-3.446E-08	1.4015E-03	9.221E-05
12.4	1026.5604	-0.1950	0.001307	-3.546E-05	1.2735E-06	-3.430E-08	1.4108E-03	9.275E-05
12.5	1026.5408	-0.1960	0.001304	-3.531E-05	1.2701E-06	-3.415E-08	1.4201E-03	9.329E-05
12.6	1026.5212	-0.1970	0.001300	-3.515E-05	1.2666E-06	-3.400E-08	1.4295E-03	9.383E-05
12.7	1026.5014	-0.1980	0.001297	-3.500E-05	1.2633E-06	-3.385E-08	1.4389E-03	9.437E-05
12.8	1026.4816	-0.1985	0.001293	-3.484E-05	1.2599E-06	-3.370E-08	1.4483E-03	9.492E-05
12.9	1026.4617	-0.2000	0.001290	-3.469E-05	1.2565E-06	-3.355E-08	1.4578E-03	9.546E-05
13.0	1026.4416	-0.2010	0.001286	-3.454E-05	1.2532E-06	-3.341E-08	1.4674E-03	9.601E-05
13.1	1026.4215	-0.2015	0.001283	-3.439E-05	1.2498E-06	-3.326E-08	1.4770E-03	9.657E-05
13.2	1026.4013	-0.2030	0.001279	-3.424E-05	1.2465E-06	-3.312E-08	1.4867E-03	9.713E-05
13.3	1026.3809	-0.2040	0.001276	-3.409E-05	1.2432E-06	-3.297E-08	1.4965E-03	9.768E-05
13.4	1026.3605	-0.2045	0.001273	-3.395E-05	1.2399E-06	-3.283E-08	1.5063E-03	9.825E-05
13.5	1026.3400	-0.2055	0.001269	-3.380E-05	1.2366E-06	-3.268E-08	1.5161E-03	9.881E-05
13.6	1026.3194	-0.2065	0.001266	-3.365E-05	1.2334E-06	-3.254E-08	1.5260E-03	9.938E-05
13.7	1026.2987	-0.2075	0.001262	-3.351E-05	1.2301E-06	-3.240E-08	1.5360E-03	9.995E-05

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
13.8	1026.2779	-0.2085	0.001259	-3.337E-05	1.2269E-06	-3.226E-08	1.5460E-03	1.005E-04
13.9	1026.2570	-0.2095	0.001256	-3.322E-05	1.2237E-06	-3.212E-08	1.5561E-03	1.011E-04
14.0	1026.2360	-0.2105	0.001252	-3.308E-05	1.2205E-06	-3.198E-08	1.5662E-03	1.017E-04
14.1	1026.2149	-0.2110	0.001249	-3.294E-05	1.2173E-06	-3.185E-08	1.5764E-03	1.023E-04
14.2	1026.1938	-0.2120	0.001246	-3.280E-05	1.2141E-06	-3.171E-08	1.5867E-03	1.028E-04
14.3	1026.1725	-0.2135	0.001243	-3.266E-05	1.2109E-06	-3.157E-08	1.5970E-03	1.034E-04
14.4	1026.1511	-0.2140	0.001239	-3.252E-05	1.2078E-06	-3.144E-08	1.6074E-03	1.040E-04
14.5	1026.1297	-0.2150	0.001236	-3.238E-05	1.2047E-06	-3.130E-08	1.6178E-03	1.046E-04
14.6	1026.1081	-0.2160	0.001233	-3.224E-05	1.2015E-06	-3.117E-08	1.6283E-03	1.052E-04
14.7	1026.0865	-0.2170	0.001230	-3.211E-05	1.1984E-06	-3.104E-08	1.6389E-03	1.058E-04
14.8	1026.0647	-0.2180	0.001226	-3.197E-05	1.1953E-06	-3.091E-08	1.6495E-03	1.064E-04
14.9	1026.0429	-0.2185	0.001223	-3.184E-05	1.1922E-06	-3.077E-08	1.6601E-03	1.070E-04
15.0	1026.0210	-0.2195	0.001220	-3.170E-05	1.1892E-06	-3.064E-08	1.6709E-03	1.076E-04
15.1	1025.9990	-0.2205	0.001217	-3.157E-05	1.1861E-06	-3.051E-08	1.6817E-03	1.082E-04
15.2	1025.9769	-0.2215	0.001214	-3.144E-05	1.1831E-06	-3.038E-08	1.6925E-03	1.088E-04
15.3	1025.9547	-0.2225	0.001211	-3.130E-05	1.1800E-06	-3.026E-08	1.7034E-03	1.095E-04
15.4	1025.9324	-0.2235	0.001208	-3.117E-05	1.1770E-06	-3.013E-08	1.7144E-03	1.101E-04
15.5	1025.9100	-0.2245	0.001204	-3.104E-05	1.1740E-06	-3.000E-08	1.7254E-03	1.107E-04
15.6	1025.8875	-0.2250	0.001201	-3.091E-05	1.1710E-06	-2.988E-08	1.7365E-03	1.113E-04
15.7	1025.8650	-0.2260	0.001198	-3.078E-05	1.1680E-06	-2.975E-08	1.7477E-03	1.119E-04
15.8	1025.8423	-0.2270	0.001195	-3.066E-05	1.1651E-06	-2.963E-08	1.7589E-03	1.126E-04
15.9	1025.8196	-0.2280	0.001192	-3.053E-05	1.1621E-06	-2.950E-08	1.7702E-03	1.132E-04
16.0	1025.7967	-0.2290	0.001189	-3.040E-05	1.1592E-06	-2.938E-08	1.7816E-03	1.139E-04
16.1	1025.7738	-0.2295	0.001186	-3.028E-05	1.1562E-06	-2.926E-08	1.7930E-03	1.145E-04
16.2	1025.7508	-0.2310	0.001183	-3.015E-05	1.1533E-06	-2.913E-08	1.8045E-03	1.151E-04
16.3	1025.7276	-0.2320	0.001180	-3.003E-05	1.1504E-06	-2.901E-08	1.8160E-03	1.158E-04
16.4	1025.7044	-0.2325	0.001177	-2.990E-05	1.1475E-06	-2.889E-08	1.8276E-03	1.164E-04
16.5	1025.6811	-0.2330	0.001174	-2.978E-05	1.1446E-06	-2.877E-08	1.8393E-03	1.171E-04
16.6	1025.6578	-0.2340	0.001171	-2.966E-05	1.1418E-06	-2.865E-08	1.8510E-03	1.177E-04
16.7	1025.6343	-0.2355	0.001168	-2.954E-05	1.1389E-06	-2.854E-08	1.8629E-03	1.184E-04
16.8	1025.6107	-0.2360	0.001165	-2.942E-05	1.1360E-06	-2.842E-08	1.8747E-03	1.191E-04
16.9	1025.5871	-0.2370	0.001162	-2.929E-05	1.1332E-06	-2.830E-08	1.8867E-03	1.197E-04
17.0	1025.5633	-0.2380	0.001159	-2.918E-05	1.1304E-06	-2.819E-08	1.8987E-03	1.204E-04
