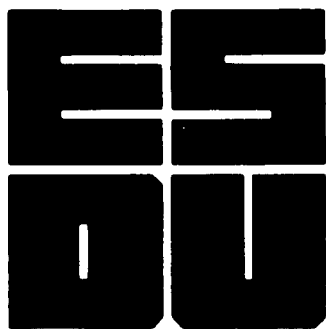




Engineering Sciences Data

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With Amendment A
July 1984

Vapour pressures and critical points of liquids

XXI: Cyclic Hydrocarbons

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ENGINEERING SCIENCES DATA ITEM No.82016

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(Continued on inside back cover)

* Corresponding Member

VAPOUR PRESSURES AND CRITICAL POINTS OF LIQUIDS XXI: CYCLIC HYDROCARBONS

1. INTRODUCTION

This Data Item presents saturated vapour pressures of the cyclic hydrocarbons listed in Table I (pages 2 and 3).

The range of the experimental data for each compound, on which the tabulated values are based, is given in Appendix A.

Table I shows, for each compound, alternative names, empirical and structural formulae, molecular weight, normal boiling point, dT/dp at the normal boiling point and acentric factor. The name in bold type is that based on BSI Recommendations.

Tables II to XV present values of vapour pressure, in kPa, at 5 K intervals of temperature down to a temperature either just above the melting point, or at which the pressure is approximately 0.001 kPa, whichever is the higher. For those compounds which are known or considered likely to be thermally stable up to the critical point, the Tables extend over the whole temperature range. However some of the compounds considered here are known, or thought, to decompose at temperatures well below their estimated critical value, so for these compounds the estimated values of critical temperature and pressure, T_c and p_c , used in the vapour pressure equation are given, but the vapour pressures in Tables II to XV terminate at a lower convenient arbitrary temperature.

The values of vapour pressure given in the Tables were obtained by evaluating, for each compound, a Wagner equation of the form

$$\log_e p = \log_e p_c + (T_c/T)[b_1 q + b_2 q^{3/2} + b_3 q^3 + b_4 q^6] \quad (1)$$

where

$$q = 1 - T/T_c.$$

This equation has been fitted to the experimental data that have been selected and weighted in accordance with a critical assessment of all the data. Table XVI gives T_c , $\log_e p_c$ and the coefficients b_1 , b_2 , b_3 , b_4 for each compound that, when using in Equation (1), give p in kPa for T in kelvins. For all compounds except cyclopropane, an adequate fit has been obtained with identical values for the coefficients b_3 and b_4 (see Section 3.2 of Reference 1).

The suggested uncertainties in the tabulated values of vapour pressure that the user should allow for are discussed and tabulated in Appendix B.

The location of the Table giving the vapour pressure values for each compound is shown on the foldout flap attached to the last page.

A full explanation of the correlation procedure used to derive the tabulated values of vapour pressure together with notation and units, a simple interpolation procedure, conversion factors and References is given in the introductory Data Item, Reference 1.

2. REFERENCES

1. — Vapour pressures and critical points of liquids. Introduction to Data Items issued after July 1980. Item No. 80016, Engineering Sciences Data Unit, 1980.

