COMPONENTS:	EVALUATOR:
1. Other amines. 2. Organic liquids.	P. G. T. Fogg, School of Chemistry, Polytechnic of North London, Holloway, London N7 8DB, United Kingdom. August 1983

CRITICAL EVALUATION:

The measurements by Wolff *et al.* (1-6) of the vapor pressure of various systems containing ethanamine, propanamine or deuterated amines are of high standard and may be accepted as reliable.

The solubility of propanamine in several alcohols was measured by Copley *et al.* (7) at 305.4 K and a pressure of propanamine of 106 mmHg, said to be its vapor pressure at 277.7 K. This value of the vapor pressure may be compared with the interpolated value of 119 mmHg from measurements by Wolff which are likely to be the more accurate. However, values published by Copley *et al.* are of the magnitude expected for solubilities in hydroxy-compounds, by analogy with the behaviour of other amines. The possibility of error in the reported pressure should be borne in mind.

Copley *et al.* also reported solubilities of 2-propanamine, 2-methyl-1-propanamine, 1-butanamine and 2-butanamine. These are of the expected order of magnitude for the solvents investigated and should be accepted on a tentative basis until comparisons with other measurements of solubilities of these amines can be made.

References:

1. Wolff, H.; Höpfner, A.; Höpfner, H.-M.
Ber. Bunsenges. Phys. Chem. 1964, *68*, 410.

2. Wolff, H.; Höpfner, A.
Ber. Bunsenges. Phys. Chem. 1965, *69*, 710.

3. Wolff, H.; Höpfner, A.
Ber. Bunsenges. Phys. Chem. 1967, *71*, 461.

4. Wolff, H.; Würtz, R.
Z. Phys. Chem (Frankfurt am Main) 1969, *67*, 115.

5. Wolff, H.; Würtz, R.
J. Phys. Chem. 1970, *74*, 1600.

6. Wolff, H.; Shadiakhy, A.
Fluid Phase Equilibria 1983, *11*, 267-287.

7. Copley, M. J.; Ginsberg, E.; Zellhoefer, G. F.; Marvel, C. S.
J. Amer. Chem. Soc. 1941, *63*, 254.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethanamine, (ethylamine); C_2H_7N; [75-04-7] 2. Butane; C_4H_{10}; [106-97-8]	Wolff, H.; Höpfner, A.; Höpfner, H.-M. *Ber. Bunsenges. Phys. Chem.* 1964, *68*, 410-417.
VARIABLES:	PREPARED BY:
Composition, temperature	P. G. T. Fogg

EXPERIMENTAL VALUES:

Variation of the total vapor pressure/Torr with variation of temperature and of mole fraction of C_2H_7N in the liquid phase, $x_{C_2H_7N}$

	T/K				
$x_{C_2H_7N}$	218.15	233.15	253.15	273.15	293.15
0	52.1	125.0	338.5	772.7	1552.6
0.0141	53.1	127.0	343.3	782.6	1571.1
0.0353	53.7	129.2	349.2	794.1	1594.2
0.0544	54.2	130.8	352.9	802.9	1612.2
0.0887	54.5	131.7	357.5	814.7	1635.8
0.1265	54.3	132.1	360.0	821.6	1655.4
0.1446	54.6	132.3	360.7	824.1	1660.7
0.168	54.3	132.1	360.3	826.5	1667.4
0.195	54.2	132.1	360.0	827.7	1670.5
0.281	53.9	130.5	358.3	824.4	1672.4
0.348	53.1	129.3	354.3	818.5	1663.1
0.359	54.0	129.5	353.5	816.4	1659.6
0.400	52.9	128.0	350.5	809.9	1649.9
0.423	52.3	127.4	348.0	806.2	1642.9
0.575	50.1	121.4	332.5	770.5	1575.5
0.577	50.1	121.5	331.7	768.4	1571.6
0.646	48.3	116.8	320.3	743.7	1524.6
0.651	48.6	116.6	319.8	743.5	1522.7

Cont.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Apparatus described previously was used (1). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ± 0.02°C. The total vapor pressures were measured by a mercury manometer.

The authors calculated activity coefficients of each component from the vapor pressure data by a method described by Barker (2). Constants for Redlich-Kister equations (3) for activity coefficients were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. From commercial *reinst* ethylammonium chloride by reaction with KOH; gas dried with KOH and Na; liquified gas treated with Li and repeatedly fractionated until the first and last fractions had consistent vapor pressures as described for methylamine (1).
2. Commercial product; dried with P_2O_5 repeatedly fractionated until first and last fractions had consistent vapor pressures as described for hexane (1).

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$ (estimated by authors)

REFERENCES:

1. Wolff, H.; Höpfner, A. *Z. Elektrochem.* 1962, *66*, 149.
2. Barker, J.A. *Aust. J. Chem.* 1953, *6*, 207.
3. Redlich, O.; Kister, A.T. *Ind. Eng. Chem.* 1948, *21*, 345.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethanamine, (ethylamine); C_2H_7N; [75-04-7] 2. Butane; C_4H_{10}; [106-97-8]	Wolff, H.; Höpfner, A.; Höpfner, H.-M. *Ber. Bunsenges. Phys. Chem.* 1964, *68*, 410-417.
VARIABLES: Composition, temperature	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES: Cont.

	T/K				
$x_{C_2H_7N}$	218.15	233.15	253.15	273.15	293.15
0.772	43.2	104.6	288.3	675.5	1396.9
0.838	38.6	94.0	262.7	622.1	1300.9
0.861	36.4	89.2	250.5	598.5	1259.2
0.900	32.4	79.8	227.8	553.1	1178.0
0.935	26.7	67.3	199.0	496.2	1082.1
0.940	25.8	66.3	197.0	492.7	1076.6
0.962	21.8	56.5	174.7	450.1	1006.7
1	12.1	37.3	131.6	369.2	872.9

760 Torr = 1 atm = 1.013×10^5 Pa

Constants for calculation of activity coefficients from the Redlich-Kister equations given below.

T/K	A	B	C
218.15	1.772	-0.212	0.237
223.15	1.718	-0.201	0.213
228.15	1.671	-0.179	0.205
233.15	1.630	-0.173	0.184
243.15	1.528	-0.128	0.142
253.15	1.439	-0.100	0.123
263.15	1.348	-0.070	0.098
273.15	1.259	-0.041	0.072
283.15	1.176	-0.024	0.062
293.15	1.091	-0.011	0.048

$$\ln f_1 = A x_2^2 - B x_2^2(1 - 4 x_1) + C x_2^2(1 - 8 x_1 + 12 x_1^2)$$

$$\ln f_2 = A x_1^2 + B x_1^2(1 - 4 x_2) + C x_1^2(1 - 8 x_2 + 12 x_2^2)$$

where f_1 = activity coefficient of ethylamine
f_2 = activity coefficient of butane
x_1 = mole fraction of ethylamine in the liquid phase
x_2 = mole fraction of butane in the liquid phase

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethanamine, (ethylamine); C_2H_7N; [75-04-7] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Höpfner, A.; Höpfner, H.-M. *Ber. Bunsenges. Phys. Chem.* 1964, *68*, 410-417.
VARIABLES:	PREPARED BY:
Composition, temperature	P. G. T. Fogg

EXPERIMENTAL VALUES:

