PREDICTION OF CRITICAL CONSTANTS ($T_c P_c$ & V_c)—AN EXTENSION TO BRANCHED CHAIN COMPOUNDS

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[Received : August 2, 1969]

ABSTRACT

Critical constants (T_c, P_c *and* V_c) *of branched chain organic liquids have been estimated by the following proposed correlations* :

$$T_c = n_1 \log (M) + C_1 \quad [1]$$

$$P_c = n_2 \log (M) + C_2 \quad [2]$$

$$V_c = n_3 (M) + C_3 \quad [3]$$

The values have been compared with the existing literature data. The values of n_1, n_2 *and* n_3 *and* C_1, C_2 *and* C_3 *have been tabulated for alkanes, alkenes, alkyl benzenes, alkyl naphthalenes, styrenes, cyclopentanes, cyclopentene, cyclohexanes and cyclohexenes. The present method has been compared with the methods of Eduljee and Lyderson. It is also more widely applicable than the previous methods reported in literature.*

Earlier simple correlations [1,2,3] have been proposed to predict Critical Constants *i.e.*, temperature, pressure and volume of normal hydrocarbons, cyclopentanes, cyclohexanes and organic liquids including isocompounds of alcohols and esters. The same approach has been extended for the estimation of critical constants of isomers of aromatic hydrocarbons, cyclohexanes, cyclohexenes, cyclopentanes, cyclopentenes and groups of alkyl naphthalene and styrene compounds.

The present method is based on a simple correlation using molecular weight as the input property. Linear relationships are obtained when critical constants like T_c and P_c are plotted against molecular weight on semi-logarithm co-ordinates, whereas V_c vs. molecular weight on ordinary co-ordinates. 472, 384 and 377 isomeric compounds, whose molecular weight range from 58 to 297 and whose Critical temperature, pressure and volume

*Deceased.

varied between 408 to 876 °K, 12 to 45 atmospheres, and 235 to 1068 cc/gm. mole have been tested. Due to lack of data for some isomers in the cyclohexane group, the tested equation from the previous paper[1-2] for T_c and P_c has been used again to calculate all the critical properties, As four new groups *e.g.*, alkyl naphthalenes, styrenes, cyclohexenes, and cyclopentenes have been tested in this paper, one or two normal compounds for which the data are available have been included in the beginning of the group.

Table I shows all the values of critical constants, *i.e.*, T_c, P_c & V_c into different groups obtained from literature[6]. Table I also compares the experimental data with the calculated values from the present correlation and gives the percentage error. The compounds, marked with asterik for which the percent deviation is more than 10 are not considered in the calculation of the average percentage error. From Table I, it is seen that the calculated critical constants for some of the groups *e.g.*, P_c for alkanes and alkenes and V_c for alkenes show large percentage deviation.

The general equations for prediction of Critical constants are

$$T_c = n_1 \log M + C_1 \qquad [1]$$

$$P_c = n_2 \log M + C_2 \qquad [2]$$

$$V_c = n_3 M + C_3 \qquad [3]$$

where,

T_c – critical temperature, °K

P_c – critical pressure, atms.

V_c – critical volume, cc/g. mole

n, C – constants in Equations 1, 2 and 3

M – Molecular weight.

The values of these constants n & C for different groups are given in Tables 2, 3 & 4. In the critieal temperature and pressure, the percentage and the number of compounds tested with the present correlation along with the percentage error of Eduljee[4] and Lynderson[5] correlation have been given in Table 2 and 3. Table 4, shows the percentage error and the number of compounds with the present correlation along with the percentage error of Lyderson[4] correlation for Critical Volume.

TABLE I

Experimental and Calculated Values of Critical Constants

	M	T_c Lit.	T_c Calc.	Error %	P_c Lit.	P_c Calc.	Error %	V_c Lit.	V_c Calc.	Error %
I. Alkanes										
1. Isobutane	58.12	408.0	413.0	1.22	36.00	37.22	3.25	262.99	259.9	1.14
2. Isopentane	72.15	460.8	456.0	1.03	32 90	33.03	0.40	308.0	312.5	1.47
3. Isohexane	86.17	497.9	484.0	2.79	29.90	29.40	1.67	366.99	366.0	0.27
4. 3-Methyl pentane	86.17	504.7	484.0	8.10	30.80	,,	4,55	366.99	366.0	0.27
5. 2,2-Dimethyl butane	86.17	489.2	484.0	1.15	30.60	,,	3.92	358.99	,,	1.98
6. 2,3-Dimethyl ,,	86.17	500.1	,,	3.21	30.90	,,	4.85	357.95	,,	2.25
7. 2-Methyl hexane	100.20	530.9	525.0	1.10	27.20	26.60	2.20	428.05	424.0	0.94
8. 3-Methyl hexane	,,	535.4	525.0	1.90	28.10	,,	5.34	418.03	,,	1.43
9. 3-Ethyl pentane	,,	540.6	,,	2.86	28.60	,,	7.00	416.03	,,	1.92
10. 2,2-Dimethyl pentane	,,	520.7	,,	0.82	28.40	,,	6.34	404.00	,,	4.95
11. 2,3-Dimethyl pentane	,,	537.6	525.0	2.00	29.20	,,	8.90	405.00	,,	4.70
12. 2,4-Dinethyl pentane	,,	520.1	,,	0 90	27.40	,,	2.92	420.03	,,	0.95
13. 3,3-Dimethyl pentane	,,	536.0	,,	2.05	30.00	,,	11.35*	419.13	,,	1.17
14. 2,2,3-Trimethyl butane	,,	531.3	,,	1.22	29.70	,,	10.41*	393.90	,,	7.16
15. 2-Methyl heptane	114.23	561.0	529.0	5.77	24.80	24.10	2.82	488.06	472.0	3.28
16. 3-Methyl heptane	,,	565.0	529.0	6.37	25.60	,,	5.86	478.01	472.0	1.26
17. 4-Methyl heptane	,,	563.0	,,	6.05	,,	,,	5.86	475.95	472.0	0.83

TABLE I – (*contd.*)

		M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
18.	3-Ethyl hexane	114.23	567.0	529.0	6.70	26.20	24.10	8.02	466.01	472.0	1.28
19.	2,2-Dimethyl hexane	,,	552.0	,,	4.16	25.60	,,	5.86	466.93	,,	1.09
20.	2,3-Dimethyl hexane	,,	566.0	,,	6.53	26.61	,,	10.40*	460 99	,,	2.35
21.	2,4-Dimethyl hexane	,,	555.0	,,	4 68	24 85	,,	3 02	466.01	,,	1.28
22.	2,5-Dimethyl hexane	,,	552.0	,,	4.17	25.00	,,	3.60	478 01	,,	1.26
23.	3,3-Dimethyl hexane	,,	550.9	,,	3.92	22.85	,,	5.02	450.02	,,	4 86
24.	3,4-Dimethyl hexane	,,	571.0	,,	7.35	27.45	,,	12.20*	451.96	,,	4 30
25.	3-Ethyl-2-methyl pentane	,,	568.0	,,	6.88	,,	,,	12.20*	450.02	,,	4.86
26.	3-Ethyl.3-methyl pentane	,,	578.0	,,	8.50	28 85	,,	16.45*	434.94	,,	7.85
27.	2,2,3-Trimethyl pentane	,,	567.0	,,	6.70	28.22	,,	14.60*	437.00	,,	8.00
28.	2,2,4-Trimethyl pentane	,,	544.2	,,	2.50	25 50	,,	5.50	482.00	,,	2.07
29.	2,3,3-Trimethyl pentane	,,	576.0	,,	8.15	28.90	,,	16.60*	433.0	,,	9.00
30.	2,3,4-Trimethyl pentane	,,	568.0	,,	6.87	27.60	,,	12.70*	446 94	,,	5.61
31.	2,2,3,3-Tetramethyl butane	,,	543.8	,,	2.76	24.50	,,	1.63	478 46	,,	1.36
32.	2-Methyl octane	128.25	584.0	570.0	2.40	21.80	21 82	0.92	...	...	...
33.	3-Methyl octane	,,	586.8	,,	2.86	22.20	,,	1.74	...	...	...
34.	4-Methyl octane	,,	584.0	,,	2.40	22.10	,,	1.27	...	...	...