TABLE I (Part 1)
Cyclic Hydrocarbons

No.	Name	Alternative Names
(Name based on BSI Recommendations in Bold Type)		
CYCLOALKANES		
1	C ₃ H ₆ Cyclopropane	
2	C ₄ H ₈ Cyclobutane	
3	C ₅ H ₁₀ Cyclopentane	
4	C ₆ H ₁₂ Methylcyclopentane	
5	C ₇ H ₁₄ Ethylcyclopentane	
6	C ₇ H ₁₄ 1,1-Dimethylcyclopentane	
7	C ₇ H ₁₄ 1,cis-2-Dimethylcyclopentane	
8	C ₇ H ₁₄ 1,trans-2-Dimethylcyclopentane	
9	C ₇ H ₁₄ 1,cis-3-Dimethylcyclopentane	
10	C ₇ H ₁₄ 1,trans-3-Dimethylcyclopentane	
11	C ₈ H ₁₆ Propylcyclopentane	
12	C ₈ H ₁₆ Isopropylcyclopentane	isoPropylcyclopentane
13	C ₈ H ₁₆ 1-Methyl-1-ethylcyclopentane	
14	C ₈ H ₁₆ 1-Methyl-cis-2-ethylcyclopentane	
15	C ₈ H ₁₆ 1,1,2-Trimethylcyclopentane	
16	C ₈ H ₁₆ 1,1,3-Trimethylcyclopentane	
17	C ₈ H ₁₆ 1,cis-2,trans-4-Trimethylcyclopentane	
18	C ₈ H ₁₆ 1,trans-2,cis-4-Trimethylcyclopentane	
19	C ₉ H ₁₈ Butylcyclopentane	
20	C ₁₅ H ₃₀ Decylcyclopentane	
21	C ₆ H ₁₂ Cyclohexane	
22	C ₇ H ₁₄ Methylcyclohexane	
23	C ₈ H ₁₆ Ethylcyclohexane	
24	C ₈ H ₁₆ 1,1-Dimethylcyclohexane	
25	C ₈ H ₁₆ 1,cis-2-Dimethylcyclohexane	
26	C ₈ H ₁₆ 1,trans-2-Dimethylcyclohexane	
27	C ₈ H ₁₆ 1,cis-3-Dimethylcyclohexane	
28	C ₈ H ₁₆ 1,trans-3-Dimethylcyclohexane	
29	C ₈ H ₁₆ 1,cis-4-Dimethylcyclohexane	
30	C ₈ H ₁₆ 1,trans-4-Dimethylcyclohexane	
31	C ₉ H ₁₈ Propylcyclohexane	
32	C ₉ H ₁₈ Isopropylcyclohexane	isoPropylcyclohexane
33	C ₉ H ₁₈ 1-Methyl-cis-3-ethylcyclohexane	
34	C ₉ H ₁₈ 1,1,3-Trimethylcyclohexane	
35	C ₉ H ₁₈ 1,3,5-Trimethylcyclohexane	
36	C ₁₀ H ₂₀ Butylcyclohexane	
37	C ₁₀ H ₂₀ secButylcyclohexane	
38	C ₁₀ H ₂₀ Isobutylcyclohexane	isoButylcyclohexane
39	C ₁₀ H ₂₀ tertButylcyclohexane	
40	C ₁₆ H ₃₂ Decylcyclohexane	
41	C ₇ H ₁₂ Methylenecyclohexane	
42	C ₁₂ H ₁₆ Phenylcyclohexane	Cyclohexylbenzene
43	C ₇ H ₁₄ Cycloheptane	
44	C ₈ H ₁₆ Cyclooctane	Cyclo-octane
CYCLOALKENES		
45	C ₄ H ₆ Cyclobutene	
46	C ₅ H ₈ Cyclopentene	
47	C ₆ H ₁₀ Cyclohexene	
48	C ₁₀ H ₁₆ Terpinolene	p-Mentha-1,4(8)-diene
49	C ₁₀ H ₁₆ Dipentene	1-Methyl-4-isopropylidenecyclohexene 1-Methyl-4-isopropenylcyclohexene
50	C ₅ H ₆ Cyclopenta-1,3-diene	Cyclopentadiene
51	C ₆ H ₈ Cyclohexa-1,3-diene	
52	C ₇ H ₈ Cycloheptatriene	
53	C ₈ H ₈ Cyclooctatetraene	Cyclo-octatetraene
OTHER CYCLIC HYDROCARBONS		
54	C ₅ H ₈ Spiropentane	
55	C ₉ H ₁₆ 1,4-Dimethylbicyclo[2.2.1]heptane	
56	C ₉ H ₁₆ 2,trans-3-Dimethylbicyclo[2.2.1]heptane	
57	C ₁₀ H ₁₆ alpha-Pinene	2,7,7-Trimethylbicyclo[3.1.1]hept-2-ene
58	C ₁₀ H ₁₆ beta-Pinene	1-Methylene-7,7-dimethylbicyclo[3.1.1]heptane
59	C ₉ H ₁₆ cis-Hexahydroindane	cis-Bicyclo[4.3.0]nonane
60	C ₉ H ₁₆ trans-Hexahydroindane	trans-Bicyclo[4.3.0]nonane
61	C ₁₀ H ₁₂ Dicyclopentadiene	4,7-Methylene-4,7,8,9-tetrahydroindene
62	C ₁₀ H ₁₈ cis-Decahydronaphthalene	cis-Decalin
63	C ₁₀ H ₁₈ trans-Decahydronaphthalene	trans-Decalin
64	C ₁₀ H ₁₂ 1,2,3,4-Tetrahydronaphthalene	Tetralin