17.1	1025.5395	-0.2385	0.001156	-2.906E-05	1.1276E-06	-2.807E-08	1.9107E-03	1.211E-04
17.2	1025.5156	-0.2395	0.001153	-2.894E-05	1.1248E-06	-2.796E-08	1.9229E-03	1.217E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
17.3	1025.4916	-0.2405	0.001151	-2.882E-05	1.1220E-06	-2.784E-08	1.9351E-03	1.224E-04
17.4	1025.4675	-0.2415	0.001148	-2.870E-05	1.1192E-06	-2.773E-08	1.9474E-03	1.231E-04
17.5	1025.4433	-0.2425	0.001145	-2.859E-05	1.1164E-06	-2.761E-08	1.9597E-03	1.238E-04
17.6	1025.4190	-0.2430	0.001142	-2.847E-05	1.1137E-06	-2.750E-08	1.9721E-03	1.245E-04
17.7	1025.3947	-0.2440	0.001139	-2.836E-05	1.1109E-06	-2.739E-08	1.9846E-03	1.252E-04
17.8	1025.3702	-0.2450	0.001136	-2.824E-05	1.1082E-06	-2.728E-08	1.9971E-03	1.258E-04
17.9	1025.3457	-0.2460	0.001134	-2.813E-05	1.1055E-06	-2.717E-08	2.0098E-03	1.265E-04
18.0	1025.3210	-0.2470	0.001131	-2.801E-05	1.1028E-06	-2.706E-08	2.0225E-03	1.272E-04
18.1	1025.2963	-0.2475	0.001128	-2.790E-05	1.1001E-06	-2.695E-08	2.0352E-03	1.279E-04
18.2	1025.2715	-0.2485	0.001125	-2.779E-05	1.0974E-06	-2.684E-08	2.0480E-03	1.287E-04
18.3	1025.2466	-0.2495	0.001122	-2.768E-05	1.0947E-06	-2.673E-08	2.0609E-03	1.294E-04
18.4	1025.2216	-0.2500	0.001120	-2.757E-05	1.0920E-06	-2.662E-08	2.0739E-03	1.301E-04
18.5	1025.1966	-0.2510	0.001117	-2.746E-05	1.0894E-06	-2.652E-08	2.0870E-03	1.308E-04
18.6	1025.1714	-0.2520	0.001114	-2.735E-05	1.0867E-06	-2.641E-08	2.1001E-03	1.315E-04
18.7	1025.1462	-0.2525	0.001111	-2.724E-05	1.0841E-06	-2.631E-08	2.1133E-03	1.322E-04
18.8	1025.1209	-0.2535	0.001109	-2.713E-05	1.0815E-06	-2.620E-08	2.1265E-03	1.330E-04
18.9	1025.0955	-0.2545	0.001106	-2.702E-05	1.0789E-06	-2.610E-08	2.1399E-03	1.337E-04
19.0	1025.0700	-0.2555	0.001103	-2.692E-05	1.0763E-06	-2.599E-08	2.1533E-03	1.344E-04
19.1	1025.0444	-0.2565	0.001101	-2.681E-05	1.0737E-06	-2.589E-08	2.1667E-03	1.352E-04
19.2	1025.0187	-0.2575	0.001098	-2.671E-05	1.0711E-06	-2.578E-08	2.1803E-03	1.359E-04
19.3	1024.9929	-0.2580	0.001095	-2.660E-05	1.0685E-06	-2.568E-08	2.1939E-03	1.366E-04
19.4	1024.9671	-0.2585	0.001093	-2.650E-05	1.0659E-06	-2.558E-08	2.2076E-03	1.374E-04
19.5	1024.9412	-0.2595	0.001090	-2.639E-05	1.0634E-06	-2.548E-08	2.2214E-03	1.381E-04
19.6	1024.9152	-0.2605	0.001087	-2.629E-05	1.0608E-06	-2.538E-08	2.2353E-03	1.389E-04
19.7	1024.8891	-0.2615	0.001085	-2.618E-05	1.0583E-06	-2.528E-08	2.2492E-03	1.397E-04
19.8	1024.8629	-0.2625	0.001082	-2.608E-05	1.0558E-06	-2.518E-08	2.2632E-03	1.404E-04
19.9	1024.8366	-0.2630	0.001079	-2.598E-05	1.0533E-06	-2.508E-08	2.2773E-03	1.412E-04
20.0	1024.8103	-0.2640	0.001077	-2.588E-05	1.0508E-06	-2.498E-08	2.2914E-03	1.419E-04
20.1	1024.7838	-0.2650	0.001074	-2.578E-05	1.0483E-06	-2.488E-08	2.3056E-03	1.427E-04
20.2	1024.7573	-0.2655	0.001072	-2.568E-05	1.0458E-06	-2.479E-08	2.3200E-03	1.435E-04
20.3	1024.7307	-0.2665	0.001069	-2.558E-05	1.0433E-06	-2.469E-08	2.3343E-03	1.443E-04
20.4	1024.7040	-0.2675	0.001067	-2.548E-05	1.0409E-06	-2.459E-08	2.3488E-03	1.451E-04
20.5	1024.6772	-0.2680	0.001064	-2.538E-05	1.0384E-06	-2.450E-08	2.3634E-03	1.458E-04
20.6	1024.6504	-0.2690	0.001061	-2.528E-05	1.0360E-06	-2.440E-08	2.3780E-03	1.466E-04
20.7	1024.6234	-0.2700	0.001059	-2.518E-05	1.0335E-06	-2.431E-08	2.3927E-03	1.474E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
20.8	1024.5964	-0.2705	0.001056	-2.509E-05	1.0311E-06	-2.421E-08	2.4075E-03	1.482E-04
20.9	1024.5693	-0.2715	0.001054	-2.499E-05	1.0287E-06	-2.412E-08	2.4223E-03	1.490E-04
21.0	1024.5421	-0.2725	0.001051	-2.489E-05	1.0263E-06	-2.402E-08	2.4373E-03	1.498E-04
21.1	1024.5148	-0.2735	0.001049	-2.480E-05	1.0239E-06	-2.393E-08	2.4523E-03	1.506E-04
21.2	1024.4874	-0.2740	0.001047	-2.470E-05	1.0215E-06	-2.384E-08	2.4674E-03	1.514E-04
21.3	1024.4600	-0.2745	0.001044	-2.461E-05	1.0191E-06	-2.375E-08	2.4826E-03	1.523E-04
21.4	1024.4325	-0.2755	0.001042	-2.451E-05	1.0167E-06	-2.366E-08	2.4978E-03	1.531E-04
21.5	1024.4049	-0.2765	0.001039	-2.442E-05	1.0144E-06	-2.357E-08	2.5132E-03	1.539E-04
21.6	1024.3772	-0.2775	0.001037	-2.433E-05	1.0120E-06	-2.347E-08	2.5286E-03	1.547E-04
21.7	1024.3494	-0.2785	0.001034	-2.424E-05	1.0097E-06	-2.338E-08	2.5441E-03	1.555E-04
