

Vapour pressures and critical points of liquids: Glycol ethers (alkyl cellosolves and carbitols etc.)

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THE PREPARATION OF THIS DATA ITEM

The work on this particular Data Item was monitored and guided by the Physical Data and Reaction Kinetics Committee, which first met in 1966 and now has the following membership:

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Dr A.P. Laughton	— British Gas plc, Loughborough, UK
Dr K.N. Marsh†	— Thermodynamics Research Center, Texas A & M University System, USA
Mrs K.M. de Reuck	— Imperial College of Science, Technology & Medicine, London, UK
Mr J.T.R. Watson	— National Engineering Laboratory, East Kilbride, UK.

* Emeritus Member.

† Corresponding Member.

The technical work involved in the assessment of the available information and the construction and subsequent development of the Data Item was undertaken (under contract to ESDU) by

Mr J. Walton — Independent

in consultation with Dr D. Ambrose.

The person with overall responsibility for the work in this subject area is Mr S.J. Pugh, Head of Thermofluids Group.

VAPOUR PRESSURES AND CRITICAL POINTS OF LIQUIDS
GLYCOL ETHERS (ALKYL CELLOSOLVES AND CARBITOLS etc.)

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	COMPOUND TABLES in the following order	

Sheet	Name		Common and Trade Names	
MONOALKYL ETHERS				
1.11	C ₃ H ₈ O ₂	Ethylene glycol monomethyl ether	Methyl glycol	Methyl cellosolve
1.12	C ₄ H ₁₀ O ₂	Ethylene glycol monoethyl ether	Ethyl glycol	Ethyl cellosolve
1.13a	C ₅ H ₁₂ O ₂	Ethylene glycol monopropyl ether	Propyl glycol	Propyl cellosolve
1.13b	,,	Ethylene glycol monoisopropyl ether	Isopropyl glycol	Isopropyl cellosolve
1.14a	C ₆ H ₁₄ O ₂	Ethylene glycol monobutyl ether	Butyl glycol	Butyl cellosolve
1.14c	,,	Ethylene glycol monoisobutyl ether	Isobutyl glycol	Isobutyl cellosolve
1.21	C ₅ H ₁₂ O ₃	Diethylene glycol monomethyl ether	Methyl diglycol	Methyl carbitol
1.22	C ₆ H ₁₄ O ₃	Diethylene glycol monoethyl ether	Ethyl diglycol	Ethyl carbitol
1.23a	C ₇ H ₁₆ O ₃	Diethylene glycol monopropyl ether	Propyl diglycol	Propyl carbitol
1.24a	C ₈ H ₁₈ O ₃	Diethylene glycol monobutyl ether	Butyl diglycol	Butyl carbitol
DIALKYL ETHERS				
2.11	C ₄ H ₁₀ O ₂	Ethylene glycol dimethyl ether	Dimethyl glycol	Dimethyl cellosolve
2.12	C ₆ H ₁₄ O ₂	Ethylene glycol diethyl ether	Diethyl glycol	Diethyl cellosolve
2.21	C ₆ H ₁₄ O ₃	Diethylene glycol dimethyl ether	Dimethyl diglycol	Dimethyl carbitol
2.22	C ₈ H ₁₈ O ₃	Diethylene glycol diethyl ether	Diethyl diglycol	Diethyl carbitol
2.31	C ₈ H ₁₈ O ₄	Triethylene glycol dimethyl ether	Dimethyl triglycol	Triglyme
2.41	C ₁₀ H ₂₂ O ₅	Tetraethylene glycol dimethyl ether	Dimethyl tetraglycol	Tetraglyme

NB. Other alternative names for most compounds are given on the relevant Sheets.

Note. To allow for the future issue of omitted compounds sheet numbers are not always consecutive.

VAPOUR PRESSURES AND CRITICAL POINTS OF LIQUIDS
GLYCOL ETHERS (ALKYL CELLOSOLVES AND CARBITOLS etc.)

