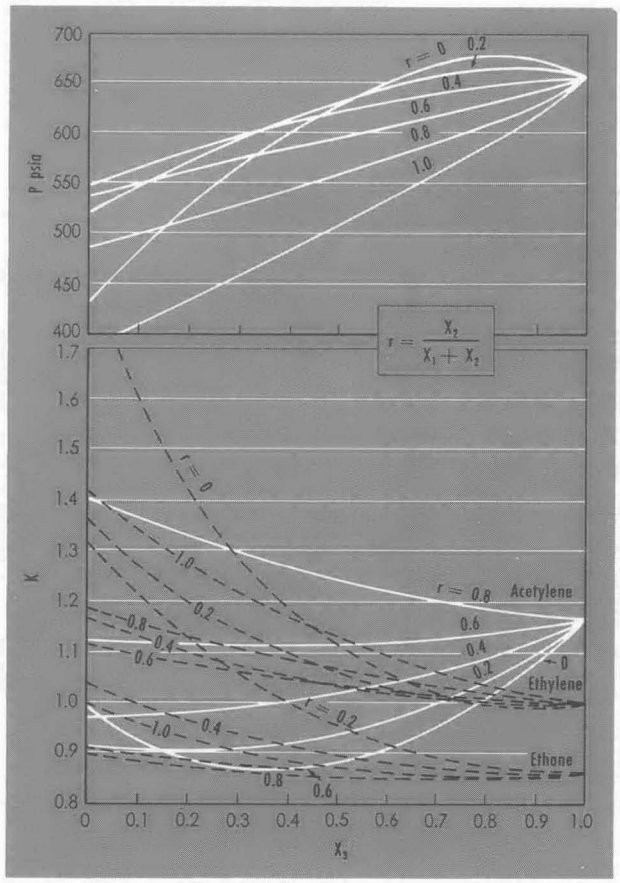

Figure 12. Calculated vapor-liquid equilibrium constants and bubble pressures for the acetylene(1)–ethane(2)–ethylene(3) system at 40° F.

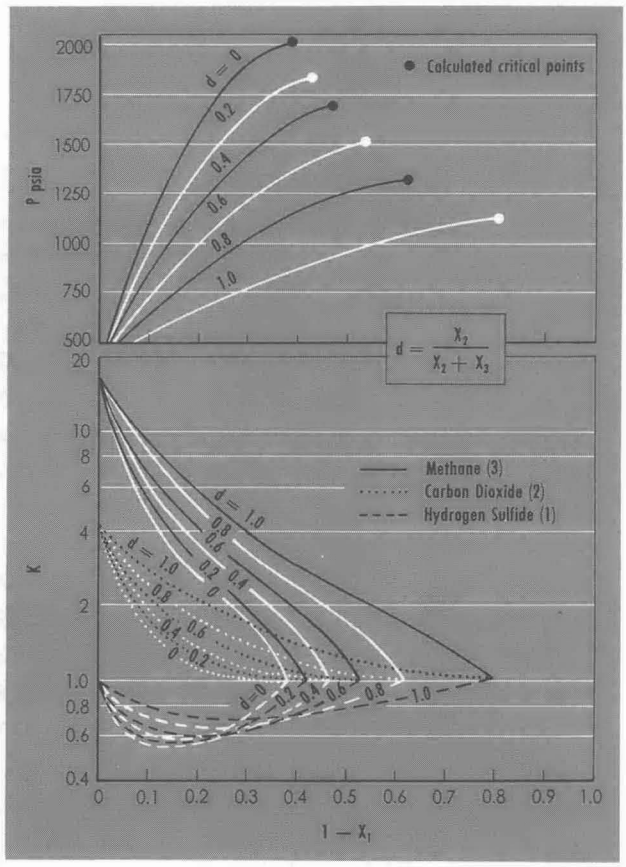

Figure 13. Calculated vapor-liquid equilibrium constants and bubble pressures for the hydrogen sulfide(1)–carbon dioxide(2)–methane(3) system at 100° F.

ethane–ethylene, all three components are treated as solvents, using only one parameter, α, per binary, as explained in Section B.

Very near the critical point of the mixture, for the region $0.97 \leq T_R \leq 1.0$ for the liquid mixture, calculated results are extremely sensitive to small errors in any of the thermodynamic quantities involved. Results for this hypersensitive region can be best obtained by interpolating between calculations at a lower T_R and the known condition at the critical point—i.e., $K_i = 1$ for each component and the pressure is equal to the critical pressure of the mixture. Correlations of critical properties of mixtures are given elsewhere (*7*, *26*).

In general, agreement between predicted and experimental results is very good. However, in a few instances, significant disagreement was noted, especially

Table IV. Comparison of Calculated and Experimental Results from Program BUBL P
n-Pentane(1)–Propane(2)–Methane(3) System

Given				Calculated				Experimental[a]			
T, ° R	x_1	x_2	x_3	P, psia	y_1	y_2	y_3	P, psia	y_1	y_2	y_3
559.7	0.678	0.170	0.152	495	0.046	0.086	0.868	500	0.049	0.085	0.866
559.7	0.555	0.139	0.306	987	0.040	0.056	0.903	1000	0.043	0.056	0.901
559.7	0.442	0.110	0.448	1448	0.049	0.049	0.902	1500	0.051	0.049	0.900
559.7	0.315	0.079	0.606	1973	0.068	0.047	0.885	2000	0.083	0.046	0.871
619.7	0.701	0.175	0.124	515	0.113	0.143	0.744	500	0.112	0.145	0.743
619.7	0.587	0.147	0.266	1019	0.093	0.086	0.821	1000	0.094	0.080	0.826
619.7	0.482	0.121	0.397	1499	0.103	0.069	0.828	1500	0.103	0.068	0.829
619.7	0.363	0.091	0.546	2070	0.130	0.057	0.813	2000	0.138	0.073	0.789
679.7	0.730	0.182	0.088	495	0.243	0.227	0.529	500	0.238	0.215	0.547
679.7	0.616	0.154	0.230	1000	0.186	0.129	0.685	1000	0.181	0.122	0.697
679.7	0.501	0.125	0.374	1443	0.185	0.093	0.722	1500	0.206	0.099	0.695

[a] References *4*, *11*.

