TABLE 2-153 Heat Capacities of Inorganic and Organic Liquids [J/(kmol·K)]

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1	C2	C3	C4	C5	T_{min}, K	C_p at T_{min} ×1E-05	T_{max}, K	C_p at T_{max} ×1E-05
1	Acetaldehyde	C_2H_4O	75-07-0	44.053	115,100	−433	1.425			150.15	0.8221	294.00	1.1097
2	Acetamide	C_2H_5NO	60-35-5	59.067	102,300	128.7				354.15	1.4788	571.00	1.7579
3	Acetic acid	$C_2H_4O_2$	64-19-7	60.052	139,640	−320.8	0.8985			289.81	1.2213	391.05	1.5159
4	Acetic anhydride	$C_4H_6O_3$	108-24-7	102.089	36,600	511				250.00	1.6435	350.00	2.1545
5	Acetone	C_3H_6O	67-64-1	58.079	135,600	−177	0.2837	0.000689		178.45	1.1696	329.44	1.3271
6	Acetonitrile	C_2H_3N	75-05-8	41.052	97,582	−122.2	0.34085			229.32	0.8748	354.75	0.9713
7	Acetylene	C_2H_2	74-86-2	26.037	−122,020	3,082.7	−15.895	0.027732		192.40	0.8021	250.00	0.8853
8	Acrolein	C_3H_4O	107-02-8	56.063	103,090	−247.8	1.0343			253.00	1.0660	379.50	1.5801
9	Acrylic acid	$C_3H_4O_2$	79-10-7	72.063	55,300	300				286.15	1.4114	375.00	1.6780
10	Acrylonitrile	C_3H_3N	107-13-1	53.063	109,900	−109.75	0.35441			189.63	1.0183	400.00	1.2271
11	Air	Mixture	132259-10-0	28.960	−214,460	9,185.1	−106.12	0.41616		75.00	0.5307	115.00	0.7132
12	Ammonia [use Eq. (2)]	H_3N	7664-41-7	17.031	61.289	80,925	799.4	−2,651		203.15	0.7575	401.15	4.1847
13	Anisole	C_7H_8O	100-66-3	108.138	150,940	93.455	0.23602			298.15	1.9978	484.20	2.5153
14	Argon	Ar	7440-37-1	39.948	134,390	−1,989.4	11.043			83.78	0.4523	135.00	0.6708
15	Benzamide	C_7H_7NO	55-21-0	121.137	161,440	260.66				403.00	2.6649	563.15	3.0823
16	Benzene	C_6H_6	71-43-2	78.112	129,440	−169.5	0.64781			278.68	1.3251	353.24	1.5040
16	Benzene	C_6H_6	71-43-2	78.112	162,940	−344.94	0.85562			278.68	1.3326	500.00	2.0437
17	Benzenethiol	C_6H_6S	108-98-5	110.177	119,780	180.34				258.27	1.6636	442.29	1.9954
18	Benzoic acid	$C_7H_6O_2$	65-85-0	122.121	−5,480	647.12				395.45	2.5042	450.00	2.8572
19	Benzonitrile	C_7H_5N	100-47-0	103.121	93,383	242.61				260.40	1.5656	464.15	2.0599
20	Benzophenone	$C_{13}H_{10}O$	119-61-9	182.218	156,130	454.49				321.35	3.0218	640.00	4.4700
21	Benzyl alcohol	C_7H_8O	100-51-6	108.138	−334,997	3,644.21	−7.77514	0.00591102		257.85	1.8905	478.60	2.7617
22	Benzyl ethyl ether	$C_9H_{12}O$	539-30-0	136.191	87,500	480				275.65	2.1981	458.15	3.0741
23	Benzyl mercaptan	C_7H_8S	100-53-8	124.203	100,320	346.89				243.95	1.8494	472.03	2.6406
24	Biphenyl	$C_{12}H_{10}$	92-52-4	154.208	121,770	429.3				342.20	2.6868	533.37	3.5075
25	Bromine	Br_2	7726-95-6	159.808	179,400	−667.11	1.0701			265.90	0.7768	331.90	0.7587
26	Bromobenzene	C_6H_5Br	108-86-1	157.008	121,600	−9.45	0.358			293.15	1.4960	495.08	2.0467
27	Bromoethane	C_2H_5Br	74-96-4	108.965	94,364	−109.12	0.44032			160.00	0.8818	320.00	1.0453
28	Bromomethane	CH_3Br	74-83-9	94.939	129,730	−596.54	2.16	−0.0024234		184.45	0.7798	276.71	0.7870
29	1,2-Butadiene	C_4H_6	590-19-2	54.090	135,150	−311.14	0.97007	−0.0001523		136.95	1.1034	290.00	1.2279
30	1,3-Butadiene	C_4H_6	106-99-0	54.090	128,860	−323.1	1.015	0.000032		165.00	1.0333	350.00	1.4148
31	Butane	C_4H_{10}	106-97-8	58.122	191,030	−1,675	12.5	−0.03874	4.6121E-05	134.86	1.1272	400.00	2.2237
32	1,2-Butanediol [use Eq. (2)]	$C_4H_{10}O_2$	584-03-2	90.121	55.136	314,200	280.19	1,413.9		220.00	1.5590	670.00	5.2045
33	1,3-Butanediol [use Eq. (2)]	$C_4H_{10}O_2$	107-88-0	90.121	42.152	324,580	517.35	1,449.5		196.15	0.6251	670.00	5.2437
34	1-Butanol	$C_4H_{10}O$	71-36-3	74.122	191,200	−730.4	2.2998			183.85	1.3465	391.90	2.5817
35	2-Butanol	$C_4H_{10}O$	78-92-2	74.122	426,790	−3,694.6	13.828	−0.0135		158.45	1.3485	372.90	2.7190
