Chromatographic Data

CHROM. 5732

The calculation of standard retention indices and their associated errors

In an earlier paper[1] we discussed the calculation and use of "standard" retention indices, obtained from boiling point data using a formula similar to that of KOVÁTS[2], for the prediction of retention indices and the characterization of stationary phases. Because the boiling points of the *n*-alkanes are known it is possible to precalculate standard retention indices over a wide range of boiling points enabling standard retention indices of compounds of known boiling point to be read from the table. Such data are contained in Table I for compounds with boiling points from that of hydrogen to that of *n*-heptadecane, in 0.1° increments. This table was prepared using an IBM 1130 computer programmed in Fortran IV.

In our original paper we based the system on the Celsius scale of temperature. Since then we have obtained slightly better agreement with observed results for alkanes on non-polar stationary phases using the Kelvin scale. A comparison of the two systems is given in Table II. Table I is based on a Kelvin temperature scale but the Celsius equivalent is given in the right hand column for convenience:

Accuracy of standard retention indices

The error ($a_{I\chi}^*$) in the standard retention index (I_χ^*) of a compound χ, may be calculated from errors (a_{BP}) in measured boiling points of χ (BP_χ), and of the C_n normal hydrocarbon (BP_n) and C_{n+1} normal hydrocarbon (BP_{n+1}) as follows:

$$a_{I_\chi}^* = \frac{100\,(a_{BP_n} + a_{BP_{n+1}} + a_{BP_\chi})}{(BP_{n+1}) - (BP_n)}$$

where

$$BP_n \leqslant BP_\chi \leqslant BP_{n+1}$$

Usually higher boiling points are less accurately known than lower ones and this leads to a considerable variation in the magnitude of errors. Thus

(a) For compounds whose boiling points lie between methane and ethane and whose boiling point is known with accuracy similar to these (±0.005°) a_I^* is ±0.016 index units.

(b) For compounds between *n*-tetradecane and *n*-pentadecane (where the accuracy is ±0.1°) a_I^* is ±1.75 index units.

Table III contains the boiling points used in the calculations in Table I, their accuracy and the values of r for each pair of hydrocarbons ($r = BP_{n+1} - BP_n$). The values for *n*-alkanes higher than *n*-heptadecane are included for comparison. It can be seen that the increase in boiling point per methylene group is too small and erratic to make the calculation of standard retention indices worthwhile in this region.

TABLE I

STANDARD RETENTION INDICES FOR COMPOUNDS OF BOILING POINTS[3] FROM 13.98 TO 576.12 °K

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
1.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-272
2.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-271
3.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-270
4.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-269
5.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-268
6.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-267
7.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-266
8.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-265
9.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-264
10.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-263
11.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-262
12.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-261
13.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	-260
14.0	0.07	0.45	0.83	1.21	1.58	1.95	2.32	2.68	3.04	3.40	-259
15.0	3.76	4.12	4.47	4.82	5.17	5.52	5.86	6.20	6.54	6.88	-258
16.0	7.22	7.55	7.88	8.21	8.54	8.86	9.18	9.51	9.83	10.14	-257
17.0	10.46	10.77	11.08	11.39	11.70	12.01	12.31	12.62	12.92	13.22	-256
18.0	13.52	13.81	14.11	14.40	14.69	14.98	15.27	15.56	15.84	16.13	-255
19.0	16.41	16.69	16.97	17.25	17.52	17.80	18.07	18.34	18.61	18.88	-254
20.0	19.15	19.42	19.68	19.95	20.21	20.47	20.73	20.99	21.25	21.51	-253
21.0	21.76	22.02	22.27	22.52	22.77	23.02	23.27	23.52	23.76	24.01	-252
22.0	24.25	24.49	24.74	24.98	25.22	25.45	25.69	25.93	26.16	26.40	-251
23.0	26.63	26.86	27.09	27.32	27.55	27.78	28.01	28.23	28.46	28.68	-250
24.0	28.91	29.13	29.35	29.57	29.79	30.01	30.23	30.44	30.66	30.88	-249
25.0	31.09	31.30	31.52	31.73	31.94	32.15	32.36	32.57	32.78	32.98	-248
26.0	33.19	33.39	33.60	33.80	34.00	34.21	34.41	34.61	34.81	35.01	-247
27.0	35.21	35.40	35.60	35.80	35.99	36.19	36.38	36.58	36.77	36.96	-246
28.0	37.15	37.34	37.53	37.72	37.91	38.10	38.29	38.47	38.66	38.85	-245
29.0	39.03	39.21	39.40	39.58	39.76	39.94	40.13	40.31	40.49	40.66	-244
30.0	40.84	41.02	41.20	41.38	41.55	41.73	41.90	42.08	42.25	42.42	-243
31.0	42.60	42.77	42.94	43.11	43.28	43.45	43.62	43.79	43.96	44.13	-242
32.0	44.30	44.46	44.63	44.80	44.96	45.13	45.29	45.45	45.62	45.78	-241
33.0	45.94	46.10	46.27	46.43	46.59	46.75	46.91	47.07	47.22	47.38	-240
34.0	47.54	47.70	47.85	48.01	48.17	48.32	48.48	48.63	48.78	48.94	-239
35.0	49.09	49.24	49.40	49.55	49.70	49.85	50.00	50.15	50.30	50.45	-238
36.0	50.60	50.75	50.89	51.04	51.19	51.34	51.48	51.63	51.77	51.92	-237
37.0	52.06	52.21	52.35	52.50	52.64	52.78	52.92	53.07	53.21	53.35	-236
38.0	53.49	53.63	53.77	53.91	54.05	54.19	54.33	54.47	54.60	54.74	-235
39.0	54.88	55.02	55.15	55.29	55.43	55.56	55.70	55.83	55.97	56.10	-234
40.0	56.23	56.37	56.50	56.63	56.77	56.90	57.03	57.16	57.29	57.42	-233
41.0	57.55	57.68	57.81	57.94	58.07	58.20	58.33	58.46	58.59	58.72	-232
42.0	58.84	58.97	59.10	59.22	59.35	59.48	59.60	59.73	59.85	59.98	-231
43.0	60.10	60.23	60.35	60.47	60.60	60.72	60.84	60.97	61.09	61.21	-230
44.0	61.33	61.45	61.58	61.70	61.82	61.94	62.06	62.18	62.30	62.42	-229
45.0	62.53	62.65	62.77	62.89	63.01	63.13	63.24	63.36	63.48	63.59	-228
46.0	63.71	63.83	63.94	64.06	64.17	64.29	64.40	64.52	64.63	64.75	-227
47.0	64.86	64.97	65.09	65.20	65.31	65.43	65.54	65.65	65.76	65.88	-226
48.0	65.99	66.10	66.21	66.32	66.43	66.54	66.65	66.76	66.87	66.98	-225
49.0	67.09	67.20	67.31	67.42	67.53	67.63	67.74	67.85	67.96	68.06	-224
50.0	68.17	68.28	68.38	68.49	68.60	68.70	68.81	68.91	69.02	69.13	-223