Variation of the total vapor pressure/Torr with variation of temperature and of mole fraction of C_2H_7N in the liquid phase, $x_{C_2H_7N}$

	T/K			
$x_{C_2H_7N}$	233.15	253.15	273.15	293.15
0	3.7	14.3	45.4	121.0
0.0105	6.3	20.4	59.1	145.5
0.0266	9.7	29.6	77.8	180.3
0.0359	11.5	34.6	88.3	201.1
0.0598	15.0	43.0	110.9	244.6
0.0824	17.6	52.0	130.5	287.1
0.0921	18.7	56.4	140.1	304.9
0.0956	19.2	56.8	141.4	306.5
0.1244	21.5	64.7	162.4	350.7
0.1591	23.5	72.7	184.4	401.8
0.1744	23.6	75.4	191.8	417.5
0.227	25.7	83.4	215.7	473.3
0.319	28.2	93.3	247.2	552.8
0.400	28.9	100.1	268.1	607.2
0.436	29.9	102.4	276.4	629.2
0.441	29.9	102.2	276.8	632.0
0.558	31.6	109.0	298.5	689.1
0.622	33.0	111.3	307.7	716.2
0.631	32.2	112.6	309.4	722.0

Cont.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Apparatus described previously was used (1). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ± 0.02°C. The total vapor pressure was measured by a mercury manometer.

The authors calculated activity coefficients of each component from the vapor pressure data by a method described by Barker (2). Constants for Redlich-Kister equations (3) for activity coefficients were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. From commercial *reinst* ethylammonium chloride by reaction with KOH; gas dried with KOH and Na; liquified gas treated with Li and repeatedly fractionated as described for preparation of methylamine (1).
2. Material of high purity; dried over P_2O_5, distilled and repeatedly fractionated until first and last fractions had the same vapor pressures as measured by the manometer (1).

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$ (estimated by authors)

RLFERENCES:

1. Wolff, H.; Höpfner, A. *Z. Elektrochem.* 1962, *66*, 149.
2. Barker, J.A. *Aust. J. Chem.* 1953, *6*, 207.
3. Redlich, O.; Kister, A.T. *Ind. Eng. Chem.* 1948, *21*, 345.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethanamine, (ethylamine); C_2H_7N; [75-04-7] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Höpfner, A.; Höpfner, H.-M. *Ber. Bunsenges. Phys. Chem.* 1964, *68*, 410-417.
VARIABLES: Composition, temperature	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES: Cont.

	T/K			
$x_{C_2H_7N}$	233.15	253.15	273.15	293.15
0.687	32.8	115.0	318.8	744.2
0.761	35.1	118.5	330.5	774.3
0.831	35.0	122.5	341.4	801.9
0.846	35.4	123.3	344.1	808.1
0.928	35.6	127.5	357.3	843.0
0.951	36.6	128.4	360.8	851.5
1	37.6	132.1	369.5	872.8

760 Torr = 1 atm = 1.013×10^5 Pa

Constants for calculation of activity coefficients from the Redlich-Kister equations given below

T/K	A	B	C
233.15	1.665	-0.082	0.232
243.15	1.581	-0.015	0.169
253.15	1.477	-0.004	0.107
263.15	1.376	+0.024	0.096
273.15	1.285	+0.046	0.081
283.15	1.190	+0.061	0.067
293.15	1.097	+0.077	0.061

$$\ln f_1 = A x_2^2 - B x_2^2(1 - 4 x_1) + C x_2^2(1 - 8 x_1 + 12 x_1^2)$$

$$\ln f_2 = A x_1^2 + B x_1^2(1 - 4 x_2) + C x_1^2(1 - 8 x_2 + 12 x_2^2)$$

where f_1 = activity coefficient of ethylamine
f_2 = activity coefficient of hexane
x_1 = mole fraction of ethylamine in the liquid phase
x_2 = mole fraction of hexane in the liquid phase.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethanamine-d_2; $C_2H_5D_2N$; [5852-45-9] 2. Butane; C_4H_{10}; [106-97-8]	Wolff, H.; Höpfner, A. *Ber. Bunsenges. Phys. Chem.* 1965, *69*, 710-716.
VARIABLES:	PREPARED BY:
Composition, Temperature	P. G. T. Fogg

EXPERIMENTAL VALUES:

Variation of the total vapor pressure/Torr with variation of temperature and of mole fraction of $C_2H_5D_2N$ in the liquid phase, $x_{C_2H_5D_2N}$

	T/K				
$x_{C_2H_5D_2N}$	218.15	233.15	253.15	273.15	293.15
0	52.1	125.0	338.5	772.7	1552.6
0.0102	52.9	126.5	341.7	780.0	1566.5
0.0242	53.6	128.4	346.0	788.8	1583.5
0.0463	53.7	130.1	351.0	800.5	1606.6
0.0646	54.1	131.2	354.9	808.0	1621.4
0.0925	54.7	131.6	357.6	816.9	1640.5
0.146	54.2	131.9	359.9	825.6	1662.0
0.171	54.3	131.8	360.0	827.4	1668.6
0.212	54.0	131.3	359.1	827.2	1673.6
0.235	53.7	130.6	358.9	826.9	1674.2
0.268	53.3	130.4	357.1	825.0	1671.8
0.343	53.3	128.9	353.6	816.7	1661.3
0.425	52.0	126.7	347.2	804.2	1638.3
0.483	52.2	125.1	341.7	792.1	1614.9
0.579	49.7	120.6	329.9	765.0	1565.1
0.631	48.6	116.9	321.3	744.9	1525.7
0.651	48.0	115.7	317.0	737.6	1512.0
0.677	46.8	113.6	311.6	725.4	1490.6
0.687	46.9	113.5	310.1	721.5	1482.5

Cont.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Apparatus described previously was used (1). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ± 0.02°C. The total vapor pressure was measured by a mercury manometer.

The authors calculated activity coefficients of each component by a method described by Barker (2). Constants for Redlich-Kister equations for activity coefficients were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. Prepared from $C_2H_5NH_2$ and D_2O; repeatedly fractionated until 1st and last fractions had vapor pressures which differed by 0.4 Torr at 20°C. Spectroscopic measurements indicated that the product was at least 99% pure.
2. Commercial product; dried over P_2O_5; distilled and repeatedly fractionated until first and last fractions had consistent vapor pressures, as described for hexane (1)

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$ (estimated by authors)

REFERENCES:

1. Wolff, H.; Höpfner, A. *Z. Elektrochem.* 1962, *66*, 149.
2. Barker, J. A. *Aust. J. Chem.* 1953, *6*, 207.
3. Redlich, O.; Kister, A.T. *Ind. Eng. Chem.* 1948, *21*, 345.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethanamine-d_2; $C_2H_5D_2N$; [5852-45-9] 2. Butane; C_4H_{10}; [106-97-8]	Wolff, H.; Höpfner, A. *Ber. Bunsenges. Phys. Chem.* 1965, *69*, 710-716.

EXPERIMENTAL VALUES: Cont.

