TABLE 2-164 Critical Constants and Acentric Factors of Inorganic and Organic Compounds (*Concluded*)

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	T_c, K	$P_c \times 1E\text{-}06$ Pa	V_c, m³/Kmol	Z_c	Acentric factor
190	Fluoromethane	CH_3F	593533	34.033	317.42	5.88	0.113	0.252	0.198
191	Chloromethane	CH_3Cl	74873	50.488	416.25	6.69	0.142	0.275	0.154
192	Trichloromethane	$CHCl_3$	67663	119.377	536.4	5.55	0.238	0.296	0.228
193	Tetrachloromethane	CCl_4	56235	153.822	556.35	4.54	0.274	0.270	0.191
194	Bromomethane	CH_3Br	74839	94.939	467	8.00	0.156	0.321	0.192
195	Fluoroethane	C_2H_5F	353366	48.060	375.31	5.01	0.164	0.263	0.218
196	Chloroethane	C_2H_5Cl	75003	64.514	460.35	5.46	0.155	0.221	0.206
197	Bromoethane	C_2H_5Br	74964	108.966	503.8	6.29	0.215	0.323	0.259
198	1-Chloropropane	C_3H_7Cl	540545	78.541	503.15	4.58	0.247	0.270	0.228
199	2-Chloropropane	C_3H_7Cl	75296	78.541	489	4.51	0.247	0.274	0.196
200	1,1-Dichloropropane	$C_3H_6Cl_2$	78999	112.986	560	4.24	0.292	0.266	0.253
201	1,2-Dichloropropane	$C_3H_6Cl_2$	78875	112.986	572	4.23	0.291	0.259	0.256
202	Vinyl chloride	C_2H_3Cl	75014	62.499	432	5.75	0.179	0.287	0.106
203	Fluorobenzene	C_6H_5F	462066	96.104	560.09	4.54	0.269	0.262	0.247
204	Chlorobenzene	C_6H_5Cl	108907	112.558	632.35	4.53	0.308	0.265	0.251
205	Bromobenzene	C_6H_5Br	108861	157.010	670.15	4.52	0.324	0.263	0.251
206	Air		132259100	28.951	132.45	3.79	0.092	0.318	0.000
207	Hydrogen	H_2	1333740	2.016	33.19	1.32	0.064	0.307	−0.215
208	Helium-4	He	7440597	4.003	5.2	0.23	0.058	0.305	−0.388
209	Neon	Ne	7440019	20.180	44.4	2.67	0.042	0.300	−0.038
210	Argon	Ar	7440371	39.948	150.86	4.90	0.075	0.292	0.000
211	Fluorine	F_2	7782414	37.997	144.12	5.17	0.067	0.287	0.053
212	Chlorine	Cl_2	7782505	70.905	417.15	7.79	0.124	0.279	0.073
213	Bromine	Br_2	7726956	159.808	584.15	10.28	0.135	0.286	0.128
214	Oxygen	O_2	7782447	31.999	154.58	5.02	0.074	0.287	0.020
215	Nitrogen	N_2	7727379	28.014	126.2	3.39	0.089	0.288	0.037
216	Ammonia	NH_3	7664417	17.031	405.65	11.30	0.072	0.241	0.253
217	Hydrazine	N_2H_4	302012	32.045	653.15	14.73	0.158	0.429	0.315
218	Nitrous oxide	N_2O	10024972	44.013	309.57	7.28	0.098	0.277	0.143
219	Nitric oxide	NO	10102439	30.006	180.15	6.52	0.058	0.252	0.585
220	Cyanogen	C_2N_2	460195	52.036	400.15	5.94	0.195	0.348	0.276
221	Carbon monoxide	CO	630080	28.010	132.92	3.49	0.095	0.300	0.048
222	Carbon dioxide	CO_2	124389	44.010	304.21	7.39	0.095	0.277	0.224
223	Carbon disulfide	CS_2	75150	76.143	552	8.04	0.160	0.280	0.118
224	Hydrogen fluoride	HF	7664393	20.006	461.15	6.49	0.069	0.117	0.383
225	Hydrogen chloride	HCl	7647010	36.461	324.65	8.36	0.082	0.253	0.134
226	Hydrogen bromide	HBr	10035106	80.912	363.15	8.46	0.100	0.280	0.069
227	Hydrogen cyanide	HCN	74908	27.026	456.65	5.35	0.139	0.195	0.407
228	Hydrogen sulfide	H_2S	7783064	34.082	373.53	9.00	0.099	0.287	0.096
229	Sulfur dioxide	SO_2	7446095	64.065	430.75	7.86	0.123	0.269	0.244
230	Sulfur trioxide	SO_3	7446119	80.064	490.85	8.19	0.127	0.255	0.423
231	Water	H_2O	7732185	18.015	647.13	21.94	0.056	0.228	0.343

All substances are listed in alphabetical order in Table 2-6a.

Compiled from Daubert, T. E., R. P. Danner, H. M. Sibul, and C. C. Stebbins, DIPPR Data Compilation of Pure Compound Properties, Project 801 Sponsor Release, July, 1993, Design Institute for Physical Property Data, AIChE, New York, NY; and from Ambrose, D. "Vapour-Liquid Critical Properties", Report Chem 107, National Physical Laboratory, Teddington, UK, October, 1979.

In order to ensure thermodynamic consistency, in almost all cases these properties are calculated from T_c and the vapor pressure and liquid density correlation coefficients listed in those tables. This means that there will be slight differences between the values listed here and those in the DIPPR tables. Most of the differences are less than 1%, and almost all the rest are less than the estimated accuracy of the quantity in question.

The atomic weights used, taken from *J. Phys. Chem. Ref. Data* **22**(6), 1993, are C = 12.011, H = 1.00794, O = 15.9994, N = 14.00674, S = 32.066, F = 18.9984, Cl = 35.4527, Br = 79.904, and I = 126.90447.

The value of the gas constant, R, used here is 8314.51 J/(kmol·K), as given by E. R. Cohen and B. N. Taylor in *J. Phys. Chem. Ref. Data* **17**, 1988. K − 273.15 = °C; 1.8 × K − 459.67 = °F; Pa × 9.869233E-06 = atm; Pa × 1.450377E-04 = psia *j*; m³/kmol × (1E + 03/mol. wt.) = cm³/g; m³/kmol × (1.601846E + 01/mol wt) = ft³/lb.