



Designation: D7265 – 23

# Standard Specification for Hydrogen Thermophysical Property Tables<sup>1</sup>

This standard is issued under the fixed designation D7265; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 The thermophysical property tables for normal hydrogen are for use in the calculation of the pressure-volume-temperature (PVT), thermodynamic, and transport properties of hydrogen for process design and operations, particularly as they relate to hydrogen fuel cell applications. Tables are provided for gaseous hydrogen at temperatures between 50 K and 500 K at pressures to 500 MPa. These tables were developed by the National Institute of Standards and Technology from a Standard Reference Database product REFPROP, version 10.0<sup>2</sup>.

1.2 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>3</sup>

D4150 Terminology Relating to Gaseous Fuels

## 3. Applicability

3.1 These tables apply directly only to pure gaseous hydrogen. However, it is expected that they may find substantial use in mathematical models and tables for the thermophysical properties of mixtures containing hydrogen.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D03 on Gaseous Fuels and is the direct responsibility of Subcommittee D03.08 on Thermophysical Properties.

Current edition approved Nov. 1, 2023. Published January 2024. Originally approved in 2006. Last previous edition approved in 2018 as D7265 – 12 (2018). DOI: 10.1520/D7265-23.

<sup>2</sup> Lemmon, E.W., Bell, I.H., Huber, M.L., McLinden, M.O. NIST Standard Reference Database 23: Reference Fluid Thermodynamic and Transport Properties-REFPROP, Version 10.0, National Institute of Standards and Technology, Standard Reference Data Program, Gaithersburg, 2018.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## 4. Terminology

4.1 *Definitions*—For definitions of general terms used in D03 Gaseous Fuels standards, refer to Terminology D4150.

## 5. Tables

5.1 The tabulated thermophysical properties are:

$\rho$ , molar density ( $\text{mol}\cdot\text{L}^{-1}$ )

$V$ , molar volume ( $\text{L}^{-1}\cdot\text{mol}$ )

$H$ , molar enthalpy ( $\text{J}\cdot\text{mol}^{-1}$ )

$S$ , molar entropy ( $\text{J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$ )

$C_v$ , constant volume molar heat capacity ( $\text{J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$ )

$C_p$ , constant pressure molar heat capacity ( $\text{J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$ )

$c$ , speed of sound ( $\text{m}\cdot\text{s}^{-1}$ )

$\eta$ , viscosity ( $\mu\text{Pa}\cdot\text{s}$ )

$\lambda$ , thermal conductivity ( $\text{mW}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ )

5.2 These tables were produced by equations from a computer package, “NIST Standard Reference Database 23; Reference Fluid Thermodynamic and Transport Properties Database (REFPROP): Version 10.0.” A wide selection of units (SI units, engineering units, chemical units) is available with this program.

## 6. Additional Information

6.1 The Reference States for enthalpy and entropy have been updated in this version of the Standard.

6.2 Reference state properties are required to calculate certain of the thermodynamic properties (enthalpy, entropy, etc.) from an equation of state formulation.

6.3 The reference state properties used to generate the tables in this specification are: enthalpy,  $H$ , and entropy,  $S$ , at 298.15 K and 0.101325 MPa ( $H = 10018 \text{ J/mol}$  and  $S = 186.266 \text{ J/(mol K)}$ ). The molar mass of hydrogen is 2.0159 g/mol.

6.4 Two new tables have been added at 35 Mpa (350 Bar) and 70 Mpa (700 Bar). These are the most common fuel pressures used for vehicles using hydrogen fuel cells.

## 7. Keywords

7.1 hydrogen gas tables; thermodynamic properties of hydrogen; transport properties of hydrogen

**TABLE 1 Hydrogen Thermophysical Property Tables**

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
0.1 MPa									
50	0.242470	4.1243	3641.7	142.90	12.543	21.131	584.75	37.766	2.4059
55	0.219970	4.5461	3747.3	144.91	12.579	21.113	613.42	40.905	2.6017
60	0.201340	4.9668	3852.9	146.75	12.643	21.137	640.40	43.986	2.7904
65	0.185650	5.3866	3958.8	148.44	12.740	21.204	665.79	47.025	2.9728
70	0.172240	5.8057	4065.0	150.02	12.871	21.312	689.70	50.040	3.1496
75	0.160660	6.2244	4171.9	151.49	13.037	21.460	712.26	53.046	3.3215
80	0.150540	6.6426	4279.7	152.88	13.235	21.643	733.56	56.059	3.4888
85	0.141630	7.0605	4388.4	154.20	13.462	21.858	753.75	59.089	3.6520
90	0.133720	7.4781	4498.3	155.46	13.712	22.098	772.95	62.146	3.8114
95	0.126650	7.8955	4609.4	156.66	13.981	22.359	791.27	65.237	3.9674
100	0.120300	8.3127	4721.9	157.81	14.264	22.635	808.85	68.365	4.1202
105	0.114550	8.7298	4835.8	158.92	14.556	22.921	825.77	71.531	4.2701
110	0.109330	9.1467	4951.1	160.00	14.852	23.212	842.14	74.735	4.4172
115	0.104560	9.5635	5067.9	161.04	15.150	23.506	858.02	77.974	4.5619
120	0.100200	9.9802	5186.2	162.04	15.446	23.798	873.50	81.242	4.7041
125	0.096183	10.397	5305.9	163.02	15.738	24.086	888.61	84.534	4.8441
130	0.092478	10.813	5427.0	163.97	16.023	24.368	903.41	87.845	4.9821
135	0.089049	11.230	5549.6	164.89	16.300	24.643	917.93	91.167	5.1181
140	0.085865	11.646	5673.5	165.79	16.568	24.908	932.21	94.493	5.2522
145	0.082901	12.063	5798.6	166.67	16.825	25.164	946.27	97.819	5.3846
150	0.080135	12.479	5925.1	167.53	17.073	25.410	960.13	101.14	5.5154
155	0.077549	12.895	6052.7	168.37	17.309	25.645	973.80	104.44	5.6446
160	0.075124	13.311	6181.5	169.19	17.535	25.869	987.30	107.73	5.7723
165	0.072846	13.728	6311.4	169.98	17.750	26.082	1000.6	110.99	5.8985
170	0.070703	14.144	6442.3	170.77	17.954	26.285	1013.8	114.23	6.0235
175	0.068682	14.560	6574.2	171.53	18.147	26.477	1026.9	117.45	6.1471
180	0.066774	14.976	6707.1	172.28	18.330	26.659	1039.8	120.63	6.2695
185	0.064969	15.392	6840.8	173.01	18.503	26.831	1052.6	123.77	6.3908
190	0.063259	15.808	6975.4	173.73	18.666	26.994	1065.3	126.89	6.5109
195	0.061637	16.224	7110.7	174.43	18.821	27.147	1077.8	129.96	6.6299
200	0.060096	16.640	7246.8	175.12	18.966	27.292	1090.2	133.00	6.7480
205	0.058630	17.056	7383.6	175.80	19.103	27.428	1102.6	136.01	6.8650
210	0.057234	17.472	7521.1	176.46	19.231	27.556	1114.8	138.97	6.9810
215	0.055903	17.888	7659.2	177.11	19.352	27.676	1126.9	141.90	7.0961
220	0.054633	18.304	7797.8	177.75	19.465	27.789	1138.9	144.80	7.2104
225	0.053419	18.720	7937.0	178.37	19.572	27.895	1150.8	147.65	7.3238
230	0.052258	19.136	8076.8	178.99	19.672	27.994	1162.6	150.47	7.4363
235	0.051146	19.552	8217.0	179.59	19.765	28.087	1174.4	153.26	7.5481
240	0.050081	19.968	8357.6	180.18	19.852	28.174	1186.0	156.01	7.6591
245	0.049059	20.384	8498.7	180.77	19.934	28.255	1197.6	158.73	7.7693
250	0.048078	20.799	8640.2	181.34	20.010	28.331	1209.0	161.42	7.8788
255	0.047136	21.215	8782.0	181.90	20.081	28.402	1220.4	164.07	7.9876
260	0.046229	21.631	8924.2	182.45	20.148	28.468	1231.7	166.70	8.0957
265	0.045357	22.047	9066.7	182.99	20.209	28.529	1242.9	169.29	8.2032
270	0.044518	22.463	9209.5	183.53	20.267	28.587	1254.1	171.86	8.3100
275	0.043709	22.879	9352.5	184.05	20.320	28.640	1265.1	174.40	8.4162
280	0.042928	23.295	9495.9	184.57	20.370	28.689	1276.1	176.91	8.5218
285	0.042175	23.710	9639.4	185.08	20.416	28.735	1287.0	179.39	8.6268
290	0.041449	24.126	9783.2	185.58	20.458	28.777	1297.9	181.85	8.7313
295	0.040746	24.542	9927.2	186.07	20.498	28.817	1308.6	184.29	8.8351
300	0.040067	24.958	10071	186.55	20.534	28.853	1319.3	186.70	8.9385
305	0.039411	25.374	10216	187.03	20.568	28.886	1329.9	189.09	9.0413
310	0.038775	25.790	10360	187.50	20.599	28.917	1340.5	191.45	9.1435
315	0.038160	26.205	10505	187.96	20.628	28.946	1351.0	193.80	9.2453
320	0.037564	26.621	10650	188.42	20.654	28.972	1361.4	196.12	9.3466
325	0.036986	27.037	10795	188.87	20.679	28.996	1371.8	198.43	9.4474
330	0.036426	27.453	10940	189.31	20.701	29.018	1382.0	200.72	9.5478
335	0.035883	27.869	11085	189.75	20.722	29.039	1392.3	202.98	9.6476
340	0.035355	28.284	11230	190.18	20.740	29.057	1402.4	205.24	9.7471
345	0.034843	28.700	11375	190.60	20.758	29.075	1412.5	207.47	9.8461
350	0.034345	29.116	11521	191.02	20.773	29.090	1422.6	209.69	9.9446
355	0.033862	29.532	11666	191.43	20.788	29.105	1432.5	211.89	10.043
360	0.033392	29.948	11812	191.84	20.801	29.118	1442.4	214.08	10.141
365	0.032934	30.363	11957	192.24	20.813	29.130	1452.3	216.25	10.238
370	0.032490	30.779	12103	192.64	20.824	29.141	1462.1	218.41	10.335
375	0.032057	31.195	12249	193.03	20.834	29.151	1471.8	220.55	10.431
380	0.031635	31.611	12395	193.42	20.843	29.160	1481.5	222.69	10.528
385	0.031224	32.026	12540	193.80	20.852	29.168	1491.1	224.81	10.623
390	0.030824	32.442	12686	194.18	20.859	29.175	1500.7	226.91	10.719
395	0.030434	32.858	12832	194.55	20.866	29.182	1510.2	229.01	10.814
400	0.030054	33.274	12978	194.91	20.873	29.189	1519.6	231.09	10.909
405	0.029683	33.689	13124	195.28	20.878	29.194	1529.0	233.17	11.003
410	0.029321	34.105	13270	195.63	20.884	29.200	1538.4	235.23	11.097