36	1-Butene	C_4H_8	106-98-9	56.106	182,050	−1,611	11.963	−0.037454	4.5027E-05	87.80	1.1015	380.00	1.8103
37	*cis*-2-Butene	C_4H_8	590-18-1	56.106	126,680	−65.47	−0.64	0.002912		134.26	1.1340	350.00	1.5022
38	*trans*-2-Butene	C_4H_8	624-64-6	56.106	112,760	−104.7	0.5214			167.62	1.0986	274.03	1.2322
39	Butyl acetate	$C_6H_{12}O_2$	123-86-4	116.158	111,850	384.52				298.15	2.2649	399.26	2.6537
40	Butylbenzene	$C_{10}H_{14}$	104-51-8	134.218	182,470	−13.912	0.72897			185.30	2.0492	400.00	2.9354
41	Butyl mercaptan	$C_4H_{10}S$	109-79-5	90.187	232,190	−804.35	2.7063	−0.0023017		157.46	1.6365	390.00	1.9359
42	*sec*-Butyl mercaptan	$C_4H_{10}S$	513-53-1	90.187	197,890	−491.54	1.7219	−0.0012499		133.02	1.6003	370.00	1.8844
43	1-Butyne	C_4H_6	107-00-6	54.090	136,340	−300.4	1.0216			147.43	1.1426	298.15	1.3759
44	Butyraldehyde	C_4H_8O	123-72-8	72.106	65,682	1,329.1	−7.1579	0.012755		176.75	1.4741	300.00	1.6459
45	Butyric acid	$C_4H_8O_2$	107-92-6	88.105	237,700	−746.4	1.829			267.95	1.6902	436.42	2.6031
46	Butyronitrile	C_4H_7N	109-74-0	69.105	104,000	174				161.25	1.3206	390.75	1.7199
47	Carbon dioxide	CO_2	124-38-9	44.010	−8,304,300	104,370	−433.33	0.60052		220.00	0.7827	290.00	1.6603
48	Carbon disulfide	CS_2	75-15-0	76.141	85,600	−122	0.5605	−0.001452	2.008E-06	161.11	0.7577	552.00	1.3125
49	Carbon monoxide [use Eq. (2)]	CO	630-08-0	28.010	65.429	28,723	−847.39	1,959.6		68.15	0.5912	132.00	6.4799
50	Carbon tetrachloride	CCl_4	56-23-5	153.823	−752,700	8,966.1	−30.394	0.034455		250.33	1.2763	388.71	1.6374
51	Carbon tetrafluoride	CF_4	75-73-0	88.004	104,600	−500.6	2.2851			89.56	0.7810	145.10	0.8007
52	Chlorine	Cl_2	7782-50-5	70.906	63,936	46.35	−0.1623			172.12	0.6711	239.12	0.6574
53	Chlorobenzene	C_6H_5Cl	108-90-7	112.557	−1,307,500	15,338	−53.974	0.063483		227.95	1.3617	360.00	1.8101
54	Chloroethane	C_2H_5Cl	75-00-3	64.514	127,900	−345.15	0.915			134.80	0.9800	340.00	1.1632
55	Chloroform	$CHCl_3$	67-66-3	119.378	124,850	−166.34	0.43209			233.15	1.0956	366.48	1.2192
56	Chloromethane	CH_3Cl	74-87-3	50.488	96,910	−207.9	0.37456	0.000488		175.43	0.7460	373.15	0.9684
57	1-Chloropropane	C_3H_7Cl	540-54-5	78.541	132,280	−153.27	0.50836			150.35	1.2073	319.67	1.3523
58	2-Chloropropane	C_3H_7Cl	75-29-6	78.541	69,362	215.01				200.00	1.1236	308.85	1.3577

TABLE 2-153 Heat Capacities of Inorganic and Organic Liquids [J/(kmol·K)] (*Continued*)

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1	C2	C3	C4	C5	T_{min}, K	C_p at T_{min} × 1E-05	T_{max}, K	C_p at T_{max} × 1E-05
59	*m*-Cresol	C_7H_8O	108-39-4	108.138	–246,700	3,256.8	–7.4202	0.0060467		285.39	2.1895	400.00	2.5578
60	*o*-Cresol	C_7H_8O	95-48-7	108.138	–185,150	3,148	–8.0367	0.007254		304.20	2.3297	400.00	2.5243
61	*p*-Cresol	C_7H_8O	106-44-5	108.138	259,980	–1,112.3	4.9427	–0.0054367		307.93	2.2740	400.00	2.5794
62	Cumene	C_9H_{12}	98-82-8	120.192	61,723	494.81				177.14	1.4937	425.56	2.7229
63	Cyanogen	C_2N_2	460-19-5	52.035	65,516	144.7	0.063229			200.08	0.9700	300.08	1.1463
64	Cyclobutane	C_4H_8	287-23-0	56.106	101,920	–215.81	0.8103			190.00	0.9017	298.15	1.0961
65	Cyclohexane	C_6H_{12}	110-82-7	84.159	–220,600	3,118.3	–9.4216	0.010687		279.69	1.4836	400.00	2.0323
66	Cyclohexanol	$C_6H_{12}O$	108-93-0	100.159	–40,000	853				296.60	2.1300	434.00	3.3020
67	Cyclohexanone	$C_6H_{10}O$	108-94-1	98.143	6,110.4	600.94				290.00	1.8038	489.75	3.0042
68	Cyclohexene	C_6H_{10}	110-83-8	82.144	105,850	–60	0.68			169.67	1.1525	356.12	1.7072
69	Cyclopentane	C_5H_{10}	287-92-3	70.133	122,530	–403.8	1.7344	–0.0010975		179.28	0.9956	322.40	1.3584
70	Cyclopentene	C_5H_8	142-29-0	68.117	125,380	–349.7	1.143			138.13	0.9888	317.38	1.2953