TABLE I (Part 2)
General Information

No.	Name	M.W.	Structural Formula	Normal Boiling Point				Acentric Factor ω
				$p = 101.325 \text{ kPa}$		$p = 760 \text{ mmHg}$		
				T K	dT/dp K/kPa	t $^{\circ}\text{C}$	dt/dp $^{\circ}\text{C/mmHg}$	
CYCLOALKANES								
1	Cyclopropane	42.080	C_3H_6	240.31	0.2287	-32.84	0.03049	0.129
2	Cyclobutane	56.107	C_4H_8	285.63	0.2690	12.48	0.03587	0.169
3	Cyclopentane	70.134	C_5H_{10}	322.40	0.3001	49.25	0.04001	0.195
4	Methylcyclopentane	84.161	$\text{CH}_3\text{C}_5\text{H}_9$	344.95	0.3207	71.80	0.04275	0.230
5	Ethylcyclopentane	98.188	$\text{C}_2\text{H}_5\text{C}_5\text{H}_9$	376.62	0.3471	103.47	0.04626	0.271
6	1,1-Dimethylcyclopentane	98.188	$1,1-(\text{CH}_3)_2\text{C}_5\text{H}_8$	360.99	0.3376	87.84	0.04500	0.245
7	1,cis-2-Dimethylcyclopentane	98.188	$1,2-(\text{CH}_3)_2\text{C}_5\text{H}_8$	372.68	0.3454	99.53	0.04605	0.254
8	1,trans-2-Dimethylcyclopentane	98.188	$1,2-(\text{CH}_3)_2\text{C}_5\text{H}_8$	365.02	0.3394	91.87	0.04525	0.250
9	1,cis-3-Dimethylcyclopentane	98.188	$1,3-(\text{CH}_3)_2\text{C}_5\text{H}_8$	363.92	0.3388	90.77	0.04517	0.255
10	1,trans-3-Dimethylcyclopentane	98.188	$1,3-(\text{CH}_3)_2\text{C}_5\text{H}_8$	364.87	0.3395	91.72	0.04526	0.258
11	Propylcyclopentane	112.214	$n\text{-C}_3\text{H}_7\text{C}_5\text{H}_9$	404.11	0.3668	130.96	0.04890	0.324
12	Isopropylcyclopentane	112.214	$i\text{-C}_3\text{H}_7\text{C}_5\text{H}_9$	399.58	0.3686	126.43	0.04915	0.299
13	1-Methyl-1-ethylcyclopentane	112.214	$1\text{-CH}_3\text{-1-C}_2\text{H}_5\text{C}_5\text{H}_8$	394.68	0.3652	121.53	0.04869	0.290
14	1-Methyl-cis-2-ethylcyclopentane	112.214	$1\text{-CH}_3\text{-2-C}_2\text{H}_5\text{C}_5\text{H}_8$	401.21	0.3674	128.06	0.04899	0.308
15	1,1,2-Trimethylcyclopentane	112.214	$1,1,2-(\text{CH}_3)_3\text{C}_5\text{H}_7$	386.88	0.3614	113.73	0.04819	0.280
16	1,1,3-Trimethylcyclopentane	112.214	$1,1,3-(\text{CH}_3)_3\text{C}_5\text{H}_7$	378.05	0.3545	104.90	0.04726	0.272
17	1,cis-2,trans-4-Trimethylcyclopentane	112.214	$1,2,4-(\text{CH}_3)_3\text{C}_5\text{H}_7$	389.88	0.3620	116.73	0.04827	0.297
18	1,trans-2,cis-4-Trimethylcyclopentane	112.214	$1,2,4-(\text{CH}_3)_3\text{C}_5\text{H}_7$	382.44	0.3555	109.29	0.04740	0.290
19	Butylcyclopentane	126.241	$n\text{-C}_4\text{H}_9\text{C}_5\text{H}_9$	429.78	0.3869	156.63	0.05159	0.372
20	Decyclopentane	210.402	$n\text{-C}_{10}\text{H}_{21}\text{C}_5\text{H}_9$	552.60	0.4603	279.45	0.06137	0.644
21	Cyclohexane	84.161	C_6H_{12}	353.88	0.3284	80.73	0.04378	0.210
22	Methylcyclohexane	98.188	$\text{CH}_3\text{C}_6\text{H}_{11}$	374.09	0.3506	100.94	0.04674	0.236
23	Ethylcyclohexane	112.214	$\text{C}_2\text{H}_5\text{C}_6\text{H}_{11}$	404.95	0.3729	131.80	0.04972	0.290
24	1,1-Dimethylcyclohexane	112.214	$1,1-(\text{CH}_3)_2\text{C}_6\text{H}_{10}$	392.70	0.3691	119.55	0.04921	0.256
25	1,cis-2-Dimethylcyclohexane	112.214	$1,2-(\text{CH}_3)_2\text{C}_6\text{H}_{10}$	402.89	0.3743	129.74	0.04991	0.277
26	1,trans-2-Dimethylcyclohexane	112.214	$1,2-(\text{CH}_3)_2\text{C}_6\text{H}_{10}$	396.58	0.3715	123.43	0.04953	0.269
27	1,cis-3-Dimethylcyclohexane	112.214	$1,3-(\text{CH}_3)_2\text{C}_6\text{H}_{10}$	393.25	0.3664	120.10	0.04884	0.268
28	1,trans-3-Dimethylcyclohexane	112.214	$1,3-(\text{CH}_3)_2\text{C}_6\text{H}_{10}$	397.61	0.3684	124.46	0.04912	0.285
29	1,cis-4-Dimethylcyclohexane	112.214	$1,4-(\text{CH}_3)_2\text{C}_6\text{H}_{10}$	397.48	0.3693	124.33	0.04924	0.277