	T/K				
$x_{C_2H_5D_2N}$	218.15	233.15	253.15	273.15	293.15
0.754	43.8	105.7	291.5	681.8	1410.7
0.803	40.6	99.2	274.5	645.2	1342.0
0.869	35.3	85.9	242.0	579.4	1222.7
0.890	32.4	80.5	227.6	551.8	1176.3
0.930	27.1	67.9	198.9	494.1	1078.8
0.955	22.5	57.9	175.7	450.5	1003.6
1	11.3	34.8	124.5	354.7	847.2

760 Torr = 1 atm = 1.013×10^5 Pa

Constants for calculation of activity coefficients from the Redlich-Kister equations given below

T/K	A	B	C
218.15	1.789	-0.233	0.253
223.15	1.762	-0.219	0.233
228.15	1.699	-0.199	0.210
233.15	1.660	-0.194	0.206
243.15	1.558	-0.151	0.150
253.15	1.470	-0.125	0.132
263.15	1.376	-0.095	0.106
273.15	1.286	-0.071	0.083
283.15	1.199	-0.050	0.064
293.15	1.115	-0.032	0.049

$$\ln f_1 = A x_2^2 - B x_2^2(1 - 4x_1) + C x_2^2(1 - 8 x_1 + 12 x_1^2)$$

$$\ln f_2 = A x_1^2 + B x_1^2(1 - 4x_2) + C x_1^2(1 - 8 x_2 + 12 x_2^2)$$

where f_1 = activity coefficient of ethanamine-d_2

f_2 = activity coefficient of butane

x_1 = mole fraction of ethanamine-d_2 in the liquid phase

x_2 = mole fraction of butane in the liquid phase

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 1-Propanamine, (propylamine); C_3H_9N; [107-10-8] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Höpfner, A.; Höpfner,H.-M. *Ber. Bunsenges. Phys. Chem.* 1964, *68*, 410-417.
VARIABLES:	PREPARED BY:
Composition, temperature	P. G. T. Fogg

EXPERIMENTAL VALUES:

Variation of the total vapor pressure/Torr with variation of temperature and of mole fraction of C_3H_9N in the liquid phase, $x_{C_3H_9N}$

	T/K		
$x_{C_3H_9N}$	253.15	273.15	293.15
0	14.4	46.0	121.7
0.0055	14.9	46.9	124.3
0.0114	15.5	48.3	127.6
0.0321	17.4	53.0	137.3
0.0679	19.9	60.0	153.3
0.0880	21.0	63.5	161.0
0.1503	23.9	71.7	181.1
0.1715	24.5	74.0	186.9
0.210	25.5	77.8	196.6
0.229	26.0	79.3	200.8
0.277	26.7	82.4	209.4
0.296	27.1	83.6	212.5
0.360	28.2	87.0	222.3
0.402	28.6	88.7	227.5
0.451	29.3	90.9	233.7
0.527	29.8	93.1	240.7
0.608	30.4	95.2	247.1
0.628	30.2	95.5	248.0

Cont.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Apparatus described previously was used (1). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ± 0.02°C. The total vapor pressures were measured by a mercury manometer.

The authors calculated activity coefficients of each component from the vapor pressure data by a method described by Barker (2). Constants for Redlich-Kister equations (3) for activity coefficients were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. From commercial propylammonium chloride by reaction with KOH; dried with KOH and with Li; repeatedly fractionated until the first and last fractions had the same vapor pressure as measured by manometer. (See ref. 1.)
2. Commercial product; dried with P_2O_5; repeatedly fractionated until first and last fractions had the same vapor pressure as measured by the manometer (1).

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$ (estimated by authors)

REFERENCES:

1. Wolff, H.; Höpfner, A. *Z. Elektrochem.* 1962, *66*, 149.
2. Barker, J.A. *Aust. J. Chem.* 1953, *6*, 207.
3. Redlich, O.; Kister, A.T. *Ind. Eng. Chem.* 1948, *21*, 345.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 1-Propanamine, (propylamine); C_3H_9N; [107-10-8] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Höpfner, A.; Höpfner, H.-M *Ber. Bunsenges. Phys. Chem.* 1964, *68*, 410-417.
VARIABLES:	PREPARED BY:
Composition, temperature	P. G. T. Fogg

EXPERIMENTAL VALUES: Cont.

	T/K		
$x_{C_3H_9N}$	253.15	273.15	293.15
0.680	30.6	96.4	250.0
0.725	30.8	97.1	253.5
0.796	30.7	98.0	255.5
0.910	30.2	97.1	255.8
0.971	29.6	95.5	253.3
1	29.0	94.2	252.6

760 Torr = 1 atm = 1.013×10^5 Pa.

Constants for calculation of activity coefficients from the Redlich-Kister equations given below

T/K	A	B	C
253.15	1.253	-0.070	0.090
263.15	1.165	-0.034	0.059
273.15	1.099	-0.002	0.041
283.15	1.024	0.002	0.042
293.15	0.947	0.008	0.015

$$\ln f_1 = A x_2^2 - B x_2^2(1 - 4 x_1) + C x_2^2(1 - 8 x_1 + 12 x_1^2)$$

$$\ln f_2 = A x_1^2 + B x_1^2(1 - 4 x_2) + C x_1^2(1 - 8 x_2 + 12 x_2^2)$$

where f_1 = activity coefficient of propylamine
f_2 = activity coefficient of hexane
x_1 = mole fraction of propylamine in the liquid phase
x_2 = mole fraction of hexane in the liquid phase

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Propanamine; C_3H_9N; [107-10-8]	Wolff, H.; Shadiakhy, A.
2. Hexane; C_6H_{14}; [110-54-3]	*Fluid Phase Equilibria*
	1983, *11*, 267-287.
VARIABLES:	PREPARED BY:
	C. L. Young

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
293.15	0	16.17	303.15	0	25.00
	0.048_4	19.13		0.048_4	29.28
	0.097_1	21.80		0.097_1	33.00
	0.150_0	24.12		0.149_8	36.36
	0.183_6	25.30		0.183_4	38.05
	0.234_0	26.77		0.233_8	40.32
	0.284_3	27.97		0.284_1	42.25
	0.348_0	29.42		0.347_8	44.41
	0.377_8	29.98		0.377_7	45.28
	0.429_7	30.76		0.429_5	46.56
	0.483_1	31.50		0.483_0	47.80
	0.543_1	32.29		0.543_0	49.01
	0.584_0	32.60		0.583_9	49.72
	0.659_8	33.29		0.659_7	50.68
	0.708_9	33.69		0.708_8	51.37
	0.767_2	34.04		0.767_2	52.08
	0.804_8	34.22		0.804_7	52.33
	0.877_9	34.44		0.877_5	52.65
	0.938_6	34.33		0.938_6	52.72
	0.975_6	33.93		0.975_6	52.34
	1	33.85		1	52.16

(cont.)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Apparatus described previously was used (1), (2). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ±0.02 °C. The total pressure was measured using a mercury manometer. The authors calculated activity coefficients of each component by a method described by Barker (3). Constants for the Wilson equation (4) were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. Fluka purissima grade, fractionated, purity 99.5 mole per cent.
2. Purity 99.97 mole per cent, degassed, dried over molecular sieve.

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$.

REFERENCES:

1. Wolff, H.; Höppel, H. E. *Ber. Bunsenges. Phys. Chem.* 1966, *70*, 874.
2. Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1981, *7*, 309.
3. Barker, J. A. *Aust. J. Chem.* 1953, *6*, 207.
4. Wilson, G. M. *J. Am. Chem. Soc.* 1964, *86*, 127.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Propanamime; C_3H_9N; [107-10-8]	Wolff, H.; Shadiakhy, A.
2. Hexane; C_6H_{14}; [110-54-3]	*Fluid Phase Equilibria*
	1983, *11*, 267-287.