71	Cyclopropane	C_3H_6	75-19-4	42.080	89,952	–196.63	0.65237			150.00	0.7514	298.15	0.8932
72	Cyclohexyl mercaptan	$C_6H_{12}S$	1569-69-3	116.224	177,560	–179.12	0.76723			189.64	1.7118	431.95	2.4334
73	Decanal	$C_{10}H_{20}O$	112-31-2	156.265	150,460	586.63				267.15	3.0718	488.15	4.3682
74	Decane	$C_{10}H_{22}$	124-18-5	142.282	278,620	–197.91	1.0737			243.51	2.9409	460.00	4.1478
75	Decanoic acid	$C_{10}H_{20}O_2$	334-48-5	172.265	219,840	140.41	0.9968			304.75	3.5521	543.15	5.9017
76	1-Decanol	$C_{10}H_{22}O$	112-30-1	158.281	4,988,500	–52,898	216.35	–0.37538	0.00023674	280.05	3.5373	503.00	5.0169
77	1-Decene	$C_{10}H_{20}$	872-05-9	140.266	417,440	–1,616.5	5.3948	–0.004348		206.89	2.7541	443.75	3.8250
78	Decyl mercaptan	$C_{10}H_{22}S$	143-10-2	174.347	314,570	–160.93	0.95561			247.56	3.3330	512.35	4.8297
79	1-Decyne	$C_{10}H_{18}$	764-93-2	138.250	276,900	–371.23	1.5774			229.15	2.7466	447.15	4.2629
80	Deuterium	D_2	7782-39-0	4.032									
81	1,1-Dibromoethane	$C_2H_4Br_2$	557-91-5	187.861	149,400	–231.8	0.5946			210.15	1.2695	381.15	1.4743
82	1,2-Dibromoethane	$C_2H_4Br_2$	106-93-4	187.861	200,560	–491.44	0.9187			282.85	1.3506	410.00	1.5350
83	Dibromomethane	CH_2Br_2	74-95-3	173.835	202,580	–726.3	1.3377			240.00	1.0532	370.10	1.1701
84	Dibutyl ether	$C_8H_{18}O$	142-96-1	130.228	270,720	–259.83	0.95427			175.30	2.5450	450.00	3.4704
85	*m*-Dichlorobenzene	$C_6H_4Cl_2$	541-73-1	147.002	114,880	187.25				248.39	1.6139	400.00	1.8978
86	*o*-Dichlorobenzene	$C_6H_4Cl_2$	95-50-1	147.002	93,093	183.97	0.2314			273.15	1.6061	528.75	2.5506
87	*p*-Dichlorobenzene	$C_6H_4Cl_2$	106-46-7	147.002	133,950	–24.84	0.48191			326.14	1.7711	513.56	2.4829
88	1,1-Dichloroethane	$C_2H_4Cl_2$	75-34-3	98.959	126,340	–94.63	0.32			176.19	1.1960	330.45	1.3001
89	1,2-Dichloroethane	$C_2H_4Cl_2$	107-06-2	98.959	179,170	–444.74	0.93009			237.49	1.2601	356.59	1.3885
90	Dichloromethane	CH_2Cl_2	75-09-2	84.933	98,968	–62.941	0.23265			180.00	0.9518	320.00	1.0265
91	1,1-Dichloropropane	$C_3H_6Cl_2$	78-99-9	112.986	144,560	–53.605	0.30617			180.00	1.4483	361.25	1.6515
92	1,2-Dichloropropane	$C_3H_6Cl_2$	78-87-5	112.986	111,560	149.44				275.00	1.5266	369.52	1.6678
93	Diethanol amine	$C_4H_{11}NO_2$	111-42-2	105.136	184,200	286				301.15	2.7033	541.54	3.3908
94	Diethyl amine	$C_4H_{11}N$	109-89-7	73.137	101,330	243.18				223.35	1.5564	328.60	1.8124
95	Diethyl ether	$C_4H_{10}O$	60-29-7	74.122	44,400	1,301	–5.5	0.008763		156.92	1.4698	460.00	3.3202
96	Diethyl sulfide	$C_4H_{10}S$	352-93-2	90.187	238,520	–1,038.4	4.0587	–0.0044691		181.95	1.5703	322.08	1.7579
97	1,1-Difluoroethane [use Eq. (2)]	$C_2H_4F_2$	75-37-6	66.050	67.155	105,580	310.21	–490.54		154.56	0.9915	359.98	1.6874
98	1,2-Difluoroethane	$C_2H_4F_2$	624-72-6	66.050	82,577	109.85				215.00	1.0619	283.65	1.1374
99	Difluoromethane	CH_2F_2	75-10-5	52.023	263,980	–1,791.1	4.3666			200.00	0.8042	250.00	0.8912
100	Di-isopropyl amine	$C_6H_{15}N$	108-18-9	101.190	98,434	429.04				275.00	2.1642	357.05	2.5162
101	Di-isopropyl ether	$C_6H_{14}O$	108-20-3	102.175	163,000	–4.5	0.62			187.65	1.8399	341.45	2.3375
102	Di-isopropyl ketone	$C_7H_{14}O$	565-80-0	114.185	179,270	28.37	0.5375			204.81	2.0763	410.00	2.8126
103	1,1-Dimethoxyethane	$C_4H_{10}O_2$	534-15-6	90.121	187,790	–313.41	1.1023			159.95	1.6586	337.45	2.0755
104	1,2-Dimethoxypropane	$C_5H_{12}O_2$	7778-85-0	104.148	199,930	–191.5	0.87664			226.10	2.0145	366.15	2.4734
105	Dimethyl acetylene	C_4H_6	503-17-3	54.090	88,153	124.16				240.91	1.1806	300.13	1.2542
106	Dimethyl amine	C_2H_7N	124-40-3	45.084	–214,870	3,787.2	–13.781	0.016924		180.96	1.1947	298.15	1.3779