TABLE I—(*contd*)

		M	Lit.	T_c Calc	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
35.	3-Ethyl heptane	128 25	586.1	570.0	2 75	22 20	21.82	1.74	.....	.....	.....
36.	4-Ethyl heptane	,,	584.0	,,	2.40	22.41	,,	2.63	.....	.....	.....
37.	2,2-Dimethyl heptane	,,	568 2	,,	0.32	20.60	,,	5.92	.....	.....	.....
38.	2,3-Dimethyl heptane	,,	582.5	,,	2.14	21.90	,,	0.37	.....	.....	.....
39.	2-4-Dimethyl heptane	,,	570.7	,,	0.12	21.30	,,	2.41	.....	.....	.....
40.	2,5-Dimethyl heptane	,,	573.7	,,	0.65	21.22	,,	2.82	.....	.....	.....
41.	2,6-Dimethyl heptane	,,	577.5	,,	0.28	20.82	,,	4.80	.....	.....	.....
42.	3,3-Dimethyl heptane	,,	577.5	,,	0.99	21.10	,,	3.40	.....	.....	.....
43.	3,4-Dimethyl heptane	,,	584.1	,,	2.42	22.30	,,	2.16	.....	.....	.....
44.	3,5-Dimethyl heptane	,,	575.3	,,	0.92	21.50	,,	1.46	.....	.....	.....
45.	4,4-Dimethyl heptane	,,	574.7	,,	0.82	21.00	,,	3.90	.....	.....	.....
46.	3-Ethyl-2-methyl hexane	,,	579.7	,,	1.68	21.79	,,	0.18	.....	.....	.....
47.	4-Ethyl-2-methyl hexane	,,	572.9	,,	0.51	21.20	,,	2.92	.....	.....	.....
48.	3-Ethyl-3-methyl hexane	,,	585.5	,,	2.62	21.61	,,	0.97	.....	.....	.....
49.	4-Ethyl-3-methyl hexane	,,	585.3	,,	2.61	22.40	,,	2.59	.....	.....	.....
50.	2,2,3-Trimethyl hexane	,,	573.9	,,	0.68	21.10	,,	3.42	.....	.....	.....
51.	2,2,4-Trimethyl hexane	,,	561.7	,,	1.48	20.35	,,	2.31	.....	.....	.....

TABLE I—(*contd.*)

		M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
52.	2,2,5-Trimethyl hexane	128.25	555.1	570.0	2.70	19.80	21.82	10.20*	.....	.....	.....
53.	2,3,3-Trimethyl hexane	,,	580.8	,,	1.84	21.10	,,	3.42	.....	.....	.....
54.	2,3,4-Trimethyl hexane	,,	583.8	,,	2 23	22.00	,,	0.82	.....	.....	.....
55.	2,3,5-Trimethyl hexane	,,	568.6	,,	0.25	20.75	,,	5.20	.....	.....	.....
56.	2,4,4-Trimethyl hexane	,,	,,	,,	0.25	20.61	,,	5.86	.....	.....	.....
57.	3,3,4-Trimethyl hexane	,,	585.0	,,	2.56	21.40	,,	1.96	.....	.....	.....
58.	3,3-Diethyl pentane	,,	597.3	,,	4.52	22.60	,,	3.45	.....	.....	.....
59.	3-Ethyl-2,2-dimethyl pentane	,,	575.2	,,	0.91	21.20	,,	2.92	.....	.....	.....
60.	3-Ethyl-2,3-dimethyl pentane	,,	589.4	,,	3.40	21.61	,,	0.97	.....	.....	.....
61.	3-Ethyl-2,4-dimethyl pentane	,,	580.6	,,	2.19	21.50	,,	1.46	.....	.....	.....
62.	2,2,3,3-Tetramethyl pentane	,,	589.6	,,	3.34	22.00	,,	0.82	.....	.....	.....
63.	2,2,3,4-Tetramethyl pentane	,,	575.3	,,	0.92	21.10	,,	3.42	.....	.....	.....
64.	2,2,4,4-Tetramethyl pentane	,,	556.0	,,	2.52	19.51	,,	11.80*	.....	.....	.....
65.	2,3,3,4-Tetramethyl pentane	,,	590.1	,,	3.40	21.77	,,	0.23	.....	.....	.....
66.	2-Methyl nonane	142.28	609.0	598.0	1.81	20.20	19.78	2.08	579.89	580.0	0.02
67.	3-Methyl nonane	,,	609.8	,,	1.94	21.22	,,	6.78	585.72	,,	0.98
68.	4-Methyl nonane	,,	606.0	,,	1.32	20.90	,,	5.36	587.14	,,	1.22
69.	5-Methyl nonane	,,	606.0	,,	1.32	21.20	,,	6.70	583.03	,,	0.52

TABLE I – (*contd.*)

		M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
70.	3-Ethyl octane	142.28	610.0	598.0	1.97	21.22	19.78	6.78	581.17	580.0	0.20
71.	4-Ethyl-octane	,,	610.0	,,	,,	21.22	,,	,,	,,	,,	0.20
72.	2,2-Dimethyl octane	,,	591.5	,,	1.10	19.68	,,	0.51	593.26	,,	2.24
73.	2,3-Dimethyl octane	,,	604.8	,,	1.13	20.20	,,	2.08	590.98	,,	1.84
74.	2,4-Dimethyl octane	,,	587.7	,,	1.76	19.30	,,	2.49	599.95	,,	3.27
75.	2,5-Dimethyl octane	,,	596.2	,,	0.31	19.80	,,	0.10	591.84	,,	2.00
76.	2,6-Dimethyl octane	,,	595.7	,,	0.34	19.54	,,	1.23	599.95	,,	3.34
77.	2,7-Dimethyl octane	,,	695.6	,,	0.24	19.40	,,	1.96	606.21	,,	4.32
78.	3,3-Dimethyl octane	,,	601.5	,,	0.58	21.15	,,	6.50	588.42	,,	1.44
79.	3,4-Dimethyl octane	,,	608.8	,,	1.78	20.42	,,	3.13	587.29	,,	1.24
80.	3,5-Dimethyl octane	,,	598.8	,,	0.14	19.90	,,	0.61	593.26	,,	2.24
81.	3,6-Dimethyl octane	,,	599.4	,,	0.24	20.00	,,	1.10	589.99	,,	1.69
82.	4,4-Dimethyl octane	,,	600.4	,,	0.40	19.95	,,	0.85	592.98	,,	2.19
83.	4,5-Dimethyl octane	,,	604.6	,,	1.10	20.60	,,	3.98	577.90	,,	0.37
84.	4-Propyl heptane	,,	602.6	,,	0.77	20 20	,,	2.08	588.28	,,	1.40
85.	4-Isopropyl heptane	,,	599.7	,,	0.29	20.05	,,	1.32	588.00	,,	1.36
86.	3-Ethyl-2-methyl heptane	,,	608.8	,,	1.78	20.40	,,	3.04	587.43	,,	1.27

TABLE I—(*contd.*)

		M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
87.	4-Ethyl-2-methyl heptane	142.28	598.8	598.0	0.14	19 91	19.78	0 65	592.27	580.0	2.07
88.	5-Ethyl-2-methyl heptane	,,	598.4	,,	0 07	19.79	,,	0.06	593.97	,,	2.36
89.	3-Ethyl-3-methyl heptane	,,	607.0	,,	1.48	20.79	,,	4.84	575.48	,,	0.95
90.	4-Ethyl-3-methyl heptane	,,	611.4	,,	2.19	20.75	,,	4.67	580.60	,,	0.11
91.	5-Ethyl-3-methyl heptane	,,	601.0	,,	0.50	20 20	,,	2.08	586.15	,,	1.05
92.	3-Ethyl-4-methyl heptane	,,	611.3	,,	2.18	20.70	,,	4.45	581.03	,,	0.10
93.	4-Ethyl-4-methyl heptane	,,	611.0	,,	2.13	20.68	,,	4.35	582.02	,,	0.34
94.	2,2,3-Trimethyl heptane	,,	597.1	,,	0.15	20 02	,,	1.19	586.43	,,	1.10
95.	2,2,4-Trimethyl heptane	,,	582.0	,,	2.75	18.60	,,	6.35	615.88	,,	5.82
96.	2,2-5-Trimethyl heptane	,,	581.0	,,	2.92	19.30	,,	2.48	594.11	,,	2.38
97.	2,2,6-Trimethyl heptane	,,	581.0	,,	2.92	19.11	,,	3.50	599.52	,,	3.26
98.	2,3,3-Trimethyl heptane	,,	601.0	,,	0.50	20.42	,,	3.13	579.75	,,	0.04
99.	2,3,4-Trimethyl heptane	,,	606.0	,,	1.32	20.60	,,	3.98	580.17	,,	0.03
100.	2,3,5-Trimethyl heptane	,,	596.0	,,	0.34	19.05	,,	3.83	615.60	,,	5.77
101.	2,3,6-Trimethyl heptane	,,	593.0	,,	0.85	18.79	,,	5.26	621.43	,,	6.65
102.	2,4,4-Trimethyl heptane	,,	580.0	,,	3.10	16.70	,,	18.40*	683.46	,,	15.10*
103.	2,4,5-Trimethyl heptane	,,	596.0	,,	0 34	19.10	,,	3.56	615.31	,,	5.75

TABLE I – (*contd.*)

