CHAPTER VI

DISCUSSION AND CONCLUSION

6.1 DISCUSSION

Chapter V presents the details of calculated results which consist of calculated saturation pressures based on QEOS and PR-EOS , %deviation and % absolute average deviation (%AAD) is also given. But %dev depend on the temperature and pressure ranges. Therefore , in this chapter, a better picture of %dev for each binary system is presented. In the following table ,%dev is classified into three categories : 0-5 % for small deviation from experimental data , 5-10% for medium deviation and excess 10 % for large deviation or poor prediction .

The following symbols are used :

% dev $\uparrow$ P $\uparrow$	means % deviation increases with P
% dev $\uparrow$ P $\downarrow$	means % deviation increases as P decreases
% dev Λ P $\uparrow$	means % deviation increases with P, then decreases
% dev $\uparrow$ T $\uparrow$	means % deviation increases with T
% dev $\uparrow$ T $\downarrow$	means % deviation increases as T decreases
% dev Λ T $\uparrow$	means % deviation increases with T, then decreases

Table 6.1 **%AAD Summary for saturation pressure calculated from QEOS and PR-EOS**

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
1-1	Water & 1,2 propanediol	353	1.079E-02	0.83	7.23
			2.3E-03 - 5.96E-03	6.67-10.87	5.33-15.65
			4.139 E-02	45.40	30.44
		373	6.830E-03 - 5.120E-03	0.15-2.73	8.49-10.35
			2.978E-02 - 8.547E-02	15.36-16.05	13.80-98.83
			1.046E-02	30.31	7.46
				(%dev∧ P↑)	
1-2	Water & HCl	253	9.356E-04	97.81	94.02
		263	1.573E-04	49.26	0.01
		273	3.426E-04	191.89	8.67
	Water & Ethanol	372.4-374.2	0.1013	37.97 - 40.73	0.0066-0.0068
		375.6		2.93	0.0069
		376.7		39.96	0.0072
				(%dev∧ P↑)	(%dev↑ T↑)
	Water & Ammonia	333.15	1.236E-02 - 1.823E-02	42.96 - 61.66	1.43-9.63
			3.177E-02 - 1.0366E-01	78.19 - 93.11	6.86-25.03
				(%dev↑ P↑)	

Table 6.1 (continue)

Group	system	(K)	P (MPa)	%dev QEOS	%dev PR-EOS
1-2	Propionic acid & Phenol	383.2	1.507E-02	1.19	0.63
			2.466E-02	9.94	9.45
				(%dev ↑ P↑)	
		403.2	1.913E-02 - 5.073E-02	0.89 - 11.55	0.12 - 0.48
			5.713E-02	5.10	11.80
				(%dev ↑ P↑)	
	Water & Methanol	376.4	1.013E-01	88.77	1.53
		373 - 375.6		92.09 - 92.48	2.86 - 5.84
		378 - 383.9		92.56 - 93.51	0.25 - 19.40
	Water & Ethanol	349.2	1.013E-01	45.63	1.17
		351.6 - 355.4		85.57 - 86.95	0.1- 0.71
		357.9 - 358.4		85.41- 85.41	83.09
	Water & 1-Propanol	352.9 - 353.5	1.013E-01	5.41 - 6.22	0.01 - 0.20
		354.7 - 358.5		32.96 - 53.33	26.69 - 26.72
	Water & 2-Propanol	350.1	1.013E-01	0.24	0.41
		353.5 - 356.4		47.07 - 70.97	34.86 - 35.13

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
2-2	Diethylamine & Methanol	348.09	1.44E-01	95.68	0.44
			1.405E-01 - 1.419 E-01	95.48 - 95.59	1.31 - 11.99
			1.421E-01 - 1.486E-01	95.48 -95.55	3.84 - 25.74
	Methanol & Ethanol	345.63 - 349.60	1.013E-01	44.23 - 48.37	0
		341.64 - 343.74		50.74 - 53.41	0
		339.22 - 341.26		35.14 - 49.26	0
				(%dev↑ T↓)	
	Methanol & 1 -Octanol	433.78	1.013E-01	1.74	0.89
		437.95		10.15	0.05
				(%dev↑ T↑)	(%dev↑ T↓)
	Ethanol & 1 -Octanol	452.19	1.013E-01	0.65	0
		403.52 - 413.28		2.40 - 9.28	0
				(%dev↑ T↓)	
	Pyridine & Methanol	413.20	1.062	11.76	5.98
			2.257E-01 - 7.114E-01	22.79 - 85.94	36.04 - 85.80
				(%dev ↑ P↑)	