1. INTRODUCTION

This Data Item presents saturated vapour pressures of the glycol ethers (alkyl cellosolves and carbitols etc.) shown in the order of arrangement on the Contents page.

Table 1, page 5, gives the constants in the Wagner vapour pressure equation for all the compounds. On the following Sheets, the values of vapour pressure for each compound have been obtained by calculation from the Wagner vapour pressure equation given at the top of each Sheet. Using the critical temperature and the critical pressure given, the numerical values of the coefficients were derived by fitting the equation to the data that had been selected and weighted in accordance with a critical assessment of all the data. Note that estimated values of critical temperature are rounded to the nearest kelvin and that values in other units are obtained by exact conversion.

The Sheets also give the acentric factor, the normal boiling point, the value of dT/dp at the normal boiling point and the approximate normal melting point. Brackets enclose data at those temperatures which are outside the range of supporting experimental data.

The table of Data at Specified Pressures for each compound gives, at each pressure, the temperature and the derivative of pressure with respect to temperature. This table also gives an assessment of the data quality indicated, in decreasing order, by one of the letters 'A', 'B' or 'C'. Except at very low pressures, the estimated uncertainties in temperature and pressure which are dependent upon the data quality are shown below each letter rounded to 1, 2, or 5 times a power of 10. Uncertainties are discussed at greater length in Section 5.

Tabulated values of vapour pressure are presented in two sets of units, namely, (i) pressures in kPa at temperatures in K, (ii) pressures in mmHg or atm at temperatures in degrees C. The table providing pressures in kPa also gives the uncertainties in pressure and temperature. Where justified, pressures are given at temperatures from just above the melting point to just below the critical point. To make maximum use of the space available, a larger temperature interval is frequently used at low temperatures. For compounds with very high estimated critical temperatures the tables are usually truncated at a convenient temperature somewhat less than the critical value. For compounds for which the available data are low in extent or quality the tabulated values are terminated at a few atmospheres pressure.

The sources of information which give vapour pressure and/or critical point data for the compound considered are listed on the reverse side of each sheet. Those sources that were used to derive the critical properties and the coefficients of the vapour pressure equation are shown in bold type together with the pressure ranges of their data. These arbitrary pressure ranges are described in Section 3.

For most of the compounds considered here saturated liquid density data were available, see Item 95005, and for these compounds the critical temperature and pressure were adjusted to be optimum values for the correlation of both properties.

2. NOTATION AND UNITS

All temperatures are based on the International Temperature Scale (ITS-90).

N_1, N_2, N_3, N_4 non-dimensional coefficients of the Wagner vapour-pressure equation

p vapour pressure

q $(1-T/T_c)$

T kelvin temperature

t Celsius temperature $(T-273.15)$

Note. The UNITS of temperature and vapour pressure are shown in each table.

Subscripts

b denotes value at normal boiling point

c denotes value at critical point

m denotes value at normal melting point

3. SOURCES OF DATA

Experimental vapour pressure data are, according to the apparatus and technique applied, usually reported for different pressure regions which may loosely be defined as:-

- (a) low pressure, below say 1 kPa (approximately 7.5 mmHg),
- (b) medium pressure, say 1 kPa to 200 kPa (approximately 2 atm),
- (c) high pressure, say 200 kPa to the critical point,
- (d) the critical point.

In general the experimental data reported for the low and high pressure ranges are usually less accurate than, and not always compatible with, data for the medium pressure range, which are usually of a much higher degree of precision, possibly with an uncertainty in pressure less than 0.01 per cent near the normal boiling point.

For the compounds considered here, low pressure range measurements have been made on two of them. Medium pressure range measurements have been made on all the compounds and for one compound a critical temperature and a critical pressure have been reported. For some compounds the available data are a number of scattered points, mostly in the medium pressure range, each reported by a different author or authors.