b.p. (°K)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	b.p. (°C)
51.0	69.23	69.34	69.44	69.54	69.65	69.75	69.86	69.96	70.06	70.17	-222
52.0	70.27	70.37	70.47	70.58	70.68	70.78	70.88	70.98	71.09	71.19	-221
53.0	71.29	71.39	71.49	71.59	71.69	71.79	71.89	71.99	72.09	72.19	-220
54.0	72.29	72.39	72.49	72.58	72.68	72.78	72.88	72.98	73.08	73.17	-219
55.0	73.27	73.37	73.46	73.56	73.66	73.75	73.85	73.95	74.04	74.14	-218
56.0	74.23	74.33	74.42	74.52	74.61	74.71	74.80	74.90	74.99	75.09	-217
57.0	75.18	75.27	75.37	75.46	75.55	75.65	75.74	75.83	75.93	76.02	-216
58.0	76.11	76.20	76.30	76.39	76.48	76.57	76.66	76.75	76.84	76.93	-215
59.0	77.03	77.12	77.21	77.30	77.39	77.48	77.57	77.66	77.75	77.84	-214
60.0	77.92	78.01	78.10	78.19	78.28	78.37	78.46	78.55	78.63	78.72	-213
61.0	78.81	78.90	78.98	79.07	79.16	79.25	79.33	79.42	79.51	79.59	-212
62.0	79.68	79.77	79.85	79.94	80.02	80.11	80.19	80.28	80.36	80.45	-211
63.0	80.53	80.62	80.70	80.79	80.87	80.96	81.04	81.13	81.21	81.29	-210
64.0	81.38	81.46	81.54	81.63	81.71	81.79	81.88	81.96	82.04	82.12	-209
65.0	82.21	82.29	82.37	82.45	82.54	82.62	82.70	82.78	82.86	82.94	-208
66.0	83.02	83.10	83.19	83.27	83.35	83.43	83.51	83.59	83.67	83.75	-207
67.0	83.83	83.91	83.99	84.07	84.15	84.23	84.31	84.38	84.46	84.54	-206
68.0	84.62	84.70	84.78	84.86	84.93	85.01	85.09	85.17	85.25	85.32	-205
69.0	85.40	85.48	85.56	85.63	85.71	85.79	85.86	85.94	86.02	86.09	-204
70.0	86.17	86.25	86.32	86.40	86.48	86.55	86.63	86.70	86.78	96.85	-203
71.0	86.93	87.01	87.08	87.16	87.23	87.31	87.38	87.46	87.53	87.60	-202
72.0	87.68	87.75	87.83	87.90	87.97	88.05	88.12	88.20	88.27	88.34	-201
73.0	88.42	88.49	88.56	88.64	88.71	88.78	88.85	88.93	89.00	89.07	-200
74.0	89.14	89.22	89.29	89.36	89.43	89.50	89.58	89.65	89.72	89.79	-199
75.0	89.86	89.93	90.00	90.08	90.15	90.22	90.29	90.36	90.43	90.50	-198
76.0	90.57	90.64	90.71	90.78	90.85	90.92	90.99	91.06	91.13	91.20	-197
77.0	91.27	91.34	91.41	91.48	91.55	91.62	91.69	91.75	91.82	91.89	-196
78.0	91.96	92.03	92.10	92.17	92.23	92.30	92.37	92.44	92.51	92.57	-195
79.0	92.64	92.71	92.78	92.84	92.91	92.98	93.05	93.11	93.18	93.25	-194
80.0	93.31	93.38	93.45	93.52	93.58	93.65	93.71	93.78	93.85	93.91	-193
81.0	93.98	94.05	94.11	94.18	94.24	94.31	94.37	94.44	94.51	94.57	-192
82.0	94.64	94.70	94.77	94.83	94.90	94.96	95.03	95.09	95.16	95.22	-191
83.0	95.28	95.35	95.41	95.48	95.54	95.61	95.67	95.73	95.80	95.86	-190
84.0	95.93	95.99	96.05	96.12	96.18	96.24	96.31	96.37	96.43	96.50	-189
85.0	96.56	96.62	96.68	96.75	96.81	96.87	96.93	97.00	97.06	97.12	-188
86.0	97.18	97.25	97.31	97.37	97.43	97.49	97.56	97.62	97.68	97.74	-187
87.0	97.80	97.86	97.93	97.99	98.05	98.11	98.17	98.23	98.29	98.35	-186
88.0	98.41	98.47	98.54	98.60	98.66	98.72	98.78	98.84	98.90	98.96	-185
89.0	99.02	99.08	99.14	99.20	99.26	99.32	99.38	99.44	99.50	99.56	-184
90.0	99.62	99.68	99.73	99.79	99.85	99.91	99.97	100.09	100.24	100.40	-183
91.0	100.55	100.71	100.86	101.02	101.17	101.32	101.48	101.63	101.78	101.94	-182
92.0	102.09	102.24	102.40	102.55	102.70	102.85	103.01	103.16	103.31	103.46	-181
93.0	103.61	103.76	103.91	104.06	104.22	104.37	104.52	104.67	104.82	104.97	-180
94.0	105.12	105.27	105.42	105.57	105.71	105.86	106.01	106.16	106.31	106.46	-179
95.0	106.61	106.75	106.90	107.05	107.20	107.34	107.49	107.64	107.79	107.93	-178
96.0	108.08	108.23	108.37	108.52	108.66	108.81	108.96	109.10	109.25	109.39	-177
97.0	109.54	109.68	109.83	109.97	110.12	110.26	110.40	110.55	110.69	110.84	-176
98.0	110.98	111.12	111.27	111.41	111.55	111.70	111.84	111.98	112.12	112.27	-175
99.0	112.41	112.55	112.69	112.83	112.98	113.12	113.26	113.40	113.54	113.68	-174
100.0	113.82	113.96	114.10	114.24	114.38	114.52	114.66	114.80	114.94	115.08	-173

(Continued on D20)

TABLE I *(continued)*

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
101.0	115.22	115.36	115.50	115.64	115.78	115.92	116.06	116.19	116.33	116.47	-172
102.0	116.61	116.75	116.88	117.02	117.16	117.30	117.43	117.57	117.71	117.85	-171
103.0	117.98	118.12	118.25	118.39	118.53	118.66	118.80	118.93	119.07	119.21	-170
104.0	119.34	119.48	119.61	119.75	119.88	120.02	120.15	120.29	120.42	120.55	-169
105.0	120.69	120.82	120.96	121.09	121.22	121.36	121.49	121.62	121.76	121.89	-168
106.0	122.02	122.15	122.29	122.42	122.55	122.68	122.82	122.95	123.08	123.21	-167
107.0	123.34	123.47	123.61	123.74	123.87	124.00	124.13	124.26	124.39	124.52	-166
108.0	124.65	124.78	124.91	125.04	125.17	125.30	125.43	125.56	125.69	125.82	-165
109.0	125.95	126.08	126.21	126.34	126.46	126.59	126.72	126.85	126.98	127.11	-164
110.0	127.23	127.36	127.49	127.62	127.74	127.87	128.00	128.13	128.25	128.38	-163
111.0	128.51	128.63	128.76	128.89	129.01	129.14	129.27	129.39	129.52	129.64	-162
112.0	129.77	129.89	130.02	130.15	130.27	130.40	130.52	130.65	130.77	130.90	-161
113.0	131.02	131.14	131.27	131.39	131.52	131.64	131.76	131.89	132.01	132.14	-160
114.0	132.26	132.38	132.51	132.63	132.75	132.88	133.00	133.12	133.24	133.37	-159
115.0	133.49	133.61	133.73	133.85	133.98	134.10	134.22	134.34	134.46	134.59	-158
116.0	134.71	134.83	134.95	135.07	135.19	135.31	135.43	135.55	135.67	135.79	-157
117.0	135.91	136.03	136.15	136.27	136.39	136.51	136.63	136.75	136.87	136.99	-156
118.0	137.11	137.23	137.35	137.47	137.59	137.71	137.83	137.94	138.06	138.18	-155
119.0	138.30	138.42	138.54	138.65	138.77	138.89	139.01	139.12	139.24	139.36	-154
120.0	139.48	139.59	139.71	139.83	139.94	140.06	140.18	140.30	140.41	140.53	-153
121.0	140.64	140.76	140.88	140.99	141.11	141.22	141.34	141.46	141.57	141.69	-152
122.0	141.80	141.92	142.03	142.15	142.26	142.38	142.49	142.61	142.72	142.84	-151
123.0	142.95	143.07	143.18	143.29	143.41	143.52	143.64	143.75	143.86	143.98	-150
124.0	144.09	144.20	144.32	144.43	144.54	144.66	144.77	144.88	145.00	145.11	-149
125.0	145.22	145.33	145.45	145.56	145.67	145.78	145.89	146.01	146.12	146.23	-148
126.0	146.34	146.45	146.56	146.68	146.79	146.90	147.01	147.12	147.23	147.34	-147
127.0	147.45	147.56	147.68	147.79	147.90	148.01	148.12	148.23	148.34	148.45	-146
128.0	148.56	148.67	148.78	148.89	149.00	149.11	149.22	149.33	149.43	149.54	-145
129.0	149.65	149.76	149.87	149.98	150.09	150.20	150.31	150.41	150.52	150.63	-144
130.0	150.74	150.85	150.96	151.06	151.17	151.28	151.39	151.49	151.60	151.71	-143
131.0	151.82	151.92	152.03	152.14	152.25	152.35	152.46	152.57	152.67	152.78	-142
132.0	152.89	152.99	153.10	153.21	153.31	153.42	153.53	153.63	153.74	153.84	-141
133.0	153.95	154.06	154.16	154.27	154.37	154.48	154.58	154.69	154.79	154.90	-140
134.0	155.00	155.11	155.21	155.32	155.42	155.53	155.63	155.74	155.84	155.95	-139
135.0	156.05	156.15	156.26	156.36	156.47	156.57	156.67	156.78	156.88	156.98	-138
136.0	157.09	157.19	157.29	157.40	157.50	157.60	157.71	157.81	157.91	158.02	-137
137.0	158.12	158.22	158.32	158.43	158.53	158.63	158.73	158.84	158.94	159.04	-136
138.0	159.14	159.24	159.35	159.45	159.55	159.65	159.75	159.85	159.96	160.06	-135
139.0	160.16	160.26	160.36	160.46	160.56	160.66	160.76	160.86	160.97	161.07	-134
140.0	161.17	161.27	161.37	161.47	161.57	161.67	161.77	161.87	161.97	162.07	-133
141.0	162.17	162.27	162.37	162.47	162.57	162.67	162.77	162.86	162.96	163.06	-132
142.0	163.16	163.26	163.36	163.46	163.56	163.66	163.76	163.85	163.95	164.05	-131
143.0	164.15	164.25	164.35	164.44	164.54	164.64	164.74	164.84	164.93	165.03	-130
144.0	165.13	165.23	165.33	165.42	165.52	165.62	165.72	165.81	165.91	166.01	-129
145.0	166.10	166.20	166.30	166.39	166.49	166.59	166.69	166.78	166.88	166.97	-128
146.0	167.07	167.17	167.26	167.36	167.46	167.55	167.65	167.74	167.84	167.94	-127
147.0	168.03	168.13	168.22	168.32	168.41	168.51	168.60	168.70	168.80	168.89	-126
148.0	168.99	169.08	169.18	169.27	169.37	169.46	169.55	169.65	169.74	169.84	-125
149.0	169.93	170.03	170.12	170.22	170.31	170.40	170.50	170.59	170.69	170.78	-124
150.0	170.87	170.97	171.06	171.16	171.25	171.34	171.44	171.53	171.62	171.72	-123