30	1,trans-4-Dimethylcyclohexane	112.214	$1,4-(\text{CH}_3)_2\text{C}_6\text{H}_{10}$	392.51	0.3680	119.36	0.04906	0.268
31	Propylcyclohexane	126.241	$n\text{-C}_3\text{H}_7\text{C}_6\text{H}_{11}$	429.90	0.3903	156.75	0.05203	0.344
32	Isopropylcyclohexane	126.241	$i\text{-C}_3\text{H}_7\text{C}_6\text{H}_{11}$	427.74	0.3909	154.59	0.05212	0.336
33	1-Methyl-cis-3-ethylcyclohexane	126.241	$1\text{-CH}_3\text{-3-C}_2\text{H}_5\text{C}_6\text{H}_{10}$	421.62	0.3855	148.47	0.05139	0.337
34	1,1,3-Trimethylcyclohexane	126.241	$1,1,3-(\text{CH}_3)_3\text{C}_6\text{H}_9$	409.79	0.3817	136.64	0.05089	0.307
35	1,3,5-Trimethylcyclohexane	126.241	$1,3,5-(\text{CH}_3)_3\text{C}_6\text{H}_9$	413.70	0.3777	140.55	0.05035	0.347
36	Butylcyclohexane	140.268	$n\text{-C}_4\text{H}_9\text{C}_6\text{H}_{11}$	454.13	0.4060	180.98	0.05413	0.398
37	sec-Butylcyclohexane	140.268	$s\text{-C}_4\text{H}_9\text{C}_6\text{H}_{11}$	452.52	0.4082	179.37	0.05442	0.381
38	iso-Butylcyclohexane	140.268	$i\text{-C}_4\text{H}_9\text{C}_6\text{H}_{11}$	444.50	0.4027	171.35	0.05369	0.370
39	tert-Butylcyclohexane	140.268	$t\text{-C}_4\text{H}_9\text{C}_6\text{H}_{11}$	444.77	0.4074	171.62	0.05431	0.351
40	Decylcyclohexane	224.429	$n\text{-C}_{10}\text{H}_{21}\text{C}_6\text{H}_{11}$	570.80	0.4745	297.65	0.06326	0.665
41	Methylenecyclohexane	96.172	$\text{CH}_2=\text{C}_6\text{H}_{10}$	376.58	0.3491	103.43	0.04654	0.245
42	Phenylcyclohexane	160.258	$\text{C}_6\text{H}_5\text{C}_6\text{H}_{11}$	512.65	0.4620	239.50	0.06159	0.326
43	Cycloheptane	98.188	C_7H_{14}	391.95	0.3681	118.80	0.04823	0.239
44	Cyclooctane	112.214	C_8H_{16}	424.31	0.3890	151.16	0.05187	0.252
CYCLOALKENES								
45	Cyclobutene	54.091	C_4H_6	275.77	0.2610	2.62	0.03480	0.150
46	Cyclopentene	68.118	C_5H_8	317.39	0.2959	44.24	0.03944	0.186
47	Cyclohexene	82.145	C_6H_{10}	356.09	0.3287	82.94	0.04383	0.200
48	Terpinolene	136.236	$\text{C}_{10}\text{H}_{16}$	460.06	0.3978	186.91	0.05304	0.424
49	Dipentene	136.236	$\text{C}_{10}\text{H}_{16}$	447.05	0.3979	173.90	0.05305	0.352
50	Cyclopenta-1,3-diene	66.102	C_5H_6	313.83	0.2906	40.68	0.03875	0.195
51	Cyclohexa-1,3-diene	80.129	C_6H_8	353.49	0.3256	80.34	0.04341	0.200
52	Cycloheptatriene	92.140	C_7H_8	388.99	0.3551	115.84	0.04734	0.230
53	Cyclooctatetraene	104.151	C_8H_8	414.28	0.3730	141.13	0.04973	0.248
OTHER CYCLIC HYDROCARBONS								
54	Spiropentane	68.118	C_5H_8	312.12	0.2868	38.97	0.03823	0.174
55	1,4-Dimethylbicyclo[2.2.1]heptane	124.225	$1,4-(\text{CH}_3)_2\text{C}_7\text{H}_{10}$	397.84	0.3737	124.69	0.04982	0.261
56	2,trans-3-Dimethylbicyclo[2.2.1]heptane	124.225	$2,3-(\text{CH}_3)_2\text{C}_7\text{H}_{10}$	416.43	0.3830	143.28	0.05106	0.298
57	alpha-Pinene	136.236	$2,7,7-(\text{CH}_3)_3\text{C}_7\text{H}_7$	429.33	0.3937	156.18	0.05249	0.342
58	beta-Pinene	136.236	$1\text{-CH}_2\text{-7,7-(CH}_3)_2\text{C}_7\text{H}_8$	439.42	0.4045	166.27	0.05393	0.339
59	cis-Hexahydroindane	124.225	C_9H_{16}	441.03	0.4040	167.88	0.05387	0.262
60	trans-Hexahydroindane	124.225	C_9H_{16}	434.26	0.3996	161.11	0.05328	0.262
61	Dicyclopentadiene	132.205	$\text{C}_{10}\text{H}_{12}$	442.24	0.4053	169.09	0.05404	0.261
62	cis-Decahydronaphthalene	138.252	$\text{C}_{10}\text{H}_{18}$	468.97	0.4287	195.82	0.05716	0.285
63	trans-Decahydronaphthalene	138.252	$\text{C}_{10}\text{H}_{18}$	460.46	0.4244	187.54	0.05688	0.279
64	1,2,3,4-Tetrahydronaphthalene	132.205	$\text{C}_{10}\text{H}_{16}$	480.54	0.4425	207.39	0.05697	0.316