4. EVALUATION AND CORRELATION

In References 4 and 5 Ambrose and Giassee have examined the differences, in the high pressure range, between the shapes of well-established vapour pressure curves for a variety of compounds. They have shown that for compounds in different classes of chemical substances these differences in shape are characterised by different ranges of numerical relationships between the coefficients of their Wagner equations. In Reference 6 Ambrose and Walton have demonstrated this phenomenon

for the two homologous series of normal alkanes and alkan-1-ols. Thus, for certain classes of compounds it is possible to establish criteria that should be met by vapour pressure curves based on less extensive or less reliable data.

In Reference 3 Ambrose and Davies have shown how very low vapour pressures may be obtained from the differences between the ideal gas heat capacity and the liquid heat capacity at various temperatures. The procedure involves two integrations; rigorous treatment also requires the liquid molar volume and the second virial coefficient of the vapour. Low range vapour pressures obtained in this way were included in the data used to derive the vapour pressure equations of nearly all of the alkanes in Reference 6 but, in general, were not available for the alkanols.

In Reference 7 Watson, reversing the procedure, derived the difference between the ideal gas and liquid heat capacities from the the second differential of the Wagner vapour pressure equation. He plotted this difference against reduced temperature from the melting point to the normal boiling point for all the alkanes and alkanols in Reference 7. Although only valid up to reduced temperatures of about 0.5 these were shown to be a well ordered, uniformly varying set of curves for both series. Denoting the differences between the ideal gas and liquid heat capacities at reduced temperatures of 0.3 and 0.5 by, say, D3 and D5 respectively, it was noted that for the alkanes from propane to hexadecane, the variation of D3/D5 with D5 could be represented by a straight line without significant error.

Because of the -OH group at one end of the molecule, the physical behaviour of the monoalkyl glycol ethers considered here was assumed to be like that of the homomorphic alkan-1-ols. The data of each compound were therefore fitted by adjusting the parameters and properties of their vapour pressure curve to be fairly close to those of their homomorphic alcohol.

In contrast, the physical behaviour of the dialkyl glycol ethers considered was assumed to be like that of the homomorphic alkanes. The equations for the alkanes from Reference 6 were used to derive a correlation which was similar in form to that described in Items 84022, 84028 and 85002. This correlation was then used to fit the data of the dialkyl glycol ethers. as, in general, their data were either not sufficiently precise or extensive enough to be fitted without constraint.

5. DISCUSSION OF UNCERTAINTIES

At any temperature, the estimated uncertainties in the tabulated values of temperature and pressure are dependent upon the reliability of the experimental and estimated data on which they are based and thus may vary considerably over the entire liquid range of a compound. Except at very low pressures values dependent on estimated data are much less certain than values dependent upon measured data.

The term 'data quality' is used here to express the assessed reliability of the fitted data and hence also the reliability of the tabulated values. In the table of Data at Specified Pressures the data quality at each pressure is denoted by one of the letters 'A', 'B' or 'C'. Up to the normal boiling point average quality data, denoted by the letter 'B', have uncertainties in pressure varying, approximately, from 0.1 to 1 per cent, increasing to between 1 and 10 per cent at the critical point. Data with uncertainties lower or higher than these bands are graded 'A' or 'C' respectively.

The uncertainties in temperature and pressure are not thought to be more than the values shown below each letter. However when the data quality is 'C' it will be appreciated that the uncertainties are necessarily rather speculative and that for some compounds they may be underestimated. If the data quality is 'C' at the critical point the values of critical temperature and critical pressure given in the Tables should, in general, be regarded only as correlating parameters. Furthermore, since the acentric factor, ω , is dependent upon the value of critical pressure selected, the uncertainty in ω for these compounds is high, possibly greater than 0.05.