	M	Lit	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
104. 2,4,6-Trimethyl heptane	142.28	576.0	598.0	3.82	18.07	19.78	9.48	628.54	580.0	7.25
105. 2,5,5-Trimethyl heptane	,,	590.0	,,	1.36	18.74	,,	5.55	619 01	,,	6.30
106. 3,3,4-Trimethyl heptane	,,	609.0	,,	1.81	19.81	,,	0.15	604.07	,,	4.00
107. 3,3,5-Trimethyl heptane	,,	595.0	,,	0.55	19.15	,,	3.29	612.18	,,	5.22
108. 3,4,4-Trimethyl heptane	,,	609.0	,,	1.36	19.81	,,	0.51	604.07	,,	4.00
109. 3,4,5-Trimethyl heptane	,,	608.0	,,	1.80	19.95	,,	0.85	580.46	,,	0.79
110. 3-Isopropyl-2-methyl hexane	,,	606.0	,,	1.32	20.59	,,	3.94	579.03	,,	0.20
111. 3,3-Diethyl hexane	,,	613.0	,,	2.45	21.22	,,	6.77	566.37	,,	2.43
112. 3,4-Diethyl hexane	,,	605.0	,,	1.15	20.70	,,	4.45	576.19	,,	0.66
113. 3-Ethyl-2,2-dimethyl hexane	,,	600.0	,,	3.34	19.40	,,	1.96	609.05	,,	4.80
114. 4-Ethyl-2,2-dimethyl hexane	,,	581.0	,,	2.92	18.91	,,	4.61	604.50	,,	4.05
115. 3-Ethyl-2-3 dimethyl hexane	,,	612.0	,,	2.29	19 02	,,	3.99	632.67	,,	8.35
116. 4-Ethyl-2-3-dimethyl hexane	,,	609.0	,,	1.81	19.95	,,	0 85	602.22	,,	3.70
117. 3-Ethyl-2,4-dimethyl hexane	,,	609.0	,,	1.81	,,	,,	0.85	602.22	,,	3.70
118. 4-Ethyl-2,4-dimethyl hexane	,,	599.0	,,	0.17	19.30	,,	2 48	610.62	,,	5.05
119. 3-Ethyl-2,5-dimethyl hexane	,,	596.0	,,	0 34	19.01	,,	4.04	615.74	,,	5.80
120. 4-Ethyl-3,3-dimethyl hexane	,,	611.0	,,	2.12	20.01	,,	1.15	597.53	,,	2.94

TABLE I – (*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
121. 3-Ethyl-3,4-dimethyl hexane	142.28	619.0	598.0	3.40	20.04	19.78	1 30	595.11	580.0	2.54
122. 2,2,3,3-Tetramethyl hexane	,,	607.0	,,	0.17	20 22	,,	2.17	590.42	,,	1.78
123. 2,2,3,4-Tetramethyl hexane	,,	596.0	,,	0.34	19.20	,,	3.02	610.76	,,	4.97
124. 2,2,3,5-Tetramethyl hexane	,,	583.0	,,	2.57	18.15	,,	9.00	632.24	,,	8.25
125. 2,2,4,4-Tetramethyl haxane	,,	591.0	,,	1.18	18.65	,,	6.06	623.85	,,	7.05
126. 2,2,4,5-Tetramethyl haxaue	,,	583.0	,,	2.57	18.35	,,	7.62	624.70	,,	7.20
127. 2,2,5,5-Tetramethyl hexane	,,	566.0	,,	5.66	17.41	,,	13.60*	640.78	,,	9.50
128. 2,3,3,4-Tetramethyl hexane	,,	609.0	,,	1.81	19.42	,,	1.86	616.59	,,	5.95
129. 2,3,3,5-Tetramethyl hexane	,,	591.0	,,	0.51	18.81	,,	5.15	618.44	,,	6.21
130. 2,3,4,4-Tetramethyl hexane	,,	606.0	,,	1.32	19.52	,,	1.33	610.33	,,	4.95
131. 2,3,4,5-Tetramethyl hexane	,,	604.0	,,	0.99	19.48	,,	1.54	610.90	,,	5.05
132. 3,3,4,4-Tetramethyl hexane	,,	621.0	,,	3.70	20.75	,,	4.67	590.42	,,	1.78
133. 3-Isopropyl-2,4-dimethyl pentane	,,	600.0	,,	0.34	20.03	,,	1.25	589.70	,,	1.65
134. 3,3-Diethyl-2-methyl pentane	,,	621.0	,,	3.70	19 68	,,	0 51	620.43	,,	6.50
135. 3-Ethyl-2,2,3-trimethyl ,,	,,	618.0	,,	3.24	20.72	,,	4.53	589.71	,,	1.31
136. 3-Ethyl-2,2,4-trimethyl ,,	,,	597.0	,,	0.17	19.35	,,	2.22	602 37	,,	7.02

TABLE I—(*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
137. 3-Ethyl-2,3,4-trimethyl ,,	142.28	620.0	598.0	3.55	20.59	19.78	3.94	592 98	580.0	2.19
138. 2,2,3,3,4-Pentamethyl ,,	,,	619.0	,,	3.40	21.38	,,	7.50	570.78	,,	1.60
139. 2,2,3,4,4-Pentamethyl pentane	,,	606.0	,,	1.32	20.42	,,	3.13	583.59	,,	0.62
		Av. Error		2.19	Av. Error		3.38	Av. Error		2.96
II. Alkanes										
1. Cis-2-Butene	56.11	428.0	418.0	2.34	40.90	40.94	0.10	235.90	239.8	3.23
2. Trans-2.Butene	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,
3. Isobutene	,,	417.0	418.0	0.07	39.30	,,	4.17	240.00	,,	1.46
4. Cis-2-Pentene	70.13	483.0	466.0	3.52	35.10	35.64	1.54	302.50	286.0	1.92
5. Trans-2-Pentene	,,	472.0	,,	1.27	,,	,,	,,	295.60	,,	0.38
6. 2-Methyl-1-butene	,,	462.0	,,	0.44	34.40	,,	3.61	296.20	,,	0.17
7. 3-Methyl-1-butene	,,	443.0	,,	5.20	30.62	,,	16.40*	320.40	,,	7.30
8. 2-Methyl-1-butene	,,	477.0	,,	2.31	36.20	,,	1.55	289.50	,,	2.49
9. Cis-2-hexene	84.16	511.0	507.0	0.83	31.32	31.93	1.95	353.60	331.5	0.85
10. Trans-2-hexene	,,	509.0	,,	0.44	30.70	31 93	3.79	358.30	,,	2.14
11. Cis-3-hexene	,,	506.0	,,	0.20	,,	,,	,,	357.30	,,	1.88
12. trans-3-hexene	,,	507.0	,,	...	30.60	,,	4.35	359.30	,,	2.42

TABLE I—(*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc	Error %
13. 2-Methyl-1-pentene	84.16	498.0	507.0	1.80	30.40	31 93	5.03	355.5	331.5	1.35
14. 3-Methyl-1-pentene	,,	486.0	,,	4.32	28.38	,,	12.61*	359 80	,,	2.61
15. 4-Methyl-1-pentene	,,	485.0	,,	4.55	29.15	,,	9.55	360.60	,,	2.74
16. 2-Methyl-2-pentene	,,	508.0	,,	0.20	31.00	,,	3.00	354.77	,,	1.18
17. 3-Methyl-cis-2-pentene	,,	516.0	,,	1.74	32.01	,,	0.25	348.38	,,	0.64
18. 3-Methyl-trans-2-pentene	,,	511.0	,,	0.79	31.70	,,	0.72	349.30	,,	0.38
19. 4-Methyl-cis-2-pentene	,,	490.0	,,	3.47	29.60	,,	7.88	358.89	,,	2.30
20. 4-Methyl-trans-2-pentene	,,	493.0	,,	2.84	,,	,,	7.88	360.16	,,	2.66
21. 2-Ethyl-1-butene	,,	505.0	,,	0.40	31.20	,,	2.34	349.22	,,	0.40
22. 2,3-Dimethyl-1-butene	,,	490.0	,,	3.47	30.00	,,	6.43	353.43	,,	0.81
23. 3,3-Dimethyl-1-butene	,,	465.0	,,	9.05	27.70	,,	15.30*	365.88	,,	4.18
24. 2,3-Dimethyl-2-butene	,,	521.0	,,	2.69	32.70	,,	2.36	341.64	,,	2.62
25. Cis-2-heptene	98.18	545.0	540.0	0.92	28.60	28.04	1.91	398.02	404.50	1.38
26. Trans-2-heptene	,,	542.0	,,	0.37	28.20	,,	0.57	404.50	,,	...
27. Cis-3-heptene	,,	539.0	,,	0.19	28.10	,,	0.21	402.14	,,	0.59
28. Trans-3-heptene	,,	539.0	,,	0.19	27.70	,,	1.24	...	,,	...
29 2-Methyl-1-hexene	,,	534.0	,,	1.13	27.70	,,	1.24	...	,,	...

TABLE I – (*contd*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
30. 3-Methyl-1-hexene	98.18	522.0	540.0	3.45	27.40	28.04	2.34	406.66	404.50	0.53
31. 4-Methyl-1-hexene	,,	525.0	,,	2.86	27.50	,,	1.96	407.64	,,	0.77
32. 5-Methyl-1-hexene	,,	522.0	,,	3.45	26.42	,,	2.34	412.55	,,	1.95
33. 2-Methyl-1-hexene	,,	539.0	,,	0.19	28.30	,,	0.92	405.48	,,	0.24
34. 3-Methyl-cis-2-hexene	,,	539.0	,,	0.19	28.60	,,	1.91	400.57	,,	0.98
35. 3-Methyl-trans-2-hexene	,,	539.0	,,	0.19	28.60	,,	1.91	400.57	,,	0.98
36. 4-Methyl-cis-2-hexene	,,	527.0	,,	2.46	26.41	,,	6.17	412 35	,,	1 90
37. 4-Methyl-trans-2-hexene	,,	527.0	,,	2.46	26.98	,,	3.94	416.64	,,	2 92
38. 5-Methyl-cis-2-hexene	,,	533.0	,,	1.31	24.50	,,	14.40*	455.55	,,	11.20*
39. 5-Methyl-trans-2-hexene	,,	526.0	,,	2.66	23.90	,,	17.30*	465.37	,,	13.00*
40. 2-Methyl-cis-3-hexene	,,	525.0	,,	2.86	23.65	,,	18.55*	.....	.....	.....
41. 2-Methyl-trans-3-hexene	,,	525.0	,,	2.86	23.65	,,	18.55*	.....	.....	.....
42. 3-Methyl-cis-3-hexene	,,	541.0	,,	1.85	25.22	,,	11.55*	.....	.....	.....
43. 3-Methyl-trans-3-hexene	,,	538.0	,,	3.72	24.98	,,	12.25*	.....	.....	.....
44. 2-Ethyl-1-pentene	,,	539.0	,,	0.19	25.10	,,	11.70*	.....	.....	.....
45. 3-Ethyl-1-pentene	,,	523.0	,,	3.25	23.00	,,	21.90*	.....	.....	.....
46. 2,3-Dimethyl-1-pentene	,,	523.0	,,	3.25	23.90	,,	17.3*	.....	.....	.....

