


1	 HONEYWELL Calgary, Alberta CANADA	Case Name:	C:\Program Files (x86)\...UniSim ThermoWorkbench R360\NoName.utw
2		Unit Set:	SI
3		Date/Time:	Wednesday Dec 7 2011, 7:08:13
4			
5			

Phase Equilibrium Properties Datasheet

Fluid Package

Selected Fluid Package	Fluid1	Selected Property Package	Ideal Solution-Ideal Gas
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Binary Interaction Information

Minimum Composition	0.0000 *	Maximum Composition	1.0000 *
Number of Points	51 *	X axis Composition Basis	Mole

Constant Pressure Basis

101.0 kPa *

Ethanol	Mole	Temperature (C)		Enthalpy (kJ/kgmole)		Entropy (kJ/kgmole-C)		Molar Density (kgmole/m3)		Viscosity (cP)		Thermal Cond. (W/m-K)	
		Bubble Point	Dew Point	Bubble Point	Dew Point	Bubble Point	Dew Point	Bubble Point	Dew Point	Bubble Point	Dew Point	Bubble Point	Dew Point
21	0.0000 *	99.9078 *	99.9080 *	-279222.1719 *	-238567.3477 *	23.5545 *	132.4841 *	52.6211 *	0.0326 *	0.2792 *	0.0121 *	0.6827 *	0.0241 *
22	0.0200 *	99.2255 *	99.5972 *	-279013.5126 *	-238394.6790 *	25.2658 *	134.2638 *	50.6900 *	0.0326 *	0.2851 *	0.0092 *	0.6651 *	0.0239 *
23	0.0400 *	98.5596 *	99.2255 *	-278805.9879 *	-238222.7527 *	26.7341 *	135.8058 *	48.8772 *	0.0326 *	0.2949 *	0.0092 *	0.6479 *	0.0237 *
24	0.0600 *	97.9097 *	98.9658 *	-278599.6586 *	-238051.6665 *	28.1015 *	137.2517 *	47.1735 *	0.0326 *	0.3040 *	0.0092 *	0.6310 *	0.0235 *
25	0.0800 *	97.2753 *	98.5596 *	-278394.4824 *	-237881.4318 *	29.3989 *	138.6319 *	45.5699 *	0.0327 *	0.3124 *	0.0092 *	0.6144 *	0.0234 *
26	0.1000 *	96.6557 *	98.3213 *	-278190.4195 *	-237712.0602 *	30.6410 *	139.9608 *	44.0580 *	0.0327 *	0.3202 *	0.0092 *	0.5981 *	0.0232 *
27	0.1200 *	96.0502 *	97.9097 *	-277987.4326 *	-237543.5637 *	31.8364 *	141.2466 *	42.6308 *	0.0327 *	0.3274 *	0.0092 *	0.5822 *	0.0230 *
28	0.1400 *	95.4584 *	97.6632 *	-277785.4862 *	-237375.9548 *	32.9910 *	142.4949 *	41.2815 *	0.0328 *	0.3342 *	0.0092 *	0.5666 *	0.0229 *
29	0.1600 *	94.8796 *	97.2753 *	-277584.5469 *	-237209.2463 *	34.1090 *	143.7093 *	40.0043 *	0.0328 *	0.3405 *	0.0092 *	0.5513 *	0.0227 *
30	0.1800 *	94.3135 *	96.9907 *	-277384.5832 *	-237043.4513 *	35.1936 *	144.8927 *	38.7938 *	0.0328 *	0.3464 *	0.0091 *	0.5364 *	0.0226 *
31	0.2000 *	93.7594 *	96.6557 *	-277185.5652 *	-236878.5835 *	36.2471 *	146.0472 *	37.6452 *	0.0328 *	0.3519 *	0.0091 *	0.5217 *	0.0224 *
32	0.2200 *	93.2170 *	96.3032 *	-276987.4644 *	-236714.6570 *	37.2715 *	147.1744 *	36.5541 *	0.0329 *	0.3571 *	0.0091 *	0.5074 *	0.0222 *