6. ANTOINE EQUATION

Some users may find it more convenient to use an Antoine equation for certain applications confined to limited ranges of temperature or pressure. The coefficients of the Antoine equation given at the end of each sheet have been obtained by fitting this equation to values obtained from the Wagner equation between pressures of 5 and 500 kPa. The RMS deviation of each fit is usually less than 0.1 per cent.

WARNING. Although, for most compounds, the Antoine equation may be used in the range 5 to 500 kPa without undue error, use at pressures outside this range will give vapour pressures that get progressively lower than the values given by the Wagner equation.

7. REFERENCES

1. AMBROSE, D. Correlation and estimation of vapour-liquid critical properties: I. Critical temperatures of organic compounds. NPL Report Chem. 92, National Physical Laboratory, Teddington, Middlesex, UK, September 1978.
2. AMBROSE, D. Correlation and estimation of vapour-liquid critical properties: II. Critical pressures and critical volumes of organic compounds. NPL Report Chem. 98, National Physical Laboratory, Teddington, Middlesex, UK, May 1979.
3. AMBROSE, D.
DAVIES, R.H. Correlation and estimation of vapour pressures III. Reference values for low pressure estimations. J.Chem.Thermodynamics, Vol.12, pp.871-879, 1980.
4. AMBROSE, D.
GHIASSEE, N.B. Vapour pressures and critical temperatures and critical pressures of some alkanolic acids: C1 to C10. J.Chem.Thermodynamics, Vol.19, pp.505-519, 1987.
5. AMBROSE, D.
GHIASSEE, N.B. Vapour pressures and critical temperatures and critical pressures of C5 and C6 cyclic alcohols and ketones. J.Chem.Thermodynamics, Vol.19, pp.903-909, 1987.
6. AMBROSE, D.
WALTON, J. Vapour pressures up to their critical temperatures of normal alkanes and alkan-1-ols. Pure & Appl.Chem., Vol.61, pp.1395-1403, 1989.
7. WATSON, J.T.R. Private Communication, 1990.

TABLE 1

Summary of Constants in the Wagner vapour pressure equation

$$\ln p = \ln p_c + (N_1q + N_2q^{1.5} + N_3q^{2.5} + N_4q^5)/(T/T_c) \quad \text{where } q = 1 - T/T_c$$

Sheet	Name	T_c K	p_c kPa	N_1	N_2	N_3	N_4
MONOALKYL ETHERS							
1.11	Ethylene glycol monomethyl ether	573	4450	-8.71477	0.96249	-2.16560	-0.22017
1.12	Ethylene glycol monoethyl ether	584	3950	-8.91090	1.87731	-3.75463	-0.76651
1.13a	Ethylene glycol monopropyl ether	600	3500	-9.04124	2.45356	-4.66176	-1.36748
1.13b	Ethylene glycol monoisopropyl ether	587	3450	-9.00949	2.20872	-4.19657	-1.17783
1.14a	Ethylene glycol monobutyl ether	626	3300	-9.25309	3.07771	-5.53987	-2.05803
1.14c	Ethylene glycol monoisobutyl ether	606	3100	-9.33637	3.01359	-5.42446	-1.66979
1.21	Diethylene glycol monomethyl ether	662	3250	-9.05942	3.28277	-6.23725	-3.65637
1.22	Diethylene glycol monoethyl ether	668	2850	-9.11852	3.53372	-6.36070	-5.77629
1.23a	Diethylene glycol monopropyl ether	675	2650	-9.75806	4.62240	-7.85807	-5.58115
1.24a	Diethylene glycol monobutyl ether	689	2500	-9.97788	4.71259	-7.96427	-6.14106
DIALKYL ETHERS							
2.11	Ethylene glycol dimethyl ether	535	3850	-7.87447	2.01436	-3.10916	-3.33683
2.12	Ethylene glycol diethyl ether	563	2850	-8.37115	2.28886	-3.90188	-3.76852
2.21	Diethylene glycol dimethyl ether	610	2750	-8.81015	2.55807	-4.64437	-4.10077
2.22	Diethylene glycol diethyl ether	635	2250	-8.87991	2.60305	-4.76582	-4.14947
2.31	Triethylene glycol dimethyl ether	666	2150	-9.57624	3.08370	-6.02788	-4.57702
2.41	Tetraethylene glycol dimethyl ether	713	1800	-10.37383	3.70081	-7.57818	-4.94328