This page Amendment A

TABLE II

- 1 C_3H_6 Cyclopropane
 2 C_4H_8 Cyclobutane
 3 C_5H_{10} Cyclopentane
 4 C_6H_{12} Methylcyclopentane
 5 C_7H_{14} Ethylcyclopentane

No.	1
T_c	398.3
p_c	5579
T K	
395	5285.0
390	4867.2
385	4477.6
380	4113.5
375	3773.0
370	3454.5
365	3156.8
360	2878.7
355	2619.3
350	2377.6
345	2152.7
340	1943.8
335	1750.1
330	1570.9
325	1405.5
320	1253.2
315	1113.3
310	985.24
305	868.32
300	761.95
295	665.52
290	578.44
285	500.13
280	430.02
275	367.56
270	312.19
265	263.38
260	220.60
255	183.36
250	151.16
245	123.52
240	99.979
235	80.109
230	63.491
225	49.732
220	38.464
215	29.344
210	22.058
205	16.317
200	11.862
195	8.462
190	5.913
185	4.040
180	2.693
175	1.748
170	1.101
165	0.672
160	0.395
155	0.223
150	0.121
T_m	146

No.	2	3	4	5	No.	2	3	4	5
T_c	462	511.7	532.8	569.5					
p_c	5000	4510	3785	3400					
T K					T K				
570					245	17.198	3.038	0.997	0.190
565				3211.3	240	13.184	2.208	0.699	0.126
560				3013.3	235	9.977	1.580	0.482	0.083
555				2826.0	230	7.445	1.111	0.326	0.053
550				2648.5	225	5.474	0.767	0.216	0.033
545				2480.1	220	3.960	0.519	0.140	0.020
540				2320.4	215	2.816	0.344	0.088	0.012
535				2168.8	210	1.966	0.223	0.054	0.007
530			3648.1	2025.1	205	1.345	0.141	0.033	0.004
525			3415.6	1888.9	200	0.900	0.087	0.019	0.002
520			3196.1	1759.7	195	0.588	0.052	0.011	0.001
515			2988.5	1637.5	190	0.375	0.030	0.006	0.001
510		4409.2	2792.0	1521.7	185	0.232	0.017	0.003	
505		4125.5	2605.8	1412.3	180		0.009	0.002	
500		3857.8	2429.4	1308.9	175			0.001	
495		3604.6	2262.4	1211.2	170				
490		3364.9	2104.3	1119.1	165				
485		3137.8	1954.8	1032.4	160				
480		2922.7	1813.4	950.78	155				
475		2719.1	1679.8	874.07	150				
470		2526.4	1553.7	802.08	T_m	182	179	131	135
465		2344.1	1434.8	734.61					
460	4857.2	2171.8	1322.8	671.47					
455	4517.5	2009.1	1217.4	612.48					
450	4198.3	1855.6	1118.4	557.45					
445	3897.6	1710.9	1025.4	506.22					
440	3614.3	1574.7	938.35	458.60					
435	3347.1	1446.7	856.85	414.43					
430	3095.3	1326.4	780.71	373.55					
425	2858.1	1213.7	709.70	335.79					
420	2634.8	1108.2	643.61	301.00					
415	2424.8	1009.6	582.20	269.01					
410	2227.4	917.64	525.27	239.69					
405	2042.2	831.98	472.59	212.87					
400	1868.6	752.38	423.98	188.42					
395	1706.1	678.56	379.21	166.18					
390	1554.3	610.25	338.10	146.03					
385	1412.6	547.20	300.45	127.83					
380	1280.6	489.13	266.06	111.44					
375	1158.0	435.81	234.75	96.744					
370	1044.2	386.97	206.33	83.610					
365	938.84	342.37	180.63	71.922					
360	841.58	301.78	157.46	61.565					
355	751.98	264.94	136.65	52.429					
350	669.67	231.64	118.04	44.407					
345	594.25	201.63	101.47	37.398					
340	525.37	174.71	86.772	31.308					
335	462.65	150.65	73.801	26.045					
330	405.73	129.24	62.411	21.523					
325	354.27	110.28	52.461	17.662					
320	307.91	93.566	43.817	14.387					
315	266.32	78.912	36.351	11.628					
310	229.16	66.133	29.944	9.321					
305	196.13	55.054	24.482	7.407					
300	166.89	45.507	19.857	5.832					
295	141.15	37.336	15.971	4.548					
290	118.61	30.389	12.731	3.510					
285	98.996	24.528	10.052	2.679					
280	82.026	19.621	7.858	2.021					
275	67.444	15.548	6.078	1.507					
270	55.002	12.196	4.647	1.108					
265	44.465	9.465	3.511	0.804					
260	35.615	7.262	2.619	0.574					
255	28.246	5.504	1.926	0.404					
250	22.165	4.118	1.396	0.279					