b.p. (°K)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	b.p. (°C)
151.0	171.81	171.90	172.00	172.09	172.18	172.27	172.37	172.46	172.55	172.65	-122
152.0	172.74	172.83	172.92	173.02	173.11	173.20	173.29	173.38	173.48	173.57	-121
153.0	173.66	173.75	173.84	173.94	174.03	174.12	174.21	174.30	174.39	174.49	-120
154.0	174.58	174.67	174.76	174.85	174.94	175.03	175.12	175.22	175.31	175.40	-119
155.0	175.49	175.58	175.67	175.76	175.85	175.94	176.03	176.12	176.21	176.30	-118
156.0	176.39	176.48	176.57	176.66	176.75	176.84	176.93	177.02	177.11	177.20	-117
157.0	177.29	177.38	177.47	177.56	177.65	177.74	177.83	177.92	178.01	178.10	-116
158.0	178.19	178.27	178.36	178.45	178.54	178.63	178.72	178.81	178.90	178.98	-115
159.0	179.07	179.16	179.25	179.34	179.43	179.51	179.60	179.69	179.78	179.87	-114
160.0	179.96	180.04	180.13	180.22	180.31	180.39	180.48	180.57	180.66	180.74	-113
161.0	180.83	180.92	181.01	181.09	181.18	181.27	181.36	181.44	181.53	181.62	-112
162.0	181.70	181.79	181.88	181.96	182.05	182.14	182.22	182.31	182.40	182.48	-111
163.0	182.57	182.66	182.74	182.83	182.91	183.00	183.09	183.17	183.26	183.34	-110
164.0	183.43	183.52	183.60	183.69	183.77	183.86	183.94	184.03	184.11	184.20	-109
165.0	184.29	184.37	184.46	184.54	184.63	184.71	184.80	184.88	184.97	185.05	-108
166.0	185.14	185.22	185.30	185.39	185.47	185.56	185.64	185.73	185.81	185.90	-107
167.0	185.98	186.06	186.15	186.23	186.32	186.40	186.49	186.57	186.65	186.74	-106
168.0	186.82	186.90	186.99	187.07	187.16	187.24	187.32	187.41	187.49	187.57	-105
169.0	187.66	187.74	187.82	187.91	187.99	188.07	188.15	188.24	188.32	188.40	-104
170.0	188.49	188.57	188.65	188.73	188.82	188.90	188.98	189.06	189.15	189.23	-103
171.0	189.31	189.39	189.48	189.56	189.64	189.72	189.80	189.89	189.97	190.05	-102
172.0	190.13	190.21	190.29	190.38	190.46	190.54	190.62	190.70	190.78	190.87	-101
173.0	190.95	191.03	191.11	191.19	191.27	191.35	191.43	191.52	191.60	191.68	-100
174.0	191.76	191.84	191.92	192.00	192.08	192.16	192.24	192.32	192.40	192.48	-99
175.0	192.56	192.64	192.73	192.81	192.89	192.97	193.05	193.13	193.21	193.29	-98
176.0	193.37	193.45	193.53	193.61	193.69	193.77	193.85	193.92	194.00	194.08	-97
177.0	194.16	194.24	194.32	194.40	194.48	194.56	194.64	194.72	194.80	194.88	-96
178.0	194.96	195.04	195.11	195.19	195.27	195.35	195.43	195.51	195.59	195.67	-95
179.0	195.74	195.82	195.90	195.98	196.06	196.14	196.22	196.29	196.37	196.45	-94
180.0	196.53	196.61	196.68	196.76	196.84	196.92	197.00	197.07	197.15	197.23	-93
181.0	197.31	197.39	197.46	197.54	197.62	197.70	197.77	197.85	197.93	198.01	-92
182.0	198.08	198.16	198.24	198.31	198.39	198.47	198.55	198.62	198.70	198.78	-91
183.0	198.85	198.93	199.01	199.08	199.16	199.24	199.31	199.39	199.47	199.54	-90
184.0	199.62	199.70	199.77	199.85	199.93	200.02	200.27	200.53	200.78	201.03	-89
185.0	201.28	201.53	201.79	202.04	202.29	202.54	202.79	203.04	203.29	203.54	-88
186.0	203.80	204.05	204.30	204.55	204.80	205.05	205.30	205.55	205.80	206.05	-87
187.0	206.30	206.55	206.79	207.04	207.29	207.54	207.79	208.04	208.29	208.53	-86
188.0	208.78	209.03	209.28	209.53	209.77	210.02	210.27	210.52	210.76	211.01	-85
189.0	211.26	211.50	211.75	212.00	212.24	212.49	212.73	212.98	213.23	213.47	-84
190.0	213.72	213.96	214.21	214.45	214.70	214.94	215.19	215.43	215.68	215.92	-83
191.0	216.16	216.41	216.65	216.90	217.14	217.38	217.63	217.87	218.11	218.36	-82
192.0	218.60	218.84	219.08	219.33	219.57	219.81	220.05	220.30	220.54	220.78	-81
193.0	221.02	221.26	221.50	221.75	221.99	222.23	222.47	222.71	222.95	223.19	-80
194.0	223.43	223.67	223.91	224.15	224.39	224.63	224.87	225.11	225.35	225.59	-79
195.0	225.83	226.07	226.31	226.55	226.78	227.02	227.26	227.50	227.74	227.98	-78
196.0	228.21	228.45	228.69	228.93	229.16	229.40	229.64	229.88	230.11	230.35	-77
197.0	230.59	230.82	231.06	231.30	231.53	231.77	232.00	232.24	232.48	232.71	-76
198.0	232.95	233.18	233.42	233.65	233.89	234.12	234.36	234.59	234.83	235.06	-75
199.0	235.30	235.53	235.76	236.00	236.23	236.47	236.70	236.93	237.17	237.40	-74
200.0	237.63	237.87	238.10	238.33	238.57	238.80	239.03	239.26	239.49	239.73	-73

(Continued on D22)

TABLE I *(continued)*

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
201.0	239.96	240.19	240.42	240.65	240.89	241.12	241.35	241.58	241.81	242.04	-72
202.0	242.27	242.50	242.73	242.97	243.20	243.43	243.66	243.89	244.12	244.35	-71
203.0	244.58	244.81	245.03	245.26	245.49	245.72	245.95	246.18	246.41	246.64	-70
204.0	246.87	247.10	247.32	247.55	247.78	248.01	248.24	248.46	248.69	248.92	-69
205.0	249.15	249.37	249.60	249.83	250.06	250.28	250.51	250.74	250.96	251.19	-68
206.0	251.42	251.64	251.87	252.09	252.32	252.55	252.77	253.00	253.22	253.45	-67
207.0	253.67	253.90	254.12	254.35	254.57	254.80	255.02	255.25	255.47	255.70	-66
208.0	255.92	256.15	256.37	256.59	256.82	257.04	257.26	257.49	257.71	257.93	-65
209.0	258.16	258.38	258.60	258.83	259.05	259.27	259.49	259.72	259.94	260.16	-64
210.0	260.38	260.60	260.83	261.05	261.27	261.49	261.71	261.93	262.16	262.38	-63
211.0	262.60	262.82	263.04	263.26	263.48	263.70	263.92	264.14	264.36	264.58	-62
212.0	264.80	265.02	265.24	265.46	265.68	265.90	266.12	266.34	266.56	266.78	-61
213.0	267.00	267.22	267.43	267.65	267.87	268.09	268.31	268.53	268.75	268.96	-60
214.0	269.18	269.40	269.62	269.83	270.05	270.27	270.49	270.70	270.92	271.14	-59
215.0	271.35	271.57	271.79	272.01	272.22	272.44	272.65	272.87	273.09	273.30	-58
216.0	273.52	273.73	273.95	274.17	274.38	274.60	274.81	275.03	275.24	275.46	-57
217.0	275.67	275.89	276.10	276.32	276.53	276.75	276.96	277.17	277.39	277.60	-56
218.0	277.82	278.03	278.24	278.46	278.67	278.88	279.10	279.31	279.52	279.74	-55
219.0	279.95	280.16	280.38	280.59	280.80	281.01	281.23	281.44	281.65	281.86	-54
220.0	282.07	282.29	282.50	282.71	282.92	283.13	283.34	283.56	283.77	283.98	-53
221.0	284.19	284.40	284.61	284.82	285.03	285.24	285.45	285.66	285.87	286.08	-52
222.0	286.29	286.50	286.71	286.92	287.13	287.34	287.55	287.76	287.97	288.18	-51
223.0	288.39	288.60	288.81	289.02	289.23	289.43	289.64	289.85	290.06	290.27	-50
224.0	290.48	290.68	290.89	291.10	291.31	291.52	291.72	291.93	292.14	292.35	-49
225.0	292.55	292.76	292.97	293.17	293.38	293.59	293.79	294.00	294.21	294.41	-48
226.0	294.62	294.83	295.03	295.24	295.45	295.65	295.86	296.06	296.27	296.47	-47
227.0	296.68	296.88	297.09	297.29	297.50	297.70	297.91	298.11	298.32	298.52	-46
228.0	298.73	298.93	299.14	299.34	299.55	299.75	299.95	300.19	300.44	300.69	-45
229.0	300.94	301.19	301.43	301.68	301.93	302.18	302.43	302.67	302.92	303.17	-44
230.0	303.41	303.66	303.91	304.15	304.40	304.65	304.89	305.14	305.39	305.63	-43
231.0	305.88	306.12	306.37	306.62	306.86	307.11	307.35	307.60	307.84	308.09	-42
232.0	308.33	308.58	308.82	309.07	309.31	309.56	309.80	310.04	310.29	310.53	-41
233.0	310.78	311.02	311.26	311.51	311.75	311.99	312.24	312.48	312.72	312.97	-40
234.0	313.21	313.45	313.69	313.94	314.18	314.42	314.66	314.91	315.15	315.39	-39
235.0	315.63	315.87	316.12	316.36	316.60	316.84	317.08	317.32	317.56	317.80	-38
236.0	318.04	318.29	318.53	318.77	319.01	319.25	319.49	319.73	319.97	320.21	-37
237.0	320.45	320.69	320.93	321.17	321.40	321.64	321.88	322.12	322.36	322.60	-36
238.0	322.84	323.08	323.32	323.55	323.79	324.03	324.27	324.51	324.75	324.98	-35
239.0	325.22	325.46	325.70	325.93	326.17	326.41	326.65	326.88	327.12	327.36	-34
240.0	327.59	327.83	328.07	328.30	328.54	328.78	329.01	329.25	329.48	329.72	-33
241.0	329.96	330.19	330.43	330.66	330.90	331.13	331.37	331.60	331.84	332.07	-32
242.0	332.31	332.54	332.78	333.01	333.25	333.48	333.71	333.95	334.18	334.42	-31
243.0	334.65	334.88	335.12	335.35	335.59	335.82	336.05	336.28	336.52	336.75	-30
244.0	336.98	337.22	337.45	337.68	337.91	338.15	338.38	338.61	338.84	339.08	-29
245.0	339.31	339.54	339.77	340.00	340.23	340.47	340.70	340.93	341.16	341.39	-28
246.0	341.62	341.85	342.08	342.31	342.54	342.78	343.01	343.24	343.47	343.70	-27
247.0	343.93	344.16	344.39	344.62	344.85	345.08	345.30	345.53	345.76	345.99	-26
248.0	346.22	346.45	346.68	346.91	347.14	347.37	347.59	347.82	348.05	348.28	-25
249.0	348.51	348.74	348.96	349.19	349.42	349.65	349.88	350.10	350.33	350.56	-24
250.0	350.79	351.01	351.24	351.47	351.69	351.92	352.15	352.37	352.60	352.83	-23