**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
415	0.028968	34.521	13416	195.99	20.889	29.205	1547.7	237.29	11.191
420	0.028623	34.937	13562	196.34	20.893	29.209	1556.9	239.33	11.284
425	0.028287	35.352	13708	196.68	20.897	29.213	1566.1	241.37	11.377
430	0.027958	35.768	13854	197.03	20.901	29.217	1575.2	243.40	11.470
435	0.027637	36.184	14000	197.36	20.905	29.221	1584.3	245.42	11.562
440	0.027323	36.600	14146	197.70	20.908	29.224	1593.4	247.43	11.655
445	0.027016	37.015	14293	198.03	20.912	29.227	1602.3	249.43	11.746
450	0.026716	37.431	14439	198.35	20.915	29.230	1611.3	251.42	11.838
455	0.026422	37.847	14585	198.68	20.917	29.233	1620.2	253.41	11.929
460	0.026135	38.263	14731	199.00	20.920	29.236	1629.0	255.40	12.020
465	0.025854	38.678	14877	199.31	20.923	29.238	1637.8	257.37	12.111
470	0.025579	39.094	15023	199.63	20.926	29.241	1646.5	259.34	12.201
475	0.025310	39.510	15170	199.94	20.928	29.244	1655.2	261.30	12.292
480	0.025047	39.926	15316	200.24	20.931	29.246	1663.9	263.26	12.381
485	0.024788	40.341	15462	200.54	20.933	29.249	1672.5	265.21	12.471
490	0.024536	40.757	15608	200.84	20.936	29.251	1681.1	267.16	12.560
495	0.024288	41.173	15755	201.14	20.939	29.254	1689.6	269.10	12.649
500	0.024045	41.589	15901	201.44	20.941	29.256	1698.0	271.03	12.738
0.2 MPa									
50	0.48887	2.0456	3631.6	137.00	12.577	21.451	583.60	38.363	2.4174
55	0.44256	2.2596	3738.6	139.04	12.606	21.366	612.77	41.449	2.6124
60	0.40446	2.4724	3845.3	140.89	12.665	21.343	640.11	44.487	2.8003
65	0.37253	2.6844	3952.1	142.60	12.758	21.374	665.78	47.490	2.9820
70	0.34534	2.8957	4059.2	144.19	12.886	21.456	689.91	50.474	3.1582
75	0.32191	3.1065	4166.8	145.67	13.050	21.582	712.63	53.454	3.3294
80	0.30149	3.3168	4275.1	147.07	13.246	21.749	734.06	56.444	3.4961
85	0.28354	3.5269	4384.3	148.40	13.472	21.950	754.35	59.453	3.6587
90	0.26762	3.7366	4494.6	149.66	13.721	22.179	773.62	62.493	3.8177
95	0.25341	3.9462	4606.1	150.86	13.989	22.430	792.01	65.568	3.9732
100	0.24064	4.1555	4718.9	152.02	14.271	22.698	809.63	68.681	4.1256
105	0.22911	4.3647	4833.1	153.14	14.562	22.978	826.59	71.835	4.2751
110	0.21864	4.5738	4948.7	154.21	14.858	23.264	842.99	75.027	4.4219
115	0.20909	4.7827	5065.8	155.25	15.156	23.552	858.90	78.254	4.5662
120	0.20034	4.9916	5184.2	156.26	15.451	23.840	874.39	81.513	4.7082
125	0.19230	5.2003	5304.2	157.24	15.742	24.125	889.52	84.796	4.8480
130	0.18488	5.4090	5425.5	158.19	16.027	24.404	904.33	88.098	4.9857
135	0.17801	5.6176	5548.2	159.12	16.304	24.675	918.87	91.412	5.1215
140	0.17164	5.8261	5672.2	160.02	16.572	24.938	933.15	94.732	5.2554
145	0.16571	6.0346	5797.6	160.90	16.829	25.192	947.21	98.051	5.3876
150	0.16018	6.2431	5924.1	161.76	17.076	25.436	961.07	101.36	5.5182
155	0.15500	6.4515	6051.9	162.59	17.313	25.669	974.75	104.66	5.6472
160	0.15015	6.6598	6180.8	163.41	17.538	25.891	988.25	107.94	5.7747
165	0.14560	6.8681	6310.8	164.21	17.753	26.103	1001.6	111.20	5.9009
170	0.14131	7.0764	6441.8	165.00	17.957	26.304	1014.8	114.44	6.0257
175	0.13727	7.2847	6573.8	165.76	18.150	26.495	1027.8	117.65	6.1492
180	0.13346	7.4929	6706.8	166.51	18.333	26.676	1040.7	120.82	6.2715
185	0.12985	7.7011	6840.6	167.24	18.506	26.847	1053.5	123.96	6.3927
190	0.12643	7.9093	6975.2	167.96	18.669	27.009	1066.2	127.07	6.5127
195	0.12319	8.1175	7110.6	168.66	18.823	27.162	1078.7	130.15	6.6316
200	0.12011	8.3257	7246.8	169.35	18.968	27.305	1091.2	133.18	6.7495
205	0.11718	8.5338	7383.7	170.03	19.105	27.441	1103.5	136.18	6.8665
210	0.11439	8.7419	7521.2	170.69	19.234	27.568	1115.7	139.15	6.9824
215	0.11173	8.9500	7659.3	171.34	19.354	27.688	1127.8	142.07	7.0975
220	0.10919	9.1581	7798.1	171.98	19.468	27.800	1139.8	144.96	7.2117
225	0.10677	9.3662	7937.3	172.61	19.574	27.905	1151.7	147.82	7.3250
230	0.10445	9.5742	8077.1	173.22	19.674	28.004	1163.6	150.64	7.4375
235	0.10223	9.7823	8217.4	173.82	19.767	28.097	1175.3	153.42	7.5492
240	0.10010	9.9903	8358.1	174.42	19.854	28.183	1186.9	156.17	7.6601
245	0.098055	10.198	8499.2	175.00	19.936	28.264	1198.5	158.89	7.7703
250	0.096095	10.406	8640.7	175.57	20.012	28.339	1209.9	161.57	7.8797
255	0.094211	10.614	8782.6	176.13	20.083	28.410	1221.3	164.22	7.9885
260	0.092401	10.822	8924.8	176.68	20.150	28.476	1232.6	166.85	8.0966
265	0.090658	11.030	9067.3	177.23	20.211	28.537	1243.8	169.44	8.2040
270	0.088980	11.238	9210.1	177.76	20.269	28.594	1254.9	172.00	8.3108
275	0.087364	11.446	9353.2	178.29	20.322	28.646	1266.0	174.54	8.4169
280	0.085805	11.654	9496.6	178.80	20.372	28.696	1277.0	177.05	8.5225
285	0.084300	11.862	9640.2	179.31	20.418	28.741	1287.9	179.53	8.6275
290	0.082848	12.070	9784.0	179.81	20.460	28.783	1298.7	181.99	8.7319
295	0.081444	12.278	9928.0	180.30	20.500	28.822	1309.5	184.42	8.8357
300	0.080088	12.486	10072	180.79	20.536	28.858	1320.2	186.83	8.9390
305	0.078776	12.694	10217	181.27	20.570	28.892	1330.8	189.22	9.0418
310	0.077506	12.902	10361	181.74	20.601	28.922	1341.3	191.58	9.1440
315	0.076277	13.110	10506	182.20	20.630	28.951	1351.8	193.93	9.2458
320	0.075086	13.318	10651	182.66	20.656	28.977	1362.2	196.25	9.3470

