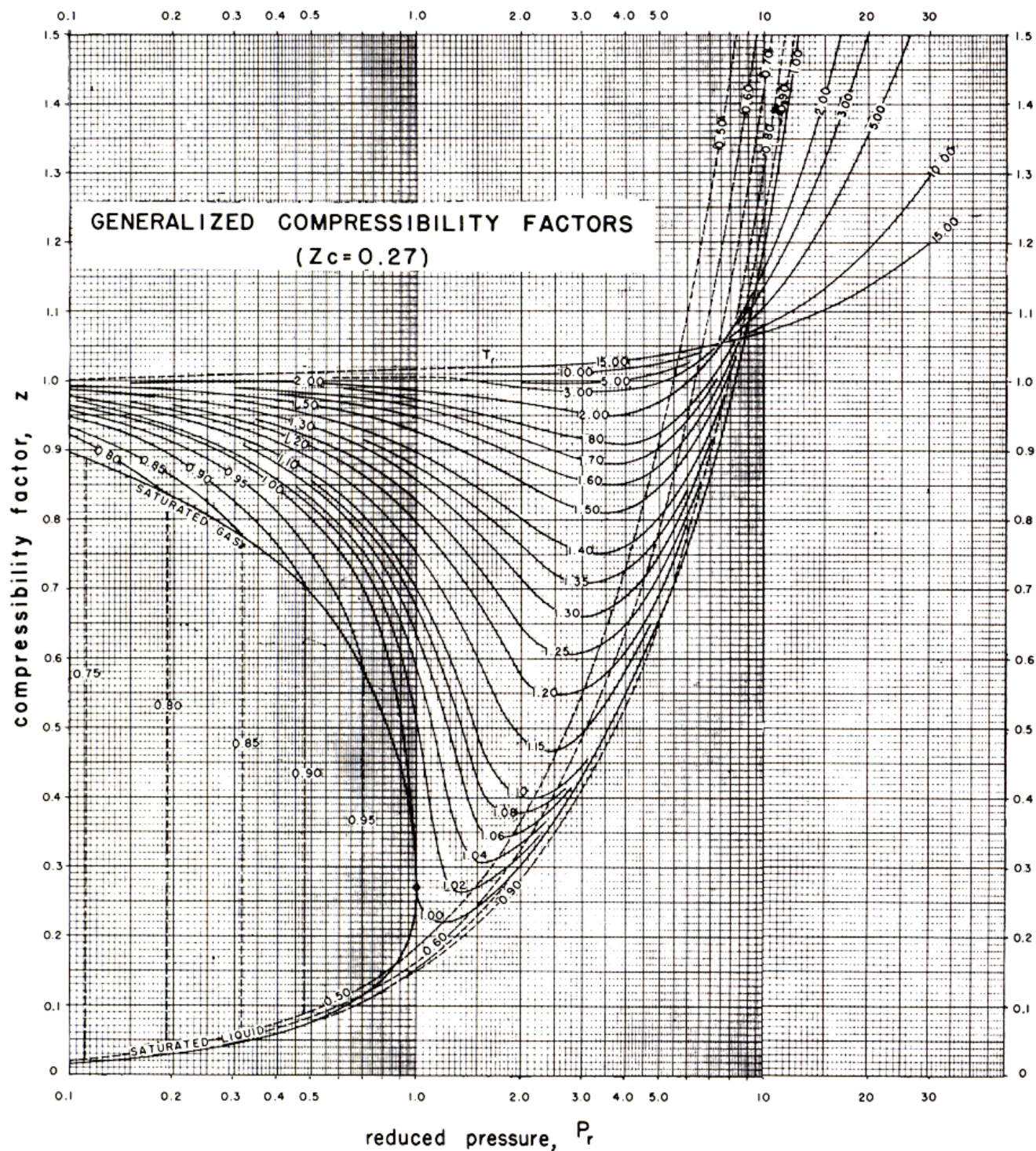


DATA TABLES and FIGURES

GENERALIZED COMPRESSIBILITY CHART



PITZER-CURL TABLES

Table C-1
Pitzer-Curl Generalized $Z^{(0)}$

Tr	0.2	0.4	0.6	0.8	1.0	1.2	1.4	Pr 1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
0.80	0.851	0.066	0.100	0.133	0.164	0.192	0.255	0.258	0.287	0.318	0.347	0.376	0.405	0.433	0.461
0.85	0.882	0.067	0.101	0.134	0.165	0.194	0.226	0.258	0.287	0.316	0.345	0.374	0.403	0.431	0.459
0.90	0.904	0.778	0.102	0.135	0.167	0.198	0.229	0.258	0.288	0.316	0.345	0.373	0.402	0.430	0.458
0.95	0.920	0.819	0.697	0.145	0.176	0.205	0.235	0.262	0.292	0.321	0.347	0.375	0.403	0.430	0.457
1.00	0.932	0.849	0.756	0.638	0.291	0.231	0.250	0.278	0.304	0.329	0.356	0.381	0.407	0.433	0.458
1.05	0.942	0.874	0.800	0.714	0.609	0.470	0.341	0.320	0.332	0.350	0.372	0.393	0.417	0.441	0.446
1.10	0.950	0.893	0.833	0.767	0.691	0.607	0.512	0.442	0.408	0.402	0.405	0.420	0.440	0.462	0.484
1.15	0.958	0.98	0.858	0.805	0.746	0.684	0.620	0.562	0.514	0.484	0.477	0.478	0.485	0.498	0.513
1.20	0.963	0.921	0.879	0.835	0.788	0.737	0.690	0.640	0.598	0.568	0.553	0.545	0.544	0.548	0.554
1.25	0.968	0.930	0.896	0.858	0.820	0.778	0.740	0.702	0.664	0.636	0.618	0.606	0.599	0.597	0.598
1.30	0.971	0.940	0.909	0.878	0.846	0.811	0.780	0.749	0.718	0.691	0.671	0.657	0.649	0.644	0.642
1.4	0.977	0.952	0.929	0.908	0.883	0.859	0.838	0.817	0.795	0.777	0.759	0.745	0.734	0.725	0.720
1.5	0.982	0.963	0.945	0.927	0.909	0.892	0.875	0.859	0.844	0.831	0.819	0.808	0.800	0.794	0.790
1.6	0.985	0.971	0.957	0.944	0.930	0.917	0.904	0.893	0.882	0.872	0.863	0.855	0.848	0.843	0.840
1.7	0.988	0.977	0.966	0.956	0.946	0.936	0.926	0.919	0.911	0.903	0.896	0.889	0.889	0.883	0.879
1.8	0.991	0.982	0.974	0.966	0.958	0.950	0.944	0.937	0.931	0.926	0.921	0.916	0.913	0.910	0.908
1.9	0.993	0.986	0.980	0.974	0.968	0.962	0.958	0.952	0.948	0.944	0.940	0.936	0.933	0.931	0.930