b.p. (°K)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	b.p. (°C)
251.0	353.05	353.28	353.51	353.73	353.96	354.18	354.41	354.64	354.86	355.09	-22
252.0	355.31	355.54	355.76	355.99	356.21	356.44	356.66	356.89	357.11	357.34	-21
253.0	357.56	357.79	358.01	358.24	358.46	358.68	358.91	359.13	359.36	359.58	-20
254.0	359.80	360.03	360.25	360.47	360.70	360.92	361.14	361.37	361.59	361.81	-19
255.0	362.04	362.26	362.48	362.70	362.93	363.15	363.37	363.59	363.82	364.04	-18
256.0	364.26	364.48	364.70	364.92	365.15	365.37	365.59	365.81	366.03	366.25	-17
257.0	366.47	366.69	366.92	367.14	367.36	367.58	367.80	368.02	368.24	368.46	-16
258.0	368.68	368.90	369.12	369.34	369.56	369.78	370.00	370.22	370.44	370.66	-15
259.0	370.88	371.10	371.32	371.54	371.75	371.97	372.19	372.41	372.63	372.85	-14
260.0	373.07	373.29	373.50	373.72	373.94	374.16	374.38	374.60	374.81	375.03	-13
261.0	375.25	375.47	375.68	375.90	376.12	376.34	376.55	376.77	376.99	377.20	-12
262.0	377.42	377.64	377.85	378.07	378.29	378.50	378.72	378.94	379.15	379.37	-11
263.0	379.59	379.80	380.02	380.23	380.45	380.66	380.88	381.10	381.31	381.53	-10
264.0	381.74	381.96	382.17	382.39	382.60	382.82	383.03	383.25	383.46	383.67	-9
265.0	383.89	384.10	384.32	384.53	384.75	384.96	385.17	385.39	385.60	385.82	-8
266.0	386.03	386.24	386.46	386.67	386.88	387.10	387.31	387.52	387.74	387.95	-7
267.0	388.16	388.37	388.59	388.80	389.01	389.22	389.44	389.65	389.86	390.07	-6
268.0	390.28	390.50	390.71	390.92	391.13	391.34	391.56	391.77	391.98	392.19	-5
269.0	392.40	392.61	392.82	393.03	393.25	393.46	393.67	393.88	394.09	394.30	-4
270.0	394.51	394.72	394.93	395.14	395.35	395.56	395.77	395.98	396.19	396.40	-3
271.0	396.61	396.82	397.03	397.24	397.45	397.66	397.87	398.07	398.28	398.49	-2
272.0	398.70	398.91	399.12	399.33	399.54	399.75	399.95	400.23	400.52	400.81	-1
273.0	401.10	401.40	401.69	401.98	402.27	402.56	402.85	403.14	403.43	403.72	0
274.0	404.01	404.30	404.59	404.88	405.17	405.47	405.75	406.04	406.33	406.62	0
275.0	406.91	407.20	407.49	407.78	408.07	408.36	408.65	408.94	409.23	409.51	1
276.0	409.80	410.09	410.38	410.67	410.95	411.24	411.53	411.82	412.11	412.39	2
277.0	412.68	412.97	413.25	413.54	413.83	414.12	414.40	414.69	414.98	415.26	3
278.0	415.55	415.83	416.12	416.41	416.69	416.98	417.26	417.55	417.83	418.12	4
279.0	418.41	418.69	418.98	419.26	419.55	419.83	420.12	420.40	420.68	420.97	5
280.0	421.25	421.54	421.82	422.10	422.39	422.67	422.96	423.24	423.52	423.81	6
281.0	424.09	424.37	424.66	424.94	425.22	425.51	425.79	426.07	426.35	426.64	7
282.0	426.92	427.20	427.48	427.76	428.05	428.33	428.61	428.89	429.17	429.45	8
283.0	429.74	430.02	430.30	430.58	430.86	431.14	431.42	431.70	431.98	432.26	9
284.0	432.54	432.82	433.10	433.38	433.66	433.94	434.22	434.50	434.78	435.06	10
285.0	435.34	435.62	435.90	436.18	436.46	436.73	437.01	437.29	437.57	437.85	11
286.0	438.13	438.40	438.68	438.96	439.24	439.52	439.79	440.07	440.35	440.63	12
287.0	440.91	441.18	441.46	441.74	442.01	442.29	442.57	442.84	443.12	443.40	13
288.0	443.67	443.95	444.23	444.50	444.78	445.05	445.33	445.60	445.88	446.16	14
289.0	446.43	446.71	446.98	447.26	447.53	447.81	448.08	448.36	448.63	448.91	15
290.0	449.18	449.46	449.73	450.00	450.28	450.55	450.83	451.10	451.37	451.65	16
291.0	451.92	452.19	452.47	452.74	453.01	453.29	453.56	453.83	454.11	454.38	17
292.0	454.65	454.92	455.20	455.47	455.74	456.01	456.28	456.56	456.83	457.10	18
293.0	457.37	457.64	457.91	458.19	458.46	458.73	459.00	459.27	459.54	459.81	19
294.0	460.08	460.35	460.62	460.89	461.16	461.44	461.71	461.98	462.25	462.52	20
295.0	462.79	463.06	463.32	463.59	463.86	464.13	464.40	464.67	464.94	465.21	21
296.0	465.48	465.75	466.02	466.28	466.55	466.82	467.09	467.36	467.63	467.89	22
297.0	468.16	468.43	468.70	468.97	469.23	469.50	469.77	470.04	470.30	470.57	23
298.0	470.84	471.11	471.37	471.64	471.91	472.17	472.44	472.70	472.97	473.24	24
299.0	473.50	473.77	474.04	474.30	474.57	474.83	475.10	475.37	475.63	475.90	25
300.0	476.16	476.43	476.69	476.96	477.22	477.49	477.75	478.02	478.28	478.55	26

(Continued on D24)