Table V. Comparison of Calculated and Experimental Results from Program BUBL P

Acetylene(1)–Ethane(2)–Ethylene(3) System

Given				Calculated				Experimental[a]			
T, °R	x_1	x_2	x_3	P, psia	y_1	y_2	y_3	P, psia	y_1	y_2	y_3
424.7	0.187	0.330	0.483	197.4	0.203	0.252	0.545	200.3	0.202	0.260	0.538
424.7	0.061	0.316	0.623	199.4	0.073	0.230	0.697	200.3	0.084	0.234	0.682
424.7	0.084	0.104	0.812	218.9	0.084	0.075	0.841	220.0	0.084	0.080	0.836
424.7	0.142	0.630	0.228	170.8	0.205	0.501	0.294	175.1	0.206	0.511	0.283
459.7	0.060	0.204	0.736	356.2	0.069	0.156	0.775	359.9	0.065	0.157	0.778
459.7	0.025	0.437	0.538	316.9	0.035	0.346	0.619	320.2	0.034	0.347	0.619
459.7	0.143	0.795	0.062	277.0	0.237	0.685	0.078	280.1	0.220	0.684	0.096
459.7	0.056	0.464	0.480	315.8	0.079	0.370	0.551	319.7	0.077	0.374	0.549
499.7	0.074	0.767	0.159	466.8	0.113	0.694	0.193	465.5	0.113	0.698	0.189
499.7	0.031	0.741	0.228	461.8	0.048	0.673	0.279	464.8	0.046	0.677	0.277
499.7	0.843	0.082	0.075	510.5	0.771	0.120	0.109	514.4	0.778	0.114	0.108
499.7	0.192	0.658	0.150	515.7	0.252	0.579	0.169	514.4	0.242	0.590	0.168
499.7	0.042	0.426	0.532	542.0	0.055	0.366	0.579	564.4	0.050	0.363	0.587
499.7	0.257	0.493	0.250	558.6	0.299	0.432	0.269	564.4	0.286	0.441	0.273
499.7	0.316	0.202	0.482	619.6	0.319	0.182	0.499	614.4	0.310	0.188	0.502
499.7	0.500	0.041	0.459	621.8	0.448	0.043	0.509	614.4	0.460	0.047	0.493
499.7	0.104	0.067	0.829	650.1	0.114	0.058	0.828	664.4	0.103	0.061	0.836
499.7	0.224	0.032	0.745	668.6	0.224	0.029	0.747	664.4	0.217	0.032	0.751

[a] References *15, 18.*

Table VI. Comparison of Calculated and Experimental Results from Program BUBL P

Propane(1)–Ethane(2)–Methane(3) System

Given				Calculated				Experimental[a]			
T, °R	x_1	x_2	x_3	P, psia	y_1	y_2	y_3	P, psia	y_1	y_2	y_3
309.7	0.500	0.258	0.242	97	0.003	0.025	0.972	100	0.003	0.028	0.969
309.7	0.153	0.319	0.528	191	0.001	0.021	0.978	200	0.002	0.024	0.974
359.7	0.570	0.320	0.110	103	0.021	0.115	0.864	100	0.025	0.110	0.865
359.7	0.281	0.483	0.236	202	0.007	0.102	0.891	200	0.009	0.098	0.893
359.7	0.262	0.242	0.496	400	0.006	0.042	0.951	400	0.007	0.036	0.956
409.7	0.607	0.268	0.125	202	0.054	0.148	0.798	200	0.056	0.140	0.804
409.7	0.200	0.523	0.277	408	0.014	0.185	0.801	400	0.013	0.188	0.799
409.7	0.293	0.109	0.598	816	0.032	0.048	0.920	800	0.036	0.036	0.928
409.7	0.145	0.089	0.766	968	0.031	0.076	0.893	1000	0.047	0.050	0.903
459.7	0.139	0.724	0.136	407	0.026	0.482	0.492	400	0.028	0.485	0.487
459.7	0.421	0.188	0.391	805	0.075	0.105	0.821	800	0.082	0.094	0.824
459.7	0.308	0.107	0.585	1079	0.086	0.075	0.839	1100	0.099	0.063	0.838
459.7	0.260	0.030	0.710	1221	0.107	0.027	0.866	1300	0.146	0.025	0.829
509.7	0.811	0.160	0.027	200	0.432	0.290	0.278	200	0.441	0.284	0.275
509.7	0.715	0.175	0.110	401	0.246	0.188	0.566	400	0.250	0.193	0.557
509.7	0.593	0.121	0.286	801	0.179	0.093	0.728	800	0.187	0.091	0.722
509.7	0.442	0.169	0.389	975	0.156	0.129	0.715	1000	0.167	0.126	0.707
509.7	0.463	0.037	0.500	1225	0.209	0.030	0.762	1200	0.214	0.030	0.756

[a] Reference *29.*