SYSTEM –

Water and Pyridine

Activity Coefficient Model –

Wilson

Type of Equation	Parameters	$\ln \gamma_1$ = $\ln \gamma_2$ =	Notation of Parameters in Data Sheet
Wilson [8]	$\lambda_{12} - \lambda_{11}$ [1]	$-\ln(x_1 + \Lambda_{12}x_2) + x_2\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{\Lambda_{21}x_1 + x_2}\right)$ (30a)	A 12
	$\lambda_{21} - \lambda_{22}$	$-\ln(x_2 + \Lambda_{21}x_1) - x_1\left(\frac{\Lambda_{12}}{x_1 + \Lambda_{12}x_2} - \frac{\Lambda_{21}}{\Lambda_{21}x_1 + x_2}\right)$ (30b)	A 21

1) $\Lambda_{12} = \frac{V_2^L}{V_1^L} \exp -\frac{\lambda_{12} - \lambda_{11}}{RT}$ $\Lambda_{21} = \frac{V_1^L}{V_2^L} \exp -\frac{\lambda_{21} - \lambda_{22}}{RT}$

V_i^L molar volume of pure liquid component i. For values of V_i^L see Appendix A.

λ_{ij} interaction energy between components i and j $\lambda_{ij} = \lambda_{ji}$

Parameters are given in cal/mol with the gas.

2. Antoine Vapor Pressure Equation

The Antoine vapor pressure equation is used in the following form:

$$\log[p_i^0] = A - \frac{B}{t + C} \qquad (70)$$

with $[p_i^0]$ vapor pressure of pure component i in mm Hg
t temperature in degrees Celsius (° C)

The Antoine constants A, B, and C are given with respective temperature regions (in ° C).

Note- Here it is log (Base 10).

Value of Constants

(1) WATER H2O

(2) PYRIDINE C5H5N

+++++ ANTOINE CONSTANTS +++++ REGION CONSISTENCY

(1)	8.07131 1730.630	233.426	1- 100 C	METHOD 1	-
(2)	7.04115 1373.799	214.979	67- 153 C	METHOD 2	+

PRESSURE= 760.00 MM HG (1.013 BAR)

CONSTANTS:	A12	A21	α_{12}	γ_1^∞	γ_2^∞	OBJECTIVE FUNCTION	
MARGULES	.4767	2.3102		1.61	10.08	1.7458	G
VAN LAAR	.7927	2.9264		2.21	18.66	.2208	G
WILSON	1098.7901	1266.6728		2.41	24.28	.0796	G
NRTL	1999.3885	328.3587	.6092	2.61	20.79	.0736	G
UNIQUAC	-630.0054	841.3075		2.47	14.58	.4602	G

Please take data corresponding to Wilson

There is no alpha12 for Wilson.

T-X-Y Data

EXPERIMENTAL DATA

T DEG C	X1	Y1
115.50	0.0000	0.0000
111.10	.0490	.1740
109.30	.0756	.2463
107.90	.0936	.2789
107.70	.1067	.3019
106.90	.1097	.3057
105.60	.1366	.3606
104.70	.1525	.3808
103.70	.1664	.4034
103.80	.1740	.4110
101.70	.1965	.4429
101.00	.2402	.4869
99.70	.2671	.5130
99.50	.2743	.5136
97.50	.3512	.5757
97.40	.3910	.6016
96.20	.4633	.6407
95.50	.5461	.6809
95.40	.5544	.6860
95.00	.6016	.7060
94.70	.6502	.7244
94.70	.6622	.7291
94.60	.6903	.7378
94.40	.7761	.7625
94.50	.8016	.7691
94.50	.8390	.7766
94.80	.8703	.7829
94.90	.8896	.7879
94.90	.8961	.7898
95.10	.9162	.7950
95.30	.9503	.8107
95.50	.9629	.8217
96.00	.9707	.8348
96.30	.9809	.8592
96.60	.9824	.8607

Take the molar volume from NIST Database. If not available there, please contact the TA's (Sandra and Krishna).

All data taken from Dechema Chemistry Data Series.