21.8	1024.3215	-0.2790	0.001032	-2.414E-05	1.0073E-06	-2.330E-08	2.5597E-03	1.564E-04
21.9	1024.2936	-0.2795	0.001029	-2.405E-05	1.0050E-06	-2.321E-08	2.5754E-03	1.572E-04
22.0	1024.2656	-0.2805	0.001027	-2.396E-05	1.0027E-06	-2.312E-08	2.5912E-03	1.581E-04
22.1	1024.2375	-0.2815	0.001025	-2.387E-05	1.0004E-06	-2.303E-08	2.6070E-03	1.589E-04
22.2	1024.2093	-0.2825	0.001022	-2.378E-05	9.9810E-07	-2.294E-08	2.6230E-03	1.598E-04
22.3	1024.1810	-0.2835	0.001020	-2.369E-05	9.9581E-07	-2.285E-08	2.6390E-03	1.606E-04
22.4	1024.1526	-0.2840	0.001018	-2.360E-05	9.9353E-07	-2.277E-08	2.6551E-03	1.615E-04
22.5	1024.1242	-0.2845	0.001015	-2.351E-05	9.9126E-07	-2.268E-08	2.6713E-03	1.623E-04
22.6	1024.0957	-0.2855	0.001013	-2.342E-05	9.8899E-07	-2.260E-08	2.6875E-03	1.632E-04
22.7	1024.0671	-0.2865	0.001010	-2.334E-05	9.8674E-07	-2.251E-08	2.7039E-03	1.641E-04
22.8	1024.0384	-0.2870	0.001008	-2.325E-05	9.8449E-07	-2.243E-08	2.7204E-03	1.649E-04
22.9	1024.0097	-0.2880	0.001006	-2.316E-05	9.8225E-07	-2.234E-08	2.7369E-03	1.658E-04
23.0	1023.9808	-0.2890	0.001004	-2.307E-05	9.8002E-07	-2.226E-08	2.7535E-03	1.667E-04
23.1	1023.9519	-0.2895	0.001001	-2.299E-05	9.7780E-07	-2.217E-08	2.7702E-03	1.676E-04
23.2	1023.9229	-0.2905	0.000999	-2.290E-05	9.7559E-07	-2.209E-08	2.7870E-03	1.684E-04
23.3	1023.8938	-0.2910	0.000997	-2.282E-05	9.7338E-07	-2.201E-08	2.8039E-03	1.693E-04
23.4	1023.8647	-0.2920	0.000994	-2.273E-05	9.7119E-07	-2.193E-08	2.8209E-03	1.702E-04
23.5	1023.8354	-0.2930	0.000992	-2.265E-05	9.6900E-07	-2.184E-08	2.8380E-03	1.711E-04
23.6	1023.8061	-0.2935	0.000990	-2.256E-05	9.6682E-07	-2.176E-08	2.8551E-03	1.720E-04
23.7	1023.7767	-0.2945	0.000988	-2.248E-05	9.6464E-07	-2.168E-08	2.8724E-03	1.729E-04
23.8	1023.7472	-0.2950	0.000985	-2.240E-05	9.6248E-07	-2.160E-08	2.8897E-03	1.739E-04
23.9	1023.7177	-0.2955	0.000983	-2.232E-05	9.6032E-07	-2.152E-08	2.9071E-03	1.748E-04
24.0	1023.6881	-0.2970	0.000981	-2.223E-05	9.5818E-07	-2.144E-08	2.9247E-03	1.757E-04
24.1	1023.6583	-0.2980	0.000979	-2.215E-05	9.5604E-07	-2.136E-08	2.9423E-03	1.766E-04
24.2	1023.6285	-0.2980	0.000976	-2.207E-05	9.5390E-07	-2.128E-08	2.9600E-03	1.775E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
24.3	1023.5987	-0.2990	0.000974	-2.199E-05	9.5178E-07	-2.120E-08	2.9778E-03	1.785E-04
24.4	1023.5687	-0.3000	0.000972	-2.191E-05	9.4966E-07	-2.113E-08	2.9957E-03	1.794E-04
24.5	1023.5387	-0.3005	0.000970	-2.183E-05	9.4755E-07	-2.105E-08	3.0137E-03	1.803E-04
24.6	1023.5086	-0.3015	0.000968	-2.175E-05	9.4545E-07	-2.097E-08	3.0317E-03	1.813E-04
24.7	1023.4784	-0.3025	0.000966	-2.167E-05	9.4336E-07	-2.089E-08	3.0499E-03	1.822E-04
24.8	1023.4481	-0.3030	0.000963	-2.159E-05	9.4128E-07	-2.082E-08	3.0682E-03	1.832E-04
24.9	1023.4178	-0.3040	0.000961	-2.151E-05	9.3920E-07	-2.074E-08	3.0866E-03	1.841E-04
25.0	1023.3873	-0.3050	0.000959	-2.143E-05	9.3713E-07	-2.066E-08	3.1050E-03	1.851E-04
25.1	1023.3568	-0.3050	0.000957	-2.136E-05	9.3506E-07	-2.059E-08	3.1236E-03	1.861E-04
25.2	1023.3263	-0.3060	0.000955	-2.128E-05	9.3301E-07	-2.051E-08	3.1422E-03	1.870E-04
25.3	1023.2956	-0.3070	0.000953	-2.120E-05	9.3096E-07	-2.044E-08	3.1610E-03	1.880E-04
25.4	1023.2649	-0.3080	0.000951	-2.112E-05	9.2892E-07	-2.036E-08	3.1798E-03	1.890E-04
25.5	1023.2340	-0.3085	0.000948	-2.105E-05	9.2689E-07	-2.029E-08	3.1988E-03	1.900E-04
25.6	1023.2032	-0.3090	0.000946	-2.097E-05	9.2486E-07	-2.022E-08	3.2178E-03	1.910E-04
25.7	1023.1722	-0.3105	0.000944	-2.090E-05	9.2284E-07	-2.014E-08	3.2370E-03	1.919E-04
25.8	1023.1411	-0.3110	0.000942	-2.082E-05	9.2083E-07	-2.007E-08	3.2562E-03	1.929E-04
25.9	1023.1100	-0.3115	0.000940	-2.075E-05	9.1883E-07	-2.000E-08	3.2756E-03	1.939E-04
26.0	1023.0788	-0.3125	0.000938	-2.067E-05	9.1683E-07	-1.993E-08	3.2950E-03	1.949E-04
26.1	1023.0475	-0.3130	0.000936	-2.060E-05	9.1485E-07	-1.985E-08	3.3146E-03	1.960E-04
26.2	1023.0162	-0.3135	0.000934	-2.053E-05	9.1286E-07	-1.978E-08	3.3342E-03	1.970E-04
26.3	1022.9848	-0.3145	0.000932	-2.045E-05	9.1089E-07	-1.971E-08	3.3539E-03	1.980E-04
26.4	1022.9533	-0.3155	0.000930	-2.038E-05	9.0892E-07	-1.964E-08	3.3738E-03	1.990E-04
26.5	1022.9217	-0.3165	0.000928	-2.031E-05	9.0696E-07	-1.957E-08	3.3937E-03	2.000E-04