Sheet 1.11

Ethylene glycol monomethyl ether; Methyl glycol; Methyl cellosolve;
3-Oxabutan-1-ol; 2-Methoxyethanol

CAS Reg. No. 109-86-4

Mol. Wt. 76.100

Vapour Pressure $\ln p = \ln p_c + (N_1q + N_2q^{1.5} + N_3q^{2.5} + N_4q^5)/(T/T_c)$

where T is the kelvin temperature on the International Temperature Scale of 1990 (ITS-90), p is the vapour pressure, T_c , p_c are the critical temperature and the critical pressure respectively and $q = 1 - T/T_c$.

Critical Temperature	$T_c = 573 \text{ K}$	($t_c = 299.85 \text{ }^\circ\text{C}$)
Critical Pressure	$p_c = 4450 \text{ kPa}$	($p_c = 43.92 \text{ atm}$)
	$N_1 = -8.71477$	
	$N_2 = 0.96249$	
	$N_3 = -2.16560$	
	$N_4 = -0.22017$	
Acentric Factor	$= 0.590$	
Normal Boiling Point	$= 397.282 \text{ K}$	($= 124.132 \text{ }^\circ\text{C}$)
dT/dp at N.B.P.	$= 0.311 \text{ K/kPa}$	($= 0.041 \text{ }^\circ\text{C/mmHg}$)
Normal Melting Point	$= 188 \text{ K}$	($= -85 \text{ }^\circ\text{C}$)

Data at Specified Pressures

p/kPa	0.001	0.01	0.1	1	10	101.325	1000	4450
T/K	(213.100)	(234.138)	260.098	293.055	336.508	397.282	(487.120)	(573.000)
(dp/dT)/(kPa/K)	(1.E-4)	(1.E-3)	0.008	0.061	0.456	3.220	(20.454)	(67.680)
Data Quality				C	B	B	(B)	(C)
Uncert. in T (K)				0.2	0.1	0.05	(1)	(5)
Uncert. in p (kPa)				0.01	0.05	0.2	(20)	(500)
Uncert. in p (%)				1	0.5	0.2	(2)	(10)

Vapour Pressure of Ethylene glycol monomethyl ether

Units: kPa v. K

		Uncertainty in				Uncertainty in				Uncertainty in	
T	p	T	p	T	p	T	p	T	p	T	p
K	kPa	K	%	K	kPa	K	%	K	kPa	K	%
				325	5.797	0.1	0.5	450	(437.7)	0.5	1
				330	7.384	0.1	0.5	455	(493.4)	0.5	1
				335	9.332	0.1	0.5	460	(554.6)	0.5	1
215	(0.001)			340	11.71	0.1	0.5	465	(621.7)	0.5	1
220	(0.002)			345	14.58	0.1	0.5	470	(695.1)	0.5	1
225	(0.004)			350	18.04	0.1	0.5	475	(775.2)	0.5	2
230	(0.007)			355	22.17	0.1	0.5	480	(862.5)	1	2
235	(0.011)			360	27.08	0.1	0.2	485	(957.4)	1	2
240	(0.018)			365	32.88	0.1	0.2	490	(1060.)	1	2
245	(0.028)			370	39.69	0.1	0.2	495	(1172.)	1	2
250	(0.043)			375	47.66	0.1	0.2	500	(1292.)	1	2
255	0.066			380	56.92	0.05	0.2	505	(1422.)	2	2
260	0.099			385	67.65	0.05	0.2	510	(1562.)	2	2
265	0.146			390	80.01	0.05	0.2	515	(1713.)	2	5
270	0.213			395	94.19	0.05	0.2	520	(1874.)	2	5
275	0.305			400	110.4	0.05	0.2	525	(2048.)	2	5
280	0.430			405	128.8	0.1	0.2	530	(2234.)	2	5
285	0.600			410	(149.7)	0.1	0.2	535	(2432.)	2	5
290	0.827			415	(173.3)	0.1	0.2	540	(2645.)	2	5
295	1.126	0.2	1	420	(199.9)	0.1	0.5	545	(2872.)	5	5
300	1.516	0.2	1	425	(229.7)	0.2	0.5	550	(3114.)	5	5
305	2.021	0.1	1	430	(263.0)	0.2	0.5	555	(3372.)	5	5
310	2.667	0.1	0.5	435	(300.2)	0.2	0.5	560	(3647.)	5	10
315	3.485	0.1	0.5	440	(341.4)	0.2	0.5	565	(3940.)	5	10
320	4.514	0.1	0.5	445	(387.2)	0.2	1	570	(4252.)	5	10