**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
325	0.073932	13.526	10796	183.10	20.680	29.001	1372.6	198.56	9.4478
330	0.072812	13.734	10941	183.55	20.703	29.023	1382.9	200.84	9.5481
335	0.071726	13.942	11086	183.98	20.723	29.043	1393.1	203.11	9.6480
340	0.070672	14.150	11231	184.41	20.742	29.062	1403.2	205.36	9.7474
345	0.069649	14.358	11376	184.84	20.759	29.079	1413.3	207.59	9.8464
350	0.068655	14.566	11522	185.26	20.775	29.094	1423.3	209.81	9.9449
355	0.067688	14.774	11667	185.67	20.789	29.108	1433.3	212.01	10.043
360	0.066749	14.982	11813	186.08	20.802	29.121	1443.2	214.20	10.141
365	0.065835	15.189	11959	186.48	20.814	29.133	1453.1	216.37	10.238
370	0.064946	15.397	12104	186.88	20.825	29.144	1462.9	218.53	10.335
375	0.064081	15.605	12250	187.27	20.835	29.154	1472.6	220.67	10.432
380	0.063238	15.813	12396	187.65	20.845	29.163	1482.3	222.80	10.528
385	0.062418	16.021	12542	188.03	20.853	29.171	1491.9	224.92	10.623
390	0.061618	16.229	12688	188.41	20.861	29.178	1501.4	227.03	10.719
395	0.060839	16.437	12833	188.78	20.867	29.185	1510.9	229.12	10.814
400	0.060079	16.645	12979	189.15	20.874	29.191	1520.4	231.21	10.909
405	0.059338	16.853	13125	189.51	20.880	29.197	1529.8	233.28	11.003
410	0.058615	17.061	13271	189.87	20.885	29.202	1539.1	235.34	11.097
415	0.057909	17.268	13417	190.22	20.890	29.207	1548.4	237.40	11.191
420	0.057220	17.476	13563	190.57	20.894	29.211	1557.6	239.44	11.284
425	0.056547	17.684	13709	190.92	20.899	29.216	1566.8	241.48	11.377
430	0.055890	17.892	13856	191.26	20.902	29.219	1576.0	243.50	11.470
435	0.055248	18.100	14002	191.60	20.906	29.223	1585.0	245.52	11.562
440	0.054621	18.308	14148	191.93	20.909	29.226	1594.1	247.53	11.655
445	0.054008	18.516	14294	192.26	20.913	29.229	1603.1	249.53	11.746
450	0.053408	18.724	14440	192.59	20.916	29.232	1612.0	251.53	11.838
455	0.052822	18.932	14586	192.91	20.919	29.235	1620.9	253.52	11.929
460	0.052248	19.139	14732	193.23	20.921	29.238	1629.7	255.50	12.020
465	0.051687	19.347	14879	193.55	20.924	29.240	1638.5	257.47	12.111
470	0.051137	19.555	15025	193.86	20.927	29.243	1647.2	259.44	12.201
475	0.050599	19.763	15171	194.17	20.929	29.245	1655.9	261.40	12.291
480	0.050073	19.971	15317	194.48	20.932	29.248	1664.6	263.36	12.381
485	0.049557	20.179	15464	194.78	20.934	29.250	1673.2	265.31	12.471
490	0.049051	20.387	15610	195.08	20.937	29.253	1681.7	267.26	12.560
495	0.048556	20.595	15756	195.38	20.940	29.255	1690.2	269.20	12.649
500	0.048071	20.803	15902	195.67	20.942	29.258	1698.7	271.13	12.738
0.5 MPa									
50	1.2530	0.79809	3600.5	128.96	12.677	22.483	580.37	40.125	2.4560
55	1.1266	0.88761	3712.1	131.08	12.685	22.168	611.04	43.047	2.6478
60	1.0248	0.97584	3822.4	133.00	12.729	21.985	639.47	45.952	2.8328
65	0.94060	1.0632	3932.1	134.76	12.811	21.901	665.95	48.846	3.0117
70	0.86974	1.1498	4041.6	136.38	12.931	21.895	690.69	51.738	3.1854
75	0.80916	1.2358	4151.2	137.89	13.088	21.955	713.88	54.640	3.3544
80	0.75671	1.3215	4261.2	139.31	13.279	22.069	735.67	57.562	3.5191
85	0.71082	1.4068	4371.9	140.66	13.500	22.227	756.24	60.513	3.6800
90	0.67030	1.4919	4483.5	141.93	13.746	22.422	775.73	63.500	3.8373
95	0.63424	1.5767	4596.2	143.15	14.012	22.645	794.29	66.528	3.9914
100	0.60193	1.6613	4710.0	144.32	14.292	22.890	812.04	69.600	4.1425
105	0.57281	1.7458	4825.1	145.44	14.581	23.149	829.11	72.716	4.2908
110	0.54641	1.8301	4941.5	146.52	14.876	23.418	845.59	75.874	4.4366
115	0.52237	1.9143	5059.3	147.57	15.172	23.692	861.57	79.070	4.5799
120	0.50039	1.9985	5178.5	148.59	15.466	23.967	877.12	82.300	4.7209
125	0.48020	2.0825	5299.0	149.57	15.757	24.241	892.29	85.557	4.8599
130	0.46159	2.1664	5420.9	150.53	16.040	24.510	907.13	88.835	4.9968
135	0.44438	2.2503	5544.1	151.46	16.317	24.773	921.69	92.127	5.1319
140	0.42843	2.3341	5668.6	152.36	16.584	25.029	936.00	95.426	5.2652
145	0.41358	2.4179	5794.3	153.24	16.841	25.276	950.07	98.725	5.3969
150	0.39974	2.5016	5921.3	154.10	17.087	25.513	963.94	102.02	5.5269
155	0.38680	2.5853	6049.5	154.95	17.323	25.741	977.62	105.30	5.6554
160	0.37468	2.6689	6178.7	155.77	17.548	25.958	991.12	108.57	5.7825
165	0.36330	2.7525	6309.0	156.57	17.763	26.166	1004.5	111.81	5.9082
170	0.35260	2.8361	6440.3	157.35	17.966	26.363	1017.7	115.03	6.0326
175	0.34251	2.9197	6572.6	158.12	18.159	26.551	1030.7	118.23	6.1557
180	0.33298	3.0032	6705.8	158.87	18.341	26.728	1043.6	121.39	6.2777
185	0.32397	3.0867	6839.9	159.60	18.514	26.896	1056.4	124.52	6.3985
190	0.31544	3.1701	6974.8	160.32	18.677	27.055	1069.0	127.62	6.5182
195	0.30735	3.2536	7110.4	161.03	18.831	27.205	1081.6	130.68	6.6369
200	0.29967	3.3370	7246.8	161.72	18.976	27.346	1094.0	133.71	6.7545
205	0.29236	3.4204	7383.9	162.40	19.112	27.480	1106.3	136.70	6.8712
210	0.28540	3.5038	7521.6	163.06	19.241	27.605	1118.5	139.65	6.9869
215	0.27877	3.5872	7659.9	163.71	19.361	27.723	1130.6	142.57	7.1017
220	0.27244	3.6706	7798.8	164.35	19.475	27.833	1142.6	145.45	7.2157
225	0.26639	3.7539	7938.2	164.98	19.581	27.937	1154.5	148.30	7.3288
230	0.26060	3.8373	8078.2	165.59	19.680	28.034	1166.3	151.11	7.4411