TABLE I *(continued)*

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
301.0	478.81	479.07	479.34	479.60	479.87	480.13	480.39	480.66	480.92	481.19	27
302.0	481.45	481.71	481.98	482.24	482.50	482.77	483.03	483.29	483.55	483.82	28
303.0	484.08	484.34	484.61	484.87	485.13	485.39	485.65	485.92	486.18	486.44	29
304.0	486.70	486.96	487.23	487.49	487.75	488.01	488.27	488.53	488.79	489.06	30
305.0	489.32	489.58	489.84	490.10	490.36	490.62	490.88	491.14	491.40	491.66	31
306.0	491.92	492.18	492.44	492.70	492.96	493.22	493.48	493.74	494.00	494.26	32
307.0	494.52	494.78	495.04	495.30	495.55	495.81	496.07	496.33	496.59	496.85	33
308.0	497.11	497.36	497.62	497.88	498.14	498.40	498.65	498.91	499.17	499.43	34
309.0	499.69	499.94	500.26	500.59	500.91	501.24	501.57	501.90	502.23	502.55	35
310.0	502.88	503.21	503.54	503.86	504.19	504.52	504.84	505.17	505.50	505.82	36
311.0	506.15	506.48	506.80	507.13	507.45	507.78	508.11	508.43	508.76	509.08	37
312.0	509.41	509.73	510.06	510.39	510.71	511.03	511.36	511.68	512.01	512.33	38
313.0	512.66	512.98	513.31	513.63	513.95	514.28	514.60	514.93	515.25	515.57	39
314.0	515.90	516.22	516.54	516.87	517.19	517.51	517.83	518.16	518.48	518.80	40
315.0	519.12	519.45	519.77	520.09	520.41	520.73	521.06	521.38	521.70	522.02	41
316.0	522.34	522.66	522.98	523.31	523.63	523.95	524.27	524.59	524.91	525.23	42
317.0	525.55	525.87	526.19	526.51	526.83	527.15	527.47	527.79	528.11	528.43	43
318.0	528.75	529.07	529.38	529.70	530.02	530.34	530.66	530.98	531.30	531.62	44
319.0	531.93	532.25	532.57	532.89	533.21	533.52	533.84	534.16	534.48	534.79	45
320.0	535.11	535.43	535.75	536.06	536.38	536.70	537.01	537.33	537.65	537.96	46
321.0	538.28	538.60	538.91	539.23	539.54	539.86	540.17	540.49	540.81	541.12	47
322.0	541.44	541.75	542.07	542.38	542.70	543.01	543.33	543.64	543.96	544.27	48
323.0	544.58	544.90	545.21	545.53	545.84	546.15	546.47	546.78	547.10	547.41	49
324.0	547.72	548.04	548.35	548.66	548.98	549.29	549.60	549.91	550.23	550.54	50
325.0	550.85	551.16	551.48	551.79	552.10	552.41	552.72	553.04	553.35	553.66	51
326.0	553.97	554.28	554.59	554.90	555.21	555.53	555.84	556.15	556.46	556.77	52
327.0	557.08	557.39	557.70	558.01	558.32	558.63	558.94	559.25	559.56	559.87	53
328.0	560.18	560.49	560.80	561.11	561.42	561.73	562.03	562.34	562.65	562.96	54
329.0	563.27	563.58	563.89	564.19	564.50	564.81	565.12	565.43	565.73	566.04	55
330.0	566.35	566.66	566.97	567.27	567.58	567.89	568.19	568.50	568.81	569.12	56
331.0	569.42	569.73	570.04	570.34	570.65	570.95	571.26	571.57	571.87	572.18	57
332.0	572.48	572.79	573.10	573.40	573.71	574.01	574.32	574.62	574.93	575.23	58
333.0	575.54	575.84	576.15	576.45	576.76	577.06	577.37	577.67	577.97	578.28	59
334.0	578.58	578.89	579.19	579.49	579.80	580.10	580.40	580.71	581.01	581.31	60
335.0	581.62	581.92	582.22	582.53	582.83	583.13	583.43	583.74	584.04	584.34	61
336.0	584.64	584.95	585.25	585.55	585.85	586.15	586.45	586.76	587.06	587.36	62
337.0	587.66	587.96	588.26	588.56	588.86	589.16	589.47	589.77	590.07	590.37	63
338.0	590.67	590.97	591.27	591.57	591.87	592.17	592.47	592.77	593.07	593.37	64
339.0	593.67	593.97	594.27	594.56	594.86	595.16	595.46	595.76	596.06	596.36	65
340.0	596.66	596.96	597.25	597.55	597.85	598.15	598.45	598.75	599.04	599.34	66
341.0	599.64	599.94	600.27	600.61	600.96	601.30	601.64	601.98	602.33	602.67	67
342.0	603.01	603.35	603.70	604.04	604.38	604.72	605.06	605.41	605.75	606.09	68
343.0	606.43	606.77	607.11	607.45	607.79	608.13	608.48	608.82	609.16	609.50	69
344.0	609.84	610.18	610.52	610.86	611.20	611.54	611.88	612.22	612.56	612.90	70
345.0	613.24	613.58	613.91	614.25	614.59	614.93	615.27	615.61	615.95	616.29	71
346.0	616.62	616.96	617.30	617.64	617.98	618.31	618.65	618.99	619.33	619.67	72
347.0	620.00	620.34	620.68	621.01	621.35	621.69	622.03	622.36	622.70	623.03	73
348.0	623.37	623.71	624.04	624.38	624.72	625.05	625.39	625.72	626.06	626.40	74
349.0	626.73	627.07	627.40	627.74	628.07	628.41	628.74	629.08	629.41	629.75	75
350.0	630.08	630.41	630.75	631.08	631.42	631.75	632.09	632.42	632.75	633.09	76

b.p. (°K)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	b.p. (°C)
351.0	633.42	633.75	634.09	634.42	634.75	635.09	635.42	635.75	636.08	636.42	77
352.0	636.75	637.08	637.42	637.75	638.08	638.41	638.74	639.08	639.41	639.74	78
353.0	640.07	640.40	640.73	641.07	641.40	641.73	642.06	642.39	642.72	643.05	79
354.0	643.38	643.71	644.04	644.38	644.70	645.03	645.37	645.70	646.03	646.36	80
355.0	646.68	647.02	647.34	647.67	648.00	648.33	648.66	648.99	649.32	649.65	81
356.0	649.98	650.31	650.64	650.96	651.29	651.62	651.95	652.28	652.61	652.93	82
357.0	653.26	653.59	653.92	654.25	654.57	654.90	655.23	655.55	655.88	656.21	83
358.0	656.54	656.86	657.19	657.52	657.84	658.17	658.50	658.82	659.15	659.48	84
359.0	659.80	660.13	660.45	660.78	661.11	661.43	661.76	662.08	662.41	662.73	85
360.0	663.06	663.38	663.71	664.03	664.36	664.68	665.01	665.33	665.66	665.98	86
361.0	666.31	666.63	666.95	667.28	667.60	667.93	668.25	668.57	668.90	669.22	87
362.0	669.54	669.87	670.19	670.51	670.84	671.16	671.48	671.81	672.13	672.45	88
363.0	672.77	673.10	673.42	673.74	674.06	674.38	674.71	675.03	675.35	675.67	89
364.0	675.99	676.31	676.64	676.96	677.28	677.60	677.92	678.24	678.56	678.88	90
365.0	679.21	679.53	679.85	680.17	680.49	680.81	681.13	681.45	681.77	682.09	91
366.0	682.41	682.73	683.05	683.37	683.69	684.01	684.33	684.65	684.96	685.28	92
367.0	685.60	685.92	686.24	686.56	686.88	687.20	687.51	687.83	688.15	688.47	93
368.0	688.79	689.11	689.42	689.74	690.06	690.38	690.70	691.01	691.33	691.65	94
369.0	691.96	692.28	692.60	692.92	693.23	693.55	693.87	694.18	694.50	694.82	95
370.0	695.13	695.45	695.76	696.08	696.40	696.71	697.03	697.35	697.66	697.98	96
371.0	698.29	698.61	698.92	699.24	699.55	699.87	700.22	700.61	700.99	701.37	97
372.0	701.75	702.14	702.52	702.90	703.28	703.66	704.04	704.43	704.81	705.19	98
373.0	705.57	705.95	706.33	706.71	707.09	707.47	707.85	708.23	708.62	708.99	99
374.0	709.38	709.76	710.13	710.52	710.90	711.27	711.65	712.03	712.41	712.79	100
375.0	713.17	713.55	713.93	714.31	714.69	715.06	715.44	715.82	716.20	716.58	101
376.0	716.96	717.33	717.71	718.09	718.47	718.85	719.22	719.60	719.98	720.35	102
377.0	720.73	721.11	721.48	721.86	722.24	722.62	722.99	723.37	723.74	724.12	103
378.0	724.50	724.87	725.25	725.62	726.00	726.38	726.75	727.13	727.50	727.88	104
379.0	728.25	728.63	729.00	729.38	729.75	730.13	730.50	730.87	731.25	731.62	105
380.0	732.00	732.37	732.75	733.12	733.49	733.87	734.24	734.61	734.99	735.36	106
381.0	735.73	736.11	736.48	736.85	737.22	737.60	737.97	738.34	738.72	739.09	107
382.0	739.46	739.83	740.20	740.58	740.95	741.32	741.69	742.06	742.43	742.80	108
383.0	743.18	743.55	743.92	744.29	744.66	745.03	745.40	745.77	746.14	746.51	109
384.0	746.88	747.25	747.62	747.99	748.36	748.73	749.10	749.47	749.84	750.21	110
385.0	750.58	750.95	751.32	751.69	752.05	752.42	752.79	753.16	753.53	753.90	111
386.0	754.27	754.63	755.00	755.37	755.74	756.11	756.47	756.84	757.21	757.58	112
387.0	757.94	758.31	758.68	759.04	759.41	759.78	760.15	760.51	760.88	761.24	113
388.0	761.61	761.98	762.34	762.71	763.08	763.44	763.81	764.17	764.54	764.90	114
389.0	765.27	765.64	766.00	766.37	766.73	767.10	767.46	767.83	768.19	768.56	115
390.0	768.92	769.28	769.65	770.01	770.38	770.74	771.11	771.47	771.83	772.20	116
391.0	772.56	772.92	773.29	773.65	774.01	774.38	774.74	775.10	775.46	775.83	117
392.0	776.19	776.55	776.92	777.28	777.64	778.00	778.36	778.73	779.09	779.45	118
393.0	779.81	780.17	780.53	780.90	781.26	781.62	781.98	782.34	782.70	783.06	119
394.0	783.42	783.79	784.15	784.51	784.87	785.23	785.59	785.95	786.31	786.67	120
395.0	787.03	787.39	787.75	788.11	788.47	788.83	789.18	789.54	789.90	790.26	121
396.0	790.62	790.98	791.34	791.70	792.06	792.41	792.77	793.13	793.49	793.85	122
397.0	794.21	794.56	794.92	795.28	795.64	795.99	796.35	796.71	797.07	797.42	123
398.0	797.78	798.14	798.50	798.85	799.21	799.57	799.92	800.32	800.73	801.14	124
399.0	801.54	801.95	802.36	802.76	803.17	803.58	803.98	804.39	804.80	805.20	125
400.0	805.61	806.02	806.42	806.83	807.23	807.64	808.05	808.45	808.86	809.26	126