107	2,3-Dimethylbutane	C_6H_{14}	79-29-8	86.175	129,450	18.5	0.608			145.19	1.4495	331.13	2.0224
108	1,1-Dimethylcyclohexane	C_8H_{16}	590-66-9	112.213	134,500	8.765	0.81151			239.66	1.8321	392.70	2.6309
109	*cis*-1,2-Dimethylcyclohexane	C_8H_{16}	2207-01-4	112.213	150,130	–62.38	0.8851			223.16	1.8029	402.94	2.6870
110	*trans*-1,2-Dimethylcyclohexane	C_8H_{16}	6876-23-9	112.213	155,560	–145.26	1.0932			184.99	1.6610	396.58	2.6989
111	Dimethyl disulfide	$C_2H_6S_2$	624-92-0	94.199	171,580	–256.67	0.5727			188.44	1.4355	360.00	1.5340
112	Dimethyl ether	C_2H_6O	115-10-6	46.068	110,100	–157.47	0.51853			131.65	0.9836	250.00	1.0314
113	*N,N*-Dimethyl formamide	C_3H_7NO	68-12-2	73.094	147,900	–106	0.384			273.82	1.4767	466.44	1.8200
114	2,3-Dimethylpentane	C_7H_{16}	565-59-3	100.202	146,420	59.2	0.604			90.00	1.5664	380.00	2.5613
115	Dimethyl phthalate	$C_{10}H_{10}O_4$	131-11-3	194.184	206,560	325.75				274.16	2.9587	360.00	3.2383
116	Dimethylsilane	C_2H_8Si	1111-74-6	60.170	131,810					298.15	1.3181	298.15	1.3181

117	Dimethyl sulfide	C_2H_6S	75-18-3	62.134	146,950	−380.06	1.2035	−0.00084787		174.88	1.1276	310.48	1.1959
118	Dimethyl sulfoxide	C_2H_6OS	67-68-5	78.133	240,300	−595	1.013			291.67	1.5293	422.15	1.6965
119	Dimethyl terephthalate	$C_{10}H_{10}O_4$	120-61-6	194.184	190,020	431.04				423.40	3.7252	466.35	3.9104
120	1,4-Dioxane	$C_4H_8O_2$	123-91-1	88.105	956,860	−5,559.9	9.6124			284.95	1.5306	374.47	2.2277
121	Diphenyl ether	$C_{12}H_{10}O$	101-84-8	170.207	134,160	447.67				300.03	2.6847	570.00	3.8933
122	Dipropyl amine	$C_6H_{15}N$	142-84-7	101.190	49,120	562.24				277.90	2.0537	407.90	2.7846
123	Dodecane	$C_{12}H_{26}$	112-40-3	170.335	508,210	−1,368.7	3.1015			263.57	3.6292	330.00	3.9429
124	Eicosane	$C_{20}H_{42}$	112-95-8	282.547	352,720	807.32	0.2122			309.58	6.2299	616.93	9.3154
125	Ethane [use Eq. (2)]	C_2H_6	74-84-0	30.069	44.009	89,718	918.77	−1,886		92.00	0.6855	290.00	1.2444
126	Ethanol	C_2H_6O	64-17-5	46.068	102,640	−139.63	−0.030341	0.0020386		159.05	0.8787	390.00	1.6450
127	Ethyl acetate	$C_4H_8O_2$	141-78-6	88.105	226,230	−624.8	1.472			189.60	1.6068	350.21	1.8796
128	Ethyl amine	C_2H_7N	75-04-7	45.084	121,700	38.993				192.15	1.2919	289.73	1.3300
129	Ethylbenzene	C_8H_{10}	100-41-4	106.165	154,040	−142.29	0.80539			178.20	1.5426	409.35	2.3075
130	Ethyl benzoate	$C_9H_{10}O_2$	93-89-0	150.175	124,500	370.6				238.45	2.1287	486.55	3.0482
131	2-Ethyl butanoic acid	$C_6H_{12}O_2$	88-09-5	116.158	56,359	603.02				258.15	2.1203	466.95	3.3794
132	Ethyl butyrate	$C_6H_{12}O_2$	105-54-4	116.158	82,434	422.45	0.20992			285.50	2.2015	428.25	3.0185
133	Ethylcyclohexane	C_8H_{16}	1678-91-7	112.213	132,360	72.74	0.64738			161.84	1.6109	404.95	2.6798
134	Ethylcyclopentane	C_7H_{14}	1640-89-7	98.186	178,520	−518.35	2.3255	−0.0016818		134.71	1.4678	301.82	1.8767
135	Ethylene	C_2H_4	74-85-1	28.053	247,390	−4,428	40.936	−0.1697	0.00026816	104.00	0.7012	252.70	0.9758
136	Ethylenediamine	$C_2H_8N_2$	107-15-3	60.098	184,440	−150.2	0.37044			284.29	1.7168	390.41	1.8226
137	Ethylene glycol	$C_2H_6O_2$	107-21-1	62.068	35,540	436.78	−0.18486			260.15	1.3666	493.15	2.0598
138	Ethyleneimine	C_2H_5N	151-56-4	43.068	46,848	205.35				250.00	0.9819	329.00	1.1441
139	Ethylene oxide	C_2H_4O	75-21-8	44.053	144,710	−758.87	2.8261	−0.003064		160.65	0.8303	283.85	0.8693
140	Ethyl formate	$C_3H_6O_2$	109-94-4	74.079	80,000	223.6				254.20	1.3684	374.20	1.6367
141	2-Ethyl hexanoic acid	$C_8H_{16}O_2$	149-57-5	144.211	207,670	−17.907	1.0493			235.00	2.6141	510.10	4.7157
142	Ethylhexyl ether	$C_8H_{18}O$	5756-43-4	130.228	146,040	458.22				298.15	2.8266	417.15	3.3719