TABLE I—(*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
47. 2,4-Dimethyl-1-pentene	98.18	518.0	540.0	4.25	23.38	28.04	20.00*	.....	.....	.....
48. 3,3-Dimethyl-1-pentene	,,	513.0	,,	5.26	23.00	,,	21.9*	.....	.....	.....
49. 3,4-Dimethyl-1-pentene	,,	519.0	,,	7.05	23.62	,,	18.70*	468.31	404.50	13.60*
50. 4,4-Dimethyl-1-pentene	,,	503.0	,,	7.35	22.20	,,	26.10*	488.93	,,	17.30*
51. 3-Ethyl-2-pentene	,,	543.0	,,	0.55	25.42	,,	10.30*	450.64	,,	10.10*
52. 2,3-Dimethyl-2-pentene	,,	546.0	,,	1.10	25.58	,,	9 66	.....	.....	.....
53. 2,4-Dimethyl-2-pentene	,,	521.0	,,	3.64	23.41	,,	19 8	472.24	404.50	14.40*
54. 3,4-Dimethyl-cis-2-pentene	,,	529.0	,,	2.09	24.70	,,	13.5*	454.77	,,	11.20*
55. 3,4-Dimethyl-trans-2-pentene	,,	,,	,,	,,	,,	,,	13.5*	,,	,,	11.20*
56. 4,4-Dimethyl-ris-2-pentene	,,	517.0	,,	4.45	23.38	,,	20.0*	473.22	,,	14.50*
57. 4,4-Dimethyl-trans-2-pehtene	,,	510.0	,,	5.90	22.42	,,	25.00*	484.02	,,	16.50*
58. 2-Ethyl 3-methyl-1-butene	,,	532.0	,,	1.50	24.95	,,	12.40*	453.98	,,	10.90*
59. 2,3,3-Trimethyl-1-butene	,,	514.0	,,	5.06	23.22	,,	20.70*	470.28	,,	13.90*
60. Cis-2-octene	11.21	573.0	549.0	4.20	23.90	26.69	11.7*	448.84	,,	2.15
61. trans-2-octene	,,	572.0	,,	4.05	23.95	,,	11.45*	498.21	458.60	7.80
62. cis-3-octene	,,	570.0	,,	3.68	24.10	,,	10.75*	492.60	,,	6.92
63. trans-3-octene	,,	568.0	,,	3.35	23 62	,,	12.95*	498 21	,,	7.80

TABLE 1—(*contd.*)

		M	T_c Lit.	T_c Calc.	Error %	P_c Lit.	P_c Calc.	Error %	V_c Lit.	V_c Calc.	Error %
64.	Cis-4-octene	112.21	568.0	549 0	3.35	23.85	26.69	11.90*	495.96	458.60	7.55
65.	trans-4-octene	,,	567.0	,,	3.17	23.50	,,	13.60*	502.70	,,	8.80
66.	2-Methyl-1-heptene	,,	564.0	,,	2.66	23.62	,,	12.95*	497.09	,,	7.75
67.	3-Methyl-1-heptene	,,	551.0	,,	0.36	23.70	,,	12.50*	509.43	,,	9.99
68.	4-Methyl-1-heptene	,,	554.0	,,	0.91	23.20	,,	15.0*	501.57	,,	8.55
69.	5-Methyl-1-hentene	,,	554.0	,,	0.91	23.08	,,	13.60*	504.94	,,	9.20
70.	6-Methyl-1-heptene	,,	553.0	,,	0.73	24.82	,,	7.32	467.91	,,	1.99
71.	2-Methyl-2-heptene	,,	569.0	,,	3.52	25.70	,,	3.85	462.86	,,	0.92
72.	3-Methyl-cis-2-heptene	,,	569.0	,,	3.52	26.20	,,	1.87	456.91	,,	0.37
73.	3-Methyl-trans-2-heptene	,,	569.0	,,	3.52	,,	,,	1.87	456.91	,,	0.37
74.	4-Methyl-cis-2-heptene	,,	555.0	,,	1.08	25.20	,,	5.92	462.97	,,	0.95
75.	4-Methyl-trans-2-heptene	,,	555.0	,,	1.08	,,	,,	5.92	462.97	,,	0.95
76.	5-Methyl-cis-2-heptene	,,	562.0	,,	2.32	25.60	,,	4.26	460.73	,,	0.46
77.	5-Methyl-trans-2-heptene	,,	562.0	,,	2.32	,,	,,	,,	460.73	,,	0.46
78.	6-Methyl-cis-2-heptene	,,	560.0	,,	1.97	25.36	,,	5.25	464.32	,,	1.23
79.	6-Methyl-trans-2-heptene	,,	560.0	,,	1.97	,,	,,	5.25	,,	,,	1.23
80.	2-Methyl-cis-3-heptene	,,	551.0	,,	0.36	24 62	,,	8.25	470.15	,,	2.46

TABLE I – (*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
81. 2-Methyl-trans-3-heptene	112.21	551.0	549.0	0.36	24.62	26.69	8 25	470.15	458.60	2.46
82. 3-Methyl-cis-3-heptene	,,	567.0	,,	3.18	26.00	,,	2.65	456.80	,,	0.40
83. 3-Methyl-trans-3-heptene	,,	567.0	,,	3.18	,,	,,	,,	,,	,,	0.40
84. 4-Methyl-cis-3-heptene	,,	568.0	,,	3.34	,,	,,	,,	459.61	,,	0.22
85. 4-Methyl-trans-3-heptene	,,	568.0	,,	3.34	,,	,,	,,	,,	,,	0.22
86. 5-Methyl-cis-3-heptene	,,	552.0	549.0	0.54	24.90	,,	7.20	464.54	,,	1.28
87. 5-Methyl-trans-3-heptene	,,	552.0	,,	0.54	,,	,,	,,	,,	,,	1.28
88. 6-Methyl-cis-3-heptene	,,	556.0	,,	1.26	25.10	,,	6.33	465.89	,,	1.56
89. 6-Methyl-trans-3-heptene	,,	556.0	,,	1.26	,,	,,	,,	,,	,,	1.56
90. 2-Ethyl-1-hexene	,,	565.0	,,	2.84	25.75	,,	3.65	460.17	,,	0.34
91. 3-Ethyl-1-hexene	,,	550.0	,,	0.18	24.95	,,	7.00	462.41	,,	0.83
92. 4-Ethyl-1-hexene	,,	537.0	,,	2.24	20.19	,,	32.3*	559.36	,,	23.50*
93. 2,3-Dimethyl-1-hexene	,,	551.0	,,	0.36	25.20	,,	5.92	459.94	,,	0.29
94. 2,4-Dimethyl-1-hexene	,,	552.0	,,	0.54	25.22	,,	5.82	459.73	,,	0.25
95. 2,5-Dimethyl-1-hexene	,,	551.0	,,	0.36	24.82	,,	7.51	465.44	,,	1.47
96. 3,3-Dimethyl hexene	,,	541.0	,,	1.48	24.55	,,	8.73	461.74	,,	0.68
97. 3,4-Dimethyl-1-hexene	,,	554.0	,,	0.91	25.50	,,	4.67	456 47	,,	1.47