**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
235	0.25506	3.9206	8218.6	166.19	19.773	28.125	1178.0	153.89	7.5526
240	0.24975	4.0040	8359.4	166.79	19.861	28.210	1189.6	156.63	7.6634
245	0.24466	4.0873	8500.7	167.37	19.942	28.290	1201.2	159.34	7.7734
250	0.23978	4.1706	8642.3	167.94	20.018	28.364	1212.6	162.02	7.8827
255	0.23508	4.2539	8784.3	168.50	20.089	28.434	1224.0	164.67	7.9913
260	0.23057	4.3372	8926.6	169.06	20.155	28.498	1235.3	167.28	8.0992
265	0.22622	4.4205	9069.3	169.60	20.217	28.559	1246.5	169.87	8.2065
270	0.22204	4.5037	9212.2	170.14	20.274	28.615	1257.6	172.43	8.3132
275	0.21801	4.5870	9355.4	170.66	20.328	28.667	1268.6	174.96	8.4192
280	0.21412	4.6703	9498.9	171.18	20.377	28.715	1279.6	177.46	8.5246
285	0.21037	4.7535	9642.6	171.69	20.423	28.760	1290.5	179.94	8.6295
290	0.20675	4.8368	9786.5	172.19	20.465	28.801	1301.3	182.39	8.7338
295	0.20325	4.9200	9930.6	172.68	20.505	28.839	1312.0	184.82	8.8375
300	0.19987	5.0033	10075	173.16	20.541	28.875	1322.7	187.23	8.9407
305	0.19660	5.0865	10219	173.64	20.575	28.908	1333.3	189.61	9.0434
310	0.19343	5.1697	10364	174.11	20.606	28.938	1343.8	191.97	9.1456
315	0.19037	5.2530	10509	174.58	20.634	28.966	1354.3	194.31	9.2472
320	0.18740	5.3362	10654	175.03	20.661	28.991	1364.7	196.63	9.3484
325	0.18452	5.4194	10799	175.48	20.685	29.015	1375.0	198.93	9.4491
330	0.18173	5.5026	10944	175.92	20.707	29.036	1385.3	201.21	9.5494
335	0.17902	5.5859	11089	176.36	20.727	29.056	1395.5	203.48	9.6491
340	0.17640	5.6691	11234	176.79	20.746	29.074	1405.6	205.72	9.7485
345	0.17384	5.7523	11380	177.22	20.763	29.091	1415.7	207.95	9.8474
350	0.17137	5.8355	11525	177.64	20.779	29.106	1425.7	210.17	9.9459
355	0.16896	5.9187	11671	178.05	20.793	29.120	1435.7	212.36	10.044
360	0.16661	6.0019	11816	178.46	20.806	29.132	1445.6	214.55	10.142
365	0.16434	6.0851	11962	178.86	20.818	29.144	1455.4	216.72	10.239
370	0.16212	6.1683	12108	179.25	20.829	29.154	1465.2	218.87	10.336
375	0.15996	6.2515	12254	179.65	20.839	29.164	1474.9	221.01	10.432
380	0.15786	6.3347	12399	180.03	20.848	29.172	1484.6	223.14	10.528
385	0.15582	6.4179	12545	180.41	20.857	29.180	1494.2	225.26	10.624
390	0.15382	6.5011	12691	180.79	20.864	29.187	1503.7	227.36	10.719
395	0.15188	6.5842	12837	181.16	20.871	29.194	1513.2	229.45	10.814
400	0.14998	6.6674	12983	181.53	20.878	29.200	1522.6	231.54	10.909
405	0.14813	6.7506	13129	181.89	20.883	29.205	1532.0	233.61	11.003
410	0.14633	6.8338	13275	182.25	20.889	29.210	1541.4	235.67	11.097
415	0.14457	6.9170	13421	182.60	20.893	29.215	1550.6	237.72	11.191
420	0.14285	7.0001	13567	182.95	20.898	29.219	1559.9	239.76	11.284
425	0.14118	7.0833	13713	183.30	20.902	29.223	1569.0	241.79	11.377
430	0.13954	7.1665	13860	183.64	20.906	29.226	1578.1	243.82	11.470
435	0.13794	7.2497	14006	183.98	20.909	29.230	1587.2	245.83	11.563
440	0.13637	7.3328	14152	184.31	20.913	29.233	1596.2	247.84	11.655
445	0.13484	7.4160	14298	184.64	20.916	29.236	1605.2	249.84	11.746
450	0.13335	7.4992	14444	184.97	20.919	29.238	1614.1	251.84	11.838
455	0.13189	7.5824	14590	185.29	20.922	29.241	1623.0	253.82	11.929
460	0.13045	7.6655	14737	185.61	20.925	29.244	1631.8	255.80	12.020
465	0.12905	7.7487	14883	185.93	20.927	29.246	1640.6	257.77	12.111
470	0.12768	7.8319	15029	186.24	20.930	29.248	1649.3	259.74	12.201
475	0.12634	7.9150	15175	186.55	20.932	29.251	1658.0	261.70	12.291
480	0.12503	7.9982	15322	186.86	20.935	29.253	1666.6	263.66	12.381
485	0.12374	8.0813	15468	187.16	20.938	29.256	1675.2	265.60	12.471
490	0.12248	8.1645	15614	187.46	20.940	29.258	1683.8	267.55	12.560
495	0.12125	8.2477	15760	187.76	20.943	29.260	1692.3	269.49	12.649
500	0.12004	8.3308	15907	188.05	20.945	29.263	1700.7	271.42	12.738
1.0 MPa									
50	2.6174	0.38206	3546.7	122.45	12.837	24.482	576.10	43.028	2.5365
55	2.3238	0.43034	3666.8	124.74	12.810	23.649	609.15	45.633	2.7187
60	2.0958	0.47715	3783.7	126.78	12.830	23.135	639.26	48.298	2.8958
65	1.9122	0.52296	3898.5	128.62	12.895	22.823	666.97	51.002	3.0684
70	1.7605	0.56803	4012.2	130.30	13.002	22.654	692.63	53.740	3.2366
75	1.6325	0.61255	4125.3	131.86	13.149	22.591	716.50	56.512	3.4009
80	1.5229	0.65663	4238.2	133.32	13.332	22.611	738.82	59.323	3.5616
85	1.4278	0.70036	4351.5	134.69	13.547	22.695	759.79	62.178	3.7189
90	1.3444	0.74382	4465.3	135.99	13.788	22.830	779.59	65.082	3.8730
95	1.2706	0.78705	4579.8	137.23	14.049	23.005	798.39	68.036	4.0243
100	1.2047	0.83010	4695.4	138.42	14.326	23.208	816.34	71.042	4.1730
105	1.1455	0.87298	4812.0	139.55	14.612	23.434	833.55	74.099	4.3190
110	1.0920	0.91572	4929.7	140.65	14.904	23.674	850.15	77.204	4.4628
115	1.0435	0.95835	5048.7	141.71	15.199	23.923	866.21	80.351	4.6043
120	0.99912	1.0009	5169.0	142.73	15.491	24.178	881.82	83.537	4.7437
125	0.95847	1.0433	5290.5	143.72	15.780	24.433	897.05	86.753	4.8812
130	0.92107	1.0857	5413.3	144.69	16.063	24.686	911.93	89.994	5.0167
135	0.88653	1.1280	5537.3	145.62	16.337	24.935	926.52	93.251	5.1506
140	0.85453	1.1702	5662.6	146.53	16.603	25.178	940.84	96.518	5.2827