33	0.2400 *	92.6859 *	96.0502 *	-276790.2541 *	-236551.6863 *	38.2685 *	148.2755 *	35.5164 *	0.0329 *	0.3619 *	0.0090 *	0.4933 *	0.0221 *
34	0.2600 *	92.1656 *	95.4584 *	-276593.9085 *	-236389.6865 *	39.2395 *	149.3515 *	34.5286 *	0.0329 *	0.3664 *	0.0090 *	0.4795 *	0.0219 *
35	0.2800 *	91.6557 *	95.2420 *	-276398.4036 *	-236228.6731 *	40.1854 *	150.4033 *	33.5872 *	0.0330 *	0.3706 *	0.0090 *	0.4660 *	0.0218 *
36	0.3000 *	91.1560 *	94.8796 *	-276203.7160 *	-236068.6622 *	41.1075 *	151.4314 *	32.6894 *	0.0330 *	0.3746 *	0.0089 *	0.4528 *	0.0216 *
37	0.3200 *	90.6659 *	94.5133 *	-276009.8239 *	-235909.6704 *	42.0064 *	152.4363 *	31.8321 *	0.0330 *	0.3783 *	0.0089 *	0.4399 *	0.0215 *
38	0.3400 *	90.1852 *	94.3135 *	-275816.7063 *	-235751.7150 *	42.8829 *	153.4185 *	31.0129 *	0.0331 *	0.3818 *	0.0088 *	0.4272 *	0.0213 *
39	0.3600 *	89.7137 *	93.7594 *	-275624.3430 *	-235594.8138 *	43.7376 *	154.3780 *	30.2295 *	0.0331 *	0.3851 *	0.0088 *	0.4148 *	0.0212 *
40	0.3800 *	89.2509 *	93.2170 *	-275432.7151 *	-235438.9853 *	44.5710 *	155.3153 *	29.4796 *	0.0331 *	0.3882 *	0.0088 *	0.4027 *	0.0210 *
41	0.4000 *	88.7966 *	93.0008 *	-275241.8041 *	-235284.2488 *	45.3837 *	156.2302 *	28.7613 *	0.0332 *	0.3910 *	0.0087 *	0.3908 *	0.0209 *
42	0.4200 *	88.3505 *	92.6859 *	-275051.5927 *	-235130.6243 *	46.1761 *	157.1229 *	28.0726 *	0.0332 *	0.3937 *	0.0087 *	0.3792 *	0.0208 *
43	0.4400 *	87.9123 *	92.1656 *	-274862.0642 *	-234978.1323 *	46.9484 *	157.9932 *	27.4119 *	0.0332 *	0.3963 *	0.0086 *	0.3678 *	0.0206 *
44	0.4600 *	87.4819 *	91.6557 *	-274673.2023 *	-234826.7944 *	47.7009 *	158.8412 *	26.7776 *	0.0333 *	0.3987 *	0.0086 *	0.3567 *	0.0205 *
45	0.4800 *	87.0589 *	91.4075 *	-274484.9920 *	-234676.6330 *	48.4340 *	159.6665 *	26.1682 *	0.0333 *	0.4009 *	0.0085 *	0.3459 *	0.0203 *
46	0.5000 *	86.6432 *	91.1560 *	-274297.4182 *	-234527.6713 *	49.1477 *	160.4690 *	25.5824 *	0.0334 *	0.4030 *	0.0085 *	0.3352 *	0.0202 *
47	0.5200 *	86.2345 *	90.6659 *	-274110.4671 *	-234379.9335 *	49.8423 *	161.2484 *	25.0188 *	0.0334 *	0.4050 *	0.0084 *	0.3248 *	0.0201 *
48	0.5400 *	85.8325 *	90.1852 *	-273924.1248 *	-234233.4449 *	50.5178 *	162.0042 *	24.4762 *	0.0334 *	0.4068 *	0.0084 *	0.3147 *	0.0199 *
49	0.5600 *	85.4372 *	89.7137 *	-273738.3785 *	-234088.2317 *	51.1742 *	162.7361 *	23.9537 *	0.0335 *	0.4086 *	0.0083 *	0.3047 *	0.0198 *