TABLE III

6	C ₇ H ₁₄	1,1-Dimethylcyclopentane
7	C ₇ H ₁₄	1, <i>cis</i> -2-Dimethylcyclopentane
8	C ₇ H ₁₄	1, <i>trans</i> -2-Dimethylcyclopentane
9	C ₇ H ₁₄	1, <i>cis</i> -3-Dimethylcyclopentane
10	C ₇ H ₁₄	1, <i>trans</i> -3-Dimethylcyclopentane

No.	6	7	8	9	10	No.	6	7	8	9	10
T_c	548	566	555	551	552		continued				
p_c	3300	3400	3400	3300	3300						
T K						T K					
570						245	0.452	0.240	0.359	0.388	0.366
565		3357.5				240	0.310	0.161	0.244	0.265	0.249
560		3153.3				235	0.208	0.106	0.162	0.177	0.166
555		2960.3	3400.0			230	0.137	0.068	0.106	0.116	0.108
550		2777.5	3188.9	3257.6	3215.3	225	0.088	0.043	0.068	0.074	0.069
545	3174.2	2603.9	2990.1	3053.9	3013.2	220	0.055	0.026	0.042	0.046	0.043
540	2975.0	2439.2	2802.2	2861.8	2822.6	215	0.034		0.025	0.028	0.026
535	2786.8	2282.7	2624.1	2680.0	2642.2	210	0.020		0.015	0.017	0.015
530	2608.8	2134.2	2455.2	2507.7	2471.4	205	0.012		0.009	0.010	0.009
525	2440.1	1993.2	2295.1	2344.3	2309.5	200			0.005	0.005	0.005
520	2280.3	1859.5	2143.3	2189.5	2156.2	195			0.003	0.003	0.003
515	2128.8	1732.7	1999.3	2042.7	2010.9	190			0.001	0.001	0.001
510	1985.2	1612.5	1862.9	1903.5	1873.2	185			0.001	0.001	0.001
505	1849.2	1498.6	1733.7	1771.8	1742.9						
500	1720.5	1390.9	1611.4	1647.0	1619.6						
495	1598.6	1289.1	1495.7	1529.0	1503.1	T_m	203	219	156	139	139
490	1483.4	1192.9	1386.4	1417.5	1393.0						
485	1374.5	1102.2	1283.1	1312.1	1289.0						
480	1271.7	1016.7	1185.7	1212.7	1191.0						
475	1174.7	936.22	1093.9	1119.1	1098.6						
470	1083.4	860.56	1007.5	1030.9	1011.7						
465	997.41	789.53	926.28	947.97	930.00						
460	916.61	722.95	850.01	870.12	853.33						
455	840.76	660.63	778.50	797.11	781.46						
450	769.67	602.39	711.55	728.76	714.20						
445	703.14	548.06	648.98	664.86	651.35						
440	640.97	497.48	590.59	605.22	592.71						
435	582.97	450.46	536.21	549.66	538.10						
430	528.98	406.86	485.65	498.00	487.35						
425	478.79	366.50	438.75	450.06	440.27						
420	432.25	329.23	395.32	405.67	396.68						
415	389.17	294.90	355.20	364.64	356.42						
410	349.40	263.35	318.22	326.82	319.32						
405	312.76	234.43	284.23	292.05	285.22						
400	279.10	208.00	253.07	260.15	253.96						
395	248.25	183.91	224.57	230.97	225.37						
390	220.06	162.02	198.58	204.35	199.31						
385	194.37	142.20	174.96	180.15	175.62						
380	171.04	124.31	153.56	158.22	154.15						
375	149.93	108.21	134.24	138.40	134.77						
370	130.87	93.789	116.85	120.56	117.33						
365	113.75	80.918	101.27	104.56	101.70						
360	98.417	69.477	87.357	90.268	87.746						
355	84.746	59.353	74.989	77.554	75.339						
350	72.608	50.436	64.042	66.293	64.356						
345	61.881	42.619	54.399	56.366	54.679						
340	52.446	35.803	45.946	47.656	46.195						
335	44.191	29.892	38.575	40.055	38.796						
330	37.005	24.794	32.183	33.457	32.378						
325	30.787	20.425	26.672	27.763	26.844						
320	25.439	16.704	21.950	22.879	22.100						
315	20.867	13.557	17.931	18.717	18.062						
310	16.987	10.915	14.534	15.194	14.646						
305	13.716	8.712	11.683	12.234	11.780						
300	10.981	6.892	9.310	9.766	9.392						
295	8.711	5.400	7.350	7.725	7.419						
290	6.845	4.189	5.746	6.051	5.804						
285	5.323	3.214	4.446	4.692	4.493						
280	4.095	2.438	3.402	3.598	3.441						
275	3.115	1.828	2.572	2.728	2.604						
270	2.340	1.352	1.921	2.043	1.946						
265	1.735	0.987	1.416	1.510	1.436						
260	1.269	0.710	1.029	1.100	1.044						
255	0.914	0.503	0.736	0.790	0.748						
250	0.648	0.350	0.519	0.558	0.528						