(Continued on D26)

TABLE I *(continued)*

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
401.0	809.67	810.07	810.48	810.88	811.29	811.69	812.10	812.50	812.91	813.31	127
402.0	813.72	814.12	814.52	814.93	815.33	815.74	816.14	816.54	816.95	817.35	128
403.0	817.75	818.16	818.56	818.96	819.36	819.77	820.17	820.57	820.98	821.38	129
404.0	821.78	822.18	822.58	822.99	823.39	823.79	824.19	824.59	824.99	825.40	130
405.0	825.80	826.20	826.60	827.00	827.40	827.80	828.20	828.60	829.01	829.41	131
406.0	829.81	830.21	830.60	831.01	831.41	831.81	832.21	832.60	833.00	833.40	132
407.0	833.80	834.20	834.60	835.00	835.40	835.80	836.20	836.59	836.99	837.39	133
408.0	837.79	838.19	838.59	838.99	839.38	839.78	840.18	840.58	840.97	841.37	134
409.0	841.77	842.17	842.56	842.96	843.36	843.75	844.15	844.55	844.95	845.34	135
410.0	845.74	846.13	846.53	846.93	847.32	847.72	848.11	848.51	848.90	849.30	136
411.0	849.70	850.09	850.49	850.88	851.28	851.67	852.07	852.46	852.86	853.25	137
412.0	853.65	854.04	854.43	854.83	855.22	855.62	856.01	856.40	856.80	857.19	138
413.0	857.59	857.98	858.37	858.76	859.16	859.55	859.94	860.34	860.73	861.12	139
414.0	861.52	861.91	862.30	862.69	863.08	863.48	863.87	864.26	864.65	865.04	140
415.0	865.44	865.83	866.22	866.61	867.00	867.39	867.78	868.17	868.57	868.96	141
416.0	869.35	869.74	870.13	870.52	870.91	871.30	871.69	872.08	872.47	872.86	142
417.0	873.25	873.64	874.03	874.42	874.81	875.20	875.58	875.97	876.36	876.75	143
418.0	877.14	877.53	877.92	878.31	878.69	879.08	879.47	879.86	880.25	880.64	144
419.0	881.02	881.41	881.80	882.19	882.57	882.96	883.35	883.74	884.12	884.51	145
420.0	884.90	885.28	885.67	886.06	886.45	886.83	887.22	887.60	887.99	888.38	146
421.0	888.76	889.15	889.53	889.92	890.31	890.69	891.08	891.46	891.85	892.23	147
422.0	892.62	893.00	893.39	893.77	894.16	894.54	894.93	895.31	895.70	896.08	148
423.0	896.46	896.85	897.23	897.62	898.00	898.38	898.77	899.15	899.53	899.92	149
424.0	900.35	900.79	901.23	901.67	902.11	902.55	902.99	903.43	903.87	904.31	150
425.0	904.75	905.19	905.63	906.07	906.51	906.95	907.39	907.83	908.27	908.70	151
426.0	909.14	909.58	910.02	910.46	910.90	911.33	911.77	912.21	912.65	913.09	152
427.0	913.53	913.96	914.40	914.84	915.28	915.71	916.15	916.59	917.02	917.46	153
428.0	917.90	918.33	918.77	919.21	919.64	920.08	920.51	920.95	921.39	921.82	154
429.0	922.26	922.69	923.13	923.57	924.00	924.43	924.87	925.30	925.74	926.17	155
430.0	926.61	927.04	927.48	927.91	928.35	928.78	929.22	929.65	930.08	930.52	156
431.0	930.95	931.38	931.82	932.25	932.68	933.12	933.55	933.98	934.42	934.85	157
432.0	935.28	935.72	936.15	936.58	937.01	937.44	937.88	938.31	938.74	939.17	158
433.0	939.60	940.03	940.47	940.90	941.33	941.76	942.19	942.62	943.05	943.48	159
434.0	943.91	944.35	944.78	945.21	945.64	946.07	946.50	946.93	947.36	947.79	160
435.0	948.22	948.64	949.07	949.50	949.93	950.36	950.79	951.22	951.65	952.08	161
436.0	952.51	952.94	953.36	953.79	954.22	954.65	955.08	955.51	955.93	956.36	162
437.0	956.79	957.22	957.64	958.07	958.50	958.93	959.35	959.78	960.21	960.63	163
438.0	961.06	961.49	961.91	962.34	962.77	963.19	963.62	964.05	964.47	964.90	164
439.0	965.32	965.75	966.17	966.60	967.02	967.45	967.88	968.30	968.73	969.15	165
440.0	969.58	970.00	970.43	970.85	971.27	971.70	972.12	972.55	972.97	973.39	166
441.0	973.82	974.24	974.67	975.09	975.51	975.94	976.36	976.78	977.21	977.63	167
442.0	978.05	978.47	978.90	979.32	979.74	980.16	980.59	981.01	981.43	981.85	168
443.0	982.27	982.70	983.12	983.54	983.96	984.38	984.81	985.23	985.65	986.07	169
444.0	986.49	986.91	987.33	987.75	988.17	988.59	989.01	989.43	989.85	990.27	170
445.0	990.69	991.11	991.53	991.95	992.37	992.79	993.21	993.63	994.05	994.47	171
446.0	994.89	995.31	995.73	996.15	996.56	996.98	997.40	997.82	998.24	998.66	172
447.0	999.08	999.49	999.91	1000.39	1000.88	1001.36	1001.85	1002.34	1002.83	1003.32	173
448.0	1003.81	1004.30	1004.79	1005.28	1005.76	1006.25	1006.74	1007.23	1007.72	1008.20	174
449.0	1008.69	1009.18	1009.67	1010.15	1010.64	1011.13	1011.61	1012.10	1012.59	1013.08	175
450.0	1013.56	1014.05	1014.54	1015.02	1015.51	1015.99	1016.48	1016.97	1017.45	1017.94	176