**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
145	0.82480	1.2124	5789.1	147.42	16.860	25.413	954.93	99.787	5.4133
150	0.79709	1.2546	5916.7	148.29	17.105	25.641	968.80	103.05	5.5424
155	0.77122	1.2967	6045.5	149.13	17.341	25.860	982.48	106.31	5.6700
160	0.74699	1.3387	6175.3	149.96	17.565	26.069	995.98	109.55	5.7962
165	0.72425	1.3807	6306.2	150.76	17.778	26.269	1009.3	112.77	5.9212
170	0.70287	1.4227	6438.0	151.55	17.981	26.460	1022.5	115.97	6.0448
175	0.68274	1.4647	6570.8	152.32	18.174	26.642	1035.5	119.15	6.1673
180	0.66373	1.5066	6704.4	153.07	18.356	26.814	1048.4	122.29	6.2887
185	0.64576	1.5486	6838.9	153.81	18.528	26.977	1061.2	125.40	6.4089
190	0.62875	1.5904	6974.2	154.53	18.691	27.131	1073.8	128.48	6.5280
195	0.61263	1.6323	7110.2	155.24	18.844	27.277	1086.3	131.53	6.6462
200	0.59731	1.6742	7246.9	155.93	18.989	27.414	1098.7	134.54	6.7634
205	0.58275	1.7160	7384.3	156.61	19.125	27.544	1111.0	137.52	6.8796
210	0.56888	1.7578	7522.3	157.27	19.253	27.666	1123.2	140.46	6.9949
215	0.55566	1.7996	7660.9	157.92	19.373	27.780	1135.3	143.36	7.1093
220	0.54305	1.8414	7800.1	158.56	19.486	27.888	1147.2	146.23	7.2229
225	0.53100	1.8832	7939.8	159.19	19.592	27.989	1159.1	149.07	7.3356
230	0.51948	1.9250	8080.0	159.81	19.691	28.084	1170.9	151.87	7.4476
235	0.50845	1.9668	8220.6	160.41	19.784	28.173	1182.6	154.63	7.5588
240	0.49788	2.0085	8361.7	161.01	19.871	28.256	1194.2	157.36	7.6692
245	0.48774	2.0503	8503.2	161.59	19.952	28.333	1205.7	160.06	7.7790
250	0.47801	2.0920	8645.0	162.16	20.028	28.406	1217.1	162.73	7.8880
255	0.46867	2.1337	8787.2	162.73	20.099	28.473	1228.4	165.37	7.9963
260	0.45968	2.1754	8929.8	163.28	20.165	28.536	1239.7	167.98	8.1040
265	0.45103	2.2171	9072.6	163.82	20.226	28.595	1250.9	170.55	8.2111
270	0.44270	2.2588	9215.7	164.36	20.283	28.649	1262.0	173.10	8.3175
275	0.43468	2.3005	9359.1	164.89	20.337	28.700	1273.0	175.63	8.4233
280	0.42694	2.3422	9502.7	165.40	20.386	28.747	1283.9	178.12	8.5286
285	0.41948	2.3839	9646.5	165.91	20.432	28.790	1294.8	180.59	8.6332
290	0.41227	2.4256	9790.6	166.41	20.474	28.831	1305.6	183.04	8.7373
295	0.40531	2.4673	9934.9	166.91	20.513	28.868	1316.3	185.46	8.8409
300	0.39857	2.5089	10079	167.39	20.549	28.902	1326.9	187.86	8.9439
305	0.39206	2.5506	10224	167.87	20.583	28.934	1337.5	190.23	9.0464
310	0.38576	2.5923	10369	168.34	20.614	28.963	1348.0	192.59	9.1484
315	0.37966	2.6339	10513	168.80	20.642	28.990	1358.5	194.92	9.2500
320	0.37375	2.6756	10659	169.26	20.668	29.015	1368.8	197.24	9.3510
325	0.36802	2.7172	10804	169.71	20.692	29.037	1379.1	199.53	9.4515
330	0.36247	2.7589	10949	170.15	20.715	29.058	1389.4	201.81	9.5517
335	0.35708	2.8005	11094	170.59	20.735	29.077	1399.6	204.06	9.6513
340	0.35185	2.8422	11240	171.02	20.753	29.094	1409.7	206.31	9.7505
345	0.34676	2.8838	11385	171.45	20.771	29.110	1419.7	208.53	9.8493
350	0.34183	2.9254	11531	171.87	20.786	29.125	1429.7	210.74	9.9477
355	0.33703	2.9671	11676	172.28	20.800	29.138	1439.7	212.93	10.0460
360	0.33237	3.0087	11822	172.69	20.813	29.150	1449.5	215.11	10.1430
365	0.32783	3.0503	11968	173.09	20.825	29.161	1459.3	217.27	10.2400
370	0.32342	3.0919	12114	173.49	20.836	29.171	1469.1	219.42	10.3370
375	0.31913	3.1336	12260	173.88	20.846	29.180	1478.8	221.56	10.4330
380	0.31494	3.1752	12406	174.26	20.855	29.188	1488.4	223.68	10.5300
385	0.31087	3.2168	12551	174.65	20.863	29.195	1498.0	225.80	10.6250
390	0.30690	3.2584	12697	175.02	20.871	29.202	1507.5	227.90	10.7200
395	0.30303	3.3000	12844	175.39	20.877	29.208	1517.0	229.99	10.8150
400	0.29925	3.3416	12990	175.76	20.884	29.214	1526.4	232.06	10.9100
405	0.29557	3.3833	13136	176.13	20.889	29.219	1535.8	234.13	11.0040
410	0.29198	3.4249	13282	176.48	20.895	29.223	1545.1	236.19	11.0980
415	0.28848	3.4665	13428	176.84	20.899	29.227	1554.3	238.24	11.1920
420	0.28506	3.5081	13574	177.19	20.904	29.231	1563.5	240.27	11.2850
425	0.28172	3.5497	13720	177.53	20.908	29.235	1572.7	242.30	11.3780
430	0.27845	3.5913	13866	177.88	20.912	29.238	1581.8	244.33	11.4710
435	0.27526	3.6329	14013	178.21	20.915	29.241	1590.8	246.34	11.5630
440	0.27215	3.6745	14159	178.55	20.918	29.244	1599.8	248.34	11.6550
445	0.26910	3.7161	14305	178.88	20.921	29.246	1608.8	250.34	11.7470
450	0.26612	3.7577	14451	179.21	20.924	29.249	1617.7	252.33	11.8380
455	0.26321	3.7993	14597	179.53	20.927	29.251	1626.5	254.31	11.9290
460	0.26036	3.8409	14744	179.85	20.930	29.253	1635.3	256.29	12.0200
465	0.25757	3.8825	14890	180.16	20.933	29.256	1644.1	258.26	12.1110
470	0.25484	3.9241	15036	180.48	20.935	29.258	1652.8	260.22	12.2010
475	0.25217	3.9656	15183	180.79	20.938	29.260	1661.5	262.18	12.2910
480	0.24955	4.0072	15329	181.09	20.940	29.262	1670.1	264.13	12.3810
485	0.24698	4.0488	15475	181.40	20.943	29.264	1678.7	266.08	12.4710
490	0.24447	4.0904	15622	181.70	20.945	29.266	1687.2	268.02	12.5600
495	0.24201	4.1320	15768	181.99	20.948	29.268	1695.7	269.96	12.6490
500	0.23960	4.1736	15914	182.29	20.950	29.271	1704.1	271.89	12.7380
2.0 MPa									
50	5.7345	0.17438	3432.2	115.07	13.1370	29.720	575.26	49.217	2.7767

**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
55	4.9415	0.20237	3573.7	117.77	13.0370	27.145	611.25	50.851	2.9133
60	4.3752	0.22856	3705.5	120.07	13.0130	25.692	643.47	52.877	3.0602
65	3.9430	0.25362	3831.5	122.08	13.0470	24.800	672.73	55.120	3.2107
70	3.5988	0.27787	3954.0	123.90	13.1320	24.240	699.53	57.505	3.3619
75	3.3162	0.30155	4074.3	125.56	13.2620	23.898	724.26	59.997	3.5125
80	3.0789	0.32479	4193.3	127.10	13.4320	23.710	747.22	62.578	3.6618
85	2.8762	0.34768	4311.6	128.53	13.6350	23.635	768.67	65.240	3.8096
90	2.7005	0.37030	4429.8	129.88	13.8670	23.644	788.84	67.978	3.9557
95	2.5465	0.39269	4548.1	131.16	14.1210	23.717	807.91	70.789	4.1000
100	2.4102	0.41490	4667.0	132.38	14.3910	23.838	826.05	73.669	4.2424
105	2.2886	0.43695	4786.6	133.55	14.6730	23.994	843.41	76.615	4.3831
110	2.1792	0.45887	4907.0	134.67	14.9610	24.177	860.11	79.620	4.5220
115	2.0804	0.48068	5028.4	135.75	15.2510	24.377	876.25	82.678	4.6593
120	1.9905	0.50239	5150.8	136.79	15.5400	24.589	891.91	85.782	4.7948
125	1.9083	0.52402	5274.3	137.80	15.8260	24.807	907.16	88.924	4.9288
130	1.8329	0.54557	5398.8	138.77	16.1060	25.029	922.05	92.097	5.0613
135	1.7635	0.56706	5524.5	139.72	16.3790	25.250	936.64	95.291	5.1922
140	1.6993	0.58849	5651.3	140.64	16.6430	25.468	950.95	98.500	5.3218
145	1.6397	0.60987	5779.2	141.54	16.8970	25.682	965.02	101.72	5.4500
150	1.5843	0.63121	5908.1	142.42	17.1410	25.890	978.86	104.93	5.5768
155	1.5326	0.65250	6038.1	143.27	17.3750	26.091	992.51	108.14	5.7025
160	1.4842	0.67376	6169.0	144.10	17.5980	26.285	1006.0	111.34	5.8268
165	1.4389	0.69498	6300.9	144.91	17.8100	26.471	1019.3	114.52	5.9501
170	1.3963	0.71618	6433.7	145.70	18.0120	26.649	1032.4	117.68	6.0721
175	1.3562	0.73734	6567.4	146.48	18.2030	26.819	1045.4	120.82	6.1931
180	1.3184	0.75849	6701.9	147.24	18.3840	26.980	1058.2	123.93	6.3131
185	1.2827	0.77961	6837.2	147.98	18.5560	27.134	1070.9	127.01	6.4320
190	1.2489	0.80070	6973.2	148.70	18.7180	27.279	1083.5	130.06	6.5500
195	1.2169	0.82178	7110.0	149.41	18.8700	27.416	1096.0	133.08	6.6670
200	1.1865	0.84285	7247.4	150.11	19.0140	27.546	1108.3	136.06	6.7831
205	1.1576	0.86389	7385.4	150.79	19.1500	27.669	1120.6	139.01	6.8983
210	1.1300	0.88492	7524.1	151.46	19.2770	27.784	1132.7	141.93	7.0127
215	1.1038	0.90594	7663.3	152.12	19.3970	27.893	1144.7	144.81	7.1263
220	1.0788	0.92694	7803.0	152.76	19.5090	27.995	1156.6	147.66	7.2390
225	1.0549	0.94793	7943.2	153.39	19.6140	28.091	1168.4	150.47	7.3510
230	1.0321	0.96891	8083.9	154.01	19.7130	28.181	1180.2	153.25	7.4622
235	1.0102	0.98989	8225.0	154.61	19.8050	28.265	1191.8	155.99	7.5727
240	0.98927	1.0108	8366.5	155.21	19.8920	28.344	1203.3	158.71	7.6825
245	0.96918	1.0318	8508.4	155.79	19.9730	28.418	1214.8	161.39	7.7916
250	0.94990	1.0527	8650.7	156.37	20.0480	28.486	1226.1	164.04	7.9000
255	0.93138	1.0737	8793.3	156.93	20.1180	28.550	1237.4	166.66	8.0078
260	0.91357	1.0946	8936.2	157.49	20.1840	28.610	1248.6	169.25	8.1150
265	0.89644	1.1155	9079.4	158.03	20.2450	28.666	1259.7	171.81	8.2215
270	0.87994	1.1364	9222.8	158.57	20.3020	28.717	1270.8	174.35	8.3274
275	0.86405	1.1573	9366.6	159.10	20.3550	28.765	1281.7	176.86	8.4328
280	0.84872	1.1782	9510.5	159.62	20.4040	28.809	1292.6	179.34	8.5376
285	0.83393	1.1991	9654.6	160.13	20.4490	28.851	1303.4	181.80	8.6418
290	0.81965	1.2200	9799.0	160.63	20.4910	28.888	1314.2	184.23	8.7455
295	0.80585	1.2409	9943.5	161.12	20.5300	28.923	1324.8	186.64	8.8487
300	0.79252	1.2618	10088	161.61	20.5660	28.956	1335.4	189.02	8.9514
305	0.77962	1.2827	10233	162.09	20.5990	28.985	1345.9	191.39	9.0535
310	0.76713	1.3036	10378	162.56	20.6300	29.013	1356.4	193.73	9.1552
315	0.75504	1.3244	10523	163.02	20.6580	29.038	1366.8	196.05	9.2564
320	0.74333	1.3453	10668	163.48	20.6840	29.061	1377.1	198.36	9.3571
325	0.73198	1.3662	10814	163.93	20.7080	29.082	1387.4	200.64	9.4574
330	0.72097	1.3870	10959	164.38	20.7300	29.101	1397.6	202.91	9.5572
335	0.71029	1.4079	11105	164.81	20.7500	29.119	1407.7	205.16	9.6566
340	0.69993	1.4287	11250	165.25	20.7680	29.135	1417.8	207.39	9.7555
345	0.68986	1.4496	11396	165.67	20.7850	29.149	1427.8	209.60	9.8540
350	0.68008	1.4704	11542	166.09	20.8000	29.162	1437.7	211.80	9.9522
355	0.67057	1.4913	11688	166.50	20.8140	29.174	1447.6	213.99	10.050
360	0.66133	1.5121	11834	166.91	20.8270	29.185	1457.4	216.16	10.147
365	0.65234	1.5329	11980	167.32	20.8390	29.195	1467.2	218.31	10.244
370	0.64359	1.5538	12126	167.71	20.8490	29.204	1476.9	220.45	10.341
375	0.63508	1.5746	12272	168.10	20.8590	29.212	1486.5	222.58	10.437
380	0.62678	1.5954	12418	168.49	20.8680	29.219	1496.1	224.70	10.533
385	0.61871	1.6163	12564	168.87	20.8760	29.225	1505.6	226.80	10.628
390	0.61084	1.6371	12710	169.25	20.8830	29.231	1515.1	228.90	10.723
395	0.60316	1.6579	12856	169.62	20.8900	29.236	1524.6	230.98	10.818
400	0.59568	1.6788	13002	169.99	20.8960	29.241	1533.9	233.05	10.912
405	0.58838	1.6996	13149	170.35	20.9020	29.245	1543.2	235.11	11.007
410	0.58126	1.7204	13295	170.71	20.9070	29.249	1552.5	237.16	11.100
415	0.57431	1.7412	13441	171.07	20.9110	29.252	1561.7	239.20	11.194
420	0.56752	1.7620	13587	171.42	20.9160	29.255	1570.9	241.24	11.287