26.6	1022.8900	-0.3170	0.000926	-2.023E-05	9.0501E-07	-1.950E-08	3.4138E-03	2.011E-04
26.7	1022.8583	-0.3175	0.000924	-2.016E-05	9.0306E-07	-1.943E-08	3.4340E-03	2.021E-04
26.8	1022.8265	-0.3185	0.000922	-2.009E-05	9.0112E-07	-1.936E-08	3.4542E-03	2.031E-04
26.9	1022.7946	-0.3195	0.000920	-2.002E-05	8.9919E-07	-1.929E-08	3.4746E-03	2.042E-04
27.0	1022.7626	-0.3200	0.000918	-1.995E-05	8.9726E-07	-1.922E-08	3.4950E-03	2.052E-04
27.1	1022.7306	-0.3205	0.000916	-1.988E-05	8.9534E-07	-1.916E-08	3.5156E-03	2.063E-04
27.2	1022.6985	-0.3215	0.000914	-1.981E-05	8.9343E-07	-1.909E-08	3.5363E-03	2.073E-04
27.3	1022.6663	-0.3225	0.000912	-1.974E-05	8.9152E-07	-1.902E-08	3.5571E-03	2.084E-04
27.4	1022.6340	-0.3230	0.000910	-1.967E-05	8.8963E-07	-1.895E-08	3.5780E-03	2.095E-04
27.5	1022.6017	-0.3235	0.000908	-1.960E-05	8.8773E-07	-1.889E-08	3.5990E-03	2.105E-04
27.6	1022.5693	-0.3245	0.000906	-1.953E-05	8.8585E-07	-1.882E-08	3.6201E-03	2.116E-04
27.7	1022.5368	-0.3255	0.000904	-1.946E-05	8.8397E-07	-1.875E-08	3.6413E-03	2.127E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
27.8	1022.5042	-0.3260	0.000902	-1.939E-05	8.8210E-07	-1.869E-08	3.6626E-03	2.138E-04
27.9	1022.4716	-0.3265	0.000900	-1.933E-05	8.8023E-07	-1.862E-08	3.6840E-03	2.148E-04
28.0	1022.4389	-0.3275	0.000898	-1.926E-05	8.7837E-07	-1.856E-08	3.7056E-03	2.159E-04
28.1	1022.4061	-0.3280	0.000896	-1.919E-05	8.7652E-07	-1.849E-08	3.7272E-03	2.170E-04
28.2	1022.3733	-0.3290	0.000894	-1.913E-05	8.7468E-07	-1.843E-08	3.7490E-03	2.181E-04
28.3	1022.3403	-0.3300	0.000892	-1.906E-05	8.7284E-07	-1.836E-08	3.7709E-03	2.192E-04
28.4	1022.3073	-0.3300	0.000890	-1.899E-05	8.7100E-07	-1.830E-08	3.7928E-03	2.204E-04
28.5	1022.2743	-0.3310	0.000889	-1.893E-05	8.6918E-07	-1.823E-08	3.8149E-03	2.215E-04
28.6	1022.2411	-0.3320	0.000887	-1.886E-05	8.6736E-07	-1.817E-08	3.8371E-03	2.226E-04
28.7	1022.2079	-0.3325	0.000885	-1.880E-05	8.6554E-07	-1.811E-08	3.8595E-03	2.237E-04
28.8	1022.1746	-0.3335	0.000883	-1.873E-05	8.6374E-07	-1.804E-08	3.8819E-03	2.249E-04
28.9	1022.1412	-0.3340	0.000881	-1.867E-05	8.6193E-07	-1.798E-08	3.9044E-03	2.260E-04
29.0	1022.1078	-0.3345	0.000879	-1.860E-05	8.6014E-07	-1.792E-08	3.9271E-03	2.271E-04
29.1	1022.0743	-0.3355	0.000877	-1.854E-05	8.5835E-07	-1.786E-08	3.9499E-03	2.283E-04
29.2	1022.0407	-0.3365	0.000875	-1.847E-05	8.5657E-07	-1.779E-08	3.9727E-03	2.294E-04
29.3	1022.0070	-0.3370	0.000874	-1.841E-05	8.5479E-07	-1.773E-08	3.9957E-03	2.306E-04
29.4	1021.9733	-0.3375	0.000872	-1.835E-05	8.5302E-07	-1.767E-08	4.0189E-03	2.317E-04
29.5	1021.9395	-0.3385	0.000870	-1.829E-05	8.5126E-07	-1.761E-08	4.0421E-03	2.329E-04
29.6	1021.9056	-0.3395	0.000868	-1.822E-05	8.4950E-07	-1.755E-08	4.0654E-03	2.341E-04
29.7	1021.8716	-0.3400	0.000866	-1.816E-05	8.4775E-07	-1.749E-08	4.0889E-03	2.352E-04
29.8	1021.8376	-0.3405	0.000864	-1.810E-05	8.4600E-07	-1.743E-08	4.1125E-03	2.364E-04
29.9	1021.8035	-0.3410	0.000863	-1.804E-05	8.4426E-07	-1.737E-08	4.1362E-03	2.376E-04
30.0	1021.7694	-0.3420	0.000861	-1.798E-05	8.4253E-07	-1.731E-08	4.1600E-03	2.388E-04
30.1	1021.7351	-0.3430	0.000859	-1.792E-05	8.4080E-07	-1.725E-08	4.1839E-03	2.400E-04
30.2	1021.7008	-0.3435	0.000857	-1.785E-05	8.3908E-07	-1.719E-08	4.2080E-03	2.412E-04
30.3	1021.6664	-0.3440	0.000856	-1.779E-05	8.3736E-07	-1.713E-08	4.2322E-03	2.424E-04
30.4	1021.6320	-0.3445	0.000854	-1.773E-05	8.3565E-07	-1.708E-08	4.2565E-03	2.436E-04
30.5	1021.5975	-0.3455	0.000852	-1.767E-05	8.3395E-07	-1.702E-08	4.2809E-03	2.448E-04
30.6	1021.5629	-0.3465	0.000850	-1.761E-05	8.3225E-07	-1.696E-08	4.3054E-03	2.460E-04
30.7	1021.5282	-0.3470	0.000848	-1.755E-05	8.3055E-07	-1.690E-08	4.3301E-03	2.473E-04
30.8	1021.4935	-0.3475	0.000847	-1.750E-05	8.2887E-07	-1.685E-08	4.3549E-03	2.485E-04
30.9	1021.4587	-0.3485	0.000845	-1.744E-05	8.2718E-07	-1.679E-08	4.3798E-03	2.497E-04
31.0	1021.4238	-0.3490	0.000843	-1.738E-05	8.2551E-07	-1.673E-08	4.4048E-03	2.510E-04
31.1	1021.3889	-0.3500	0.000841	-1.732E-05	8.2384E-07	-1.668E-08	4.4300E-03	2.522E-04
31.2	1021.3538	-0.3505	0.000840	-1.726E-05	8.2217E-07	-1.662E-08	4.4553E-03	2.535E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