143	Ethylisopropyl ether	$C_5H_{12}O$	625-54-7	88.148	106,250	292.15				298.15	1.9335	326.15	2.0153
144	Ethylisopropyl ketone	$C_6H_{12}O$	565-69-5	100.159	229,250	−404.54	1.1382			204.15	1.9410	386.55	2.4295
145	Ethyl mercaptan	C_2H_6S	75-08-1	62.134	134,670	−234.39	0.59656			125.26	1.1467	315.25	1.2007
146	Ethyl propionate	$C_5H_{10}O_2$	105-37-3	102.132	76,330	400.1				298.15	1.9562	410.00	2.4037
147	Ethylpropyl ether	$C_5H_{12}O$	628-32-0	88.148	103,680	726.3	−2.6047	0.0040957		145.65	1.6686	320.00	2.0358
148	Ethyltrichlorosilane	$C_2H_5Cl_3Si$	115-21-9	163.506	105,150	85.318	0.46693			167.55	1.3255	371.05	2.0109
149	Fluorine	F_2	7782-41-4	37.997	−94,585	7,529.9	−139.6	1.1301	−0.0033241	58.00	0.5541	98.00	0.5966
149	Fluorine	F_2	7782-41-4	37.997	1724,400	−59,924	537.85			53.48	0.5798	56.00	0.5535
150	Fluorobenzene	C_6H_5F	462-06-6	96.102	−991,200	11,734	−40.669	0.047333		239.99	1.3675	319.99	1.5018
151	Fluoroethane	C_2H_5F	353-36-6	48.060	85,663	−118.56	0.55459			140.00	0.7994	240.00	0.8915
152	Fluoromethane	CH_3F	593-53-3	34.033	74,746	−132.32	0.53772			140.00	0.6676	220.00	0.7166
153	Formaldehyde	CH_2O	50-00-0	30.026	61,900	28.3				204.00	0.6767	234.00	0.6852
154	Formamide	CH_3NO	75-12-7	45.041	63,400	150.6				292.00	1.0738	493.00	1.3765
155	Formic acid	CH_2O_2	64-18-6	46.026	78,060	71.54				281.45	0.9820	380.00	1.0525
156	Furan	C_4H_4O	110-00-9	68.074	114,370	−215.69	0.72691			187.55	0.9949	304.50	1.1609
157	Helium-4	He	7440-59-7	4.003	387,220	−465,570	211,800	−42,494	3212.9	2.20	0.1087	4.60	0.2965
157	Helium-4	He	7440-59-7	4.003	410,430	−464,890	135,100			1.80	0.1135	2.10	0.2995
158	Heptadecane	$C_{17}H_{36}$	629-78-7	240.468	376,970	347.82	0.57895			295.13	5.3005	575.30	7.6869
159	Heptanal	$C_7H_{14}O$	111-71-7	114.185	222,360	−105.17	0.65074			229.80	2.3256	381.25	2.7685
160	Heptane [use Eq. (2)]	C_7H_{16}	142-82-5	100.202	61.26	314,410	1,824.6	−2,547.9		182.57	1.9989	520.00	4.0657
161	Heptanoic acid	$C_7H_{14}O_2$	111-14-8	130.185	194,570	−23.206	0.88395			265.83	2.5087	496.15	4.0065
162	1-Heptanol	$C_7H_{16}O$	111-70-6	116.201	2,416,800	−26,105	110.03	−0.19172	0.00011968	239.15	2.3590	448.60	3.8766
163	2-Heptanol	$C_7H_{16}O$	543-49-7	116.201	283,127	−1,037.63	3.44064			230.00	2.2649	432.90	4.7873
164	3-Heptanone	$C_7H_{14}O$	106-35-4	114.185	270,730	−399.89	1.0601			234.15	2.3522	480.00	3.2303
165	2-Heptanone	$C_7H_{14}O$	110-43-0	114.185	265,040	−375.68	1.0024			238.15	2.3242	490.00	3.2163
166	1-Heptene	C_7H_{14}	592-76-7	98.186	267,950	−1,315.9	6.5242	−0.011994	9.3808E-06	154.12	1.8150	366.79	2.4096
167	Heptyl mercaptan	$C_7H_{16}S$	1639-09-4	132.267	236,870	−158.01	0.78982			229.92	2.4229	460.00	3.3131
168	1-Heptyne	C_7H_{12}	628-71-7	96.170	46,798	761.13	−0.62882			200.00	1.7387	372.93	2.4319
169	Hexadecane	$C_{16}H_{34}$	544-76-3	226.441	370,350	231.47	0.68632			291.31	4.9602	560.01	7.1521
170	Hexanal	$C_6H_{12}O$	66-25-1	100.159	117,700	329.52				217.15	1.8926	401.45	2.4999
171	Hexane	C_6H_{14}	110-54-3	86.175	172,120	−183.78	0.88734			177.83	1.6750	460.00	2.7534
172	Hexanoic acid	$C_6H_{12}O_2$	142-62-1	116.158	161,980	44.116	0.709			269.25	2.2526	478.85	3.4568
173	1-Hexanol	$C_6H_{14}O$	111-27-3	102.175	1,638,600	−17,261	71.721	−0.12026	0.000071087	228.55	1.9821	460.00	3.5197
174	2-Hexanol	$C_6H_{14}O$	626-93-7	102.175	267,628	−1,033.06	3.35185			223.00	2.0394	585.30	8.1124
175	2-Hexanone	$C_6H_{12}O$	591-78-6	100.159	208,250	−107.47	0.2062	0.00070293		217.35	2.0185	460.00	2.7087
176	3-Hexanone	$C_6H_{12}O$	589-38-8	100.159	235,960	−345.94	0.94278			217.50	2.0532	460.00	2.7632
177	1-Hexene	C_6H_{12}	592-41-6	84.159	164,640	−200.37	0.8784			133.39	1.5354	336.63	1.9673