**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
425	0.56090	1.7829	13734	171.76	20.9190	29.258	1580.0	243.26	11.380
430	0.55442	1.8037	13880	172.11	20.9230	29.261	1589.0	245.27	11.472
435	0.54810	1.8245	14026	172.45	20.9260	29.263	1598.0	247.28	11.564
440	0.54192	1.8453	14173	172.78	20.9300	29.265	1607.0	249.28	11.656
445	0.53587	1.8661	14319	173.11	20.9330	29.267	1615.9	251.27	11.748
450	0.52996	1.8869	14465	173.44	20.9350	29.269	1624.8	253.26	11.839
455	0.52418	1.9077	14612	173.76	20.9380	29.271	1633.6	255.23	11.930
460	0.51853	1.9285	14758	174.08	20.9410	29.273	1642.4	257.20	12.021
465	0.51299	1.9493	14904	174.40	20.9430	29.274	1651.1	259.17	12.111
470	0.50757	1.9702	15051	174.71	20.9460	29.276	1659.7	261.13	12.202
475	0.50227	1.9910	15197	175.02	20.9480	29.278	1668.4	263.08	12.292
480	0.49708	2.0118	15343	175.33	20.9500	29.279	1677.0	265.03	12.381
485	0.49199	2.0326	15490	175.63	20.9530	29.281	1685.5	266.97	12.471
490	0.48700	2.0534	15636	175.93	20.9550	29.283	1694.0	268.91	12.560
495	0.48212	2.0742	15783	176.23	20.9570	29.284	1702.4	270.84	12.649
500	0.47733	2.0950	15929	176.52	20.9600	29.286	1710.8	272.77	12.738
5.0 MPa									
50	16.759	0.059668	3122.0	103.03	13.534	41.832	694.08	76.818	4.3324
55	13.815	0.072386	3318.9	106.79	13.460	36.915	693.11	71.551	4.0097
60	11.813	0.084656	3493.1	109.82	13.399	33.009	708.27	69.334	3.8964
65	10.385	0.096288	3651.2	112.36	13.393	30.397	728.55	68.848	3.8844
70	9.3129	0.10738	3798.5	114.54	13.441	28.666	750.04	69.362	3.9249
75	8.4718	0.11804	3938.8	116.48	13.541	27.502	771.30	70.497	3.9949
80	7.7904	0.12836	4074.2	118.22	13.684	26.715	791.81	72.050	4.0828
85	7.2245	0.13842	4206.3	119.83	13.866	26.188	811.41	73.906	4.1820
90	6.7450	0.14826	4336.3	121.31	14.079	25.846	830.10	75.995	4.2886
95	6.3324	0.15792	4465.0	122.70	14.317	25.640	847.96	78.271	4.4002
100	5.9726	0.16743	4592.9	124.02	14.573	25.535	865.07	80.702	4.5150
105	5.6556	0.17682	4720.5	125.26	14.842	25.505	881.54	83.264	4.6321
110	5.3735	0.18610	4848.1	126.45	15.119	25.531	897.45	85.938	4.7505
115	5.1207	0.19529	4975.9	127.59	15.400	25.599	912.89	88.707	4.8699
120	4.8925	0.20440	5104.1	128.68	15.681	25.698	927.91	91.556	4.9897
125	4.6853	0.21344	5232.9	129.73	15.959	25.819	942.58	94.471	5.1097
130	4.4961	0.22241	5362.3	130.74	16.232	25.956	956.95	97.441	5.2297
135	4.3226	0.23134	5492.5	131.73	16.499	26.103	971.04	100.45	5.3494
140	4.1629	0.24022	5623.4	132.68	16.758	26.256	984.89	103.50	5.4689
145	4.0152	0.24905	5755.0	133.60	17.007	26.411	998.53	106.56	5.5879
150	3.8782	0.25785	5887.5	134.50	17.247	26.568	1012.0	109.64	5.7064
155	3.7508	0.26661	6020.7	135.37	17.476	26.722	1025.2	112.72	5.8243
160	3.6318	0.27534	6154.7	136.22	17.696	26.874	1038.3	115.80	5.9417
165	3.5206	0.28405	6289.4	137.05	17.904	27.023	1051.3	118.87	6.0585
170	3.4162	0.29272	6424.9	137.86	18.103	27.166	1064.1	121.93	6.1746
175	3.3181	0.30138	6561.1	138.65	18.291	27.305	1076.7	124.98	6.2901
180	3.2257	0.31001	6698.0	139.42	18.470	27.438	1089.3	128.00	6.4050
185	3.1385	0.31862	6835.5	140.18	18.638	27.565	1101.7	131.00	6.5192
190	3.0561	0.32722	6973.6	140.91	18.798	27.686	1114.0	133.97	6.6327
195	2.9780	0.33580	7112.3	141.63	18.948	27.802	1126.2	136.91	6.7457
200	2.9039	0.34436	7251.6	142.34	19.090	27.911	1138.3	139.83	6.8579
205	2.8336	0.35291	7391.4	143.03	19.223	28.015	1150.2	142.71	6.9695
210	2.7667	0.36144	7531.7	143.71	19.349	28.113	1162.1	145.57	7.0805
215	2.7029	0.36997	7672.5	144.37	19.467	28.206	1173.9	148.39	7.1909
220	2.6421	0.37848	7813.8	145.02	19.577	28.293	1185.5	151.18	7.3007
225	2.5841	0.38698	7955.5	145.65	19.681	28.375	1197.1	153.94	7.4098
230	2.5286	0.39547	8097.5	146.28	19.778	28.451	1208.6	156.67	7.5184
235	2.4755	0.40396	8240.0	146.89	19.869	28.523	1220.0	159.37	7.6264
240	2.4247	0.41243	8382.8	147.49	19.954	28.591	1231.3	162.04	7.7338
245	2.3759	0.42090	8525.9	148.08	20.034	28.654	1242.6	164.67	7.8407
250	2.3291	0.42935	8669.3	148.66	20.108	28.712	1253.7	167.28	7.9470
255	2.2841	0.43781	8813.0	149.23	20.177	28.767	1264.8	169.86	8.0527
260	2.2409	0.44625	8957.0	149.79	20.241	28.818	1275.8	172.42	8.1580
265	2.1993	0.45469	9101.2	150.34	20.301	28.865	1286.7	174.94	8.2627
270	2.1593	0.46312	9245.6	150.88	20.357	28.908	1297.5	177.44	8.3669
275	2.1207	0.47155	9390.2	151.41	20.409	28.949	1308.3	179.92	8.4706
280	2.0835	0.47997	9535.1	151.93	20.457	28.986	1319.0	182.36	8.5738
285	2.0476	0.48839	9680.1	152.45	20.501	29.020	1329.6	184.79	8.6766
290	2.0129	0.49680	9825.3	152.95	20.542	29.052	1340.2	187.19	8.7788
295	1.9794	0.50520	9970.6	153.45	20.580	29.081	1350.6	189.57	8.8806
300	1.9470	0.51361	10116	153.94	20.615	29.107	1361.1	191.93	8.9820
305	1.9157	0.52201	10262	154.42	20.648	29.131	1371.4	194.27	9.0829
310	1.8854	0.53040	10407	154.89	20.678	29.153	1381.7	196.58	9.1833
315	1.8560	0.53879	10553	155.36	20.705	29.174	1391.9	198.88	9.2834
320	1.8275	0.54718	10699	155.82	20.730	29.192	1402.1	201.16	9.3830
325	1.8000	0.55557	10845	156.27	20.753	29.208	1412.1	203.42	9.4822
330	1.7732	0.56395	10991	156.72	20.774	29.223	1422.2	205.66	9.5810