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
313.15	0	37.26	333.15	0	76.23
	0.048_4	43.13		0.048_4	86.43
	0.097_0	48.26		0.096_9	95.58
	0.149_6	53.14		0.149_1	104.26
	0.183_2	55.54		0.182_7	108.82
	0.233_6	58.82		0.232_9	115.22
	0.283_8	61.70		0.283_2	121.02
	0.347_6	64.94		0.346_9	127.47
	0.377_4	66.22		0.376_8	130.23
	0.429_3	68.19		0.428_7	134.47
	0.482_8	70.06		0.482_2	138.43
	0.542_8	71.98		0.542_3	142.41
	0.583_8	72.99		0.583_3	144.83
	0.659_6	74.59		0.659_3	148.61
	0.708_7	75.83		0.708_4	151.07
	0.767_1	76.79		0.766_9	153.36
	0.804_7	77.23		0.804_5	154.63
	0.877_5	77.83		0.877_4	156.40
	0.938_6	78.22		0.938_6	157.53
	0.975_6	77.85		0.975_6	157.21
	1	77.52		1	157.38
323.15	0	54.02	343.15	0	105.19
	0.048_4	61.81		0.048_3	118.14
	0.097_0	68.71		0.096_9	129.86
	0.149_4	75.37		0.148_8	140.96
	0.183_0	78.70		0.182_3	147.03
	0.233_3	83.39		0.232_6	155.59
	0.283_6	87.54		0.282_8	163.45
	0.347_3	92.17		0.346_5	172.40
	0.377_1	94.09		0.376_4	176.13
	0.429_0	97.01		0.428_3	181.96
	0.482_5	99.83		0.481_9	187.52
	0.542_6	102.67		0.542_0	193.21
	0.583_6	104.15		0.583_0	196.54
	0.659_5	106.80		0.659_1	201.92
	0.708_6	108.47		0.708_3	205.60
	0.767_0	110.02		0.766_8	208.94
	0.804_6	110.82		0.804_4	210.81
	0.877_4	111.90		0.877_3	213.62
	0.938_6	112.48		0.938_6	215.26
	0.975_6	112.14		0.975_6	215.29
	1	112.10		1	215.69

Constants for calculation of activity coefficients from the Wilson equation are given below:

T/K	Λ_{12}	Λ_{21}
293.15	0.6054_8	0.5600_4
303.15	0.6545_6	0.5691_0
313.15	0.6994_6	0.5755_5
323.15	0.7412_7	0.5908_9
333.15	0.7818_9	0.6018_4
343.15	0.8349_2	0.6029_9

(cont.)

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Propanamine; C_3H_9N; [107-10-8]	Wolff, H.; Shadiakhy, A.
2. Hexane; C_6H_{14}; [110-54-3]	*Fluid Phase Equilibria*
	1983, *11*, 267-287.

EXPERIMENTAL VALUES:

$$\ln f_1 = -\ln(x_1 + \Lambda_{12}x_2) + x_2\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

$$\ln f_2 = -\ln(x_2 + \Lambda_{21}x_1) - x_1\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

where f_1 = activity coefficient of amine

f_2 = activity coefficient of hexane

x_1 = mole fraction of amine in liquid

x_2 = mole fraction of hexane in liquid.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 1-Propanamine-d_2; $C_3H_7ND_2$; [25837-80-3] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1983, *11*, 267-287.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
293.15	0	16.17	303.15	0	25.00
	0.046_6	19.08		0.046_6	29.20
	0.098_9	21.81		0.098_9	33.06
	0.150_9	24.04		0.150_7	36.26
	0.212_0	25.98		0.211_8	39.13
	0.245_2	26.94		0.245_0	40.64
	0.285_9	27.89		0.285_7	42.14
	0.348_3	29.17		0.348_1	44.05
	0.421_6	30.30		0.421_4	45.97
	0.449_7	30.73		0.449_6	46.61
	0.496_6	31.30		0.496_4	47.57
	0.555_2	31.92		0.555_1	48.61
	0.607_3	32.42		0.607_2	49.44
	0.657_4	32.82		0.657_4	50.17
	0.708_0	33.26		0.707_9	50.80
	0.752_7	33.48		0.752_7	51.22
	0.812_2	33.73		0.812_1	51.60
	0.875_0	33.77		0.875_0	51.81
	0.922_1	33.66		0.922_1	51.73
	0.969_5	33.33		0.969_5	51.46
	1	32.94		1	50.95

(cont.)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Apparatus described previously was used (1), (2). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ±0.02 °C. The total pressure was measured using a mercury manometer. The authors calculated activity coefficients of each component by a method described by Barker (3). Constants for the Wilson equation (4) were evaluated and reported.	1. Prepared *via* exchange reaction of non-deuterated amine with 99.97 mole per cent D_2O. Purity better than 99 mole per cent. Dried. 2. Purity 99.97 mole per cent, degassed, dried over molecular sieve.
	ESTIMATED ERROR: $\delta T/K = \pm 0.02$.
	REFERENCES: 1. Wolff, H.; Höppel, H. E. *Ber. Bunsenges. Phys. Chem.* 1966, *70*, 874. 2. Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1981, *7*, 309. 3. Barker, J. A. *Aust. J. Chem.* 1953, *6*, 207. 4. Wilson, G. M. *J. Am. Chem. Soc.* 1964, *86*, 127.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 1-Propanamine-d_2; $C_3H_7ND_2$; [25837-80-3]	Wolff, H.; Shadiakhy, A.
2. Hexane; C_6H_{14}; [110-54-3]	*Fluid Phase Equilibria*
	1983, *11*, 267-287.

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
313.15	0	37.26	333.15	0	76.23
	0.046_6	42.98		0.046_6	86.13
	0.098_8	48.40		0.098_7	95.59
	0.150_5	52.93		0.150_0	104.02
	0.211_6	57.10		0.211_0	111.99
	0.244_8	59.24		0.244_2	116.12
	0.285_5	61.43		0.284_8	120.63
	0.347_9	64.46		0.347_3	126.84
	0.421_2	67.42		0.420_6	133.08
	0.449_3	68.41		0.448_8	135.19
	0.496_2	69.90		0.495_7	138.51
	0.554_9	71.53		0.554_5	142.09
	0.607_0	72.90		0.606_6	145.03
	0.657_2	73.98		0.656_9	147.65
	0.707_8	75.01		0.707_6	149.83
	0.752_6	75.62		0.752_4	151.59
	0.812_1	76.39		0.812_0	153.45
	0.875_0	76.79		0.874_9	154.87
	0.922_1	76.93		0.922_1	155.45
	0.969_5	76.66		0.969_5	155.63
	1	76.18		1	155.10
323.15	0	54.02	343.15	0	105.19
	0.046_6	61.61		0.046_5	117.78
	0.098_8	68.93		0.098_7	129.99
	0.150_3	75.19		0.149_7	140.84
	0.211_3	81.03		0.210_7	151.55
	0.244_5	84.03		0.243_8	157.15
	0.285_2	87.25		0.284_4	163.21
	0.347_6	91.65		0.346_9	171.84
	0.420_9	95.97		0.420_2	180.36
	0.449_1	97.49		0.448_4	183.32
	0.496_0	99.66		0.495_3	187.96
	0.554_7	102.28		0.554_2	193.13
	0.606_9	104.19		0.606_4	197.22
	0.657_1	105.91		0.656_7	200.78
	0.707_7	107.46		0.707_4	204.12
	0.752_5	108.52		0.752_3	206.57
	0.812_0	109.71		0.811_9	209.49
	0.874_9	110.56		0.874_8	211.77
	0.922_1	110.84		0.922_0	212.92
	0.969_5	110.75		0.969_5	213.37
	1	110.27		1	213.12

Constants for calculation of activity coefficients from the Wilson equation are given below:

T/K	Λ_{12}	Λ_{21}
293.15	0.6139_8	0.5320_4
303.15	0.6595_1	0.5471_8
313.15	0.7043_1	0.5622_3
323.15	0.7504_3	0.5724_9
333.15	0.8100_5	0.5684_7
343.15	0.8484_9	0.5826_3

(cont.)