TABLE 2-153 Heat Capacities of Inorganic and Organic Liquids [J/(kmol·K)] (*Continued*)

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1	C2	C3	C4	C5	T_{min}, K	C_p at T_{min} × 1E-05	T_{max}, K	C_p at T_{max} × 1E-05
178	3-Hexyne	C_6H_{10}	928-49-4	82.144	82,795	283.4				300.00	1.6781	354.35	1.8322
179	Hexyl mercaptan	$C_6H_{14}S$	111-31-9	118.240	303,320	−1,009	3.3885	−0.002762		192.62	2.1495	430.00	2.7639
180	1-Hexyne	C_6H_{10}	693-02-7	82.144	93,000	326				200.00	1.5820	344.48	2.0530
181	2-Hexyne	C_6H_{10}	764-35-2	82.144	94,860	254.15				300.00	1.7110	357.67	1.8576
182	Hydrazine	H_4N_2	302-01-2	32.045	79,815	50.929	0.043379			274.69	0.9708	653.15	1.3158
183	Hydrogen [use Eq. (2)]	H_2	1333-74-0	2.016	66.653	6,765.9	−123.63	478.27		13.95	0.1262	32.00	1.3122
184	Hydrogen bromide	HBr	10035-10-6	80.912	57,720	9.9				185.15	0.5955	206.45	0.5976
185	Hydrogen chloride	HCl	7647-01-0	36.461	47,300	90				165.00	0.6215	185.00	0.6395
186	Hydrogen cyanide	CHN	74-90-8	27.025	95,398	−197.52	0.3883			259.83	0.7029	298.85	0.7105
187	Hydrogen fluoride	HF	7664-39-3	20.006	62,520	−223.02	0.6297			189.79	0.4288	292.67	0.5119
188	Hydrogen sulfide [use Eq. (2)]	H_2S	7783-06-4	34.081	64.666	49,354	22.493	−1,623		187.68	0.6733	370.00	4.9183
189	Isobutyric acid	$C_4H_8O_2$	79-31-2	88.105	127,540	−65.35	0.82867			270.00	1.7031	427.65	2.5114
190	Isopropyl amine	C_3H_9N	75-31-0	59.110	−32,469	1,977.1	−7.0145	0.0086913		177.95	1.4621	320.00	1.6671
191	Malonic acid	$C_3H_4O_4$	141-82-2	104.061	157,850	−41.619	0.42817			407.95	2.1213	603.75	2.8880
192	Methacrylic acid	$C_4H_6O_2$	79-41-4	86.089	146,290	−58.59	0.3582			288.15	1.5915	434.15	1.8837
193	Methane [use Eq. (2)]	CH_4	74-82-8	16.042	65.708	38,883	−257.95	614.07		90.69	0.5361	190.00	14.9780
194	Methanol	CH_4O	67-56-1	32.042	105,800	−362.23	0.9379			175.47	0.7112	400.00	1.1097
195	*N*-Methyl acetamide	C_3H_7NO	79-16-3	73.094	62,600	243.4				359.00	1.4998	538.50	1.9367
196	Methyl acetate	$C_3H_6O_2$	79-20-9	74.079	61,260	270.9				253.40	1.2991	373.40	1.6241
197	Methyl acetylene	C_3H_4	74-99-7	40.064	79,791	89.49				200.00	0.9769	249.94	1.0216
198	Methyl acrylate	$C_4H_6O_2$	96-33-3	86.089	275,500	−1,147	2.568			196.32	1.4930	353.35	1.9084
199	Methyl amine	CH_5N	74-89-5	31.057	92,520	37.45				179.69	0.9925	266.82	1.0251
200	Methyl benzoate	$C_8H_8O_2$	93-58-3	136.148	125,630	279.75				260.75	1.9857	472.65	2.5785
201	3-Methyl-1,2-butadiene	C_5H_8	598-25-4	68.117	135,370	−133.34	0.63868			159.53	1.3035	314.56	1.5662
202	2-Methylbutane	C_5H_{12}	78-78-4	72.149	108,300	146	−0.292	0.00151		113.25	1.2328	310.00	1.7048
203	2-Methylbutanoic acid	$C_5H_{10}O_2$	116-53-0	102.132	74,200	417.4				321.50	2.0839	481.50	2.7518
204	3-Methyl-1-butanol	$C_5H_{12}O$	123-51-3	88.148	247,870	−1,145	3.4223			155.95	1.5254	404.15	3.4411
205	2-Methyl-1-butene	C_5H_{10}	563-46-2	70.133	149,510	−247.63	0.91849			135.58	1.3282	304.31	1.5921
206	2-Methyl-2-butene	C_5H_{10}	513-35-9	70.133	151,600	−266.72	0.90847			139.39	1.3207	311.71	1.5673
207	2-Methyl-1-butene-3-yne	C_5H_6	78-80-8	66.101	81,919	181.01				298.15	1.3589	305.40	1.3720
208	Methylbutyl ether	$C_5H_{12}O$	628-28-4	88.148	177,850	−171.57	0.74379			157.48	1.6928	343.31	2.0661
209	Methylbutyl sulfide	$C_5H_{12}S$	628-29-5	104.214	198,390	−220.35	0.76096			175.30	1.8315	510.00	2.8394
210	3-Methyl-1-butyne	C_5H_8	598-23-2	68.117	105,200	191.1				200.00	1.4342	299.49	1.6243
211	Methyl butyrate	$C_5H_{10}O_2$	623-42-7	102.132	102,930	129.1	0.62516			277.25	1.8678	415.87	2.6474
212	Methylchlorosilane	CH_5ClSi	993-00-0	80.589	47,726	338.4				250.00	1.3233	325.00	1.5771