TABLE I – (*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
98. 3,5-Dimethyl-1-hexene	112.21	540.0	549.0	1.67	24.70	26.69	8.94	464.77	458.60	1.33
99. 4,4-Dimethyl-1-hexene	,,	546.0	,,	0.55	25.05	,,	6.33	458 82	,,	0.05
100. 4-5-Dimethyl-1-hexene	,,	550.0	,,	0.18	25.60	,,	4.26	453.10	,,	1.21
101. 5,5-Dimethyl-1-hexene	,,	538.0	,,	2.05	24.58	,,	8.60	460.17	,,	0.34
102. 3-Ethyl-cis-2-hexene	,,	569.0	,,	3.52	26.44	,,	0.95	452 20	,,	1.41
103. 3-Ethyl-trans-2-hexene	,,	569.0	,,	3.52	,,	,,	,,	,,	,,	1.41
104. 4-Ethyl-cis-2-hexene	,,	555.0	,,	1.08	25.60	,,	4.26	455 68	,,	0 64
105. 4-Ethyl-trans-2-hexene	,,	555.0	,,	1.08	25 60	,,	4.26	,,	,,	0.64
106. 2,3-Dimethyl-2-hexene	,,	570.0	,,	3.69	26.42	,,	1.01	453.32	,,	1.21
107. 2,4-Dimethyl-9-hexene	,,	551.0	,,	0.36	25.15	,,	6.14	460.73	,,	0.46
108. 2,5-Dimethyl-2-hexene	,,	553.0	,,	0.74	25.30	,,	5.50	459.38	,,	0.17
109. 3,4-Dimethyl-cis-2-hexene	,,	562.0	,,	2.38	26.12	,,	2.18	449.96	,,	1.88
110. 3,4-Dimethyl-trans-2-hexene	,,	562.0	,,	2.31	26.12	,,	2.18	,,	,,	1.88
111. 3,5-Dimethyl-cis-2-hexene	,,	554.0	,,	0.91	25.60	,,	4.26	455.57	,,	0.67
112. 3,5-Dimethyl-trans-2-hexene	,,	554.0	,,	0.91	25.60	,,	,,	,,	,,	0.67
113. 4,4-Dimethyl-cis-2-hexene	,,	545.0	,,	0.74	25.30	,,	5.5	453.10	,,	1.21
114. 4,4-Dimethyl-trans-2-hexene	,,	545.0	,,	0.74	25.30	,,	,,	453.10	,,	1.21

TABLE I – (*contd.*)

		M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
115.	4,5-Dimethyl-cis-2-hexene	112.21	551.0	549.0	0.36	25.42	26.69	5.00	454.86	458.60	0.89
116.	4,5-Dimethyl-trans-2-hexene	,,	551.0	,,	0.36	25.42	,,	5.00	458.60	,,	0.89
117.	5,5-Dimethyl-cis-2-hexene	,,	544.0	,,	0.92	24.68	,,	8.25	463.20	,,	0.99
118.	5,5-Dimethyl-trans-2-hexene	,,	539.0	,,	1.86	24.20	,,	10.30*	467.91	,,	2.08
119.	3-Ethyl-3-hexene	,,	560.0	,,	3.75	25 82	,,	3.36	455.23	,,	0.74
120.	2,2-Dimethyl-cis-3-hexene	,,	542.0	,,	1.29	25.58	,,	4.35	463.42	,,	1.04
121.	2,2-Dimethyl-cis-3-hexene	,,	533.0	,,	3.02	23.83	,,	12.00*	470.04	,,	4.57
122.	2,3-Dimethyl-cis-3-hexene	,,	557.0	,,	1.44	25.78	,,	3.52	454.45	,,	0.92
123.	2,3-Dimethyl-trans-3-hexene	,,	557.0	,,	1.44	25.78	,,	3.52	454.45	,,	0.92
124.	2,4-Dimethyl-cis-3-hexene	,,	548.0	,,	0.18	24.97	,,	6 88	461.18	,,	0.56
125.	2,4-Dimethyl-trans-3-hexene	,,	545.0	,,	0.74	24.53	,,	8 80	466 90	,,	1.78
126.	2,5-Dimethyl-cis-3-hexene	,,	537.0	,,	2.24	24.51	,,	8.89	460.39	,,	0.38
127.	2,5-Dimethyl-trans-2-hexene	,,	537.0	,,	2.24	24.51	,,	8.89	460.39	,,	0.38
128.	3,4-Dimethyl-cis-3-hexene	,,	572 0	,,	4.02	26.98	,,	1.07	445.47	,,	0.70
129.	3,4-Dimethyl-trans-3hexene	,,	572.0	,,	4.02	26.98	,,	1.07	445.47	,,	0.70
130.	2-n-Propyl-1-pentene	,,	561.0	,,	2 14	25.48	,,	4.74	462 64	,,	0.87
131.	2-Isopropyl-1-pentene	,,	555.0	,,	1.08	25.59	,,	4.29	455.68	,,	0.64

TABLE I—(*contd.*)

	M	Lit	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
132. 2-Ethyl-3-methyl-1-pentene	112.21	555.0	549.0	1 08	25.74	26 69	3.69	453.10	458 60	1.15
133. 2-Ethyl-4-methyl-1-pentxne	,,	550.0	,,	0.18	24.95	,,	6.97	463.20	,,	0.99
134. 3-Ethyl-2-methyl-1-pentene	,,	552.0	,,	0 66	25.72	,,	3.77	451.08	,,	0.33
135. 3-Ethyl-3-methyl-1-pentene	,,	555.0	,,	1.08	25.72	,,	3.77	453.21	,,	1.19
136. 3-Ethyl-4-methyl-1-pentene	,,	546.0	,,	0.55	25.01	,,	6.71	458.71	,,	0.03
137. 2,3,3-Trimethyl-1-pentene	,,	549.0	,,	.....	25.59	,,	4.29	448.84	,,	2.18
138. 2,3,4-Trimethyl-1-pentene	,,	549.0	,,	.....	25.61	,,	4.21	450.52	,,	1.77
139. 2,4,4-Trimethyl-1-pentene	,,	537.0	,,	2.24	24.55	,,	4.64	460.06	,,	0.32
140. 3,3,4-Trimethyl-1-pentene	,,	544.0	,,	0.92	25.56	,,	4.42	447.71	,,	2 43
141. 3,4,4-Trimethyl-1-pentene	,,	541.0	,,	1.48	24.98	,,	6.84	455 01	,,	0.79
142. 3-Ethyl-2-methyl-2-pentene	,,	563.0	,,	2.50	26.38	,,	1.17	448.39	,,	0 28
143. 3-Ethyl-4-methyl-cis-2-pentene	,,	562.0	,,	2.31	26.34	,,	1.32	448.27	,,	2 31
144. 3-Ethyl-4-methyl-trans-2- ,,	,,	558.0	,,	1.61	25.94	,,	2.89	451.98	,,	1.47
145. 2,3,4-Trimethyl-2-pentene	,,	562.0	,,	2.31	26.33	,,	1.36	448.50	,,	2.26
146. 2,4,4-Trimethyl-2-pentene	,,	543.0	,,	1.11	24.96	,,	6.93	457.03	,,	0 35
147. 3,4,4-Trimethyl-cis-2-Pentene	,,	556.0	,,	1.26	26.23	,,	1.75	445.36	,,	2.97
148. 3,4,4-Trimethyl-trans-2 ,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	2.97

TABLE I – (*contd.*)

	M	T_c Lit.	T_c Calc.	Error %	P_c Lit.	P_c Calc	Error %	V_c Lit.	V_c Calc.	Error %
149. 2-Isopropyl-3-methyl-1-pentene	112.21	542.0	549.0	1.29	25.12	26.29	6.25	453.32	458.60	1.17
150. 2-Ethyl-3,3-dimethyl-1-butene	,,	552.0	,,	0.66	25.62	,,	4,17	452.76	,,	1.29
	Average	error		1.99	Av. error		4.23	Av. error		1.78
III. Alkyal Benzene										
1. Isopropyl benzene	120.19	636.0	623.5	1.97	30 90	32.36	4.72	437.60	437.60	0.45
2. 1,2,3-Trimethyl benzene	,,	668.0	,,	6.66	,,	,,	,,	439.58	,,	0.45
3. 1,2,4-Trimethyl benzene	,,	654.5	,,	4.75	32.00	32.36	1.13	429.04	,,	1.53
4. 1,3,5-Trimethyl benzene	,,	642.0	,,	2.88	,,	,,	,,	429.04	,,	1.53
5. o-Ethyltoluene	,,	653.0	,,	4.52	30 98	,,	4.46	439.58	,,	0.45
6. m-Ethyltolueue	,,	636.0	,,	1.96	,,	,,	,,	439.58	,,	0.45
7. p-Ethyltoluene	,,	636.0	,,	1.96	,,	,,	,,	439.58	,,	0 45
8. Isobutyl benzene	134.21	635.0	645.4	1.50	26.00	29.31	12.70*	490.00	495.20	1.06
9. sec-Butyl benzene	,,	645.0	,,	0.06	26.40	,,	11.00*	510.66	,.	3.12
10. tert-Butyl benzene	,,	639 0	,,	0.91	26.30	,,	11.50*	490.00	,,	1.06

TABLE I—(*contd.*)