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 1-Propanamine-d_2; $C_3H_7ND_2$; [25837-80-3] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1983, *11*, 267-287.

EXPERIMENTAL VALUES:

$$\ln f_1 = -\ln(x_1 + \Lambda_{12}x_2) + x_2\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

$$\ln f_2 = -\ln(x_2 + \Lambda_{21}x_1) - x_1\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

where f_1 = activity coefficient of amine

f_2 = activity coefficient of hexane

x_1 = mole fraction of amine in liquid

x_2 = mole fraction of hexane in liquid.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 1-Propanamine (n-Propylamine); C_3H_9N; [107-10-8] 2. Octanol, glycols and glycerol	Copley, M.J.; Ginsberg, E.; Zellhoefer, G.F.; Marvel, C.S. *J. Amer. Chem. Soc.* 1941, *63*, 254-256.
VARIABLES:	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES:

Solvent	T/K	$p_{C_3H_9N}$/mmHg*	Mole fraction $x_{C_3H_9N}$
1-Octanol; $C_8H_{18}O$; [111-87-5]	305.4	106	0.408
1,2-Ethanediol (ethylene glycol); $C_2H_6O_2$; [107-21-1]	305.4	106	0.465
1,3-Butanediol (1,3-butylene glycol) $C_4H_{10}O_2$; [107-88-0]	305.4	106	0.460
1,2,3-Propanetriol (glycerol); $C_3H_8O_3$; [56-81-5]	305.4	106	0.497
2,2'-Oxybis-ethanol, (diethylene glycol); $C_4H_{10}O_3$; [111-46-6]	305.4	106	0.510
2,2'-[1,2-ethanediylbis(oxy)]bis-ethanol, (triethylene glycol); $C_6H_{14}O_4$; [112-27-6]	305.4	106	0.519

760 mmHg = 1 atm = 1.013×10^5 Pa.

* The pressure of propanamine was said by the authors to correspond to its vapor pressure at 4.5°C. The authors stated that they measured the vapor pressure at several temperatures and determined the value at 4.5°C from a plot of the logarithm of the vapor pressure against (K/T).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The absorption apparatus was developed for studies of refrigeration systems (ref. (1)) and consisted of a copper drum, 4 x 12 cm, fitted with a needle valve and two-way outlet with one outlet connected to a manometer. The drum was evacuated to a pressure of 1 mmHg and about 40 cm^3 of solvent drawn into this drum which was then reweighed and immersed in a water bath at 32.2°C. The drum was agitated and propanamine vapor allowed to flow slowly into it until the final pressure corresponded to the vapor pressure of propanamine at 4.5°C. The drum and contents were weighed again to find the weight of vapor which had been absorbed.

SOURCE AND PURITY OF MATERIALS:

The authors stated that the materials used were all purified carefully by chemical means and fractional distillation where feasible.

ESTIMATED ERROR:

REFERENCES:

1. Zellhoefer, G.F. *Ind. Eng. Chem.* 1937, *29*, 548.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Propanamine (*iso*-propylamine); C_3H_9N; [75-31-0] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1983, *11*, 267-287.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
283.15	0	10.09	293.15	0	16.17
	0.046_9	14.11		0.046_9	21.74
	0.098_3	17.72		0.098_3	27.05
	0.154_6	20.97		0.154_4	31.84
	0.189_0	22.56		0.188_7	34.22
	0.250_0	25.21		0.249_7	38.17
	0.290_6	26.61		0.290_3	40.30
	0.336_1	28.04		0.335_8	42.60
	0.369_3	29.01		0.369_0	44.14
	0.432_9	30.72		0.432_6	46.78
	0.516_0	32.61		0.515_7	49.77
	0.566_0	33.61		0.565_7	51.46
	0.601_2	34.24		0.601_0	52.62
	0.664_4	35.54		0.664_2	54.52
	0.707_0	36.37		0.706_9	55.81
	0.751_1	37.13		0.751_0	57.02
	0.820_7	38.33		0.820_6	59.00
	0.869_6	39.14		0.869_5	60.32
	0.936_8	40.24		0.936_8	62.05
	0.967_2	40.76		0.967_2	62.82
	1	41.26		1	63.61

(cont.)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Apparatus described previously was used (1), (2). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ±0.02 °C. The total pressure was measured using a mercury manometer. The authors calculated activity coefficients of each component by a method described by Barker (3). Constants for the Wilson equation (4) were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. Fluka purissima grade, fractionated, purity 99.995 mole per cent.
2. Purity 99.97 mole per cent, degassed, dried over molecular sieve.

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$.

REFERENCES:

1. Wolff, H.; Höppel, H. E. *Ber. Bunsenges. Phys. Chem.* 1966, *70*, 874.
2. Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1981, *7*, 309.
3. Barker, J. A. *Aust. J. Chem.* 1953, *6*, 207.
4. Wilson, G. M. *J. Am. Chem. Soc.* 1964, *86*, 127.

COMPONENTS:	ORIGINAL MEASUREMENTS
1. 2-Propanamine (*iso*-propylamine); C_3H_9N; [75-31-0] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1983, *11*, 267-287.

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
303.15	0	25.00	323.15	0	54.02
	0.046_9	32.58		0.046_8	67.26
	0.098_2	39.86		0.098_1	80.13
	0.154_1	46.72		0.153_4	92.41
	0.188_4	49.98		0.187_6	98.51
	0.249_4	55.77		0.248_4	109.62
	0.289_9	59.00		0.289_0	116.23
	0.335_4	62.43		0.334_4	123.07
	0.368_7	64.70		0.367_7	127.82
	0.432_2	68.70		0.431_3	136.10
	0.515_4	73.42		0.514_5	145.97
	0.565_4	75.95		0.564_6	151.45
	0.600_7	77.67		0.599_9	155.15
	0.664_0	80.67		0.663_3	161.49
	0.706_7	82.59		0.706_1	165.49
	0.750_8	84.49		0.750_3	169.63
	0.820_5	87.45		0.820_2	176.05
	0.869_4	89.50		0.869_2	180.29
	0.936_8	92.15		0.936_7	186.06
	0.967_1	93.23		0.967_1	188.53
	1	94.60		1	191.23
313.15	0	37.26	333.15	0	76.23
	0.046_8	47.46		0.046_8	93.03
	0.098_2	57.28		0.098_1	109.32
	0.153_8	66.54		0.153_0	125.42
	0.188_0	71.05		0.187_1	133.68
	0.248_9	79.23		0.247_9	148.24
	0.289_5	84.02		0.288_4	157.20
	0.335_0	88.79		0.333_8	166.49
	0.368_2	92.21		0.367_1	172.89
	0.431_8	98.02		0.430_7	184.25
	0.515_0	104.92		0.514_0	198.09
	0.565_0	108.79		0.564_1	205.69
	0.600_4	111.31		0.599_5	211.02
	0.663_7	115.68		0.662_9	219.66
	0.706_4	118.54		0.705_8	225.35
	0.750_6	121.31		0.750_0	231.14
	0.820_3	125.83		0.819_9	240.03
	0.869_3	128.76		0.869_0	246.11
	0.936_7	132.80		0.936_6	254.41
	0.967_1	134.50		0.967_0	257.67
	1	136.36		1	261.57