31.3	1021.3188	-0.3510	0.000838	-1.720E-05	8.2051E-07	-1.656E-08	4.4807E-03	2.547E-04
31.4	1021.2836	-0.3520	0.000836	-1.715E-05	8.1886E-07	-1.651E-08	4.5062E-03	2.560E-04
31.5	1021.2484	-0.3525	0.000835	-1.709E-05	8.1721E-07	-1.645E-08	4.5319E-03	2.572E-04
31.6	1021.2131	-0.3535	0.000833	-1.703E-05	8.1557E-07	-1.640E-08	4.5577E-03	2.585E-04
31.7	1021.1777	-0.3540	0.000831	-1.698E-05	8.1393E-07	-1.634E-08	4.5836E-03	2.598E-04
31.8	1021.1423	-0.3545	0.000829	-1.692E-05	8.1230E-07	-1.629E-08	4.6096E-03	2.611E-04
31.9	1021.1068	-0.3555	0.000828	-1.686E-05	8.1068E-07	-1.623E-08	4.6358E-03	2.624E-04
32.0	1021.0712	-0.3560	0.000826	-1.681E-05	8.0906E-07	-1.618E-08	4.6621E-03	2.636E-04
32.1	1021.0356	-0.3565	0.000824	-1.675E-05	8.0744E-07	-1.612E-08	4.6885E-03	2.649E-04
32.2	1020.9999	-0.3575	0.000823	-1.670E-05	8.0583E-07	-1.607E-08	4.7151E-03	2.662E-04
32.3	1020.9641	-0.3580	0.000821	-1.664E-05	8.0423E-07	-1.602E-08	4.7418E-03	2.676E-04
32.4	1020.9283	-0.3585	0.000819	-1.659E-05	8.0263E-07	-1.596E-08	4.7686E-03	2.689E-04
32.5	1020.8924	-0.3595	0.000818	-1.653E-05	8.0103E-07	-1.591E-08	4.7956E-03	2.702E-04
32.6	1020.8564	-0.3605	0.000816	-1.648E-05	7.9944E-07	-1.586E-08	4.8227E-03	2.715E-04
32.7	1020.8203	-0.3610	0.000814	-1.642E-05	7.9786E-07	-1.581E-08	4.8499E-03	2.728E-04
32.8	1020.7842	-0.3615	0.000813	-1.637E-05	7.9628E-07	-1.575E-08	4.8772E-03	2.742E-04
32.9	1020.7480	-0.3620	0.000811	-1.632E-05	7.9471E-07	-1.570E-08	4.9047E-03	2.755E-04
33.0	1020.7118	-0.3625	0.000810	-1.626E-05	7.9314E-07	-1.565E-08	4.9323E-03	2.769E-04
33.1	1020.6755	-0.3635	0.000808	-1.621E-05	7.9158E-07	-1.560E-08	4.9601E-03	2.782E-04
33.2	1020.6391	-0.3645	0.000806	-1.616E-05	7.9002E-07	-1.555E-08	4.9880E-03	2.796E-04
33.3	1020.6026	-0.3650	0.000805	-1.610E-05	7.8847E-07	-1.550E-08	5.0160E-03	2.809E-04
33.4	1020.5661	-0.3655	0.000803	-1.605E-05	7.8692E-07	-1.545E-08	5.0442E-03	2.823E-04
33.5	1020.5295	-0.3660	0.000802	-1.600E-05	7.8538E-07	-1.539E-08	5.0725E-03	2.837E-04
33.6	1020.4929	-0.3670	0.000800	-1.595E-05	7.8385E-07	-1.534E-08	5.1009E-03	2.851E-04
33.7	1020.4561	-0.3680	0.000798	-1.589E-05	7.8231E-07	-1.529E-08	5.1295E-03	2.864E-04
33.8	1020.4193	-0.3680	0.000797	-1.584E-05	7.8079E-07	-1.524E-08	5.1582E-03	2.878E-04
33.9	1020.3825	-0.3685	0.000795	-1.579E-05	7.7926E-07	-1.519E-08	5.1870E-03	2.892E-04
34.0	1020.3456	-0.3695	0.000794	-1.574E-05	7.7775E-07	-1.515E-08	5.2160E-03	2.906E-04
34.1	1020.3086	-0.3705	0.000792	-1.569E-05	7.7624E-07	-1.510E-08	5.2452E-03	2.920E-04
34.2	1020.2715	-0.3710	0.000790	-1.564E-05	7.7473E-07	-1.505E-08	5.2744E-03	2.934E-04
34.3	1020.2344	-0.3715	0.000789	-1.559E-05	7.7323E-07	-1.500E-08	5.3038E-03	2.949E-04
34.4	1020.1972	-0.3720	0.000787	-1.554E-05	7.7173E-07	-1.495E-08	5.3334E-03	2.963E-04
34.5	1020.1600	-0.3725	0.000786	-1.549E-05	7.7024E-07	-1.490E-08	5.3631E-03	2.977E-04
34.6	1020.1227	-0.3735	0.000784	-1.544E-05	7.6875E-07	-1.485E-08	5.3929E-03	2.991E-04
34.7	1020.0853	-0.3745	0.000783	-1.539E-05	7.6727E-07	-1.480E-08	5.4229E-03	3.006E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
34.8	1020.0478	-0.3750	0.000781	-1.534E-05	7.6579E-07	-1.476E-08	5.4531E-03	3.020E-04
34.9	1020.0103	-0.3755	0.000780	-1.529E-05	7.6431E-07	-1.471E-08	5.4833E-03	3.035E-04
35.0	1019.9727	-0.3760	0.000778	-1.524E-05	7.6285E-07	-1.466E-08	5.5138E-03	3.049E-04
35.1	1019.9351	-0.3765	0.000777	-1.519E-05	7.6138E-07	-1.461E-08	5.5443E-03	3.064E-04
35.2	1019.8974	-0.3775	0.000775	-1.514E-05	7.5992E-07	-1.457E-08	5.5750E-03	3.079E-04
35.3	1019.8596	-0.3780	0.000774	-1.510E-05	7.5847E-07	-1.452E-08	5.6059E-03	3.094E-04
35.4	1019.8218	-0.3785	0.000772	-1.505E-05	7.5702E-07	-1.447E-08	5.6369E-03	3.108E-04
35.5	1019.7839	-0.3795	0.000771	-1.500E-05	7.5557E-07	-1.443E-08	5.6681E-03	3.123E-04
35.6	1019.7459	-0.3800	0.000769	-1.495E-05	7.5413E-07	-1.438E-08	5.6994E-03	3.138E-04
35.7	1019.7079	-0.3805	0.000768	-1.491E-05	7.5270E-07	-1.434E-08	5.7308E-03	3.153E-04
35.8	1019.6698	-0.3810	0.000766	-1.486E-05	7.5127E-07	-1.429E-08	5.7624E-03	3.168E-04
35.9	1019.6317	-0.3820	0.000765	-1.481E-05	7.4984E-07	-1.425E-08	5.7942E-03	3.183E-04