2.0	0.995	0.989	0.984	0.979	0.975	0.971	0.968	0.964	0.961	0.959	0.956	0.954	0.953	0.953	0.952

Table C-2
Pitzer-Curl Generalized $Z^{(1)}$

Tr	0.2	0.4	0.6	0.8	1.0	1.2	1.4	Pr 1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
0.80	0.095	0.028	0.044	0.058	0.07	0.08	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18
0.85	-0.067	-0.031	0.049	-0.064	-0.08	-0.09	-0.11	-0.12	-0.13	0.14	0.15	0.16	-0.17	0.18	-0.18
0.90	-0.042	-0.09	0.053	0.068	0.085	0.10	-0.11	-0.12	-0.13	-0.14	-0.15	-0.16	-0.17	-0.17	-0.18
0.95	-0.025	-0.050	0.100	0.072	0.091	0.10	0.11	0.12	0.12	0.13	0.14	0.15	0.15	0.16	0.17
1.00	-0.012	-0.16	-0.20	0.05	-0.080	-0.090	-0.099	-0.108	-0.115	-0.123	-0.13	-0.13	-0.14	-0.14	-0.15
1.05	0.000	-0.001	-0.005	-0.015	-0.02	-0.01	0.01	0.04	0.06	0.07	0.08	0.09	0.10	0.11	
1.10	-0.002	0.008	0.016	0.030	0.055	0.082	-0.11	-0.082	-0.035	0.000	-0.02	-0.03	-0.05	-0.06	-0.07
1.15	0.004	0.012	0.012	0.040	0.064	0.093	0.12	0.140	0.136	-0.100	-0.07	-0.04	-0.02	0.00	0.01
1.20	0.009	0.018	0.028	0.044	0.069	0.10	0.13	0.16	0.17	0.17	0.16	0.14	0.12	0.09	-0.07
1.25	0.011	0.023	0.036	0.050	0.069	0.10	0.13	0.16	0.18	0.19	0.19	0.18	0.16	0.14	0.12
1.30	0.013	0.027	0.041	0.055	0.072	0.10	0.13	0.16	0.18	0.20	0.20	0.20	0.20	0.19	0.18
1.4	0.016	0.032	0.049	0.065	0.082	0.10	0.13	0.16	0.18	0.19	0.20	0.21	0.21	0.21	0.20
1.5	0.017	0.035	0.052	0.070	0.088	0.10	0.13	0.15	0.17	0.18	0.20	0.20	0.21	0.21	0.21
1.6	0.018	0.036	0.054	0.07	0.08	0.10	0.12	0.14	0.16	0.17	0.18	0.19	0.20	0.20	0.21
1.7	0.018	0.036	0.054	0.07	0.09	0.10	0.11	0.13	0.15	0.16	0.17	0.18	0.19	0.20	0.21
1.8	0.018	0.036	0.054	0.07	0.09	0.10	0.11	0.13	0.15	0.16	0.17	0.18	0.19	0.20	0.21
1.9	0.018	0.035	0.05	0.07	0.09	0.10	0.11	0.13	0.15	0.16	0.17	0.18	0.19	0.20	0.21
2.0	0.016	0.031	0.05	0.07	0.08	0.10	0.11	0.13	0.14	0.15	0.16	0.17	0.19	0.20	0.21