Note. This Sheet supersedes Table E.1.3 in Item 88017.

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Vapour Pressure of Ethylene glycol monomethyl ether continued

Units: mmHg or atm v. °C

$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{mmHg}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{mmHg}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{atm}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{atm}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{atm}}$
-75	(0.001)	25	10.20	125	1.028	225	(12.30)		
-70	(0.002)	30	13.65	130	1.201	230	(13.55)		
-65	(0.004)	35	18.07	135	(1.398)	235	(14.89)		
-60	(0.008)	40	23.70	140	(1.621)	240	(16.34)		
-55	(0.014)	45	30.80	145	(1.872)	245	(17.90)		
-50	(0.024)	50	39.68	150	(2.154)	250	(19.56)		
-45	(0.041)	55	50.69	155	(2.470)	255	(21.35)		
-40	(0.068)	60	64.24	160	(2.822)	260	(23.26)		
-35	(0.111)	65	80.81	165	(3.214)	265	(25.31)		
-30	(0.177)	70	100.9	170	(3.649)	270	(27.50)		
-25	(0.277)	75	125.1	175	(4.129)	275	(29.83)		
-20	0.425	80	154.2	180	(4.660)	280	(32.31)		
-15	0.642	85	188.7	185	(5.243)	285	(34.96)		
-10	0.953	90	229.7	190	(5.883)	290	(37.79)		
-5	1.392	95	277.9	195	(6.584)	295	(40.80)		
0	2.004	100	334.3	200	(7.350)				
5	2.846	105	400.0	205	(8.185)				
10	3.987	110	476.3	210	(9.093)				
15	5.517	115	564.3	215	(10.08)				
20	7.544	120	665.5	220	(11.15)				

The following Sources give vapour pressure and/or critical point data for this compound. Those Sources used to derive the critical properties and coefficients of the vapour pressure equation are shown in bold type together with the pressure range (low 'L', medium 'M', normal boiling point only 'N', high 'H' or critical 'C') of the data. An asterisk (*) indicates that the Source is not a primary source of experimental data for this compound.

- 1 DAVIDSON, J.G., Ind.Eng.Chem., Vol.18, p.669, 1926.
- 2 GALLAUGHER, A.F., HIBBERT, H., J.Am.Chem.Soc., Vol.58, p.813, 1936.
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- 4 MELLAN, I., Industrial Solvents, 2nd.Ed., New York, 1950.
- 5 CARBIDE & CARBON CHEM. CO., Cellosolve and Carbitol Solvents, New York, 1952.
- 6 **PICK, J., FRIED, V., HALA, E., VILIM, O., Coll.Czech.Chem.Comm., Vol.21, p.260, 1956.** **M**
- 7 UNION CARBIDE CORP., Chemicals and Plastics Physical Properties, 1968.
- 8 QUITZSCH, K., et al., Z.Phys.Chem.(Leipzig), Vol.243, p.321, 1970.
- 9 CHANDAK, B.S., et al., J.Chem.Eng.Data, Vol.24, p.267, 1979.