36.0	1019.5934	-0.3825	0.000763	-1.476E-05	7.4842E-07	-1.420E-08	5.8261E-03	3.199E-04
36.1	1019.5552	-0.3830	0.000762	-1.472E-05	7.4700E-07	-1.416E-08	5.8582E-03	3.214E-04
36.2	1019.5168	-0.3840	0.000760	-1.467E-05	7.4559E-07	-1.411E-08	5.8904E-03	3.229E-04
36.3	1019.4784	-0.3845	0.000759	-1.463E-05	7.4418E-07	-1.407E-08	5.9227E-03	3.244E-04
36.4	1019.4399	-0.3850	0.000757	-1.458E-05	7.4277E-07	-1.402E-08	5.9553E-03	3.260E-04
36.5	1019.4014	-0.3855	0.000756	-1.453E-05	7.4137E-07	-1.398E-08	5.9879E-03	3.275E-04
36.6	1019.3628	-0.3865	0.000754	-1.449E-05	7.3998E-07	-1.393E-08	6.0208E-03	3.291E-04
36.7	1019.3241	-0.3870	0.000753	-1.444E-05	7.3859E-07	-1.389E-08	6.0538E-03	3.306E-04
36.8	1019.2854	-0.3875	0.000751	-1.440E-05	7.3720E-07	-1.384E-08	6.0869E-03	3.322E-04
36.9	1019.2466	-0.3880	0.000750	-1.435E-05	7.3582E-07	-1.380E-08	6.1202E-03	3.338E-04
37.0	1019.2078	-0.3885	0.000749	-1.431E-05	7.3444E-07	-1.376E-08	6.1537E-03	3.354E-04
37.1	1019.1689	-0.3895	0.000747	-1.426E-05	7.3307E-07	-1.371E-08	6.1873E-03	3.369E-04
37.2	1019.1299	-0.3900	0.000746	-1.422E-05	7.3170E-07	-1.367E-08	6.2210E-03	3.385E-04
37.3	1019.0909	-0.3905	0.000744	-1.417E-05	7.3033E-07	-1.363E-08	6.2550E-03	3.401E-04
37.4	1019.0518	-0.3915	0.000743	-1.413E-05	7.2897E-07	-1.359E-08	6.2891E-03	3.417E-04
37.5	1019.0126	-0.3920	0.000741	-1.409E-05	7.2761E-07	-1.354E-08	6.3233E-03	3.433E-04
37.6	1018.9734	-0.3925	0.000740	-1.404E-05	7.2626E-07	-1.350E-08	6.3577E-03	3.450E-04
37.7	1018.9341	-0.3930	0.000739	-1.400E-05	7.2491E-07	-1.346E-08	6.3923E-03	3.466E-04
37.8	1018.8948	-0.3935	0.000737	-1.396E-05	7.2357E-07	-1.342E-08	6.4270E-03	3.482E-04
37.9	1018.8554	-0.3945	0.000736	-1.391E-05	7.2223E-07	-1.338E-08	6.4620E-03	3.498E-04
38.0	1018.8159	-0.3950	0.000734	-1.387E-05	7.2089E-07	-1.333E-08	6.4970E-03	3.515E-04
38.1	1018.7764	-0.3955	0.000733	-1.383E-05	7.1956E-07	-1.329E-08	6.5322E-03	3.531E-04
38.2	1018.7368	-0.3960	0.000732	-1.378E-05	7.1824E-07	-1.325E-08	6.5676E-03	3.548E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
38.3	1018.6972	-0.3965	0.000730	-1.374E-05	7.1691E-07	-1.321E-08	6.6032E-03	3.564E-04
38.4	1018.6575	-0.3975	0.000729	-1.370E-05	7.1559E-07	-1.317E-08	6.6389E-03	3.581E-04
38.5	1018.6177	-0.3980	0.000728	-1.366E-05	7.1428E-07	-1.313E-08	6.6748E-03	3.598E-04
38.6	1018.5779	-0.3985	0.000726	-1.362E-05	7.1297E-07	-1.309E-08	6.7109E-03	3.615E-04
38.7	1018.5380	-0.3990	0.000725	-1.357E-05	7.1166E-07	-1.305E-08	6.7471E-03	3.631E-04
38.8	1018.4981	-0.3995	0.000723	-1.353E-05	7.1036E-07	-1.301E-08	6.7835E-03	3.648E-04
38.9	1018.4581	-0.4005	0.000722	-1.349E-05	7.0906E-07	-1.297E-08	6.8201E-03	3.665E-04
39.0	1018.4180	-0.4010	0.000721	-1.345E-05	7.0776E-07	-1.293E-08	6.8568E-03	3.682E-04
39.1	1018.3779	-0.4015	0.000719	-1.341E-05	7.0647E-07	-1.289E-08	6.8937E-03	3.700E-04
39.2	1018.3377	-0.4020	0.000718	-1.337E-05	7.0519E-07	-1.285E-08	6.9308E-03	3.717E-04
39.3	1018.2975	-0.4025	0.000717	-1.333E-05	7.0390E-07	-1.281E-08	6.9681E-03	3.734E-04
39.4	1018.2572	-0.4035	0.000715	-1.329E-05	7.0262E-07	-1.277E-08	7.0055E-03	3.751E-04
39.5	1018.2168	-0.4040	0.000714	-1.325E-05	7.0135E-07	-1.273E-08	7.0431E-03	3.769E-04
39.6	1018.1764	-0.4040	0.000713	-1.321E-05	7.0008E-07	-1.269E-08	7.0809E-03	3.786E-04
39.7	1018.1360	-0.4050	0.000711	-1.317E-05	6.9881E-07	-1.265E-08	7.1188E-03	3.804E-04
39.8	1018.0954	-0.4060	0.000710	-1.313E-05	6.9755E-07	-1.262E-08	7.1569E-03	3.821E-04
39.9	1018.0548	-0.4060	0.000709	-1.309E-05	6.9629E-07	-1.258E-08	7.1952E-03	3.839E-04
40.0	1018.0142	-0.4065	0.000708	-1.305E-05	6.9503E-07	-1.254E-08	7.2337E-03	3.857E-04
40.1	1017.9735	-0.4075	0.000706	-1.301E-05	6.9378E-07	-1.250E-08	7.2724E-03	3.874E-04
40.2	1017.9327	-0.4080	0.000705	-1.297E-05	6.9253E-07	-1.246E-08	7.3112E-03	3.892E-04
40.3	1017.8919	-0.4085	0.000704	-1.293E-05	6.9129E-07	-1.243E-08	7.3502E-03	3.910E-04
40.4	1017.8510	-0.4090	0.000702	-1.289E-05	6.9005E-07	-1.239E-08	7.3894E-03	3.928E-04
40.5	1017.8101	-0.4095	0.000701	-1.285E-05	6.8881E-07	-1.235E-08	7.4288E-03	3.946E-04
40.6	1017.7691	-0.4100	0.000700	-1.281E-05	6.8758E-07	-1.231E-08	7.4683E-03	3.964E-04
40.7	1017.7281	-0.4105	0.000699	-1.278E-05	6.8635E-07	-1.228E-08	7.5081E-03	3.983E-04