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
1-3	Water & Methyl ethyl keton	357.60 - 370.60	1.013E-01	61.73 - 63.18 (%dev ↑ T ↑)	0 - 1.28
	Acetic acid & Ethyl acetate	343.2	4.45E-02	0.2	0.66
			4.040E-02 - 3.273E-02	1.30 - 1.58	1.30 - 9.85
		373.2	9.166E-02	5.5	50.91
			1.100E-01	19.34 - 26.54	0.08
			1.849E-01 - 2.023E-01	8.88 - 26.54	72.96 - 75.28
	Acetic acid & Triethylamine	333.2	3.440E-02 - 3.60E-02	0.03 - 0.26 (%dev ↑ P ↑)	0.09 - 0.33
		353.2	7.090E-02 - 7.150E-02	0.14 - 0.23 (%dev ↑ P ↓)	0.10 - 0.35
	Water & Methyl acetate	299.5	1.013E-01	0.85	0.59
		300.40 - 305.50		3.10 - 9.78	1.32 - 90.15
	Water & Ethyl acetate	299.10 - 304.70	1.013E-01	2.55 - 3.44	1.73 - 3.66
		305 - 308		0.52 - 1.22 (%dev ↓ T ↑)	0.30 - 0.85
	Water & Acetone	300.50 - 304.0	1.013E-01	3.46 - 10.31	1.09 - 1.26

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Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
1-3	Water &Methyl ethyl keton	280.50 - 282.30	1.013E-01	2.16 - 5.72	1.36 - 2.19
		283.40 - 290.20		0.25 - 1.86	0.18 - 1.60
2-3	Methanol & Acetone	331.2 - 328.92	1.013E-01	14.44 - 19.52	0.30 - 0.92
		331.18		0.01	0.26
		332.0 - 332.11		2.71 - 5.85	1.84 - 2.14
				(%dev↗ T↑)	
	Diethylamine & Acetonitrile	298	1.624E-02	51.77	11.85
			1.951E-02 - 2.196E-02	59.46 - 63.69	0.05 - 1.85
			2.380E-02 - 2.820E-02	66.27 - 70.68	3.01 - 3.97
				(%dev↑ P↑)	
	Ethanol & Acetonitrile	293.15	1.082E-02 - 1.098E-02	7.46 - 45.17	60.39 - 63.94
			1.022E-02 - 1.059E-02	43.53 - 45.41	2.51 - 2.92
			9.586E-03	38.54	1.82
				(%dev↗ P↑)	(%dev↑ P↑)
	Ethanol & Isopropyl acetate	302	1.054E-02	4.51	4.51
			1.024E-02	15.71	15.71
			9.480E-02	23.33	23.33
				(%dev↑ P↓)	

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
2-3	Phenol & Methyl ethyl ketone	393.2	1.900E-02	36.41	73.68
			2.120E-02 - 6.760 E-02	58.28 - 92.82	4.98 - 11.41
		413.2	3.343E-02	28.72	95.51
			3.790E-02	60.42	60.42
			1.08E-01	84.89	9.47
				(%dev ↑ P↑)	(%dev↑ P↓)
	Diethyamine & Acetonitrile	313.15	2.067E-02	19.71	75.25
				(%dev↑ P↓)	(%dev ↑ P↑)
			2.664E-02 - 2.735E-02	4.50 - 15.44	79.87 - 80.24
3-3	Methyl formate & Acetone	323.2	1.452E-01	18.38	1.49
			1.686E-01	0.83	70.34
				(%dev↑ P↓)	(%dev ↑ P↑)
		343.2	2.689E-01	0.94	0.55
			3.013E-01 - 3.207E-01	0.07 - 6.30	83.41 - 84.41
		363.2	4.846E-02	0.22	9.79
			5.86E-01	10.93	90.61
				(%dev ↑ P↑)	(%dev ↑ P↑)