TABLE IV

11	C ₈ H ₁₆	Propylcyclopentane	
12	C ₈ H ₁₆	Isopropylcyclopentane	<i>Iso</i> Propylcyclopentane
13	C ₈ H ₁₆	1-Methyl-1-ethylcyclopentane	
14	C ₈ H ₁₆	1-Methyl- <i>cis</i> -2-ethylcyclopentane	

No. <i>T_c</i> <i>p_c</i>	11 596 3000	12 593 3000	13 587 3000	14 594 3000	No.	11 continued	12	13	14
<i>T K</i>					<i>T K</i>				
595	2962.5			2855.2	270	0.280	0.395	0.494	0.350
590	2782.4	2890.5			265	0.195	0.279	0.351	0.246
585	2612.4	2716.6	2926.1	2683.4	260	0.133	0.194	0.245	0.170
580	2451.4	2552.0	2749.2	2520.5	255	0.089	0.133	0.168	0.116
575	2298.6	2395.8	2582.0	2365.9	250	0.059	0.089	0.113	0.077
570	2153.7	2247.5	2423.6	2218.9	245	0.038	0.059	0.075	0.051
565	2016.1	2106.7	2273.2	2079.3	240	0.024	0.038	0.049	0.032
560	1885.6	1972.9	2130.4	1946.7	235	0.015	0.024	0.031	0.020
555	1761.8	1845.9	1994.9	1820.7	230	0.009	0.015	0.019	0.012
550	1644.4	1725.3	1866.2	1701.0	225	0.005	0.009	0.012	0.007
545	1533.1	1610.8	1744.1	1587.5	220	0.003	0.005	0.007	0.004
540	1427.6	1502.3	1628.2	1479.9	215	0.002	0.003	0.004	0.002
535	1327.8	1399.4	1518.4	1377.9	210	0.001	0.002	0.002	0.001
530	1233.4	1302.0	1414.2	1281.3	205		0.001	0.001	0.001
525	1144.2	1209.8	1315.6	1189.9					
520	1060.0	1122.6	1222.3	1103.4	<i>T_m</i>	156	162	129	167
515	980.47	1040.2	1134.1	1021.8					
510	905.55	962.46	1050.7	944.80					
505	835.03	889.16	972.03	872.23					
500	768.72	820.13	897.86	803.91					
495	706.45	755.20	828.01	739.69					
490	648.06	694.21	762.30	679.39					
485	593.37	636.99	700.58	622.86					
480	542.23	583.38	642.67	569.93					
475	494.49	533.24	588.43	520.46					
470	449.99	486.41	537.69	474.29					
465	408.59	442.75	490.31	431.28					
460	370.14	402.12	446.13	391.28					
455	334.50	364.37	405.02	354.16					
450	301.53	329.37	366.83	319.77					
445	271.10	296.99	331.42	287.99					
440	243.07	267.09	298.67	258.67					
435	217.32	239.54	268.43	231.69					
430	193.72	214.22	240.59	206.93					
425	172.15	191.02	215.00	184.25					
420	152.48	169.79	191.55	163.54					
415	134.61	150.44	170.12	144.68					
410	118.40	132.84	150.58	127.56					
405	103.77	116.89	132.82	112.06					
400	90.590	102.47	116.74	98.074					
395	78.765	89.489	102.21	85.497					
390	68.195	77.834	89.135	74.227					
385	58.781	67.411	77.409	64.167					
380	50.432	58.126	66.934	55.221					
375	43.058	49.888	57.612	47.298					
370	36.576	42.610	49.352	40.313					
365	30.903	36.208	42.064	34.182					
360	25.964	30.604	35.663	28.826					
355	21.685	25.723	30.069	24.171					
350	18.000	21.493	25.206	20.147					
345	14.844	17.847	21.000	16.687					
340	12.157	14.724	17.384	13.731					
335	9.886	12.064	14.293	11.219					
330	7.977	9.814	11.669	9.101					
325	6.386	7.922	9.454	7.325					
320	5.069	6.345	7.600	5.848					
315	3.988	5.038	6.058	4.629					
310	3.108	3.965	4.787	3.631					
305	2.398	3.092	3.747	2.821					
300	1.831	2.386	2.904	2.170					
295	1.383	1.823	2.228	1.651					
290	1.032	1.377	1.690	1.242					
285	0.760	1.028	1.267	0.924					
280	0.553	0.758	0.938	0.678					
275	0.397	0.551	0.686	0.491					