Constants for calculation of activity coefficients from the Wilson equation are given below:

T/K	Λ_{12}	Λ_{21}
283.15	0.5940_0	0.5896_1
293.15	0.6427_2	0.5986_5
303.15	0.6905_5	0.6114_9
313.15	0.7325_5	0.6233_4
323.15	0.7795_7	0.6310_4
333.15	0.8184_2	0.6444_6

(cont.)

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Propanamine (*iso*-propylamine); C_3H_9N; [75-31-0] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1983, *11*, 267-287.

EXPERIMENTAL VALUES:

$$\ln f_1 = -\ln(x_1 + \Lambda_{12}x_2) + x_2\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

$$\ln f_2 = -\ln(x_2 + \Lambda_{21}x_1) - x_1\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

where f_1 = activity coefficient of amine

f_2 = activity coefficient of hexane

x_1 = mole fraction of amine in liquid

x_2 = mole fraction of hexane in liquid.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Propanamine-d_2; $C_3H_7ND_2$; [7395-10-0] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1983, *11*, 267-287.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
283.15	0	10.09	293.15	0	16.17
	0.052_0	14.36		0.052_0	22.24
	0.105_3	18.03		0.105_3	27.50
	0.157_3	20.88		0.157_1	31.78
	0.198_9	22.76		0.198_6	34.58
	0.233_4	24.14		0.233_1	36.66
	0.299_5	26.45		0.299_2	40.26
	0.347_4	27.92		0.347_0	42.54
	0.399_1	29.36		0.398_8	44.76
	0.453_7	30.61		0.453_5	46.89
	0.516_1	31.96		0.515_9	49.05
	0.567_4	33.00		0.567_1	50.77
	0.621_2	34.00		0.621_0	52.38
	0.673_7	34.93		0.673_5	53.88
	0.714_8	35.72		0.714_6	55.08
	0.787_7	37.02		0.787_6	57.02
	0.821_6	37.53		0.821_5	57.92
	0.880_2	38.42		0.880_1	59.42
	0.925_8	39.10		0.925_8	60.62
	0.970_5	39.81		0.970_5	61.69
	1	40.14		1	62.31

(cont.)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Apparatus described previously was used (1), (2). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ±0.02 °C. The total pressure was measured using a mercury manometer. The authors calculated activity coefficients of each component by a method described by Barker (3). Constants for the Wilson equation (4) were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. Prepared *via* exchange reaction of non-deuterated amine with 99.7 mole per cent D_2O. Purity better than 99 mole per cent. Dried.
2. Purity 99.97 mole per cent, degassed, dried over molecular sieve.

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$

REFERENCES:

1. Wolff, H.; Höppel, H. E. *Ber. Bunsenges. Phys. Chem.* 1966, *70*, 874.
2. Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1981, *7*, 309.
3. Barker, J. A. *Aust. J. Chem.* 1953, *6*, 207.
4. Wilson, G. M. *J. Am. Chem. Soc.* 1964, *86*, 127.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Propanamine-d_2; $C_3H_7ND_2$; [7395-10-0]	Wolff, H.; Shadiakhy, A.
2. Hexane; C_6H_{14}; [110-54-3]	*Fluid Phase Equilibria*
	1983, *11*, 267-287.

EXPERIMENTAL VALUES:

T/K	x_1	P/kPa	T/K	x_1	P/kPa
303.15	0	25.00	323.15	0	54.02
	0.051_9	33.28		0.051_9	68.31
	0.105_2	40.58		0.105_1	81.29
	0.156_8	46.65		0.156_1	92.43
	0.198_3	50.56		0.197_5	99.83
	0.232_7	53.74		0.231_8	105.96
	0.298_9	59.05		0.297_9	116.68
	0.346_7	62.47		0.345_7	123.67
	0.398_4	65.87		0.397_4	130.64
	0.453_1	69.07		0.452_2	137.47
	0.515_5	72.43		0.514_6	144.64
	0.566_8	75.01		0.566_0	150.08
	0.620_8	77.53		0.620_1	155.68
	0.673_3	79.90		0.672_7	160.84
	0.714_4	81.79		0.713_9	164.67
	0.787_4	84.71		0.787_0	171.21
	0.821_4	86.11		0.821_1	174.21
	0.880_1	88.45		0.879_8	179.25
	0.925_8	90.26		0.925_6	183.13
	0.970_4	91.97		0.970_4	186.72
	1	92.94		1	189.09
313.15	0	37.26	333.15	0	76.23
	0.051_9	48.33		0.051_8	94.35
	0.105_2	58.24		0.105_0	110.87
	0.156_5	66.62		0.155_7	125.44
	0.197_9	71.91		0.197_0	135.31
	0.232_3	76.46		0.231_3	143.53
	0.298_4	84.18		0.297_3	157.97
	0.346_2	89.15		0.345_1	167.52
	0.398_0	94.09		0.396_8	177.03
	0.452_7	98.81		0.451_6	186.52
	0.515_1	103.83		0.514_1	196.66
	0.566_5	107.67		0.565_5	204.30
	0.620_5	111.42		0.619_6	212.02
	0.673_0	114.92		0.672_3	219.24
	0.714_2	117.62		0.713_5	224.58
	0.787_2	122.19		0.786_8	233.83
	0.821_3	124.23		0.820_9	238.21
	0.880_0	127.79		0.879_7	245.34
	0.925_7	130.39		0.925_5	250.70
	0.970_4	132.94		0.970_4	255.87
	1	134.46		1	259.20

Constants for calculation of activity coefficients from the Wilson equation are given below:

T/K	Λ_{12}	Λ_{21}
283.15	0.5998_3	0.5755_1
293.15	0.6393_0	0.5976_6
303.15	0.6856_3	0.6131_9
313.15	0.7289_0	0.6255_0
323.15	0.7789_9	0.6331_6
333.15	0.8249_4	0.6412_1

(cont.)

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Propanamine-d_2; $C_3H_7ND_2$; [7395-10-0] 2. Hexane; C_6H_{14}; [110-54-3]	Wolff, H.; Shadiakhy, A. *Fluid Phase Equilibria* 1983, *11*, 267-287.