50	0.5800 *	85.0483 *	89.2509 *	-273553.2155 *	-233944.3212 *	51.8116 *	163.4435 *	23.4501 *	0.0335 *	0.4102 *	0.0083 *	0.2950 *	0.0196 *
51	0.6000 *	84.6657 *	88.7966 *	-273368.6237 *	-233801.7422 *	52.4299 *	164.1257 *	22.9645 *	0.0336 *	0.4117 *	0.0082 *	0.2855 *	0.0195 *
52	0.6200 *	84.2891 *	88.3505 *	-273184.5915 *	-233660.5244 *	53.0291 *	164.7822 *	22.4960 *	0.0336 *	0.4131 *	0.0082 *	0.2763 *	0.0194 *
53	0.6400 *	83.9183 *	87.9123 *	-273001.1077 *	-233520.6990 *	53.6088 *	165.4121 *	22.0436 *	0.0336 *	0.4144 *	0.0081 *	0.2672 *	0.0192 *
54	0.6600 *	83.5533 *	87.4819 *	-272818.1614 *	-233382.2984 *	54.1690 *	166.0145 *	21.6068 *	0.0337 *	0.4157 *	0.0080 *	0.2584 *	0.0191 *
55	0.6800 *	83.1938 *	87.0589 *	-272635.7423 *	-233245.3569 *	54.7093 *	166.5884 *	21.1846 *	0.0337 *	0.4168 *	0.0080 *	0.2498 *	0.0190 *
56	0.7000 *	82.8398 *	86.6432 *	-272453.8403 *	-233109.9099 *	55.2293 *	167.1325 *	20.7765 *	0.0338 *	0.4179 *	0.0079 *	0.2413 *	0.0188 *
57	0.7200 *	82.4910 *	86.2345 *	-272272.4456 *	-232975.9948 *	55.7286 *	167.6455 *	20.3817 *	0.0338 *	0.4189 *	0.0079 *	0.2331 *	0.0187 *
58	0.7400 *	82.1473 *	85.8325 *	-272091.5489 *	-232843.6504 *	56.2066 *	168.1259 *	19.9996 *	0.0339 *	0.4198 *	0.0078 *	0.2251 *	0.0186 *
59	0.7600 *	81.8086 *	85.4372 *	-271911.1411 *	-232712.9176 *	56.6626 *	168.5717 *	19.6297 *	0.0339 *	0.4206 *	0.0078 *	0.2173 *	0.0184 *
60	0.7800 *	81.4748 *	84.6657 *	-271731.2134 *	-232583.8390 *	57.0957 *	168.9808 *	19.2714 *	0.0340 *	0.4214 *	0.0077 *	0.2096 *	0.0183 *
61	0.8000 *	81.1457 *	83.9183 *	-271551.7573 *	-232456.4590 *	57.5048 *	169.3507 *	18.9242 *	0.0340 *	0.4221 *	0.0077 *	0.2022 *	0.0182 *
62	0.8200 *	80.8213 *	83.5533 *	-271372.7646 *	-232330.8243 *	57.8886 *	169.6782 *	18.5877 *	0.0341 *	0.4228 *	0.0076 *	0.1949 *	0.0181 *
63	0.8400 *	80.5013 *	82.8398 *	-271194.2274 *	-232206.9830 *	58.2454 *	169.9595 *	18.2612 *	0.0341 *	0.4234 *	0.0076 *	0.1878 *	0.0179 *
64	0.8600 *	80.1857 *	82.4910 *	-271016.1379 *	-232084.9852 *	58.5731 *	170.1900 *	17.9446 *	0.0342 *	0.4239 *	0.0075 *	0.1809 *	0.0178 *
65	0.8800 *	79.8744 *	81.8086 *	-270838.4887 *	-231964.8823 *	58.8687 *	170.3635 *	17.6372 *	0.0342 *	0.4244 *	0.0075 *	0.1742 *	0.0177 *
66	0.9000 *	79.5673 *	81.4748 *	-270661.2725 *	-231846.7261 *	59.1285 *	170.4718 *	17.3387 *	0.0343 *	0.4248 *	0.0074 *	0.1677 *	0.0175 *
67	0.9200 *	79.2642 *	80.8213 *	-270484.4823 *	-231730.5679 *	59.3470 *	170.5035 *	17.0489 *	0.0343 *	0.4252 *	0.0074 *	0.1613 *	0.0174 *

