

Table 4 The estimated uncertainties of compressibility factor of ethene

Pressure		Temperature K (°C)						
10 ⁵ Pa	(atm)	273.15 (0)	298.15 (25)	323.15 (50)	348.15 (75)	373.15 (100)	398.15 (125)	423.15 (150)
1.01325	(1)	0.030%	0.030%	0.030%	0.030%	0.030%	0.030%	0.030%
10.132	(10)	0.10	0.11	0.05	0.04	0.03	0.10	0.10
20.265	(20)	0.10	0.12	0.07	0.05	0.03	0.10	0.10
30.398	(30)		0.13	0.10	0.06	0.03	0.10	0.10
40.530	(40)		0.15	0.15	0.07	0.04	0.10	0.10
50.662	(50)		0.16	0.19	0.08	0.05	0.10	0.10
60.795	(60)		0.17	0.24	0.11	0.06	0.10	0.10
70.928	(70)		0.18	0.28	0.14	0.07	0.10	0.10
81.060	(80)		0.20	0.32	0.15	0.09	0.10	0.10
91.192	(90)		0.22	0.35	0.17	0.11	0.10	0.10
101.32	(100)		0.23	0.38	0.18	0.12	0.10	0.10
111.46	(110)		0.25	0.41	0.20	0.13	0.10	0.10
121.59	(120)		0.27	0.43	0.22	0.14	0.10	0.10
131.72	(130)		0.28	0.46	0.23	0.15	0.10	0.10
141.86	(140)		0.30	0.48	0.24	0.15	0.10	0.10
151.99	(150)		0.32	0.50	0.25	0.16	0.10	0.10
162.12	(160)		0.34	0.52	0.25	0.16	0.10	0.10
172.25	(170)		0.36	0.54	0.26	0.16	0.10	0.10
182.38	(180)		0.38	0.55	0.28	0.16	0.10	0.10
192.52	(190)		0.40	0.56	0.28	0.16	0.10	0.10
202.65	(200)		0.43	0.57	0.29	0.15	0.10	0.10
253.31	(250)		0.48	0.69	0.30	0.14	0.10	0.10
303.98	(300)		0.51	0.61	0.30	0.13	0.10	0.10
354.64	(350)		0.55	0.63	0.30	0.11	0.10	0.10
405.30	(400)		0.57	0.64	0.30	0.09	0.10	0.10
455.96	(450)		0.58	0.65	0.30	0.07	0.10	0.10
506.62	(500)		0.58	0.66	0.30			
607.95	(600)		0.58	0.65	0.28			
709.28	(700)		0.55	0.64	0.25			
810.60	(800)		0.48	0.62				

it is appropriate that the values determined as below are adopted for the uncertainty or the tolerance instead of the standard deviations. The standard deviations were plotted in graph against pressures

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on each isotherm. The smoothed curves were drawn for each set of the standard deviations, with the precautions to keep in harmony with those of the adjacent isotherms and to exceed reasonably most of points of the standard deviations. The values read from the curves were recommended as the uncertainties of the tabulated values of Z . They are shown in Tables 3 and 4, in the form of the percentage deviation calculated by the following definition :

$$\text{uncertainty} = \frac{100 \times \bar{\sigma}}{\bar{Z}},$$

where $\bar{\sigma}$ is the smoothed standard deviation obtained by the method mentioned above and \bar{Z} is the tabulated most reliable compressibility factor value.

The percentage deviations of the original data from the tabulated values were also calculated by :

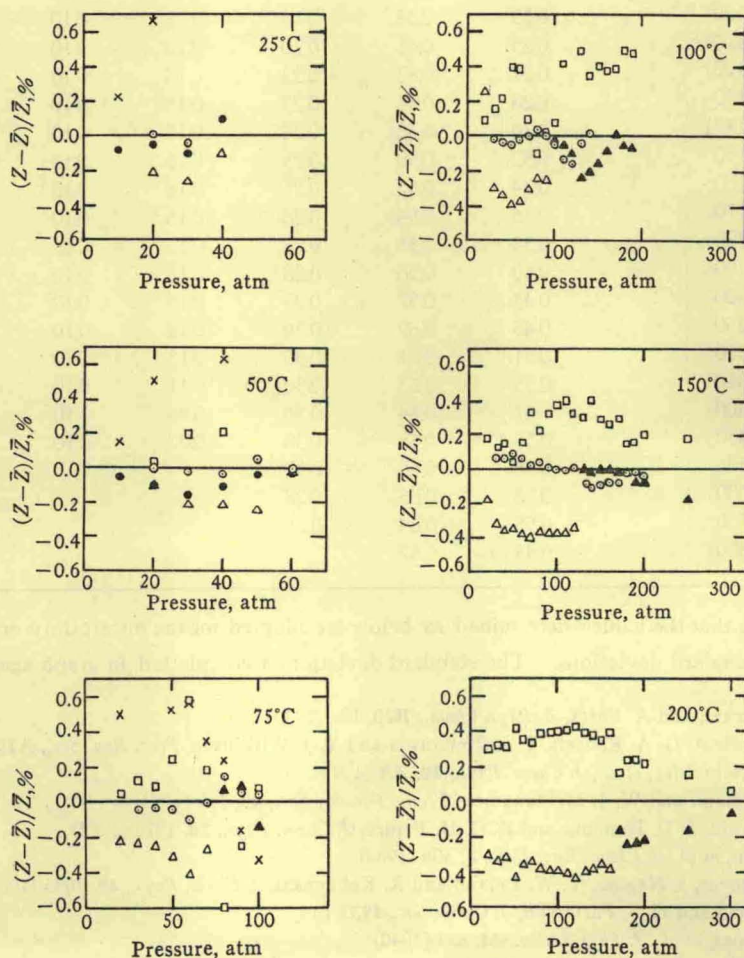


Fig. 1 Percentage deviation diagrams for ethane

○: Ref 2), ●: Ref 3), ▲: Ref 4)
 △: Ref 5), □: Ref 6), ×: Ref 7)