**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
335	1.7473	0.57233	11137	157.16	20.794	29.237	1432.1	207.89	9.6794
340	1.7220	0.58070	11284	157.59	20.812	29.249	1442.0	210.10	9.7774
345	1.6976	0.58908	11430	158.02	20.828	29.260	1451.9	212.29	9.8750
350	1.6738	0.59745	11576	158.44	20.842	29.269	1461.7	214.47	9.9723
355	1.6507	0.60582	11723	158.85	20.856	29.278	1471.4	216.64	10.069
360	1.6282	0.61418	11869	159.26	20.868	29.285	1481.1	218.79	10.166
365	1.6063	0.62255	12015	159.67	20.879	29.292	1490.7	220.93	10.262
370	1.5850	0.63091	12162	160.07	20.889	29.298	1500.3	223.05	10.358
375	1.5643	0.63927	12308	160.46	20.899	29.303	1509.8	225.16	10.453
380	1.5441	0.64763	12455	160.85	20.907	29.307	1519.2	227.26	10.548
385	1.5244	0.65598	12601	161.23	20.914	29.311	1528.6	229.35	10.643
390	1.5053	0.66434	12748	161.61	20.921	29.314	1537.9	231.43	10.737
395	1.4866	0.67269	12895	161.98	20.927	29.317	1547.2	233.49	10.832
400	1.4683	0.68104	13041	162.35	20.933	29.319	1556.5	235.55	10.925
405	1.4506	0.68939	13188	162.71	20.938	29.321	1565.6	237.59	11.019
410	1.4332	0.69774	13334	163.07	20.943	29.323	1574.8	239.63	11.112
415	1.4163	0.70608	13481	163.43	20.947	29.324	1583.9	241.66	11.205
420	1.3997	0.71443	13628	163.78	20.951	29.325	1592.9	243.67	11.298
425	1.3836	0.72277	13774	164.13	20.954	29.326	1601.9	245.68	11.390
430	1.3678	0.73111	13921	164.47	20.957	29.326	1610.8	247.69	11.482
435	1.3523	0.73946	14067	164.81	20.960	29.327	1619.7	249.68	11.574
440	1.3373	0.74779	14214	165.15	20.963	29.327	1628.5	251.67	11.665
445	1.3225	0.75613	14361	165.48	20.966	29.328	1637.3	253.65	11.756
450	1.3081	0.76447	14507	165.80	20.968	29.328	1646.0	255.62	11.847
455	1.2940	0.77281	14654	166.13	20.970	29.328	1654.7	257.58	11.938
460	1.2802	0.78114	14801	166.45	20.972	29.328	1663.4	259.54	12.028
465	1.2667	0.78948	14947	166.77	20.975	29.328	1672.0	261.50	12.118
470	1.2534	0.79781	15094	167.08	20.977	29.329	1680.5	263.44	12.208
475	1.2405	0.80614	15241	167.39	20.979	29.329	1689.1	265.39	12.297
480	1.2278	0.81448	15387	167.70	20.981	29.329	1697.5	267.32	12.387
485	1.2154	0.82281	15534	168.00	20.983	29.330	1706.0	269.25	12.476
490	1.2032	0.83114	15681	168.30	20.985	29.330	1714.3	271.18	12.565
495	1.1912	0.83947	15827	168.60	20.987	29.331	1722.7	273.10	12.653
500	1.1795	0.84780	15974	168.89	20.989	29.331	1731.0	275.02	12.742
10.0 MPa									
50	26.210	0.038154	3007.7	96.196	13.588	31.588	1012.9	107.86	6.8973
55	23.640	0.042301	3168.5	99.261	13.628	32.559	963.49	102.68	6.2316
60	21.293	0.046963	3331.6	102.10	13.661	32.552	932.19	98.225	5.7612
65	19.247	0.051957	3492.9	104.68	13.705	31.900	915.83	94.781	5.4443
70	17.509	0.057115	3650.2	107.01	13.772	30.980	910.09	92.394	5.2419
75	16.046	0.062321	3802.7	109.12	13.872	30.047	911.29	90.965	5.1217
80	14.813	0.067510	3950.8	111.03	14.007	29.227	916.81	90.340	5.0600
85	13.765	0.072648	4095.2	112.78	14.176	28.559	924.96	90.371	5.0401
90	12.866	0.077721	4236.7	114.40	14.375	28.042	934.69	90.932	5.0501
95	12.088	0.082728	4375.9	115.90	14.598	27.657	945.37	91.923	5.0823
100	11.407	0.087669	4513.4	117.32	14.840	27.383	956.61	93.265	5.1308
105	10.805	0.092549	4649.9	118.65	15.095	27.199	968.19	94.898	5.1917
110	10.270	0.097374	4785.6	119.91	15.360	27.087	979.96	96.772	5.2622
115	9.7898	0.10215	4920.8	121.11	15.629	27.032	991.86	98.847	5.3400
120	9.3568	0.10687	5055.9	122.26	15.900	27.021	1003.8	101.09	5.4236
125	8.9638	0.11156	5191.1	123.37	16.168	27.044	1015.8	103.47	5.5117
130	8.6053	0.11621	5326.4	124.43	16.433	27.093	1027.8	105.97	5.6034
135	8.2768	0.12082	5462.1	125.45	16.691	27.161	1039.8	108.56	5.6980
140	7.9743	0.12540	5598.1	126.44	16.942	27.243	1051.7	111.23	5.7948
145	7.6949	0.12996	5734.5	127.40	17.184	27.335	1063.7	113.96	5.8934
150	7.4358	0.13448	5871.4	128.33	17.417	27.433	1075.6	116.73	5.9935
155	7.1949	0.13899	6008.8	129.23	17.641	27.535	1087.4	119.54	6.0947
160	6.9701	0.14347	6146.8	130.10	17.854	27.639	1099.2	122.37	6.1968
165	6.7598	0.14793	6285.2	130.96	18.058	27.744	1111.0	125.21	6.2996
170	6.5627	0.15238	6424.2	131.79	18.251	27.847	1122.7	128.06	6.4029
175	6.3774	0.15680	6563.7	132.59	18.435	27.949	1134.3	130.91	6.5065
180	6.2028	0.16122	6703.7	133.38	18.609	28.047	1145.9	133.75	6.6104
185	6.0381	0.16561	6844.2	134.15	18.774	28.143	1157.4	136.59	6.7144
190	5.8824	0.17000	6985.1	134.90	18.929	28.235	1168.9	139.41	6.8186
195	5.7349	0.17437	7126.5	135.64	19.076	28.324	1180.2	142.21	6.9227
200	5.5950	0.17873	7268.4	136.36	19.215	28.408	1191.6	144.99	7.0268
205	5.4621	0.18308	7410.6	137.06	19.345	28.489	1202.8	147.75	7.1307
210	5.3356	0.18742	7553.2	137.75	19.467	28.565	1214.0	150.49	7.2346
215	5.2151	0.19175	7696.2	138.42	19.582	28.637	1225.1	153.21	7.3382
22 0	5.1002	0.19607	7839.6	139.08	19.690	28.705	1236.2	155.90	7.4417
225	4.9904	0.20038	7983.3	139.72	19.791	28.769	1247.2	158.57	7.5449
230	4.8855	0.20469	8127.3	140.36	19.886	28.829	1258.1	161.21	7.6478
235	4.7850	0.20899	8271.6	140.98	19.974	28.885	1269.0	163.82	7.7505
240	4.6887	0.21328	8416.1	141.59	20.057	28.937	1279.8	166.41	7.8530