1	 HONEYWELL Calgary, Alberta CANADA	Case Name:	C:\Program Files (x86)\...\UniSim ThermoWorkbench R360\NoName.utw
2		Unit Set:	SI
3		Date/Time:	Wednesday Dec 7 2011, 7:08:13
4			
5			

Phase Equilibrium Properties Datasheet

Binary Interaction Information

Constant Pressure Basis

101.0 kPa *

Ethanol	Temperature (C)		Enthalpy (kJ/kgmole)		Entropy (kJ/kgmole-C)		Molar Density (kgmole/m3)		Viscosity (cP)		Thermal Cond. (W/m-K)															
	Liquid	Mole	Bubble Point	Dew Point	Bubble Point	Dew Point	Bubble Point	Dew Point	Bubble Point	Dew Point	Bubble Point	Dew Point														
15	0.9400	*	78.9651	*	80.1857	*	-270308.1113	*	-231616.4551	*	59.5157	*	170.4415	*	16.7672	*	0.0344	*	0.4256	*	0.0073	*	0.1551	*	0.0173	*
16	0.9600	*	78.6699	*	79.5673	*	-270132.1529	*	-231504.4238	*	59.6204	*	170.2564	*	16.4934	*	0.0345	*	0.4259	*	0.0072	*	0.1491	*	0.0171	*
17	0.9800	*	78.3785	*	78.9651	*	-269956.6006	*	-231394.4777	*	59.6306	*	169.8870	*	16.2272	*	0.0345	*	0.4261	*	0.0072	*	0.1432	*	0.0170	*
18	1.0000	*	78.0909	*	78.0911	*	-269781.5357	*	-231286.4929	*	59.4037	*	169.0548	*	15.9686	*	0.0346	*	0.4263	*	0.0071	*	0.1375	*	0.0169	*