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
3-3	Vinyl acetate &	333.2	6.030E-02 - 6.200E-02	0.88- 0.98	0.07 - 19.35
	Methyl ethyl ketone			(%dev ↑ P↑)	(%dev ↑ P↑)
		353.2	1.068E-01	10.81	5.97
			1.137E-01	1.09	56.02
				(%dev↑ P↓)	
		373.2	1.965E-01	1.28	49.11
		393.2	3.584E-01 - 3.843E-01	4.24 - 7.78	0.32 - 1.67
	Triethylamine &	293	1.072E-02	4.61	0.66
	Methyl ethyl ketone		1.017E-02	0.61	15.01
				(%dev↑ P↑)	(%dev↑ P↓)
		320	3.465E-02	0.16	0.95
			2.592E-02 - 2.779E-02	4.94 - 10.72	3.05 - 4.21
	Triethylamine &	273	4.60E-02	85.66	0.09
	Ethyl acetate		1.480E-02 - 3.484E-02	49.77 - 80.68	2.61 - 10.73
		363	3.731E-01 - 4.682E-01	52.60 - 54.71	3.63 - 32.12
				(%dev↑ P↑)	(%dev↑ P↓)

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
2-4	Diethylamine & Chloroform	334.55 -335.45	1.013E -01	10.27 - 20.43	0
		336.15 - 336.25		41.76 - 42.74	0
				(%dev ↑ T↑)	
	Hydrochloric acid &	273	9.260E-01	51.4	66.31
	Dichloroethane		1.902 - 2.439	71.98 - 74.16	88.75 - 96.77
				(%dev ↑ P↑)	(%dev ↑ P↑)
3-4	Acetaldehyde &	303	5.212E-02	1.51	30.07
	1,1 Dichloroethane		7.381E-02 - 8.285E-02	51.15 - 59.56	4.89 - 39.81
			3.163E-02 - 3.252E-02	61.33 - 65.32	2.34 - 2.99
				(%dev ↑ P↑)	(%dev ↑ P↓)
		306	5.320E-02	5.98	85.9
			5.720E-02 - 6.090E-02	0.44 - 0.89	13.35 - 19.47
			8.350E-02 - 9.430E-02	57.98 - 64.91	3.69 - 8.72
				(%dev ↑ P↑)	(%dev ↑ P↓)
1-5	Propionic acid &	364	1.013E-01	4.31	0
	Carbontetrachloride	349.41 - 358		0.53 - 3.34	50.64 - 60.73
				(%dev ↑ T↑)	(%dev ↑ T↑)

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
2-5	Methanol & n-Hexane	298.15	3.634E-02 - 3.630E-02	6.16 - 16.25	0 - 0.50
			3.631E-02	1.68	0.61
					(%dev ↑ P↑)
	Methanol & n-Heptane	298.15	1.950E-02	5.64	83.08
			2.050E-02 -2.147E-02	0.79 - 2.91	0.49 - 30.60
			2.162E-01	90.38	93.34
					(%dev ↑ P↑)
	Ethanol & n-Hexane	298.15	2.450E-02 - 2.561E-02	56.73 - 67.98	8.49 - 16.05
			2.332E-02 - 2.554E-02	40.39 - 70.24	0.36 - 4.92
				(%dev ↑ P↓)	
	Ethanol & n-Heptane	298.15	1.130E-02 - 1.215E-02	53.10 - 73.37	2.27 - 4.13
				(%dev ↑ P↑)	(%dev ↑ P↓)
	Ethanol & n- Octhane	343.15	6.030E-02	2.95	29.04
			6.499E-02	35.78	34.98
			6.699E-02 - 6.984E-02	54.67 - 66.09	0.48 - 0.69
				(%dev ↑ P↑)	
	1 -Propanol & n- Octhane	385.15	5.223E-02	91.79	90.00
			5.731E-02 - 6.434E-02	56.78 - 69.04	0.10 - 16.24