		M	T_c Lit.	T_c Calc.	Error %	P_c Lit.	P_c Calc.	Error %	V_c Lit.	V_c Calc.	Error %
11.	o-propyltoluene	134.21	664.5	645.4	2.90	29.30	29.31	0.03	490 00	495.20	1.06
12.	m-propyltoluene	,,	657.4	,,	1 83	28.58	,,	2.55	470.94	,,	4.90
13.	p-propyltolune	,,	659.1	,,	2 08	27.76	,,	5.60	490.00	,,	1.06
14.	o-Isopropyltolune	,,	654.2	,,	1.35	26.42	,,	10.90*	,,	,,	1.06
15.	m-Isopropyltolune	,,	647.9	,,	0.39	,,	,,	,,	,,	,,	1.06
16.	p-Isopropyltolune	,,	650.1	,,	0.73	26 40	,,	11.00*	489.00	,,	1.09
17.	1,2-Diethyl benzene	,,	662.6	,,	1.09	29.10	,,	0.72	489.86	,,	1.08
18.	1,3-Diethyl benzene	,,	656.9	,,	1.68	28.82	,,	1.70	467.72	,,	8.00
19.	1,4-Diethyl benzene	,,	660.3	,,	2.25	28.35	,,	3.38	478.19	,,	3.56
20.	2-Ethyl-1-3-dimethyl benzene	,,	674.0	,,	4.25	30.60	,,	4.22	446.11	,,	11.00*
21.	2-Ethyl-1,4-dimethyl benzene	,,	667.4	,,	3.45	29.34	,,	0 10	460.47	,,	7.50
22.	3-Ethyl-1,2-dimethyl benzene	,,	679.9	,,	5.10	30.90	,,	5.15	446.38	,,	10 90*
23.	4-Ethyl-1,2-dimethyl benzene	,,	671.6	,,	3.90	30.10	,,	2.62	452.01	,,	9.55
24.	4-Ethyl-1,3-dimethyl benzene	,,	669.4	,,	3.60	29.80	,,	1.64	456.04	,,	8.60
25.	5-Ethyl-1,3-dimethyl benzene	,,	660.8	,,	0.67	29.80	,,	1.64	458.46	,,	8.00
26.	1,2,3,4-Tetramethyl benzene	,,	699.9	,,	7.82	32 30	,,	9.25	435.64	,,	13.70*
27.	1,2,3,5-Tetramethyl benzene	,,	686.6	,,	6.00	31.62	,,	7.30	436.18	,,	13.60*

TABLE I—(*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_f Calc.	Error %
28. 1,2,4,5-Tetramethyl benzene	134.21	684.4	645.4	5.70	31.60	29.31	7.25	438.58	495.20	12.90*
29. (1-Methyl butyl) benzene	148.24	658.4	656.4	0.31	24.90	26.22	5.30	536.29	552.50	3.02
30. (1-Ethyl propyl) benzene	,,	,,	,,	0.31	,,	,,	,,	551.71	,,	0.15
31. (Methyl butyl) benzene	,,	666.6	,,	1.54	25.18	,,	4.13	,,	,,	0.15
32. Isopentyl benzene	,,	668.6	,,	1.84	25.00	,,	4.80	,,	,,	0.15
33. (1,1-Dimethyl propyl) benzene	,,	663.3	,,	1.04	25.82	,,	1.55	,,	,,	0.15
34. (1,2-Dimethyl propyl) benzene	,,	655.9	,,	0.08	25.30	,,	3.63	,,	,,	0.15
35. (2,2-Dimethyl propyl) benzene	,,	651.1	,,	0.82	24.70	,,	6.16	,,	,,	0.15
36. 1-n-Butyl-2-methyl benzene	,,	684.0	,,	4.05	26.20	,,	0.77	,,	,,	0.15
37. 1-n-Butyl-3-methyl benzene	,,	677.7	,,	3 07	25.42	,,	3.14	,,	,,	0.15
38. 1-n-Butyl-4-methyl benzene	,,	680.2	,,	3.50	,,	,,	3.14	,,	,,	0.15
39. 1-sec-Butyl-2 methyl benzene	,,	667.6	,,	1.68	25.70	,,	2.02	,,	,,	0.15
40. 1-sec-Butyl-3-methyl benzene	,,	662.3	,,	0.89	24.99	,,	4.94	,,	,,	0.15
41. 1-sec-Butyl-4-methyl benzene	,,	667.8	,,	1.71	25.42	,,	3.14	551.41	,,	0.20
42 o-Isobutyltoluene	,,	666.8	,,	1.56	25.52	,,	2.74	,,	,,	0.20
43. 1-Isobutyl-3-methyl benzene	,,	662.1	,,	0.86	24.98	,,	4.98	,,	,,	0.20
44. 1-Isobutyl-4-methyl benzene	,,	664 6	,,	1.23	24.98	,,	,,	,,	,,	0.20

TABLE I—(*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
45. 1-tert-butyl-2-methyl benzene	148.24	677.2	656.4	1.34	26.50	26.22	1.06	551.41	552.50	0.20
46. 1-tert-butyl-3-methyl benzene	,,	657.5	,,	0.17	25.30	,,	3.63	,,	,,	0.20
47. 1-tert-butyl-4-methyl benzene	,,	661.7	,,	0.80	25.20	,,	4.05	,,	,,	0.20
48. 1-Lthyl-2-n-propyl benzene	,,	678.2	,,	3.22	26.22	,,	...	,,	,,	0.20
49. 1-Ethyl-3-n-propyl benzene	,,	673.1	,,	2.49	25.60	,,	2.41	,,	,,	0.20
50. 1-Ethyl-4-n-propyl benzene	,,	678.4	,,	3.25	,,	,,	,,	,,	,,	0.20
51. 1-Ethyl-2-isopropyl benzene	,,	665.8	,,	1.41	26.22	,,	...	,,	,,	0.20
52. 1-Ethyl-3-isopropyl benzene	,,	659.7	,,	0.50	24.98	,,	4.98	,,	,,	0.20
53. 1-Ethyl-4-isopropyl benzene	,,	666.6	,,	1.58	25.22	,,	3.98	,,	,,	0.20
54. 1,2-Dimethyl-3-n-propyl benzene	,,	691.0	,,	5.00	27.20	,,	3.60	,,	,,	0.20
55. 1,2-Dimethyl-4-n-propyl benzene	,,	686.0	,,	4.31	26.30	,,	0.30	,,	,,	0.20
56. 1,3-Dimethyl-2-n-propyl benzene	,,	686.5	,,	4.38	27.00	,,	2.89	,,	,,	0.20
57. 1,3-Dimethyl-4-n-propyl benzene	,,	682.9	,,	3.88	26.35	,,	0.50	,,	,,	0.20
58. 1,3-Dimethyl-5-n-propyl benzene	,,	674.8	,,	2.74	25.60	,,	2.42	,,	,,	0.20
59. 1,4-Dimethyl-2-n-propyl benzene	,,	679.6	,,	3.42	26.20	,,	0.77	,,	,,	0.20
60. 1,2-Dimethyl-3-isopropyl ,,	,,	679.3	,,	3.38	26.70	,,	1.80	,,	,,	0.20
61. 1,2-Dimethyl-4-isopropyl ,,	,,	675.8	,,	2.87	26.00	,,	0.83	,,	,,	0.20

TABLE I – (*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
62. 1,3-Dimethyl-2-isopropylbenzene	148.24	674.6	6564	2-71	26.22	26.22	1.06	551.41	552.50	0 20
63 Dimethyl-4-isopropyl benzene	,,	671.9	,,	2.31	25.82	,,	1.55	,,	,,	,,
64. 1,3-Dimethyl-5-isopropylbenzene	,,	663.7	,,	1.10	25.42	,,	3.42	,,	,,	,,
65. 1,4-Dimethyl-2-isopropylbenzene	,,	668.6	,,	1.83	26.00	,,	0.83	,,	,,	,,
66. 2,3-Dimethyl-1-methyl benzene	,,	686.0	,,	4.31	27.20	,,	3 70	,,	,,	,,
67. 2,4-Dimethyl-1-methyl benzene	,,	681.1	,,	3.62	26.40	,,	0.68	,,	,,	,,
68. 2,5-Dimethyl-1-methyl benzene	,,	684.2	,,	4.07	26.42	,,	0.75	,,	,,	,,
69. 2,6-Dimethyl-1-methyl benzene	,,	689.1	,,	4.75	27.22	,,	3.70	,,	,,	,,
70. 3,4-Dimethyl-1-methyl benzene	,,	679.3	,,	3.38	26.32	,,	0.38	,,	,,	,,
71. 3,5-Dimethyl-1-methyl benzene	,,	673.1	,,	2.48	25.61	,,	2.38	,,	,,	,,
72. 2-Ethyl-1,3,5-trimethyl benzene	,,	692.2	,,	5.14	26.90	,,	2.53	,,	,,	,,
73. 3-Ethyl-1,2,4-trimethyl benzene	,,	700.1	,,	6.22	27 60	,,	5.00	,,	,,	,,
74. 4-Ethyl-1,2,3-trimethyl benzene	,,	707.3	,,	7.19	27.30	,,	3.95	,,	,,	,,
75. 5-Ethyl-1,2-3-trimethyl benzene	,,	698.1	,,	6.00	27.42	,,	4.36	,,	,,	,,
76. 5-Ethyl-1,2-4-trimethyl benzene	,,	693.0	,,	5.29	26.95	,,	2.71	,,	,,	,,
77. 6-Ethyl-1,2-4-trimethyl benzene	,,	694.8	,,	5.54	27.42	,,	4.31	,,	,,	,,
78. Pentamethyl benzene	,,	725.1	,,	9.48	29 50	,,	11.10*	,,	,,	,,

TABLE I—(*contd.*)