Ethanol	Ethanol	Liquid Surface Tension	Relative Volatility	Gibbs Excess	K Factor		Activity Coefficient		Fugacity Coefficient													
					Liquid	Mole	Vapour	Mole	dyne/cm	kJ/kgmole	Ethanol	H2O	Ethanol	H2O	Ethanol	H2O						
22	0.0000	*	0.0000	*	58.6224	*	---	---	1.0000	*	0.0000	*	0.0000	*	0.8038	*	-0.0000	*				
23	0.0200	*	0.0436	*	57.8841	*	2.2363	*	---	---	2.1823	*	0.9759	*	0.0000	*	0.0000	*	0.7804	*	-0.0244	*
24	0.0400	*	0.0853	*	57.1397	*	2.2384	*	---	---	2.1327	*	0.9528	*	0.0000	*	0.0000	*	0.7574	*	-0.0483	*
25	0.0600	*	0.1251	*	56.3898	*	2.2405	*	---	---	2.0853	*	0.9307	*	0.0000	*	0.0000	*	0.7349	*	-0.0718	*
26	0.0800	*	0.1632	*	55.6347	*	2.2425	*	---	---	2.0397	*	0.9096	*	0.0000	*	0.0000	*	0.7128	*	-0.0948	*
27	0.1000	*	0.1996	*	54.8745	*	2.2445	*	---	---	1.9961	*	0.8893	*	0.0000	*	0.0000	*	0.6912	*	-0.1173	*
28	0.1200	*	0.2345	*	54.1094	*	2.2464	*	---	---	1.9541	*	0.8699	*	0.0000	*	0.0000	*	0.6699	*	-0.1394	*
29	0.1400	*	0.2679	*	53.3396	*	2.2483	*	---	---	1.9138	*	0.8512	*	0.0000	*	0.0000	*	0.6491	*	-0.1611	*
30	0.1600	*	0.3000	*	52.5653	*	2.2501	*	---	---	1.8751	*	0.8333	*	0.0000	*	0.0000	*	0.6286	*	-0.1823	*
31	0.1800	*	0.3308	*	51.7867	*	2.2519	*	---	---	1.8378	*	0.8161	*	0.0000	*	0.0000	*	0.6086	*	-0.2032	*
32	0.2000	*	0.3604	*	51.0039	*	2.2537	*	---	---	1.8019	*	0.7995	*	0.0000	*	0.0000	*	0.5888	*	-0.2237	*
33	0.2200	*	0.3888	*	50.2171	*	2.2554	*	---	---	1.7673	*	0.7836	*	0.0000	*	0.0000	*	0.5695	*	-0.2439	*
34	0.2400	*	0.4162	*	49.4264	*	2.2571	*	---	---	1.7340	*	0.7682	*	0.0000	*	0.0000	*	0.5504	*	-0.2637	*
35	0.2600	*	0.4425	*	48.6319	*	2.2588	*	---	---	1.7018	*	0.7534	*	0.0000	*	0.0000	*	0.5317	*	-0.2831	*
36	0.2800	*	0.4678	*	47.8338	*	2.2604	*	---	---	1.6708	*	0.7391	*	0.0000	*	0.0000	*	0.5133	*	-0.3023	*
37	0.3000	*	0.4922	*	47.0322	*	2.2620	*	---	---	1.6408	*	0.7254	*	0.0000	*	0.0000	*	0.4952	*	-0.3211	*
38	0.3200	*	0.5158	*	46.2272	*	2.2636	*	---	---	1.6118	*	0.7121	*	0.0000	*	0.0000	*	0.4774	*	-0.3396	*
39	0.3400	*	0.5385	*	45.4189	*	2.2651	*	---	---	1.5839	*	0.6992	*	0.0000	*	0.0000	*	0.4599	*	-0.3578	*
40	0.3600	*	0.5604	*	44.6074	*	2.2667	*	---	---	1.5568	*	0.6868	*	0.0000	*	0.0000	*	0.4426	*	-0.3757	*
41	0.3800	*	0.5816	*	43.7929	*	2.2681	*	---	---	1.5306	*	0.6748	*	0.0000	*	0.0000	*	0.4256	*	-0.3933	*
42	0.4000	*	0.6021	*	42.9753	*	2.2696	*	---	---	1.5052	*	0.6632	*	0.0000	*	0.0000	*	0.4089	*	-0.4107	*
43	0.4200	*	0.6219	*	42.1549	*	2.2710	*	---	---	1.4806	*	0.6520	*	0.0000	*	0.0000	*	0.3925	*	-0.4278	*