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
451.0	1018.42	1018.91	1019.39	1019.88	1020.36	1020.85	1021.33	1021.82	1022.30	1022.79	177
452.0	1023.27	1023.76	1024.24	1024.73	1025.21	1025.69	1026.18	1026.66	1027.14	1027.63	178
453.0	1028.11	1028.59	1029.08	1029.56	1030.04	1030.53	1031.01	1031.49	1031.97	1032.45	179
454.0	1032.94	1033.42	1033.90	1034.38	1034.87	1035.35	1035.83	1036.31	1036.79	1037.27	180
455.0	1037.75	1038.24	1038.72	1039.20	1039.68	1040.16	1040.64	1041.12	1041.60	1042.08	181
456.0	1042.56	1043.04	1043.52	1044.00	1044.48	1044.96	1045.44	1045.92	1046.40	1046.88	182
457.0	1047.36	1047.84	1048.32	1048.80	1049.27	1049.75	1050.23	1050.71	1051.19	1051.66	183
458.0	1052.14	1052.62	1053.10	1053.58	1054.06	1054.53	1055.01	1055.49	1055.96	1056.44	184
459.0	1056.92	1057.40	1057.87	1058.35	1058.83	1059.30	1059.78	1060.25	1060.73	1061.21	185
460.0	1061.68	1062.16	1062.63	1063.11	1063.59	1064.06	1064.54	1065.01	1065.49	1065.96	186
461.0	1066.44	1066.91	1067.39	1067.86	1068.34	1068.81	1069.29	1069.76	1070.23	1070.71	187
462.0	1071.18	1071.65	1072.13	1072.60	1073.08	1073.55	1074.02	1074.50	1074.97	1075.44	188
463.0	1075.92	1076.39	1076.86	1077.33	1077.81	1078.28	1078.75	1079.22	1079.70	1080.17	189
464.0	1080.64	1081.11	1081.58	1082.06	1082.53	1083.00	1083.47	1083.94	1084.41	1084.88	190
465.0	1085.35	1085.82	1086.29	1086.77	1087.24	1087.71	1088.17	1088.65	1089.12	1089.59	191
466.0	1090.06	1090.53	1091.00	1091.47	1091.94	1092.40	1092.87	1093.34	1093.81	1094.28	192
467.0	1094.75	1095.22	1095.69	1096.16	1096.62	1097.09	1097.56	1098.03	1098.50	1098.97	193
468.0	1099.43	1099.90	1100.38	1100.86	1101.34	1101.82	1102.30	1102.78	1103.26	1103.74	194
469.0	1104.22	1104.69	1105.17	1105.65	1106.13	1106.61	1107.09	1107.57	1108.05	1108.52	195
470.0	1109.00	1109.48	1109.96	1110.44	1110.91	1111.39	1111.87	1112.35	1112.82	1113.30	196
471.0	1113.78	1114.25	1114.73	1115.21	1115.69	1116.16	1116.64	1117.12	1117.59	1118.07	197
472.0	1118.55	1119.02	1119.50	1119.97	1120.45	1120.92	1121.40	1121.88	1122.35	1122.83	198
473.0	1123.30	1123.78	1124.25	1124.73	1125.20	1125.68	1126.15	1126.63	1127.10	1127.57	199
474.0	1128.05	1128.52	1129.00	1129.47	1129.94	1130.42	1130.89	1131.36	1131.84	1132.31	200
475.0	1132.78	1133.26	1133.73	1134.20	1134.68	1135.15	1135.62	1136.09	1136.57	1137.04	201
476.0	1137.51	1137.98	1138.45	1138.93	1139.40	1139.87	1140.34	1140.81	1141.28	1141.76	202
477.0	1142.23	1142.70	1143.17	1143.64	1144.11	1144.58	1145.05	1145.52	1145.99	1146.46	203
478.0	1146.93	1147.40	1147.87	1148.34	1148.81	1149.28	1149.75	1150.22	1150.69	1151.16	204
479.0	1151.63	1152.10	1152.57	1153.04	1153.51	1153.98	1154.44	1154.91	1155.38	1155.85	205
480.0	1156.32	1156.79	1157.25	1157.72	1158.19	1158.66	1159.12	1159.59	1160.06	1160.53	206
481.0	1161.00	1161.46	1161.93	1162.40	1162.86	1163.33	1163.80	1164.26	1164.73	1165.20	207
482.0	1165.66	1166.13	1166.59	1167.06	1167.53	1167.99	1168.46	1168.92	1169.39	1169.85	208
483.0	1170.32	1170.79	1171.25	1171.72	1172.18	1172.64	1173.11	1173.57	1174.04	1174.50	209
484.0	1174.97	1175.43	1175.90	1176.36	1176.82	1177.29	1177.75	1178.22	1178.68	1179.14	210
485.0	1179.61	1180.07	1180.53	1181.00	1181.46	1181.92	1182.39	1182.85	1183.31	1183.77	211
486.0	1184.24	1184.70	1185.16	1185.62	1186.09	1186.55	1187.01	1187.47	1187.93	1188.39	212
487.0	1188.86	1189.32	1189.78	1190.24	1190.70	1191.16	1191.62	1192.08	1192.55	1193.01	213
488.0	1193.47	1193.93	1194.39	1194.85	1195.31	1195.77	1196.23	1196.69	1197.15	1197.61	214
489.0	1198.07	1198.52	1198.99	1199.44	1199.90	1200.30	1200.69	1201.07	1201.46	1201.84	215
490.0	1202.22	1202.61	1202.99	1203.38	1203.76	1204.15	1204.53	1204.91	1205.30	1205.68	216
491.0	1206.06	1206.45	1206.83	1207.21	1207.60	1207.98	1208.36	1208.75	1209.13	1209.51	217
492.0	1209.89	1210.28	1210.66	1211.04	1211.42	1211.81	1212.19	1212.57	1212.95	1213.33	218
493.0	1213.72	1214.10	1214.48	1214.86	1215.24	1215.62	1216.01	1216.39	1216.77	1217.15	219
494.0	1217.53	1217.91	1218.29	1218.67	1219.05	1219.44	1219.82	1220.20	1220.58	1220.96	220
495.0	1221.34	1221.72	1222.10	1222.48	1222.86	1223.24	1223.62	1224.00	1224.38	1224.76	221
496.0	1225.14	1225.52	1225.90	1226.28	1226.65	1227.03	1227.41	1227.79	1228.17	1228.55	222
497.0	1228.93	1229.31	1229.69	1230.07	1230.44	1230.82	1231.20	1231.58	1231.96	1232.34	223
498.0	1232.71	1233.09	1233.47	1233.85	1234.22	1234.60	1234.98	1235.36	1235.74	1236.11	224
499.0	1236.49	1236.87	1237.24	1237.62	1238.00	1238.37	1238.75	1239.13	1239.51	1239.88	225
500.0	1240.26	1240.63	1241.01	1241.39	1241.76	1242.14	1242.52	1242.89	1243.27	1243.64	226

(Continued on D28)

TABLE I *(continued)*

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
501.0	1244.02	1244.40	1244.77	1245.15	1245.52	1245.90	1246.27	1246.65	1247.02	1247.40	227
502.0	1247.77	1248.15	1248.52	1248.90	1249.27	1249.65	1250.02	1250.40	1250.77	1251.15	228
503.0	1251.52	1251.89	1252.27	1252.64	1253.02	1253.39	1253.76	1254.14	1254.51	1254.88	229
504.0	1255.26	1255.63	1256.01	1256.38	1256.75	1257.13	1257.50	1257.87	1258.25	1258.62	230
505.0	1258.99	1259.36	1259.74	1260.11	1260.48	1260.85	1261.23	1261.60	1261.97	1262.34	231
506.0	1262.71	1263.09	1263.46	1263.83	1264.20	1264.57	1264.95	1265.32	1265.69	1266.06	232
507.0	1266.43	1266.80	1267.17	1267.55	1267.92	1268.29	1268.66	1269.03	1269.40	1269.77	233
508.0	1270.14	1270.51	1270.88	1271.25	1271.62	1271.99	1272.36	1272.73	1273.10	1273.47	234
509.0	1273.84	1274.21	1274.58	1274.95	1275.32	1275.69	1276.06	1276.43	1276.80	1277.17	235
510.0	1277.54	1277.91	1278.28	1278.64	1279.01	1279.38	1279.75	1280.12	1280.49	1280.86	236
511.0	1281.23	1281.59	1281.96	1282.33	1282.70	1283.07	1283.43	1283.80	1284.17	1284.54	237
512.0	1284.91	1285.28	1285.64	1286.01	1286.38	1286.74	1287.11	1287.48	1287.85	1288.21	238
513.0	1288.58	1288.95	1289.31	1289.68	1290.05	1290.41	1290.78	1291.15	1291.51	1291.88	239
514.0	1292.25	1292.61	1292.98	1293.35	1293.71	1294.08	1294.44	1294.81	1295.17	1295.54	240
515.0	1295.91	1296.27	1296.64	1297.00	1297.37	1297.73	1298.10	1298.46	1298.83	1299.19	241
516.0	1299.56	1299.92	1300.76	1301.72	1302.68	1303.65	1304.61	1305.57	1306.53	1307.49	242
517.0	1308.45	1309.41	1310.37	1311.33	1312.29	1313.25	1314.21	1315.17	1316.13	1317.09	243
518.0	1318.05	1319.01	1319.96	1320.92	1321.88	1322.84	1323.79	1324.75	1325.71	1326.67	244
519.0	1327.63	1328.58	1329.54	1330.50	1331.45	1332.40	1333.36	1334.32	1335.27	1336.22	245
520.0	1337.18	1338.14	1339.09	1340.05	1341.00	1341.95	1342.91	1343.86	1344.81	1345.77	246
521.0	1346.72	1347.67	1348.63	1349.58	1350.53	1351.49	1352.44	1353.39	1354.34	1355.29	247
522.0	1356.24	1357.19	1358.14	1359.10	1360.04	1361.00	1361.95	1362.90	1363.85	1364.80	248
523.0	1365.74	1366.70	1367.64	1368.59	1369.54	1370.49	1371.44	1372.39	1373.34	1374.28	249
524.0	1375.23	1376.18	1377.12	1378.07	1379.02	1379.96	1380.91	1381.86	1382.81	1383.75	250
525.0	1384.70	1385.64	1386.59	1387.53	1388.48	1389.43	1390.37	1391.32	1392.26	1393.20	251
526.0	1394.15	1395.09	1396.03	1396.98	1397.92	1398.86	1399.81	1400.47	1401.07	1401.67	252
527.0	1402.26	1402.86	1403.46	1404.06	1404.65	1405.25	1405.85	1406.44	1407.04	1407.63	253
528.0	1408.23	1408.83	1409.42	1410.02	1410.61	1411.21	1411.81	1412.40	1413.00	1413.59	254
529.0	1414.19	1414.78	1415.38	1415.97	1416.57	1417.16	1417.76	1418.35	1418.94	1419.54	255
530.0	1420.13	1420.72	1421.32	1421.91	1422.51	1423.10	1423.69	1424.29	1424.88	1425.47	256
531.0	1426.06	1426.66	1427.25	1427.84	1428.44	1429.03	1429.62	1430.21	1430.80	1431.40	257
532.0	1431.99	1432.58	1433.17	1433.76	1434.35	1434.94	1435.53	1436.13	1436.72	1437.31	258
533.0	1437.90	1438.49	1439.08	1439.67	1440.26	1440.85	1441.44	1442.03	1442.62	1443.21	259
534.0	1443.80	1444.39	1444.97	1445.57	1446.15	1446.74	1447.33	1447.92	1448.51	1449.10	260
535.0	1449.69	1450.27	1450.86	1451.45	1452.04	1452.63	1453.21	1453.80	1454.39	1454.98	261
536.0	1455.56	1456.15	1456.74	1457.32	1457.91	1458.50	1459.09	1459.67	1460.26	1460.84	262
537.0	1461.43	1462.02	1462.60	1463.19	1463.77	1464.36	1464.94	1465.53	1466.12	1466.70	263
538.0	1467.29	1467.87	1468.46	1469.04	1469.62	1470.21	1470.80	1471.38	1471.96	1472.55	264
539.0	1473.13	1473.72	1474.30	1474.88	1475.47	1476.05	1476.63	1477.22	1477.80	1478.38	265
540.0	1478.97	1479.55	1480.13	1480.71	1481.29	1481.88	1482.46	1483.04	1483.62	1484.21	266
541.0	1484.79	1485.37	1485.95	1486.53	1487.12	1487.69	1488.28	1488.86	1489.44	1490.02	267
542.0	1490.60	1491.18	1491.76	1492.34	1492.92	1493.50	1494.08	1494.66	1495.24	1495.82	268
543.0	1496.40	1496.98	1497.56	1498.14	1498.72	1499.30	1499.88	1500.49	1501.10	1501.71	269
544.0	1502.33	1502.95	1503.56	1504.17	1504.79	1505.40	1506.02	1506.63	1507.24	1507.86	270
545.0	1508.47	1509.09	1509.70	1510.31	1510.93	1511.54	1512.15	1512.77	1513.38	1513.99	271
546.0	1514.60	1515.22	1515.83	1516.44	1517.05	1517.66	1518.28	1518.89	1519.50	1520.11	272
547.0	1520.72	1521.34	1521.95	1522.56	1523.17	1523.78	1524.39	1525.00	1525.61	1526.22	273
548.0	1526.83	1527.44	1528.05	1528.66	1529.27	1529.88	1530.49	1531.10	1531.71	1532.32	274
549.0	1532.93	1533.54	1534.15	1534.76	1535.37	1535.98	1536.58	1537.19	1537.80	1538.41	275
550.0	1539.02	1539.62	1540.23	1540.84	1541.45	1542.05	1542.66	1543.27	1543.88	1544.49	276