213	Methylcyclohexane	C_7H_{14}	108-87-2	98.186	131,340	−63.1	0.8125			146.58	1.3955	320.00	1.9435
214	1-Methylcyclohexanol	$C_7H_{14}O$	590-67-0	114.185	50,578	508.59				300.00	2.0315	441.15	2.7494
215	*cis*-2-Methylcyclohexanol	$C_7H_{14}O$	7443-70-1	114.185	118,600	447.07				300.00	2.5272	438.15	3.1448
216	*trans*-2-Methylcyclohexanol	$C_7H_{14}O$	7443-52-9	114.185	118,170	447.99				300.00	2.5257	440.15	3.1535
217	Methylcyclopentane	C_6H_{12}	96-37-7	84.159	155,920	−490	2.1383	−0.0015585		130.73	1.2492	366.48	1.8682
218	1-Methylcyclopentene	C_6H_{10}	693-89-0	82.144	53,271	327.92				200.00	1.1885	348.64	1.6760
219	3-Methylcyclopentene	C_6H_{10}	1120-62-3	82.144	46,457	346.93				200.00	1.1584	338.05	1.6374
220	Methyldichlorosilane	CH_4Cl_2Si	75-54-7	115.034	27,030	413				250.00	1.3028	350.00	1.7158
221	Methylethyl ether	C_3H_8O	540-67-0	60.095	85,383	199.08	−0.061547			160.00	1.1566	280.50	1.3638
222	Methylethyl ketone	C_4H_8O	78-93-3	72.106	132,300	200.87	−0.9597	0.0019533		186.48	1.4905	373.15	1.7511
223	Methylethyl sulfide	C_3H_8S	624-89-5	76.161	161,240	−288.61	0.78179			167.23	1.3484	339.80	1.5344
224	Methyl formate	$C_2H_4O_2$	107-31-3	60.052	130,200	−396	1.21			174.15	0.9793	304.90	1.2195
225	Methylisobutyl ether	$C_5H_{12}O$	625-44-5	88.148	92,919	324.43				298.15	1.8965	350.00	2.0647
226	Methylisobutyl ketone	$C_6H_{12}O$	108-10-1	100.159	183,650	−79.862	0.60769			189.15	1.9029	389.15	2.4460
227	Methyl Isocyanate	C_2H_3NO	624-83-9	57.051	149,770	−529.82	1.3499			256.15	1.0263	366.00	1.3668
228	Methylisopropyl ether	$C_4H_{10}O$	598-53-8	74.122	143,440	−154.07	0.7255			127.93	1.3560	310.00	1.6540
229	Methylisopropyl ketone	$C_5H_{10}O$	563-80-4	86.132	191,170	−331.04	0.98445			180.15	1.6348	440.00	2.3610
230	Methylisopropyl sulfide	$C_4H_{10}S$	1551-21-9	90.187	211,170	−661.97	2.4216	−0.0021383		171.64	1.5808	357.91	1.8641
231	Methyl mercaptan	CH_4S	74-93-1	48.107	115,300	−263.23	0.60412			150.18	0.8939	298.15	0.9052
232	Methyl methacrylate	$C_5H_8O_2$	80-62-6	100.116	255,100	−938.4	2.413			224.95	1.6611	373.45	2.4118
233	2-Methyloctanoic acid	$C_9H_{18}O_2$	3004-93-1	158.238	226,650	15.421	1.0578			240.00	2.9128	518.15	5.1864
234	2-Methylpentane	C_6H_{14}	107-83-5	86.175	142,220	−47.83	0.739			119.55	1.4706	333.41	2.0842
235	Methyl pentyl ether	$C_6H_{14}O$	628-80-8	102.175	251,890	−468.32	1.2209			176.00	2.0728	372.00	2.4663
236	2-Methylpropane	C_4H_{10}	75-28-5	58.122	172,370	−1,783.9	14.759	−0.047909	0.00005805	113.54	0.9961	380.00	2.0725

237	2-Methyl-2-propanol	$C_4H_{10}O$	75-65-0	74.122	–925,460	7,894.9	–17.661	0.013617		298.96	2.2016	460.00	2.9455
238	2-Methyl propene	C_4H_8	115-11-7	56.106	87,680	217.1	–0.9153	0.002266		132.81	1.0568	343.15	1.4596
239	Methyl propionate	$C_4H_8O_2$	554-12-1	88.105	71,140	335.5				300.00	1.7179	390.00	2.0198
240	Methylpropyl ether	$C_4H_{10}O$	557-17-5	74.122	144,110	–102.09	0.58113			133.97	1.4086	312.20	1.6888
241	Methylpropyl sulfide	$C_4H_{10}S$	3877-15-4	90.187	179,850	–264.1	0.79202			160.17	1.5787	368.69	1.9014
242	Methylsilane	CH_6Si	992-94-9	46.144	113,470					298.15	1.1347	298.15	1.1347
243	alpha-Methyl styrene	C_9H_{10}	98-83-9	118.176	76,822	421.6				249.95	1.8220	438.65	2.6176
244	Methyl *tert*-butyl ether	$C_5H_{12}O$	1634-04-4	88.148	134,300	94.356	–0.0032	0.0009795		164.55	1.5410	328.18	1.9954
245	Methyl vinyl ether	C_3H_6O	107-25-5	58.079	73,600	184.7				151.15	1.0152	278.65	1.2507
246	Naphthalene	$C_{10}H_8$	91-20-3	128.171	29,800	527.5				353.43	2.1623	491.14	2.8888
247	Neon	Ne	7440-01-9	20.180	1,034,100	–138,770	7,154	–162.55	1.3841	24.56	0.3666	40.00	0.6980
248	Nitroethane	$C_2H_5NO_2$	79-24-3	75.067	187,740	–497.6	1.0691			183.63	1.3242	387.22	1.5536