44	0.4400	*	0.6410	*	41.3317	*	2.2724	*	---	---	1.4568	*	0.6411	*	0.0000	*	0.0000	*	0.3762	*	-0.4446	*
45	0.4600	*	0.6595	*	40.5057	*	2.2738	*	---	---	1.4337	*	0.6305	*	0.0000	*	0.0000	*	0.3603	*	-0.4612	*
46	0.4800	*	0.6774	*	39.6771	*	2.2752	*	---	---	1.4113	*	0.6203	*	0.0000	*	0.0000	*	0.3445	*	-0.4775	*
47	0.5000	*	0.6948	*	38.8459	*	2.2765	*	---	---	1.3896	*	0.6104	*	0.0000	*	0.0000	*	0.3290	*	-0.4936	*
48	0.5200	*	0.7116	*	38.0122	*	2.2778	*	---	---	1.3685	*	0.6008	*	0.0000	*	0.0000	*	0.3137	*	-0.5095	*
49	0.5400	*	0.7279	*	37.1760	*	2.2791	*	---	---	1.3480	*	0.5915	*	0.0000	*	0.0000	*	0.2986	*	-0.5251	*
50	0.5600	*	0.7437	*	36.3375	*	2.2804	*	---	---	1.3281	*	0.5824	*	0.0000	*	0.0000	*	0.2838	*	-0.5406	*
51	0.5800	*	0.7591	*	35.4968	*	2.2816	*	---	---	1.3088	*	0.5736	*	0.0000	*	0.0000	*	0.2691	*	-0.5558	*
52	0.6000	*	0.7740	*	34.6537	*	2.2828	*	---	---	1.2900	*	0.5651	*	0.0000	*	0.0000	*	0.2546	*	-0.5708	*
53	0.6200	*	0.7884	*	33.8085	*	2.2840	*	---	---	1.2717	*	0.5568	*	0.0000	*	0.0000	*	0.2403	*	-0.5856	*
54	0.6400	*	0.8025	*	32.9612	*	2.2852	*	---	---	1.2539	*	0.5487	*	0.0000	*	0.0000	*	0.2262	*	-0.6002	*
55	0.6600	*	0.8161	*	32.1117	*	2.2864	*	---	---	1.2365	*	0.5408	*	0.0000	*	0.0000	*	0.2123	*	-0.6147	*
56	0.6800	*	0.8294	*	31.2603	*	2.2876	*	---	---	1.2197	*	0.5332	*	0.0000	*	0.0000	*	0.1986	*	-0.6289	*
57	0.7000	*	0.8423	*	30.4069	*	2.2887	*	---	---	1.2033	*	0.5257	*	0.0000	*	0.0000	*	0.1850	*	-0.6430	*
58	0.7200	*	0.8548	*	29.5516	*	2.2898	*	---	---	1.1873	*	0.5185	*	0.0000	*	0.0000	*	0.1716	*	-0.6568	*
59	0.7400	*	0.8670	*	28.6944	*	2.2909	*	---	---	1.1717	*	0.5114	*	0.0000	*	0.0000	*	0.1584	*	-0.6705	*
60	0.7600	*	0.8789	*	27.8354	*	2.2920	*	---	---	1.1565	*	0.5046	*	0.0000	*	0.0000	*	0.1454	*	-0.6841	*
61	0.7800	*	0.8905	*	26.9746	*	2.2931	*	---	---	1.1416	*	0.4979	*	0.0000	*	0.0000	*	0.1325	*	-0.6974	*
62	0.8000	*	0.9017	*	26.1120	*	2.2941	*	---	---	1.1272	*	0.4913	*	0.0000	*	0.0000	*	0.1197	*	-0.7106	*
63	0.8200	*	0.9127	*	25.2477	*	2.2952	*	---	---	1.1131	*	0.4850	*	0.0000	*	0.0000	*	0.1071	*	-0.7237	*
64	0.8400	*	0.9234	*	24.3818	*	2.2962	*	---	---	1.0993	*	0.4787	*	0.0000	*	0.0000	*	0.0947	*	-0.7366	*
65	0.8600	*	0.9338	*	23.5142	*	2.2972	*	---	---	1.0858	*	0.4727	*	0.0000	*	0.0000	*	0.0824	*	-0.7493	*
66	0.8800	*	0.9440	*	22.6451	*	2.2982	*	---	---	1.0727	*	0.4668	*	0.0000	*	0.0000	*	0.0702	*	-0.7619	*
67	0.9000	*	0.9539	*	21.7744	*	2.2992	*	---	---	1.0599	*	0.4610	*	0.0000	*	0.0000	*	0.0582	*	-0.7744	*
68	0.9200	*	0.9636	*	20.9021	*	2.3002	*	---	---	1.0474	*	0.4553	*	0.0000	*	0.0000	*	0.0463	*	-0.7867	*