The following Sources were used to estimate critical point data for this compound.
 AMBROSE, D., NPL Report Chem 92, Nat.Phys.Lab., Teddington, Middlesex, UK, 1978.*
 AMBROSE, D., NPL Report Chem 98, Nat.Phys.Lab., Teddington, Middlesex, UK, 1979.*

Antoine equation: $\ln(p/\text{kPa}) = 16.22953 - 4244.394/(T/\text{K} - 31.739)$ for $1 < p/\text{kPa} < 100$.

Ethylene glycol monoethyl ether; Ethyl glycol; Ethyl cellosolve;
3-Oxapentan-1-ol; 2-Ethoxyethanol

CAS Reg. No. 110-80-5

Mol. Wt. 90.120

Vapour Pressure $\ln p = \ln p_c + (N_1q + N_2q^{1.5} + N_3q^{2.5} + N_4q^5)/(T/T_c)$

where T is the kelvin temperature on the International Temperature Scale of 1990 (ITS-90), p is the vapour pressure, T_c , p_c are the critical temperature and the critical pressure respectively and $q = 1 - T/T_c$.

Critical Temperature	$T_c = 584 \text{ K}$	($t_c = 310.85 \text{ }^\circ\text{C}$)
Critical Pressure	$p_c = 3950 \text{ kPa}$	($p_c = 38.98 \text{ atm}$)
	$N_1 = -8.91090$	
	$N_2 = 1.87731$	
	$N_3 = -3.75463$	
	$N_4 = -0.76651$	
Acentric Factor	$= 0.583$	
Normal Boiling Point	$= 408.223 \text{ K}$	($= 135.073 \text{ }^\circ\text{C}$)
dT/dp at N.B.P.	$= 0.319 \text{ K/kPa}$	($= 0.043 \text{ }^\circ\text{C/mmHg}$)
Normal Melting Point	$= -$	$-$

Data at Specified Pressures

p/kPa	0.001	0.01	0.1	1	10	101.325	1000	3950
T/K	(222.850)	(243.809)	269.674	302.593	346.280	408.223	(501.962)	(584.000)
(dp/dT)/(kPa/K)	(1.E-4)	(1.E-3)	0.008	0.061	0.452	3.130	(19.374)	(60.277)
Data Quality				C	B	B	(B)	(C)
Uncert. in T (K)				0.2	0.1	0.05	(1)	(5)
Uncert. in p (kPa)				0.01	0.05	0.2	(20)	(500)
Uncert. in p (%)				1	0.5	0.2	(2)	(10)