**TABLE 1** *Continued*

<i>T</i> (K)	$\rho$ (mol·L <sup>-1</sup> )	<i>V</i> (L <sup>-1</sup> ·mol)	<i>H</i> (J·mol <sup>-1</sup> )	<i>S</i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>v</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>C<sub>p</sub></i> (J·mol <sup>-1</sup> ·K <sup>-1</sup> )	<i>c</i> (m·s <sup>-1</sup> )	$\lambda$ (mW·m <sup>-1</sup> ·K <sup>-1</sup> )	$\eta$ ( $\mu$ Pa·s)
245	4.5964	0.21756	8560.9	142.18	20.134	28.986	1290.5	168.97	7.9551
250	4.5077	0.22184	8706.0	142.77	20.206	29.032	1301.2	171.51	8.0569
255	4.4225	0.22611	8851.2	143.35	20.274	29.074	1311.8	174.03	8.1585
260	4.3406	0.23038	8996.7	143.91	20.336	29.113	1322.3	176.51	8.2597
265	4.2618	0.23465	9142.4	144.47	20.394	29.148	1332.8	178.98	8.3605
270	4.1858	0.23890	9288.2	145.01	20.448	29.181	1343.2	181.42	8.4611
275	4.1126	0.24316	9434.2	145.55	20.498	29.212	1353.6	183.84	8.5613
280	4.0420	0.24741	9580.3	146.07	20.544	29.239	1363.8	186.24	8.6613
285	3.9738	0.25165	9726.6	146.59	20.587	29.265	1374.1	188.62	8.7608
290	3.9079	0.25589	9872.9	147.10	20.627	29.287	1384.3	190.97	8.8601
295	3.8443	0.26013	10019	147.60	20.663	29.308	1394.4	193.31	8.9590
300	3.7827	0.26436	10166	148.09	20.697	29.327	1404.4	195.62	9.0576
305	3.7231	0.26859	10313	148.58	20.728	29.344	1414.4	197.92	9.1559
310	3.6654	0.27282	10459	149.06	20.757	29.359	1424.4	200.20	9.2538
315	3.6095	0.27704	10606	149.53	20.783	29.372	1434.2	202.46	9.3514
320	3.5554	0.28127	10753	149.99	20.807	29.384	1444.1	204.70	9.4487
325	3.5028	0.28548	10900	150.44	20.829	29.394	1453.8	206.93	9.5457
330	3.4518	0.28970	11047	150.89	20.849	29.403	1463.5	209.14	9.6424
335	3.4024	0.29391	11194	151.33	20.867	29.411	1473.2	211.33	9.7387
340	3.3543	0.29812	11341	151.77	20.883	29.417	1482.8	213.51	9.8347
345	3.3076	0.30233	11488	152.20	20.899	29.423	1492.4	215.68	9.9305
350	3.2622	0.30654	11635	152.62	20.912	29.427	1501.9	217.83	10.026
355	3.2181	0.31074	11783	153.04	20.925	29.431	1511.3	219.96	10.121
360	3.1751	0.31495	11930	153.45	20.936	29.434	1520.7	222.09	10.216
365	3.1333	0.31915	12077	153.86	20.946	29.436	1530.0	224.20	10.310
370	3.0927	0.32335	12224	154.26	20.955	29.438	1539.3	226.30	10.405
375	3.0530	0.32754	12371	154.65	20.964	29.439	1548.6	228.39	10.499
380	3.0144	0.33174	12518	155.04	20.971	29.439	1557.8	230.47	10.592
385	2.9768	0.33593	12666	155.43	20.978	29.439	1566.9	232.53	10.686
390	2.9401	0.34013	12813	155.81	20.984	29.439	1576.0	234.59	10.779
395	2.9043	0.34432	12960	156.18	20.989	29.438	1585.0	236.63	10.871
400	2.8694	0.34851	13107	156.55	20.994	29.437	1594.0	238.67	10.964
405	2.8353	0.35269	13254	156.92	20.998	29.435	1603.0	240.70	11.056
410	2.8021	0.35688	13402	157.28	21.002	29.434	1611.9	242.71	11.148
415	2.7696	0.36107	13549	157.64	21.005	29.432	1620.7	244.72	11.240
420	2.7379	0.36525	13696	157.99	21.008	29.430	1629.5	246.73	11.331
425	2.7069	0.36943	13843	158.34	21.011	29.428	1638.3	248.72	11.423
430	2.6766	0.37361	13990	158.68	21.014	29.426	1647.0	250.70	11.514
435	2.6469	0.37780	14137	159.02	21.016	29.424	1655.6	252.68	11.604
440	2.6180	0.38198	14284	159.36	21.018	29.422	1664.3	254.65	11.695
445	2.5896	0.38615	14432	159.69	21.020	29.420	1672.8	256.62	11.785
450	2.5619	0.39033	14579	160.02	21.022	29.417	1681.4	258.58	11.875
455	2.5348	0.39451	14726	160.35	21.024	29.415	1689.8	260.53	11.965
460	2.5082	0.39868	14873	160.67	21.025	29.413	1698.3	262.47	12.054
465	2.4823	0.40286	15020	160.98	21.027	29.411	1706.7	264.41	12.143
470	2.4568	0.40703	15167	161.30	21.028	29.409	1715.1	266.35	12.232
475	2.4319	0.41121	15314	161.61	21.030	29.407	1723.4	268.28	12.321
480	2.4074	0.41538	15461	161.92	21.031	29.406	1731.7	270.20	12.409
485	2.3835	0.41955	15608	162.22	21.033	29.404	1739.9	272.12	12.498
490	2.3600	0.42372	15755	162.52	21.034	29.403	1748.1	274.04	12.586
495	2.3370	0.42789	15902	162.82	21.036	29.402	1756.2	275.95	12.674
500	2.3145	0.43206	16049	163.12	21.037	29.401	1764.4	277.86	12.761
20.0 MPa									
50	33.146	0.030169	3107.3	91.534	13.978	25.177	1389.5	138.89	10.1560
55	31.463	0.031784	3235.9	93.985	14.055	26.229	1344.9	135.35	9.2885
60	29.807	0.033549	3369.1	96.303	14.114	27.029	1305.7	131.90	8.6142
65	28.207	0.035452	3505.8	98.490	14.179	27.592	1272.3	128.77	8.0855
70	26.684	0.037475	3644.7	100.55	14.261	27.952	1245.0	126.07	7.6699
75	25.255	0.039596	3785.0	102.49	14.370	28.151	1223.3	123.86	7.3444
80	23.927	0.041794	3926.1	104.31	14.507	28.236	1206.6	122.13	7.0913
85	22.702	0.044048	4067.3	106.02	14.672	28.248	1194.3	120.87	6.8969
90	21.578	0.046344	4208.5	107.63	14.862	28.220	1185.6	120.06	6.7504
95	20.548	0.048666	4349.5	109.16	15.073	28.175	1180.0	119.65	6.6429
100	19.606	0.051005	4490.2	110.60	15.301	28.130	1176.9	119.62	6.5675
105	18.744	0.053352	4630.8	111.97	15.542	28.094	1175.9	119.92	6.5184
110	17.953	0.055700	4771.2	113.28	15.792	28.073	1176.7	120.53	6.4911
115	17.227	0.058047	4911.5	114.53	16.046	28.067	1178.9	121.42	6.4819
120	16.559	0.060389	5051.9	115.72	16.301	28.077	1182.3	122.54	6.4876
125	15.943	0.062724	5192.3	116.87	16.555	28.102	1186.7	123.88	6.5060
130	15.373	0.065050	5332.9	117.97	16.806	28.140	1191.9	125.40	6.5349
135	14.844	0.067368	5473.7	119.03	17.051	28.188	1197.9	127.09	6.5728
140	14.352	0.069676	5614.8	120.06	17.289	28.244	1204.4	128.91	6.6183
145	13.894	0.071975	5756.2	121.05	17.520	28.306	1211.4	130.85	6.6702
150	13.466	0.074264	5897.9	122.01	17.742	28.374	1218.8	132.88	6.7276