		M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
79.	o-Di-isopropl benzene	162.27	668.8	665.4	0.51	24.15	23.76	1.62	582.83	552.5	5.2
80.	m-Di-isopropyl benzene	,,	664.2	,,	0.18	23.20	,,	2.41	,,	,,	5.2
81.	p-Di-isopropyl benzene	,,	674.6	,,	1.37	23.22	,,	2.31	584.13	.,	5.4
			Av. Error		3.33	Av. Erroe		2.98	Av. Error		1.25
IV.	*Alkyl Napththalenes*:										
1.	Naphthalene	128.17	742.0	745.0	0.41	39.10	37.50	4.27	408.15	396.50	2.86
2.	1-Methylnaphthalene	142.19	769.0	757.0	1.57	35.10	34.23	2.48	445.05	452.10	1.60
3.	2-Methyl naphthalnene	,,	761.7	,,	0.62	34.60	,,	1.07	...	...	...
4.	1-Ethyl naphthalene	156.22	775.4	770.0	0.68	30.60	31.23	2.06	480.65	508.00	5.75
5.	2-Ethyl naphthalene	,,	771.6	,,	0.28	31.22	,,	0.03	...	...	...
6.	1,2-Dimethyl naphthalene	,,	784.0	,,	1.79	32.22	,,	3.04	473.31	508.00	7.35
7.	1,3-Dimethyl naphthalene	,,	781.0	,,	1.41	32.70	,,	4.50	473.31	,,	7.35
8.	1-4-Dimethyl naphthalene	,,	790.0	,,	2.53	33.20	,,	5.94	469.09	,,	7.82
9.	1,5-Dimethyl naphthalene	,,	781.0	,,	1.42	31.70	,,	1.48	473.31	,,	7.35
10.	1,6-Dimethyl naphthalene	,,	778.0	,,	1.03	31.80	,,	1.79	472.53	,,	7.52
11.	1,7-Dimethyl naPhthalene	,,	778.0	,,	1.03	,,	,,	,,	,,	,,	,,

TABLE I – (*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
12. 1, 8-Dimethyl naphthalene	156.22	778.0	770.0	2.29	31.70	31.23	1 48	520.64	508.0	2.43
13. 2, 3-Dimethyl naphthalene	,,	785.0	,,	1.91	,,	,,	,,	513 95	,,	1.15
14. 2, 6-Dimethyl naphthalene	,,	777.0	,,	0.90	,,	,,	,,	507.68	,,	0.07
15. 2, 7-Dymethyl naphthalene	,,	778.0	,,	1.03	31.80	,,	1.79	507.68	,,	,,
16. 1-n-Propyl naphthalene	170.245	781.0	,,	28.80	28.93	0.45	,,	566.89	,,	10.40
17. 2-n-Propyl naphthalene	,,	779.9	,,	0.14	25.20	,,	14.80*	563.49	,,	0.02
18. 1-n-Butyl naphthalene	184.27	791.6	791.6	0.08	25.60	26.13	2.07	609.90	619.0	1.50
19. 2-n.Butyl naphthalene	,,	793.2	,,	0.28	25.10	,,	4.11	609-90	,,	1.50
20. 1-n-Pentyl naphthalene	198.30	804.0	800.0	0,50	23.42	24.03	2.60	670.22	674.00	0.57
21. 2-n-Pentyl naphthalene	,,	806.2	,,	0.77	22.70	,,	5.85	670.22	,,	,,
22. 1-n-Hexyl naphthalene	212.32	812.3	811.0	0.16	21.00	21.93	4.42	726.13	730.76	0.64
23. 2-n-Hexyl naphthalene	,,	813.2	811.0	0.27	20.70	,,	5.95	,,	,,	,,
24. 1-n-Heptyl naphthalene	226.35	826.1	816.0	1.22	19.55	20.03	2.45	776.34	786.40	1.34
25. 2-n-Heptyl naphthalene	,,	825.8	,,	1 19	19.30	20.03	3.78	,,	,,	,,
26. 1-n-Octyl naphthalene	240.37	836 3	828 0	0.99	18.10	18.23	0.78	,,	,,	,,
27. 2-n-Octyl naphthalene	,,	835.9	,,	0.95	17.80	,,	2.42	848.50	853.00	0.53

TABLE I—(*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc.	Error %
28. 1-n-Nanyl naphthalene	254.40	848.2	835.0	1.54	16.67	16.13	3.24	895.45	897.50	0.23
29. 2-n- Nonyl naphthalene	,,	546.0	,,	1.37	16 40	,,	1.65	,,	,,	0.23
30. 1-n-Decyl naphthalene	268.43	857.5	841.0	1.93	15.45	15.03	2.75	1063.45	9.53.30	10.30*
31. 2-n-Decyl naphthalene	,,	855.9	,,	1.86	15.21	,,	1.58	952.89	,,	0.05
32. 1-n-Undecyl naphthalene	282.45	867.4	846.0	2.47	14.54	14.03	3.50	1008.24	1009.0	0.06
33. 2-n-Undecyl naphthalene	,,	865.9	,,	2.30	14.28	,,	1.75	,,	,,	0.06
34. 1-n-Dodecyl naphthalene	296.48	875.7	854.0	2.48	13 48	11.93	13.00*	1067.29	1067.0	0.03
35. 2-n-Dodecyl naphalene	,,	873.1	,,	2.19	13.25	,,	11.10*	,,	,,	0 03
		Average Error		1.18	Average Error		2.62	Average Error		2.27
V. Styrenes										
1. Styrene	104.15	636.7	649.0	1.94	38.00	38.40	1.08	,,	,,	,,
2. α-Methylstyrene	118.17	654.7	670.0	2.34	33.57	35.20	4.86	,,	,,	,,
3. β-Methylstyrene	,,	662.5	,,	1.13	34.20	,,	2.92	,,	,,	,,
4. O-Methylstyrene	,,	657.4	,,	1.92	36.30	,,	3.13	,,	,,	,,
5. m-Methylstyrene	,,	622.0	,,	1.21	34.07	,,	3.26	,,	,,	,,
6. p-Methylstyrene	,,	655.5	,,	0.68	34.85	,,	,,	,,	,,	,,

TABLE I—(*contd.*)

	M	Lit.	T_c Calc.	Error %	Lit.	P_c Calc.	Error %	Lit.	V_c Calc	Error %
7. m and p-Vinyltoluene	118.17	655.0	270 0	2.29	41.50	35.20	15.50*			
8. m-Ethylstyrene	132.20	676.2	685 0	1 30	31.82	32.50	2.14			
9. p-Ethyl styrene	,,	681.0	685.0	0.59	28.60	,,	13.60*			
10. p-Isopropyl styrene	146.22	682.2	705 0	3.34	28.80	29.5	2.45			
11. p-Isopropyl-α-methyl styrene	160.25	695.3	719.0	3.40	28.35	27.60	2.71			
12. o-Chlorostyrene	138.60	696.6	697 0	0 06	34.30	31.28	8.30			
13. p-Chlorostyrene	,,	700.4	697.0	0.49	33.20	31.28	3.30			
14. O-Bromostyrene	183.10	726.0	739.0	1.76	34.80	24 65	29 20			
15. p-Bromostyrene	183.10	726.4	739.0	1.74	33.80	24.65	29.00*			
	Average Error			1 61	Average Error		3 19			
VI, Cyclopentanes :										
1. 1,1-Dimethyl cyclopentane	98.18	550.0	559 70	1 77	35.00	34.45	1.57	350.50	366 53	4.57
2. Cis-1,2-Dimethyl cyclopentane	,,	565 0	,,	0 94	34.10	,,	1 03	363.27	,,	0.90
3. trans-1,2-Dimethyl cyclopentane	,,	555.0	559.7	0 85	,,	,,	1.03	,,	,,	0 90
4. Cis-1,3-Dimethyl cyclopentane	,,	,,	,,	,,	34.03	,,	1.22	,,	,,	0.90
5. trans-1,3-Dimethyl cyclopentane	,,	,,	,,	,,	35.00	,,	1.57	,,	,,	,,

TABLE 1—(*contd.*)

		M	T_c Lit.	T_c Calc.	Error %	P_c Lit.	P_c Calc.	Error %	V_c Lit.	V_c Calc.	Error %
6.	Isopropyl cyclopentane	112.21	585 1	582.7	0.41	27.10	27.46	1.33	.....	.....	.....
7.	1-Ethyl-1-methyl cyclopentane	,,	577.7	,,	0 87	27 80	,,	2.46	417 08	417 78	0.17
8.	Cis-1-Ethyl-2-methyl	,,	587.7	,,	0.85	27 70	,,	0.87	,,	,,	,,
9.	trans-1-Ethyl-2-methyl	,,	575.7	582.7	1.27	26.60	,,	3 23	426 62	,,	2.07
10.	Cis-1-Ethyl-3-methyl	,,	575.5	,,	1.25	26.50	,,	3 62	423.36	,,	1.32
11.	trans-1-Ethyl-3-methyl	,,	573.6	,,	1.59	26 00	,,	5 62	426.62	,,	2.07
12.	1,1,2-Trimethyl	,,	565.1	,,	3.10	25.50	,,	7.70	,,	,,	,,
13.	1,1,3-Trimethyl	,,	549.2	,,	6.12	24.30	,,	13.00*	431.55	,,	3.20
14.	1,Cis-2,cis-3-trimethyl	,,	580.4	,,	0.40	26.50	,,	3.62	423.36	,,	1 32
15.	1,Cis-2-trans-3-trimethyl	,,	570.2	,,	2.20	25.90	,,	6 01	426 62	,,	2.07
16.	1,trans-2,cis-3-trimethyl	,,	557.4	582.7	4.55	24 80	,,	10.70*	431 55	,,	3.20
17.	1,cis-2,cis-4-trimethyl	,,	571.7	582.7	1.93	25.80	,,	6.44	,,	,,	,,
18.	1,cis-2,trans-4-Trimethyl	,,	568.4	582 7	2 52	25.62	,,	7.17	428.30	427.08	2.46
19.	1,trans-2,cis-4-trimethyl	,,	555.2	,,	4.95	24.95	,,	10.10*	,,	,,	,,
			Average Error		1.96	Average Error		3.40	Average Error		1.76