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
2-5	1 -Butanol & n-Hexane	298.15	1.980E-02 - 2.011E-02	1.02 - 4.01	0.12 - 9.76
			1.935E-02	0.28	12.28
				(%dev↑ P↓)	(%dev↑ P↓)
	2 -Butanol & n-Hexane	298.15	2.051E-02	4.21	2.56
			1.901E-02 - 1.919E-02	0.38 - 1.20	7.88 - 9.99
				(%dev↑ P↑)	(%dev↑ P↓)
	1-Butanol & 2-Chlorobutane	368.60 - 385.24	1.013E-01	0.91 - 5.02	0
		362.20 - 358.20		70.64 - 83.33	0
				(%dev↑ T↑)	
	Tert - butyl alcohol &	361.30 - 368.40	1.013E-01	0.35 - 0.76	0
	Chlorobenzene	359.60 - 359.90		1.08 - 3.16	51.53 - 56.86
				(%dev ↑ T↓)	(%dev↑ T↓)
	Tert - butyl alcohol &	328.2	3.532E-02 - 3.815E-02	6.40 - 10.80	0.16 - 18.60
	Cyclohexane		4.400E-02 - 5.413E-02	22.18 - 32.26	8.77 - 21.47
				(%dev ↑ P↑)	(%dev ↑ P↑)
			5.426E-02 - 5.442E-02	0.97 - 11.33	0.75 - 2.76
				(%dev↑ P↓)	(%dev↑ P↓)

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
2-5	Hydrogen sulfide & Ethyl cyclohexane	310.9	1.700E-01	55.98	13.9
			4.650E-01 - 1.540	45.21 - 56.02	52.65 - 57.11
	Methanol & Dimethylsulfide	297.84	3.387E-02 - 3.614E-02	49.12 - 52.84	0.11 - 1.09
			6.232E-02 - 6.247E-02	72.75 - 72.89 (%dev ↑ P↑)	6.96 - 8.10
	Methanol & Carbonyl sulfide	293.2	1.585E-01	50.56	1.10
			2.206E-01	8.90 (%dev ↑ P↓)	40.84 (%dev ↑ P↑)
		253.2	3.826E-02	9.16	2.65
			8.995E-02 - 1.813E-01	17.26 - 19.81	17.26 - 66.76
	Methanol & Carbondisulfide	253.2	1.380E-03 - 2.070E-03	49.77 - 66.46	63.77 -75.85
			4.480E-03 - 5.240E-03	84.43 - 86.68 (%dev ↑ P↑)	0.15 - 0.75 (%dev ↑ P↓)
		233.2	4.800E-04 - 1.580E-03	39.50 - 81.57 (%dev ↑ P↓)	2.08 - 10.22
3-5	Methyl acetate & Toluene	373.80 - 379.60	1.013E-01	4.08 - 6.19 (%dev ∧ T↑)	0.3

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
3-5	Ethyl acetate & 1-Chlorobutane	298.15	1.345E-02 - 1.398E-02	2.12 - 2.93 (%dev ↑ P↑)	0.04 - 2.59 (%dev↑ P↓)
			1.401E-02 - 1.407E-02	0.50 - 0.71 (%dev↑ P↓)	4.28 - 8.75 (%dev↑ P↑)
	Acetonitrile & Toluene	343.15	6.970E-02 - 6.990E-02	5.72 - 8.90	0.02 - 0.17
			7.010E-02	2.71 (%dev↑ P↓)	0.35 (%dev↑ P↑)
	Methyl ethyl ketone & p-Xylene	356.76 - 399.12	1.013E-01	3.48 - 9.08	0
	Acetone & 1 - Chlorobutane	348.16	1.084E-01 - 1.349E-01	52.45 - 55.57	16.91 - 17.23
			1.454E-01	55.55 (%dev↑ P↑)	0.29 (%dev↑ P↓)
	Ethyl formate & Benzene	323.15	3.865E-02	51.75	11.97
			4.833E-02 - 5.985E-02	54.38 - 55.39 (%dev↑ P↑)	1.59 - 4.78 (%dev↑ P↓)
	Nitromethane & 1 -Chlorobutane	298.18	9.938E-03 - 1.268E-02	76.34 - 87.05	14.46 - 28.66
			1.321E-02 - 1.429E-02	43.05 - 70.79 (%dev↑ P↓)	4.03 - 6.79 (%dev↑ P↓)