EXPERIMENTAL VALUES:

$$\ln f_1 = -\ln(x_1 + \Lambda_{12}x_2) + x_2\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

$$\ln f_2 = -\ln(x_2 + \Lambda_{21}x_1) - x_1\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{x_2 + \Lambda_{21}x_1}\right)$$

where f_1 = activity coefficient of amine

f_2 = activity coefficient of hexane

x_1 = mole fraction of amine in liquid

x_2 = mole fraction of hexane in liquid.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Propanamine (*iso*-propyl amine); C_3H_9N; [75-31-0] 2. Glycols	Copley, M.J.; Ginsberg, E.; Zellhoefer, G.F.; Marvel, C.S. *J. Amer. Chem. Soc.* 1941, *63*, 254-256.
VARIABLES:	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES:

Solvent	T/K	$p_{C_3H_9N}$/mmHg*	Mole fraction $x_{C_3H_9N}$
1,2-Ethanediol (ethylene glycol); $C_2H_6O_2$; [107-21-1]	305.4	223	0.488
2,2'-Oxybis-ethanol, (diethylene glycol); $C_4H_{10}O_3$; [111-46-6]	305.4	223	0.517
2,2'-[1,2-ethanediylbis(oxy)]bis-ethanol, (triethylene glycol); $C_6H_{14}O_4$; [112-27-6]	305.4	223	0.552

* The pressure of 2-propanamine was said by the authors to correspond to its vapor pressure at 4.5°C. The authors stated that they measured the vapor pressure at several temperatures and determined the value at 4.5°C from a plot of the logarithm of the vapor pressure against K/T.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The absorption apparatus was developed for studies of refrigeration systems (ref. (1)) and consisted of a copper drum 4 x 12 cm, fitted with a needle valve and two-way outlet with one outlet connected to a manometer. The drum was evacuated to a pressure of 1 mmHg and about 40 cm^3 of solvent drawn into this drum which was then reweighed and immersed in a water bath at 32.2 °C. The drum was agitated and 2-propanamine vapor allowed to flow slowly into it until the final pressure corresponded to the vapor pressure of 2-propanamine at 4.5 °C. The drum and contents were weighed again to find the weight of vapor which had been absorbed.	The authors stated that the materials used were all purified carefully by chemical means and fractional distillation where feasible.
	ESTIMATED ERROR:
	REFERENCES: 1. Zellhoefer, G.F. *Ind. Eng. Chem.* 1937, *29*, 548.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 1-Butanamine, (*n*-butylamine); $C_4H_{11}N$; [109-73-9] 2. Glycols and amines	Copley, M.J.; Ginsberg, E.; Zellhoefer, G.F.; Marvel, C.S. *J. Amer. Chem. Soc.* 1941, *63*, 254-256.
VARIABLES:	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES:

Solvent	T/K	$p_{C_4H_{11}N}$/mmHg*	Mole fraction $x_{C_4H_{11}N}$
1,2-Ethanediol, (ethylene glycol); $C_2H_6O_2$; [107-21-1]	305.4	24	0.400
2,2'-Oxybis-ethanol, (diethylene glycol); $C_4H_{10}O_3$; [111-46-6]	305.4	24	0.384
2,2'-[1,2-ethanediylbis(oxy)]bis-ethanol, (triethylene glycol); $C_6H_{14}O_4$; [112-27-6]	305.4	24	0.405
2,2'-[oxybis(2,1-ethanediyloxy)]bis-ethanol, (tetraethylene glycol) ; $C_8H_{18}O_5$; [112-60-7]	305.4	24	0.410
1,6-Hexanediamine (hexamethylenediamine); $C_6H_{16}N_2$; [124-09-4]	305.4	24	0.144
N,*N*'-bis(2-aminoethyl)-1,2-ethanediamine, (triethylenetetramine); $C_6H_{18}N_4$; [112-24-3]	305.4	24	0.145

* The pressure of 1-butanamine was said by the authors to correspond to its vapor pressure at 4.5°C. The authors stated that they measured the vapor pressure at several temperatures and determined the values at 4.5°C from a plot of the logarithm of the vapor pressure against (K/T).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The absorption apparatus was developed for studies of refrigeration systems (ref. (1)) and consisted of a copper drum, 4 x 12 cm, fitted with a needle valve and two-way outlet with one outlet connected to a manometer. The drum was evacuated to a pressure of 1 mmHg and about 40 cm^3 of solvent drawn into this drum which was then reweighed and immersed in a water bath at 32.2°C. The drum was agitated and 1-butanamine vapor allowed to flow slowly into it until the final pressure corresponded to the vapor pressure of 1-butanamine at 4.5°C. The drum and contents were weighed again to find the weight of vapor which had been absorbed.	The authors stated that the materials used were all purified carefully by chemical means and fractional distillation where feasible.
	ESTIMATED ERROR:
	REFERENCES: 1. Zellhoefer, G.F. *Ind. Eng. Chem.* 1937, *29*, 548.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Butanamine, (*sec*-butylamine); $C_4H_{11}N$; [13952-84-6] 2. 1,2-Ethanediol, (ethylene glycol); $C_2H_6O_2$; [107-21-1]	Copley, M.J.; Ginsberg, E.; Zellhoefer, G.F.; Marvel, C.S. *J. Amer. Chem. Soc.* 1941, *63*, 254-256.
VARIABLES:	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES:

T/K	$P_{C_4H_{11}N}$/mmHg*	Mole fraction $x_{C_4H_{11}N}$
305.4	56.5	0.397

760 mmHg = 1 atm = 1.013×10^5 Pa.

* The pressure of 2-butanamine was said by the authors to correspond to its vapor pressure at 4.5°C. The authors stated that they measured the vapor pressure at several temperatures and determined the value at 4.5°C from a plot of the logarithm of the vapor pressure against (K/T).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The absorption apparatus was developed for studies of refrigeration systems (ref. (1)) and consisted of a copper drum, 4 x 12 cm, fitted with a needle valve and two-way outlet with one outlet connected to a manometer. The drum was evacuated to a pressure of 1 mmHg and about 40 cm^3 of solvent drawn into this drum which was then reweighed and immersed in a water bath at 32.2°C. The drum was agitated and 2-butanamine vapor allowed to flow slowly into it until the final pressure corresponded to the vapor pressure of 2-butanamine at 4.5°C. The drum and contents were weighed again to find the weight of vapor which had been absorbed.	The authors stated that the materials used were all purified carefully by chemical means and fractional distillation where feasible.
	ESTIMATED ERROR:
	REFERENCES: 1. Zellhoefer, G.F. *Ind. Eng. Chem.* 1937, *29*, 548.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. 2-Methyl-1-propanamine, (*iso*-butylamine); $C_4H_{11}N$; [78-81-9] 2. 1,2-Ethanediol, (ethylene glycol); $C_2H_6O_2$; [107-21-1]	Copley, M.J.; Ginsberg, E.; Zellhoefer, G.F.; Marvel, C.S. *J. Amer. Chem. Soc.* 1941, *63*, 254-256.
VARIABLES:	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES:

T/K	$p_{C_4H_{11}N}$/mmHg*	Mole fraction $x_{C_4H_{11}N}$
305.4	45.4	0.381

760 mmHg = 1 atm = 1.013×10^5 Pa.