40.8	1017.6870	-0.4115	0.000697	-1.274E-05	6.8512E-07	-1.224E-08	7.5480E-03	4.001E-04
40.9	1017.6458	-0.4120	0.000696	-1.270E-05	6.8390E-07	-1.220E-08	7.5881E-03	4.019E-04
41.0	1017.6046	-0.4125	0.000695	-1.266E-05	6.8268E-07	-1.217E-08	7.6284E-03	4.038E-04
41.1	1017.5633	-0.4130	0.000693	-1.262E-05	6.8147E-07	-1.213E-08	7.6688E-03	4.056E-04
41.2	1017.5220	-0.4135	0.000692	-1.259E-05	6.8026E-07	-1.209E-08	7.7095E-03	4.075E-04
41.3	1017.4806	-0.4140	0.000691	-1.255E-05	6.7905E-07	-1.206E-08	7.7503E-03	4.093E-04
41.4	1017.4392	-0.4145	0.000690	-1.251E-05	6.7784E-07	-1.202E-08	7.7914E-03	4.112E-04
41.5	1017.3977	-0.4155	0.000688	-1.247E-05	6.7664E-07	-1.198E-08	7.8326E-03	4.131E-04
41.6	1017.3561	-0.4160	0.000687	-1.244E-05	6.7545E-07	-1.195E-08	7.8740E-03	4.149E-04
41.7	1017.3145	-0.4160	0.000686	-1.240E-05	6.7425E-07	-1.191E-08	7.9156E-03	4.168E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
41.8	1017.2729	-0.4170	0.000685	-1.236E-05	6.7306E-07	-1.188E-08	7.9573E-03	4.187E-04
41.9	1017.2311	-0.4175	0.000683	-1.233E-05	6.7188E-07	-1.184E-08	7.9993E-03	4.206E-04
42.0	1017.1894	-0.4180	0.000682	-1.229E-05	6.7070E-07	-1.181E-08	8.0415E-03	4.225E-04
42.1	1017.1475	-0.4185	0.000681	-1.225E-05	6.6952E-07	-1.177E-08	8.0838E-03	4.245E-04
42.2	1017.1057	-0.4190	0.000680	-1.222E-05	6.6834E-07	-1.174E-08	8.1264E-03	4.264E-04
42.3	1017.0637	-0.4200	0.000679	-1.218E-05	6.6717E-07	-1.170E-08	8.1691E-03	4.283E-04
42.4	1017.0217	-0.4200	0.000677	-1.215E-05	6.6600E-07	-1.167E-08	8.2120E-03	4.303E-04
42.5	1016.9797	-0.4205	0.000676	-1.211E-05	6.6484E-07	-1.163E-08	8.2551E-03	4.322E-04
42.6	1016.9376	-0.4215	0.000675	-1.208E-05	6.6367E-07	-1.160E-08	8.2985E-03	4.342E-04
42.7	1016.8954	-0.4220	0.000674	-1.204E-05	6.6252E-07	-1.156E-08	8.3420E-03	4.361E-04
42.8	1016.8532	-0.4220	0.000673	-1.200E-05	6.6136E-07	-1.153E-08	8.3857E-03	4.381E-04
42.9	1016.8110	-0.4225	0.000671	-1.197E-05	6.6021E-07	-1.150E-08	8.4296E-03	4.401E-04
43.0	1016.7687	-0.4235	0.000670	-1.193E-05	6.5906E-07	-1.146E-08	8.4737E-03	4.420E-04
43.1	1016.7263	-0.4240	0.000669	-1.190E-05	6.5792E-07	-1.143E-08	8.5180E-03	4.440E-04
43.2	1016.6839	-0.4245	0.000668	-1.187E-05	6.5678E-07	-1.140E-08	8.5625E-03	4.460E-04
43.3	1016.6414	-0.4250	0.000667	-1.183E-05	6.5564E-07	-1.136E-08	8.6072E-03	4.480E-04
43.4	1016.5989	-0.4255	0.000665	-1.180E-05	6.5450E-07	-1.133E-08	8.6521E-03	4.501E-04
43.5	1016.5563	-0.4260	0.000664	-1.176E-05	6.5337E-07	-1.130E-08	8.6972E-03	4.521E-04
43.6	1016.5137	-0.4265	0.000663	-1.173E-05	6.5224E-07	-1.126E-08	8.7425E-03	4.541E-04
43.7	1016.4710	-0.4270	0.000662	-1.169E-05	6.5112E-07	-1.123E-08	8.7880E-03	4.561E-04
43.8	1016.4283	-0.4275	0.000661	-1.166E-05	6.5000E-07	-1.120E-08	8.8338E-03	4.582E-04
43.9	1016.3855	-0.4280	0.000660	-1.163E-05	6.4888E-07	-1.117E-08	8.8797E-03	4.602E-04
44.0	1016.3427	-0.4285	0.000658	-1.159E-05	6.4776E-07	-1.113E-08	8.9258E-03	4.623E-04
44.1	1016.2998	-0.4295	0.000657	-1.156E-05	6.4665E-07	-1.110E-08	8.9721E-03	4.644E-04
44.2	1016.2568	-0.4300	0.000656	-1.153E-05	6.4554E-07	-1.107E-08	9.0187E-03	4.664E-04
44.3	1016.2138	-0.4300	0.000655	-1.149E-05	6.4444E-07	-1.104E-08	9.0654E-03	4.685E-04
44.4	1016.1708	-0.4305	0.000654	-1.146E-05	6.4334E-07	-1.100E-08	9.1124E-03	4.706E-04
44.5	1016.1277	-0.4310	0.000653	-1.143E-05	6.4224E-07	-1.097E-08	9.1595E-03	4.727E-04
44.6	1016.0846	-0.4315	0.000651	-1.139E-05	6.4114E-07	-1.094E-08	9.2069E-03	4.748E-04
44.7	1016.0414	-0.4325	0.000650	-1.136E-05	6.4005E-07	-1.091E-08	9.2545E-03	4.769E-04
44.8	1015.9981	-0.4330	0.000649	-1.133E-05	6.3896E-07	-1.088E-08	9.3023E-03	4.790E-04
44.9	1015.9548	-0.4330	0.000648	-1.130E-05	6.3787E-07	-1.085E-08	9.3503E-03	4.812E-04
45.0	1015.9115	-0.4335	0.000647	-1.126E-05	6.3679E-07	-1.082E-08	9.3985E-03	4.833E-04
45.1	1015.8681	-0.4345	0.000646	-1.123E-05	6.3571E-07	-1.078E-08	9.4470E-03	4.854E-04
45.2	1015.8246	-0.4350	0.000645	-1.120E-05	6.3463E-07	-1.075E-08	9.4956E-03	4.876E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
45.3	1015.7811	-0.4350	0.000644	-1.117E-05	6.3356E-07	-1.072E-08	9.5445E-03	4.897E-04
45.4	1015.7376	-0.4355	0.000642	-1.114E-05	6.3249E-07	-1.069E-08	9.5936E-03	4.919E-04