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Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
4-5	1,2 Dichloroethane & Vinyl chloride	293	2.117E-01 - 2.514E-01	1.70 - 2.12 (%dev ↑ P↑)	0.16 - 80.11 (%dev ↑ P↑)
			1.450E-01 - 1.825E-01	58.10 - 66.08 (%dev ↑ P↑)	6.63 - 27.60
		320	6.702E-01- 7.529E-02	0.13 - 0.28 (%dev↑ P↓)	53.51 - 94.78 (%dev↑ P↓)
	1,2 Dichloroethane & Cyclohexene	352.90 - 354.00	1.013E-01	0 - 0.43 (%dev ↑ T↓)	0 - 0.30 (%dev↑ T↓)
	1,2 Dichloroethane & Cyclohexane	350.6	1.013E-01	0.17	0
5-5	Ethane & Propane	270	0.531E-01 - 5.47E-01	0 - 63.22 (%dev↑ P↓)	47.19 - 47.45 (%dev↑ P↓)
	n - Hexane & n - Heptane	351.94 - 353.96	1.013E-01	0.30 -0.99	0
		350.27 - 348.72		1.48 - 9.97 (%dev ↑ T↓)	58.44 - 60.02 (%dev↑ T↑)
	n -Hexane &Cyclohexane	349 - 351.3	1.013E-01	5.13 - 5.23 (%dev↑ T↑)	0

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev QEOS	%dev PR-EOS
5-5	Benzene & Toluene	325.15	1.340E-02	30.60	62.69
			3.260E-02 - 3.600E-02	0.56 - 3.37 (%dev↑ P↓)	0 -6.72
		373.15	1.381E-01	0.14	0.14
			1.577E-01	14.52 (%dev↑ P↑)	14.52 (%dev↑ P↑)
	Cyclohexane & Napthalene	413.15	1.628E-01	6.76	3.93
			3.978E-01	5.78 (%dev↑ P↓)	49.62 (%dev↑ P↑)
	Toluene & Napthalene	413.15	1.491E-01	1.41	3.49
	Propylene & Propane	230	1.135E-01 - 1.216E-01	0.09 - 0.58 (%dev↑ P↑)	1.56 - 1.85 (%dev↑ P↓)
		240	1.76E-01	3.29	0.45
			1.803E-01 - 1.864E -01	0.22 - 0.93 (%dev↑ P↓)	8.65 - 51.91 (%dev↑ P↑)
		270	5.085E-01 - 5.176E-01	0.66 - 4.78	2.00 - 51.12
			5.457E-01	12.39 (%dev↑ P↑)	52.63 (%dev↑ P↑)

Table 6.1 (continue)

Group	system	T (K)	P (MPa)	%dev	
				QEOS	PR-EOS
5-5	n -Heptane & Toluene	339.9 - 341.8	2.666E-02	0.28 - 2.84	0 - 0.05
		338.2	1.922E-02	27.89	22.77
		308.7 - 308.9	6.660E-03	5.44 - 8.75	4.71 - 7.21
		306.7	6.646E-03	0.21	0.12
	Propylene & 1,3 Butadiene	273.2	1.603E-01 - 2.516E-01	18.93 - 25.29 (%dev ↑ P↑)	47.82 - 71.93 (%dev↑ P↓)
		293.2	2.792E-01	56.74	1.58

Containing Effecting QEOS performance

The results of this work show that the QEOS can describe some binary systems well while fails to describe other binary systems. Accuracy also depends on the temperature and pressure ranges. The condition that affects the QEOS performance is thus examined here. Binary systems belonging to group 1-2 is used for consideration.

Since critical temperature, acentric factor and dipole monent are the basic properties used in the calculation, they should have influence on the result of calculation .The table below summarises some relevant parameter values.The table reveals that the differences of the basic properties of the pure substances forming the binary mixture result in the high%AAD values. For example,for system H_2O - HCl, Tc =647.5 K and Tc = 324.7 K for HCl