FORMULA SHEET

Constants / Conversions

$$R = 8.314 \frac{\text{kPa} \cdot \text{m}^3}{\text{kmol} \cdot \text{K}} = 8.314 \frac{\text{J}}{\text{mol} \cdot \text{K}} \quad N_A = 6.023 \times 10^{26} \frac{\text{molecules}}{\text{kmol}} \quad g = 9.81 \text{ m/s}^2$$

$$R = 0.08205 \frac{\text{atm} \cdot \text{m}^3}{\text{kmol} \cdot \text{K}} \quad k = \frac{R}{N_A} = 1.3805 \times 10^{-23} \text{ J / K} \quad 1 \text{ cP} = 10^{-3} \text{ Pa} \cdot \text{s}$$

$$101.325 \text{ kPa} = 1 \text{ atm} \quad 1 \text{ bar} = 100 \text{ kPa} \quad 1 \text{ L} = 1000 \text{ cm}^3 = 1000 \text{ mL} = 0.001 \text{ m}^3$$

$$760 \text{ mmHg} = 1 \text{ atm} \quad 1 \text{ inch} = 2.54 \text{ cm}$$

Phase Rule

$$F = C + 2 - P$$

Two-Point Interpolation

$$y = y_1 + \frac{(y_2 - y_1)}{(x_2 - x_1)}(x - x_1)$$

Geometric Shapes

$$V_{\text{sphere}} = \frac{4}{3} \pi r^3$$

$$SA_{\text{sphere}} = 4\pi r^2$$

$$V_{\text{cylinder}} = \pi r^2 h$$

Ideal Gas

$$Pv = nRT$$

Kinetic Theory of Gases

$$c_{mp} = \sqrt{\frac{2RT}{M}}$$

$$\sqrt{c^2} = \sqrt{\frac{3RT}{M}}$$

$$\bar{c} = \sqrt{\frac{8RT}{\pi M}}$$

$$P = \frac{N_A m \bar{c}^2}{3V_m}$$

$$E_k = \frac{1}{2} m \bar{c}^2$$

$$k = \frac{R}{N_A}$$

$$\lambda = \frac{1}{\sqrt{2} \pi \sigma^2 \rho_N}$$

$$\delta = \left[\frac{kT}{P} \right]^{1/3}$$

$$\rho_N = \frac{N_A}{V_m} = \frac{P}{kT}$$

Kinetic Theory of Gases - Transport Properties

$$\mu = \frac{M}{N_A \pi \sigma^2} \sqrt{\frac{RT}{\pi M}}$$

$$\kappa = \frac{C_v}{N_A \pi \sigma^2} \sqrt{\frac{RT}{\pi M}}$$

$$D_{AA} = \frac{RT}{PN_A \pi \sigma^2} \sqrt{\frac{RT}{\pi M}}$$

$$\mu = \frac{\rho_N \bar{c} \lambda m}{2}$$

$$\kappa = \frac{\lambda \rho_N \bar{c}}{2} \frac{C_v}{N_A}$$

$$j_A = -D \frac{dC}{dz}$$

$$F / A = -\mu \frac{du}{dz}$$

$$Q / A = -\kappa \frac{dT}{dz}$$

$$C_v = \frac{3}{2}R$$

$$C_p = \frac{5}{2}R$$

$$C_p = C_v + R$$

van der Waals EOS

$$P = \frac{RT}{V_m - b} - \frac{a}{V_m^2}$$

$$V_m^3 - [b + \frac{RT}{P}]V_m^2 + \frac{a}{P}V_m - \frac{ab}{P} = 0$$

$$P_c = \frac{a}{27b^2}$$

$$T_c = \frac{8a}{27Rb}$$

$$V_c = 3b$$

$$a = \frac{27}{64} \frac{R^2 T_c^2}{P_c}$$

$$b = \frac{RT_c}{8P_c}$$

Mixing Rules >>> $b = \sum y_i b_i$

$$a = [\sum y_i \sqrt{a_i}]^2$$

Law of Corresponding States

$$T_r = \frac{T}{T_c} \quad P_r = \frac{P}{P_c}$$

$$PV_m = ZRT$$

Pitzer-Curl

$$Z = Z^{(0)} + \omega Z^{(1)}$$

Mixtures >>> $T_{pc} = \sum_i y_i T_{ci}, \quad P_{pc} = \sum_i y_i P_{ci} \quad \bar{\omega} = \sum_i y_i \omega_i$