45.5	1015.6940	-0.4360	0.000641	-1.110E-05	6.3142E-07	-1.066E-08	9.6429E-03	4.941E-04
45.6	1015.6504	-0.4365	0.000640	-1.107E-05	6.3036E-07	-1.063E-08	9.6924E-03	4.963E-04
45.7	1015.6067	-0.4375	0.000639	-1.104E-05	6.2930E-07	-1.060E-08	9.7421E-03	4.984E-04
45.8	1015.5629	-0.4380	0.000638	-1.101E-05	6.2824E-07	-1.057E-08	9.7921E-03	5.006E-04
45.9	1015.5191	-0.4380	0.000637	-1.098E-05	6.2718E-07	-1.054E-08	9.8422E-03	5.028E-04
46.0	1015.4753	-0.4385	0.000636	-1.095E-05	6.2613E-07	-1.051E-08	9.8926E-03	5.051E-04
46.1	1015.4314	-0.4390	0.000635	-1.092E-05	6.2508E-07	-1.048E-08	9.9433E-03	5.073E-04
46.2	1015.3875	-0.4395	0.000634	-1.089E-05	6.2403E-07	-1.045E-08	9.9941E-03	5.095E-04
46.3	1015.3435	-0.4400	0.000633	-1.085E-05	6.2299E-07	-1.042E-08	1.0045E-02	5.118E-04
46.4	1015.2995	-0.4405	0.000631	-1.082E-05	6.2195E-07	-1.039E-08	1.0096E-02	5.140E-04
46.5	1015.2554	-0.4415	0.000630	-1.079E-05	6.2091E-07	-1.036E-08	1.0148E-02	5.163E-04
46.6	1015.2112	-0.4415	0.000629	-1.076E-05	6.1988E-07	-1.033E-08	1.0200E-02	5.185E-04
46.7	1015.1671	-0.4415	0.000628	-1.073E-05	6.1885E-07	-1.030E-08	1.0252E-02	5.208E-04
46.8	1015.1229	-0.4425	0.000627	-1.070E-05	6.1782E-07	-1.027E-08	1.0304E-02	5.231E-04
46.9	1015.0786	-0.4430	0.000626	-1.067E-05	6.1679E-07	-1.025E-08	1.0356E-02	5.253E-04
47.0	1015.0343	-0.4435	0.000625	-1.064E-05	6.1577E-07	-1.022E-08	1.0409E-02	5.276E-04
47.1	1014.9899	-0.4440	0.000624	-1.061E-05	6.1475E-07	-1.019E-08	1.0462E-02	5.299E-04
47.2	1014.9455	-0.4445	0.000623	-1.058E-05	6.1373E-07	-1.016E-08	1.0515E-02	5.323E-04
47.3	1014.9010	-0.4450	0.000622	-1.055E-05	6.1272E-07	-1.013E-08	1.0568E-02	5.346E-04
47.4	1014.8565	-0.4450	0.000621	-1.052E-05	6.1170E-07	-1.010E-08	1.0622E-02	5.369E-04
47.5	1014.8120	-0.4455	0.000620	-1.050E-05	6.1069E-07	-1.007E-08	1.0676E-02	5.392E-04
47.6	1014.7674	-0.4460	0.000619	-1.047E-05	6.0969E-07	-1.005E-08	1.0730E-02	5.416E-04
47.7	1014.7228	-0.4465	0.000618	-1.044E-05	6.0869E-07	-1.002E-08	1.0784E-02	5.439E-04
47.8	1014.6781	-0.4470	0.000617	-1.041E-05	6.0769E-07	-9.990E-09	1.0838E-02	5.463E-04
47.9	1014.6334	-0.4475	0.000616	-1.038E-05	6.0669E-07	-9.962E-09	1.0893E-02	5.487E-04
48.0	1014.5886	-0.4480	0.000615	-1.035E-05	6.0569E-07	-9.934E-09	1.0948E-02	5.510E-04
48.1	1014.5438	-0.4485	0.000613	-1.032E-05	6.0470E-07	-9.906E-09	1.1003E-02	5.534E-04
48.2	1014.4989	-0.4490	0.000612	-1.029E-05	6.0371E-07	-9.879E-09	1.1059E-02	5.558E-04
48.3	1014.4540	-0.4495	0.000611	-1.026E-05	6.0273E-07	-9.851E-09	1.1115E-02	5.582E-04
48.4	1014.4090	-0.4500	0.000610	-1.024E-05	6.0174E-07	-9.824E-09	1.1171E-02	5.606E-04
48.5	1014.3640	-0.4500	0.000609	-1.021E-05	6.0076E-07	-9.797E-09	1.1227E-02	5.630E-04
48.6	1014.3190	-0.4505	0.000608	-1.018E-05	5.9978E-07	-9.770E-09	1.1283E-02	5.655E-04
48.7	1014.2739	-0.4510	0.000607	-1.015E-05	5.9881E-07	-9.743E-09	1.1340E-02	5.679E-04

Temp t	Density ρ	$\partial\rho/\partial t$	Viscos μ	$\partial\mu/\partial t$	$\nu = \mu/\rho$	$\partial\nu/\partial t$	Pressure p_v	$\partial p_v/\partial t$
(°C)	(kg/m^3)	(kg/m^3·°C)	(Pa·s)	(Pa·s/°C)	(m^2/s)	(m^2/s·°C)	(MPa)	(MPa/°C)
48.8	1014.2288	-0.4515	0.000606	-1.012E-05	5.9783E-07	-9.716E-09	1.1397E-02	5.704E-04
48.9	1014.1836	-0.4520	0.000605	-1.010E-05	5.9686E-07	-9.689E-09	1.1454E-02	5.728E-04
49.0	1014.1384	-0.4525	0.000604	-1.007E-05	5.9590E-07	-9.662E-09	1.1511E-02	5.753E-04
49.1	1014.0931	-0.4530	0.000603	-1.004E-05	5.9493E-07	-9.635E-09	1.1569E-02	5.777E-04
49.2	1014.0478	-0.4530	0.000602	-1.001E-05	5.9397E-07	-9.609E-09	1.1627E-02	5.802E-04
49.3	1014.0025	-0.4535	0.000601	-9.986E-06	5.9301E-07	-9.583E-09	1.1685E-02	5.827E-04
49.4	1013.9571	-0.4540	0.000600	-9.959E-06	5.9205E-07	-9.557E-09	1.1743E-02	5.852E-04
49.5	1013.9117	-0.4545	0.000599	-9.931E-06	5.9110E-07	-9.530E-09	1.1802E-02	5.877E-04
49.6	1013.8662	-0.4550	0.000598	-9.904E-06	5.9015E-07	-9.504E-09	1.1861E-02	5.902E-04
49.7	1013.8207	-0.4555	0.000597	-9.877E-06	5.8920E-07	-9.478E-09	1.1920E-02	5.928E-04
49.8	1013.7751	-0.4560	0.000596	-9.850E-06	5.8825E-07	-9.452E-09	1.1979E-02	5.953E-04
49.9	1013.7295	-0.4560	0.000595	-9.823E-06	5.8731E-07	-9.426E-09	1.2039E-02	5.978E-04
50.0	1013.6839		0.000594		5.8637E-07		1.2099E-02	