Table 6.2 Physical properties of pure components in group 1-2

System	water & HCl	water & ethanol	water& 1-propanol	water & 2-propanol	water & ammonia	water & methanol
%AAD	113	53.89	32.73	47.68	75.88	92.17
Tc_1	647.15	647.15	647.15	647.15	647.15	647.15
Tc_2	325	516	537	508	405	513
Pc_1	2.212	2.212	2.212	2.212	2.212	2.212
Pc_2	8.418	6.383	5.166	4.761	1.129	7.972
Dc_1	17.94	17.94	17.94	17.94	17.94	17.94
Dc_2	12.36	5.989	4.583	4.55	13.79	8.498
μ_1	1.85	1.85	1.85	1.85	1.85	1.85
μ_2	1.1	1.69	1.68	1.66	1.47	1.7
Vc_1	0.055	0.055	0.055	0.055	0.055	0.055
Vc_2	0.081	0.167	0.219	0.219	0.073	0.119
ω_1	0.34	0.34	0.34	0.34	0.34	0.34
ω_2	0.13	0.64	0.63	0.53	0.25	0.57

6.2 CONCLUSION

According to this work ,for the application of a generalized QEOS to binary mixtures with %AAD less than 5% ,the following binary systems are included:

GROUP 1&2 - Hydroxyacids & Phenol : Propionic acid & Phenol

GROUP 2&2 - Alcohol & Alcohol : Ethanol & 1-Ocatnol T 403.52 - 452.19 K , P0.1013 MPa

GROUP 1&3 - Water & Ketone : Water & Methyl Ethyl Ketone at 0.1013 MPa

Hydroxyacids & Ester : Acetic acid & Ethyl acetate T 343.2K , P 0.032-0.044 MPa

Hydroxyacids & Amine : Acetic acid & Triethylamine T 332 - 353.2 K P 0.034 -0.07 MPa

Water & Ester : Water & Ethyl acetate T 298.0 - 308 K , P 0.1013 MPa

GROUP 3&3 - Ester & Ketone : Vinyl acetate & Methyl Ethyl Ketone T 333.2 - 373.2 K ,P 0.060 - 0.1965 MPa

Amine & Ketone : Triethylamine & Methyl Ethyl Ketone T 293 K , P 0.01017 - 0.01072 MPa

GROUP 1&5 - Carbontetrachloride & Propionic acid T 364 -349.41 K , P 0.1013 MPa

GROUP 2&5 - Alcohol & Hydrocarbon :

1-Butanol & Hexane T 298.15 K , P 0.01935 - 0.02011 MPa

2-Butanol & Hexane T 298.15 K , P 0.01901-0.02051 MPa

Alcohol & Chlorohydrocarbon :

1-Butanol & 2- Chlorobutane T 368.6 - 385.24 K ,P 0.1013 MPa

Tert - butyl alcohol & Chlorobenzene T 359.6-368.40 K ,P 0.1013 MPa

GROUP 3&5 - Ester & Chlorohydrocarbon :Ethyl acetate & 1-Chlorobutane

T 298.15 K , P 0.01312 - 0.01407 MPa

GROUP 4&5 - 1,2 Dichloroethane & Hydrocarbon :

1,2 Dichloroethane & Vinyl chloride T 320 K , P 0.07529 - 0.6702 MPa

1,2 Dichloroethane & Cyclohexene T 352.90 - 354 K, P 0.1013 MPa

1,2 Dichloroethane & Cyclohexane T 350.60 K , P 0.1013 MPa

GROUP 5&5 - Hydrocarbon & Hydrocabon :

n-Hexane & n-Heptane T 348.72 - 353.96 K ,P 0.1013 MPa

Toluene & Napthalene T 413.15 K , P 0.1491 MPa

Propane & Propylene T 230 K , P 0.1135 - 0.1216 MPa

Accuracy depends on the temperature and pressure ranges for the binary mixtures.

Comparative study with Peng - Robinson EOS show that the performance of the Quartic EOS being better than that of PR- EOS for the following binary :

GROUP 1&3 - Hydroxyacids & Ester : Acetic acid & Ethyl acetate

Hydroxyacids & Amine : Acetic acid & Triethylamine

Water & Ester : Water & Ethyl acetate

GROUP 3&3 - Ester & Ketone : Vinyl acetate & Methyl Ethyl Ketone

Amine & Ketone : Triethylamine & Methyl Ethyl Ketone,

GROUP 1&5 - Carbontetrachloride & Propionic acid

GROUP 2&5 - Alcohol & Hydrocarbon :Methanol & Hexane , 1-butanol & Hexane , 2-butanol & Hexane,Alcohol & carbonyl sulfide

GROUP 4&5 - 1,2 Dichloroethane & Cyclic Hydrocarbon.