* The pressure of 2-methyl-1-propanamine was said by the authors to correspond to its vapor pressure at 4.5°C. The authors stated that they measured the vapor pressure at several temperatures and determined the value at 4.5°C from a plot of the logarithm of the vapor pressure against 1/(T/K).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The absorption apparatus was developed for studies of refrigeration systems (ref. (1)) and consisted of a copper drum, 4 x 12 cm, fitted with a needle valve and two-way outlet with one outlet connected to a manometer. The drum was evacuated to a pressure of 1 mmHg and about 40 cm^3 of solvent drawn into this drum which was then reweighed and immersed in a water bath at 32.2°C. The drum was agitated and the amine vapor allowed to flow slowly into it until the final pressure corresponded to the vapor pressure of the amine at 4.5°C. The drum and contents were weighed again to find the weight of vapor which had been absorbed.

SOURCE AND PURITY OF MATERIALS:

The authors stated that the materials used were all purified carefully by chemical means and fractional distillation where feasible.

ESTIMATED ERROR:

REFERENCES:

1. Zellhoefer, G.F. *Ind. Eng. Chem.* 1937, *29*, 548.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. *N*-Ethylethanamine (diethylamine) $C_4H_{11}N$; [109-89-7] 2. 1,2-Ethanediol, (ethylene glycol); $C_2H_6O_2$; [107-21-1]	Copley, M.J.; Ginsberg, E.; Zellhoefer, G.F.; Marvel, C.S. *J. Amer. Chem. Soc.* 1941, *63* 254-256.
VARIABLES:	PREPARED BY: P. G. T. Fogg

EXPERIMENTAL VALUES:

T/K	$p_{C_4H_{11}N}$/mmHg*	Mole fraction $x_{C_4H_{11}N}$
305.4	88	0.371

760 mmHg = 1 atm = 1.013×10^5 Pa.

* The pressure of diethylamine was said by the authors to correspond to its vapor pressure at 4.5°C. The authors stated that they measured the vapor pressure at several temperatures and determined the value at 4.5°C from a plot of the logarithm of the vapor pressure against (K/T).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The absorption apparatus was developed for studies of refrigeration systems (ref. (1)) and consisted of a copper drum, 4 x 12 cm, fitted with a needle valve and two-way outlet with one outlet connected to a manometer. The drum was evacuated to a pressure of 1 mmHg and about 40 cm^3 of solvent drawn into this drum which was then reweighed and immersed in a water bath at 32.2°C. The drum was agitated and diethylamine vapor allowed to flow slowly into it until the final pressure corresponded to the vapor pressure of diethylamine at 4.5°C. The drum and contents were weighed again to find the weight of vapor which had been absorbed.

SOURCE AND PURITY OF MATERIALS:

The authors stated that the materials used were all purified carefully by chemical means and fractional distillation where feasible.

ESTIMATED ERROR:

REFERENCES:

1. Zellhoefer, G.F. *Ind. Eng. Chem.* 1937, *29*, 548.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. *N,N*-Diethylethanamine, (Triethylamine); $C_6H_{16}N$; [121-44-8] 2. Nitro-methane; CH_3NO_2; [75-52-5]	Halban, H. *Z. Phys. Chem.* 1913, *84*, 129-159.
VARIABLES:	PREPARED BY:
Concentration	P. G. T. Fogg

EXPERIMENTAL VALUES:

T/K	Concentration of $C_6H_{16}N$ in solution/ mol dm^{-3}	$p_{C_6H_{16}N}$/mmHg	Concentration of $C_6H_{16}N$ in solution/ concentration in gas phase	Mole fraction in solution* $x_{C_6H_{16}N}$
298.2	0.300	13.7	408	0.0159
	0.214	9.76	407	0.0114
	0.190	8.83	400	0.0102

* Calculated by the compiler, using the density of the solvent given in ref. (1), on the assumption that dissolution of gas caused negligible change of volume of the liquid phase.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The partial pressures of triethylamine above solutions of concentrations determined by titration, were measured by a dynamic method (refs. (2) & (3)). Mixtures of hydrogen and oxygen, produced by electrolysis of sodium hydroxide solution, were passed through each solution of triethylamine. The triethylamine in the gas stream was absorbed in hydrochloric acid and estimated from changes in electrical conductivity due to partial neutralisation of the acid. The volumes of hydrogen/oxygen gas mixture produced by electrolysis were found from the barometric pressure and changes in a copper voltameter in series with the cell for producing the gas. The partial pressures of triethylamine were calculated on the assumption that equilibrium was established between triethylamine in solution and that in the gas phase, during passage of hydrogen/oxygen mixture through the solution.

SOURCE AND PURITY OF MATERIALS:

1. Hydrated chloride from Kahlbaum; reacted with KOH; gas dried with NaOH.
2. Prepared according to ref. (4); dried over potassium carbonate; b.p. 100.6°C (751 mmHg).

REFERENCES:

1. Timmermans, J. *Physico-Chemical Constants of Pure Organic Compounds* Vol. 2, Elsevier, Amsterdam. 1965
2. Gaus, *Z. Anorg. Chem.* 1900, *25*, 236.
3. Abegg, R.; Riesenfeld, H. *Z. Phys. Chem.* 1902, *40*, 84.
4. Steinkopf, W; Kirchoff, G. *Ber. Dtsch. Chem. Ges.* 1909, *42*, 3438.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. *N*,*N*-Diethylethanamine, (Triethylamine); $C_6H_{16}N$; [121-44-8] 2. Hexane; C_6H_{14}; [110-54-3]	Halban, H. *Z. Phys. Chem.* 1913, *84*, 129-159.
VARIABLES:	PREPARED BY:
Concentration	P. G. T. Fogg

EXPERIMENTAL VALUES:

T/K	Concentration of $C_6H_{16}N$ in solution/ mol dm^{-3}	$p_{C_6H_{16}N}$/mmHg	Concentration of $C_6H_{16}N$ in solution/ concentration in gas phase	Mole fraction in solution* $x_{C_6H_{16}N}$
298.2	0.300	2.56	2175	0.0380
	0.269	2.35	2129	0.0342
	0.238	2.04	2169	0.0304

* Calculated by the compiler, using the density of the solvent given in ref. (1), on the assumption that dissolution of gas caused negligible change of volume of the liquid phase.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The partial pressures of triethylamine above solutions of concentrations determined by titration, were measured by a dynamic method (refs. (2) & (3)). Mixtures of hydrogen and oxygen, produced by electrolysis of sodium hydroxide solution, were passed through each solution of triethylamine. The triethylamine in the gas stream was absorbed in hydrochloric acid and estimated from changes in electrical conductivity due to partial neutralisation of the acid. The volumes of hydrogen/ oxygen gas mixture produced by electrolysis were found from the barometric pressure and changes in a copper voltameter in series with the cell for producing the gas. The partial pressures of triethylamine were calculated on the assumption that equilibrium was established between triethylamine in solution and that in the gas phase, during passage of hydrogen/oxygen mixture through the solution.	1. Hydrated chloride from Kahlbaum; reacted with KOH; gas dried with NaOH. 2. Kahlbaum *n-Hexan aus Propyljodid*; distilled over Na; b.p. 67.85-68.10°C (745 mmHg).
	ESTIMATED ERROR:
	REFERENCES: 1. Dreisbach, R.R. *Physical Properties of Chemical Compounds*, Vol. 2, A.C.S., Washington. 1959. 2. Gaus, *Z. Anorg. Chem.* 1900, *25*, 236. 3. Abegg, R.; Riesenfeld, H. *Z. Phys. Chem.* 1902, *40*, 84.