TABLE V

15	C ₈ H ₁₆	1,1,2-Trimethylcyclopentane
16	C ₈ H ₁₆	1,1,3-Trimethylcyclopentane
17	C ₈ H ₁₆	1, <i>cis</i> -2, <i>trans</i> -4-Trimethylcyclopentane
18	C ₈ H ₁₆	1, <i>trans</i> -2, <i>cis</i> -4-Trimethylcyclopentane

No.	15	16	17	18	No.	15	16	17	18
T_c	575	563	577	567		continued			
P_c	2900	2900	2900	2900					
T K					T K				
595					270	0.745	1.123	0.637	0.891
590					265	0.536	0.818	0.456	0.644
585					260	0.380	0.586	0.322	0.458
580					255	0.265	0.414	0.223	0.321
575	2900.0		2826.8		250		0.288	0.152	0.221
570	2722.7		2651.8		245		0.196	0.102	0.149
565	2555.6		2486.6	2826.3	240		0.131	0.067	0.099
560	2397.4	2790.6	2330.2	2650.1	235		0.086	0.043	0.064
555	2247.4	2617.3	2182.1	2483.7	230		0.055	0.027	0.041
550	2105.0	2453.4	2041.6	2326.2	225		0.035	0.016	0.025
545	1969.9	2298.3	1908.4	2176.9	220		0.021	0.010	0.015
540	1841.7	2151.1	1782.1	2035.4	215		0.013	0.006	0.009
535	1720.1	2011.6	1662.5	1901.2	210		0.007	0.003	0.005
530	1604.8	1879.3	1549.2	1774.1	205		0.004	0.002	0.003
525	1495.5	1753.9	1441.8	1653.6	200		0.002	0.001	0.002
520	1391.9	1635.1	1340.3	1539.5	195		0.001		0.001
515	1293.9	1522.4	1244.3	1431.5					
510	1201.2	1415.8	1153.6	1329.4	T_m	252	131	141	142
505	1113.5	1315.0	1068.1	1232.8					
500	1030.8	1219.6	987.34	1141.7					
495	952.71	1129.6	911.31	1055.7					
490	879.16	1044.6	839.77	974.65					
485	809.93	964.47	772.53	898.37					
480	744.86	889.03	709.42	826.64					
475	683.77	818.09	650.27	759.29					
470	626.50	751.44	594.90	696.13					
465	572.90	688.93	543.15	636.98					
460	522.80	630.38	494.87	581.68					
455	476.06	575.63	449.89	530.06					
450	432.52	524.50	408.07	481.95					
445	392.05	476.84	369.26	437.20					
440	354.49	432.51	333.31	395.65					
435	319.71	391.33	300.08	357.15					
430	287.58	353.18	269.44	321.56					
425	257.96	317.89	241.24	288.71					
420	230.72	285.34	215.36	258.49					
415	205.73	255.37	191.66	230.73					
410	182.86	227.86	170.02	205.31					
405	162.00	202.66	150.32	182.10					
400	143.02	179.66	132.43	160.96					
395	125.80	158.70	116.24	141.76					
390	110.24	139.69	101.64	124.39					
385	96.219	122.48	88.519	108.72					
380	83.632	106.96	76.764	94.634					
375	72.374	93.014	66.275	82.019					
370	62.346	80.533	56.955	70.765					
365	53.450	69.405	48.707	60.767					
360	45.592	59.525	41.442	51.923					
355	38.684	50.791	35.071	44.135					
350	32.640	43.108	29.513	37.309					
345	27.380	36.381	24.689	31.358					
340	22.827	30.523	20.525	26.197					
335	18.908	25.448	16.952	21.745					
330	15.555	21.078	13.904	17.930					
325	12.705	17.338	11.322	14.679					
320	10.299	14.158	9.148	11.928					
315	8.282	11.472	7.332	9.616					
310	6.604	9.220	5.827	7.688					
305	5.219	7.347	4.589	6.093					
300	4.085	5.801	3.579	4.784					
295	3.166	4.537	2.764	3.719					
290	2.428	3.512	2.111	2.861					
285	1.841	2.689	1.595	2.177					
280	1.380	2.035	1.190	1.637					
275	1.021	1.522	0.877	1.216					