Vapour Pressure of Ethylene glycol monoethyl ether

Units: kPa v. K

		Uncertainty in				Uncertainty in				Uncertainty in	
T	p	T	p	T	p	T	p	T	p	T	p
K	kPa	K	%	K	kPa	K	%	K	kPa	K	%
225	(0.001)			350	11.80	0.1	0.5	475	(574.3)	0.5	1
230	(0.002)			355	14.66	0.1	0.5	480	(639.8)	0.5	1
235	(0.004)			360	18.08	0.1	0.5	485	(711.0)	0.5	1
240	(0.007)			365	22.16	0.1	0.5	490	(788.3)	1	2
245	(0.011)			370	26.98	0.1	0.2	495	(872.0)	1	2
250	(0.018)			375	32.66	0.1	0.2	500	(962.6)	1	2
255	0.029			380	39.30	0.1	0.2	505	(1060.)	1	2
260	0.045			385	47.02	0.1	0.2	510	(1165.)	1	2
265	0.068			390	55.97	0.05	0.2	515	(1279.)	1	2
270	0.103			395	66.29	0.05	0.2	520	(1400.)	2	2
275	0.151			400	78.12	0.05	0.2	525	(1531.)	2	2
280	0.220			405	91.64	0.05	0.2	530	(1671.)	2	5
285	0.315			410	107.0	0.05	0.2	535	(1820.)	2	5
290	0.444			415	124.4	0.1	0.2	540	(1980.)	2	5
295	0.619			420	(144.1)	0.1	0.2	545	(2151.)	2	5
300	0.851			425	(166.2)	0.1	0.2	550	(2334.)	2	5
305	1.158	0.2	1	430	(190.9)	0.1	0.5	555	(2529.)	5	5
310	1.557	0.2	1	435	(218.6)	0.2	0.5	560	(2737.)	5	5
315	2.071	0.1	1	440	(249.4)	0.2	0.5	565	(2959.)	5	5
320	2.728	0.1	0.5	445	(283.5)	0.2	0.5	570	(3195.)	5	10
325	3.558	0.1	0.5	450	(321.3)	0.2	0.5	575	(3448.)	5	10
330	4.598	0.1	0.5	455	(362.9)	0.2	0.5	580	(3718.)	5	10
335	5.891	0.1	0.5	460	(408.8)	0.2	1				
340	7.486	0.1	0.5	465	(459.1)	0.5	1				
345	9.436	0.1	0.5	470	(514.1)	0.5	1				

Note. This Sheet supersedes Table E.1.3 in Item 88017.

Vapour Pressure of Ethylene glycol monoethyl ether continued

Units: mmHg or atm v. °C

$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{mmHg}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{mmHg}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{mmHg}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{atm}}$	$\frac{t}{^{\circ}\text{C}}$	$\frac{p}{\text{atm}}$
		25	5.683	125	551.7	150	(1.556)	250	(14.62)
		30	7.761	130	648.3	155	(1.791)	255	(15.97)
-65	(0.001)	35	10.48	135	758.3	160	(2.053)	260	(17.41)
-60	(0.002)	40	13.99	140	883.1	165	(2.345)	265	(18.95)
-55	(0.004)	45	18.50	145	(1024.)	170	(2.669)	270	(20.60)
-50	(0.008)	50	24.21			175	(3.028)	275	(22.35)
-45	(0.014)	55	31.40			180	(3.425)	280	(24.23)
-40	(0.025)	60	40.36			185	(3.862)	285	(26.24)
-35	(0.042)	65	51.43			190	(4.342)	290	(28.37)
-30	(0.070)	70	65.02			195	(4.867)	295	(30.65)
-25	(0.115)	75	81.57			200	(5.442)	300	(33.09)
-20	0.183	80	101.6			205	(6.068)	305	(35.69)
-15	0.286	85	125.6			210	(6.750)	310	(38.48)
-10	0.440	90	154.3			215	(7.491)		
-5	0.664	95	188.3			220	(8.293)		
0	0.985	100	228.4			225	(9.161)		
5	1.439	105	275.4			230	(10.10)		
10	2.070	110	330.2			235	(11.11)		
15	2.937	115	393.9			240	(12.20)		
20	4.112	120	467.3			245	(13.37)		

The following Sources give vapour pressure and/or critical point data for this compound. Those Sources used to derive the critical properties and coefficients of the vapour pressure equation are shown in bold type together with the pressure range (low 'L', medium 'M', normal boiling point only 'N', high 'H' or critical 'C') of the data. An asterisk (*) indicates that the Source is not a primary source of experimental data for this compound.

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The following Sources were used to estimate critical point data for this compound.
 AMBROSE, D., NPL Report Chem 92, Nat. Phys. Lab., Teddington, Middlesex, UK, 1978.*
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Antoine equation: $\ln(p/\text{kPa}) = 15.60368 - 3909.698/(T/\text{K} - 52.322)$ for $1 < p/\text{kPa} < 100$.