TABLE I—(*contd.*)

	M	T_c Lit.	T_c Calc.	Error %	P_c Lit.	P_c Calc.	Error %	V_c Lit.	V_c Calc.	Error %
Cyclopentenes										
1. Cyclopentene	68.12	504.0	526.0	4.07	44.90	44.18	1.61	246.09	246.25	0.07
2. 1-Methylcyclopentene	82.14	542.0	544.0	0.37	38.83	38.20	1.59	300.46	307.27	2.23
3. 3-Methylcyclopentene	,,	523.0	544.0	4.02	37.80	38.20	1.06	306.79	,,	0.16
4. 4-Methyl cyclopentene	,,	541.0	544.0	0.56	39.00	,,	2.05	297.92	,,	3.14
5. 1-Ethylcyclopentene	96.17	572.0	578.0	0.35	38.80	32.74	3.14	363.86	368.22	1.2
6. 3-Ethylcyclopentene	,,	561.0	578.0	3.03	32.70	,,	0.12	367.42	,,	0.22
7. 4-Ethyl cyclopentene	,,	575.0	,,	0.53	32.80	,,	0.18	374.83	,,	1.76
8. 1,2-Dithyl cyclopentene	,,	574.0	,,	0.70	33.40	,,	1.97	366.85	,,	0.37
9. 1,34-Dimethylcyclopentene	,,	549.0	,,	5.30	31.70	,,	3.32	379.73	,,	3.02
10. 1,4-Dimethyl cyclopentene	,,	553.0	578.0	4.52	30.40	,,	7.70	390.21	,,	5.60
11. 1,5-Dimethyl cyclopentene	,,	565.0	578.0	2.30	32.80	32.74	0.18	365.02	368.22	0.88
12. 3,3-Dimethyl cyclopentene	,,	543.0	578.0	6.45	30.62	,,	6.90	377.33	,,	2.42
13. 4,4-Dimethyl cyclopentene	,,	544.0	,,	6.25	30.90	,,	5.95	383.77	,,	4.07
		Average Error		2.95	Average Error		2.75	Average Error		1.93

TABLE I – (*contd.*)

	M	T_c Lit	T_c Calc.	Error %	P_c Lit.	P_c Calc.	Error %	V_c Lit.	V_c Calc.	Error %
Cyclohexanes										
1. Cyclohexane	84.16	554.0	534.0	3.50	40 60	40.44	0 39	.....	.....	.....
2. Methyl cyclohexane	98 18	572.1	558 0	2.46	34.30	35.84	2.80	.....	.....	.....
3. Ethyl cyclohexane	112.21	594.3	596.0	0.43	27.50	27.41	0.33	.....	.....	.....
4. 1,1-Dimethyl cyclohexane	,,	575.0	597.0	3.83	25.40	,,	7 90	.....	.....	.....
5. 1,cis-2-Dimethyl cyclohexane	,,	592.7	597.0	0.73	27.20	,,	0 79	.....	.....	.....
6. 1,tran-2-Dimethyl cyclohexane	,,	580.5	597.0	2.82	25.82	,,	6.15	.....	.....	.....
7. 1,cis-3-Dimethyl cyclohexane	,,	574.0	597.0	4.00	25.60	,,	7.07	.....	.....	.....
8. 1,trans-3-Dimethyl cyclohexane	,,	582.5	,,	2.50	25.50	,,	3.42	.....	.....	.....
9. 1,cis-4-Dimethyl cyclohexane	,,	582.0	,,	2.58	26.30	,,	4.22	.....	.....	.....
10. 1,trans-4-Dimethyl cyclohexane	,,	572.0	,,	4.40	24.90	,,	10.01*	.....	.....	.....
		Av. Error		2.73	Av. Error		3.67			
Cyclohexenes										
1. Cyclohexene	82.14	559.0	552.5	1.16	41.70	41.70	.....	285.27	287.53	0.80
2. 1-Methyl cyclohexene	96.17	584.0	575.5	1.46	35.20	35.21	0.03	353.79	353.00	0.23

TABLE I—(*concld.*)

	M	T_c Lit.	T_c Calc.	Error %	P_c Lit.	P_c Calc.	Error %	V_c Lit.	V_c Calc.	Error %
3. 3-Methyl cyclohexene	96.17	574.0	575.5	0.26	34.60	35.21	1.76	354.08	353.00	0.31
4. 4-Methyl cyclohexene	,,	572.0	,,	0.61	,,	,,	1.76	353.41	,,	0.21
5. 1-Ethyl cyclohexene	110.19	612.0	597.5	2.37	31.42	30.00	4.51	411.66	406.34	1.30
6. 3-Ethyl cyclohexene	,,	608.0	,,	1.73	30.62	,,	2.06	419.71	,,	3.19
7. 4-Ethyl cyclohexene	,,	605.0	,,	1.24	30.60	,,	2.00	417.84	,,	2.76
8. 1,2-Dimethyl cyclohexene	,,	613.0	,,	2.53	31.20	,,	3.85	415.19	,,	2.13
9. 1,3-Dimethyl cyclohexene	,,	610.0	,,	2.05	30.30	,,	0.99	421.03	,,	3.50
10. 1,4-Dimethyl cyclohexene	,,	596.0	,,	0.25	30.16	,,	0.53	414.97	,,	2.09
11. 1,5-Dimethyl cyclohexene	,,	596.0	,,	0.25	30.15	,,	0.50	415.85	,,	2.28
12. 1,6-Dimethyl cyclohexene	,,	606.0	,,	1.40	30.90	,,	2.90	410.00	,,	0.90
13. 3,3-Dimethyl cyclohexene	,,	683.0	,,	12.50*	30.00	,,	.....	,,	,,	,,
14. 4,4-Dimethyl cyclohexene	,,	579.0	,,	3.22	29.80	,,	0.67	409.79	,,	0.85
		Av Error		1.43	Av. Error		1.54	Av. Error		1.52

TABLE 2

Values of Constants in equation 1 Hydrocarbons and related compounds.

		$T_t = n_1(\log M) + c_1$				Group contribution Technique			
						Lyderson's method		Eduljee's method	
	Series	Number considered	n_1	C_1	% Error average	Number considered	% Error average	Number considered	% Error average
1.	Alkanes	139	478.0	−431 0	2.19	29	0 25	Heptene Octane Nonane Isomers	8 17	0 28 1.07
2.	Alkenes	150	497 6	451 0	1.99	4	0.52	.....		.....
3.	Alkyl Benzenes	81	232.8	150.4	2.82	10	1.10	.....		.....
4.	Alkyl Napthalenes	32	301 0	110.0	1.18	.....	.....	.....		.....
5.	Styrenes	15	350 0	−55.0	1.61	.....	.....	.....		.....
6.	Cyclopeutanes	19	374.0	−186.0	1 96	.....	.....	.....		.....
7.	Cyclopentenes	13	472.0	−360 0	2.95	.....	.....	.....		.....
8.	Cyclohexanes	10	500.0	−428.0	2.73	.....	.....	.....		.....
9.	Cyclohexenes	13	327.5	−72.5	1.43	.....	.....	.....		.....
		472							

TABLE 3

Values of Constants in equation 2. Hydrocarbons and related compounds.

	$P_c = n_z (\log M) + C_z$					Group Contribution Technique			
						Lyderson's method		Eduljee's method	
	Series	Number considered	n_z	C_z	Ayerage % Error	Number considered	% Error Average	Number considered	% Error average
1.	Alkanes	129	−44.90	116.40	3.38	28	4.32	Branced chain paraffins. 7	3.13
								Heptane, Octane 8	2.03
2.	Alkenes	113	−52.01	131.94	4.23			Nonane isomers 17	3.07
								Branched olefins, Diolefins and Acetylenes. 7	6.31
3.	Alkyl benzenes	74	−66.43	170.36	2.98	9	1.87		
4.	Alkyl Naphthalene	35	−70.50	180.03	2.62				
5.	Styrenes	11	−54.75	148.50	3.19				
6.	Cyclopentanes	16	−82.11	195.69	3.40				
7.	Cyclopentanes	13	−80.05	191.38	2.75				
8.	Cyclohexanes	9	−104.92	242.34	3.67				
9.	Cyclohexenes	14	−93.69	221.21	1.54				
		384							

TABLE 4

Values of Constants in equation 3. Hydrocarbons and related compounds.

	$V_c = n_s(M) + C_s$				Group Contribution Technique	
					Lyderson's method	
Series	Number considered	n_s	C_s	Average % Error	Number considered	Average % Error
1. Alkanes	102	3.78	40.0	2.96	28	2.47
2. Alkenes	126	3.83	28.5	1.78		
3. Alkyl benzenes	76	4.09	−53.5	1.25	7	0.88
4. Alkyl Napthalenes	30	3.97	−112.0	2.27		
5. Cyclopentanes	16	3.66	7.2	1.76		
6. Cyclopentenes	13	4.35	−50.0	1.93		
7. Cyclohexenes	14	4.66	−96 0	1.52		
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