b.p. (°K)	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*	*0.7*	*0.8*	*0.9*	*b.p.* (°C)
551.0	1545.09	1545.70	1546.30	1546.91	1547.52	1548.12	1548.73	1549.34	1549.94	1550.55	277
552.0	1551.15	1551.76	1552.37	1552.97	1553.58	1554.18	1554.79	1555.39	1556.00	1556.60	278
553.0	1557.21	1557.81	1558.42	1559.02	1559.63	1560.23	1560.83	1561.44	1562.04	1562.65	279
554.0	1563.25	1563.86	1564.46	1565.06	1565.66	1566.27	1566.87	1567.48	1568.08	1568.68	280
555.0	1569.28	1569.89	1570.49	1571.09	1571.69	1572.29	1572.90	1573.50	1574.10	1574.70	281
556.0	1575.30	1575.90	1576.50	1577.11	1577.71	1578.31	1578.91	1579.51	1580.11	1580.71	282
557.0	1581.31	1581.91	1582.51	1583.11	1583.71	1584.31	1584.91	1585.51	1586.11	1586.71	283
558.0	1587.31	1587.91	1588.51	1589.11	1589.71	1590.31	1590.91	1591.50	1592.10	1592.70	284
559.0	1593.30	1593.90	1594.50	1595.09	1595.69	1596.29	1596.89	1597.48	1598.08	1598.68	285
560.0	1599.28	1599.87	1600.50	1601.13	1601.77	1602.40	1603.04	1603.67	1604.30	1604.94	286
561.0	1605.57	1606.20	1606.83	1607.46	1608.10	1608.73	1609.36	1609.99	1610.63	1611.26	287
562.0	1611.89	1612.52	1613.15	1613.79	1614.42	1615.05	1615.68	1616.31	1616.94	1617.57	288
563.0	1618.20	1618.84	1619.46	1620.09	1620.72	1621.35	1621.98	1622.61	1623.24	1623.87	289
564.0	1624.50	1625.13	1625.76	1626.39	1627.02	1627.65	1628.28	1628.91	1629.54	1630.16	290
565.0	1630.79	1631.42	1632.05	1632.68	1633.31	1633.93	1634.56	1635.19	1635.82	1636.45	291
566.0	1637.07	1637.70	1638.33	1638.95	1639.58	1640.21	1640.83	1641.46	1642.09	1642.71	292
567.0	1643.34	1643.97	1644.59	1645.22	1645.84	1646.47	1647.10	1647.72	1648.34	1648.97	293
568.0	1649.60	1650.22	1650.85	1651.47	1652.10	1652.72	1653.35	1653.97	1654.59	1655.22	294
569.0	1655.84	1656.46	1657.09	1657.71	1658.34	1658.96	1659.58	1660.21	1660.83	1661.45	295
570.0	1662.07	1662.70	1663.32	1663.94	1664.57	1665.19	1665.81	1666.43	1667.06	1667.68	296
571.0	1668.30	1668.92	1669.54	1670.16	1670.79	1671.41	1672.03	1672.65	1673.27	1673.89	297
572.0	1674.51	1675.13	1675.75	1676.37	1676.99	1677.61	1678.23	1678.86	1679.48	1680.10	298
573.0	1680.71	1681.33	1681.95	1682.57	1683.19	1683.81	1684.43	1685.05	1685.67	1686.29	299
574.0	1686.90	1687.52	1688.14	1688.76	1689.38	1690.00	1690.62	1691.23	1691.85	1692.47	300
575.0	1693.08	1693.70	1694.32	1694.94	1695.55	1696.17	1696.79	1697.40	1698.02	1698.64	301
576.0	1699.25	1699.87	*******	*******	*******	*******	*******	*******	*******	*******	302
577.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	303
578.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	304
579.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	305
580.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	306
581.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	307
582.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	308
583.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	309
584.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	310
585.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	311
586.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	312
587.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	313
588.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	314
589.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	315
590.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	316
591.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	317
592.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	318
593.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	319
594.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	320
595.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	321
596.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	322
597.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	323
598.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	324
599.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	325
600.0	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	326

TABLE II

COMPARISON OF STANDARD RETENTION INDICES CALCULATED USING TWO BOILING POINT SCALES (°C AND °K) WITH EXPERIMENTAL VALUES

Class	*Compound*	I^* (°C)	ΔI^*_{squal} (100°C)	I^* (°K)	ΔI^*_{squal} (100°C)
Alkanes	2-Methylbutane	494	+17	479	+ 2
	2,2-Dimethylbutane	549	+ 8	544	+ 3
	2,3-Dimethylbutane	573	+ 2	570	− 1
	2-Methylpentane	579	+ 1	576	− 2
	3-Methylpentane	586	0	586	0
	2,4-Dimethylpentane	644	+13	643	+12
	2-Methylhexane	674	+ 6	672	+ 2
	2,3-Dimethylpentane	674	+ 1	672	− 1
	3-Methylhexane	680	+ 2	679	+ 1
	3-Ethylpentane	685	− 4	684	− 5
	2,2,4-Trimethylpentane	703	+ 4	703	+ 4
	2-Methylheptane	771	+ 6	770	+ 5
	4-Methylheptane	774	+ 5	773	+ 4
	3-Methylheptane	777	+ 3	776	+ 2
	2,2,5-Trimethylhexane	795	+16	795	+16
Alkenes	Pent-1-ene	495	+21	482	+ 8
	2-Methylbut-1-ene	496	− 4	487	−13
	2-Methylpent-1-ene	561	−18	556	−23
	4-Methylpent-1-ene	561	+10	556	+ 5
	trans-4-Methylpent-2-ene	564	+ 7	559	+ 2
	Hex-1-ene	587	+ 7	583	+ 3
	2-Methylpent-2-ene	593	− 7	594	− 6
	Hept-1-ene	684	+ 1	683	0
Cyclic alkanes	Cyclopentane	548	−27	542	−33
	Methylcyclopentane	612	−24	613	−25
	Cyclohexane	644	−30	642	−32
	Cycloheptane	776	−36	774	−38
Cyclic alkenes	Cyclopentene	532	−24	527	−29
	3-Methylcyclopent-1-ene	604	− 5	606	− 3
	1,3-Cyclohexadiene	647	−15	645	−15
	Cyclohexene	652	−28	650	−30
	1,4-Cyclohexadiene	660	−40	658	−42
	1-Methylcyclohex-1-ene	743	−24	742	−25
	Cycloheptatriene	770	− 4	769	− 5
	1,3-Cyclooctadiene	871	−22	870	−23
Aromatic	Benzene	642	− 6	640	− 8
	Toluene	747	−11	746	−12
	Ethylbenzene	844	− 4	843	− 5
	Styrene	879	+ 3	879	+ 3

TABLE III

BOILING POINTS USED IN THE PREPARATION OF TABLE I, THEIR ACCURACY AND ASSOCIATED VALUES OF r

Compound	*Boiling point*[a]		*Accuracy*	r
	°C	°K		
Hydrogen	−259.14	13.98	±0.005	
				0.767
Methane	−182.48	90.64	±0.005	
				0.939
Ethane	− 88.63	184.49	±0.005	
				0.441
Propane	− 44.5	228.62	±0.05	
				0.440
n-Butane	− 0.5	272.62	±0.05	
				0.365
n-Pentane	36.0	309.12	±0.05	
				0.320
n-Hexane	68.0	341.12	±0.05	
				0.304
n-Heptane	98.42	371.54	±0.005	
				0.271
n-Octane	125.5	398.62	±0.05	
				0.253
n-Nonane	150.80	423.92	±0.005	
				0.233
n-Decane	174.1	447.22	±0.05	
				0.209
n-Hendecane	195.0	468.12	±0.05	
				0.213
n-Dodecane	216.3	489.42	±0.05	
				0.267
n-Tridecane	243.0	516.12	±0.05	
				0.095
n-Tetradecane	253.5	526.62	±0.1	
				0.170
n-Pentadecane	270.5	543.62	±0.1	
				0.165
n-Hexadecane	287	560.12	±0.5	
				0.16
n-Heptadecane	303	576.12	±0.5	
				–
n-Octadecane	306	579.12	±0.5	
				–
n-Nonadecane	330	603.12	±0.5	
				–
n-Eicosane	327	600.12	±0.5	
				–
n-Heneicosane	363	636.12	±0.5	

[a] From ref. 3.

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Received August 9th, 1971