Phase Equilibrium Properties Datasheet

Binary Interaction Information

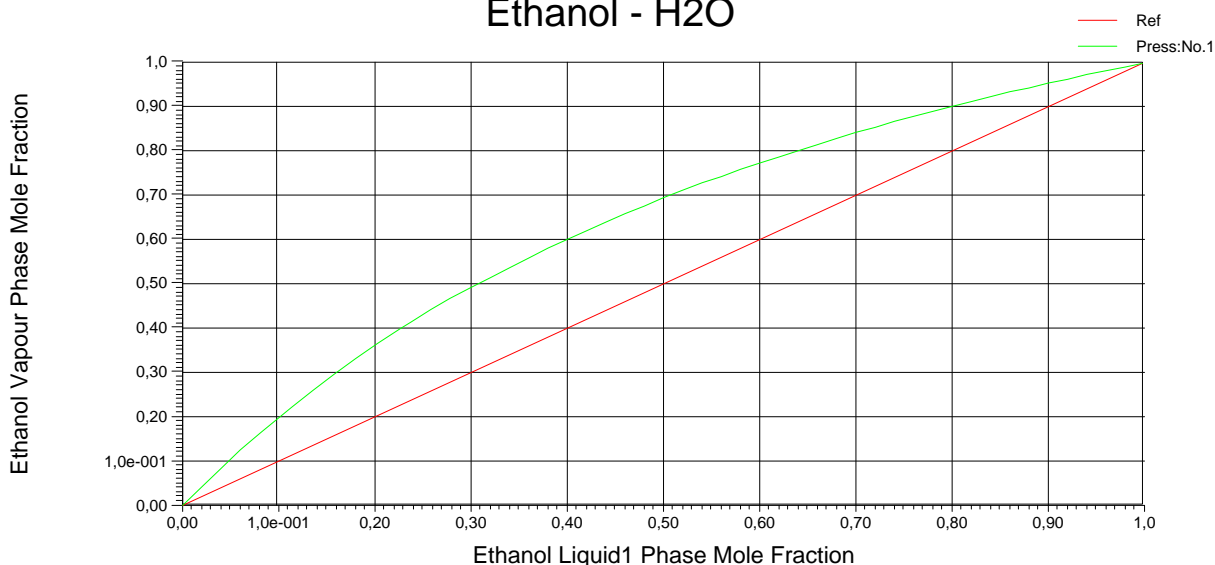
Constant Pressure Basis

101.0 kPa *

	Ethanol		Ethanol		Liquid Surface Tension dyne/cm	Relative Volatility	Gibbs Excess kJ/kgmole	K Factor		Activity Coefficient		Fugacity Coefficient	
	Liquid Mole	*	Vapour Mole	*				Ethanol	H2O	Ethanol	H2O	Ethanol	H2O
15	0.9400	*	0.9730	*	20.0284	2.3011	---	1.0351	0.4498	0.0000	0.0000	0.0345	-0.7989
16	0.9600	*	0.9822	*	19.1532	2.3021	---	1.0231	0.4444	0.0000	0.0000	0.0229	-0.8109
17	0.9800	*	0.9912	*	18.2766	2.3030	---	1.0114	0.4392	0.0000	0.0000	0.0114	-0.8228
18	1.0000	*	1.0000	*	17.3990	---	---	1.0000	---	0.0000	0.0000	0.0000	-0.8346

Plots

Ethanol - H2O



Notes and Comments