249	Nitrogen	N_2	7727-37-9	28.013	281,970	–12,281	248	–2.2182	0.0074902	63.15	0.5593	112.00	0.7960
250	Nitrogen trifluoride	F_3N	7783-54-2	71.002	101,400	–682.11	3.8912			117.00	0.7486	175.50	1.0154
251	Nitromethane	CH_3NO_2	75-52-5	61.040	116,270	–135.3	0.345			244.60	1.0382	473.15	1.2949
252	Nitrous oxide	N_2O	10024-97-2	44.013	67,556	54.373				182.30	0.7747	200.00	0.7843
253	Nitric oxide	NO	10102-43-9	30.006	–2,979,600	76,602	–652.59	1.8879		109.50	0.6229	150.00	1.9909
254	Nonadecane	$C_{19}H_{40}$	629-92-5	268.521	342,570	762.08	0.20481			305.04	5.9409	603.05	8.7663
255	Nonanal	$C_9H_{18}O$	124-19-6	142.239	136,820	531.29				255.15	2.7238	468.15	3.8554
256	Nonane	C_9H_{20}	111-84-2	128.255	383,080	–1,139.8	2.7101			219.66	2.6348	325.00	2.9890
257	Nonanoic acid	$C_9H_{18}O_2$	112-05-0	158.238	224,336	49.726	0.9813			285.55	3.1855	528.75	5.2498
258	1-Nonanol	$C_9H_{20}O$	143-08-8	144.255	10,483,000	–115,220	476.87	–0.85381	0.00056246	310.00	3.5059	460.00	4.6494
259	2-Nonanol	$C_9H_{20}O$	628-99-9	144.255	329,641	–1,046.78	3.61823			238.15	2.8555	649.50	11.7608
260	1-Nonene	C_9H_{18}	124-11-8	126.239	254,490	–298.06	1.1707			191.91	2.4041	420.02	3.3583
261	Nonyl mercaptan	$C_9H_{20}S$	1455-21-6	160.320	265,350	–46.22	0.79154			253.05	3.0434	492.95	4.3491
262	1-Nonyne	C_9H_{16}	3452-09-3	124.223	253,580	–366.3	1.4881			223.15	2.4594	423.85	3.6566
263	Octadecane	$C_{18}H_{38}$	593-45-3	254.494	399,430	374.64	0.58156			301.31	5.6511	589.86	8.2276
264	Octanal	$C_8H_{16}O$	124-13-0	128.212	130,650	463.61				246.00	2.4470	447.15	3.3795
265	Octane	C_8H_{18}	111-65-9	114.229	224,830	–186.63	0.95891			216.38	2.2934	460.00	3.4189
266	Octanoic acid	$C_8H_{16}O_2$	124-07-2	144.211	205,260	44.392	0.8956			289.65	2.9326	512.85	4.6358
267	1-Octanol	$C_8H_{18}O$	111-87-5	130.228	571,370	–4,849	19.725	–0.021532		250.00	2.5550	467.10	4.1566
268	2-Octanol	$C_8H_{18}O$	123-96-6	130.228	319,198	–1,042.21	3.52943			241.55	2.7338	452.90	5.7113
269	2-Octanone	$C_8H_{16}O$	111-13-7	128.212	300,400	–426.2	1.1172			252.86	2.6406	500.00	3.6660
270	3-Octanone	$C_8H_{16}O$	106-68-3	128.212	289,980	–417.27	1.2218			255.55	2.6314	440.65	3.4335
271	1-Octene	C_8H_{16}	111-66-0	112.213	509,420	–4,279.1	21.477	–0.044462	3.5028E-05	171.45	2.1327	394.41	2.8235
272	Octyl mercaptan	$C_8H_{18}S$	111-88-6	146.294	240,040	–33.198	0.67889			240.00	2.7118	472.19	3.7573
273	1-Octyne	C_8H_{14}	629-05-0	110.197	42,642	886.67	–0.69315			200.00	1.9225	399.35	2.8619
274	Oxalic acid	$C_2H_2O_4$	144-62-7	90.035	175,510	–381.36	0.64623			462.65	1.3740	603.00	1.8052
275	Oxygen	O_2	7782-44-7	31.999	175,430	–6,152.3	113.92	–0.92382	0.0027963	54.36	0.5365	142.00	0.9066
276	Ozone	O_3	10028-15-6	47.998	60,046	281.16				90.00	0.8535	150.00	1.0222
277	Pentadecane	$C_{15}H_{32}$	629-62-9	212.415	346,910	219.54	0.65632			283.07	4.6165	543.84	6.6042
278	Pentanal	$C_5H_{10}O$	110-62-3	86.132	112,050	257.78				200.00	1.6361	376.15	2.0901
279	Pentane	C_5H_{12}	109-66-0	72.149	159,080	–270.5	0.99537			143.42	1.4076	390.00	2.0498
280	Pentanoic acid	$C_5H_{10}O_2$	109-52-4	102.132	145,050	28.344	0.6372			239.15	1.8827	458.95	2.9228
281	1-Pentanol	$C_5H_{12}O$	71-41-0	88.148	201,200	–651.3	2.275			200.14	1.6198	389.15	2.9227
282	2-Pentanol	$C_5H_{12}O$	6032-29-7	88.148	251,596	–1,028.49	3.26306			200.00	1.7642	561.00	7.0158
283	2-Pentanone	$C_5H_{10}O$	107-87-9	86.132	194,590	–263.86	0.76808			196.29	1.7239	375.46	2.0380
284	3-Pentanone	$C_5H_{10}O$	96-22-0	86.132	193,020	–176.43	0.5669			234.18	1.8279	375.14	2.0661
285	1-Pentene	C_5H_{10}	109-67-1	70.133	156,100	–456.94	2.255	–0.003163	0.00000238	108.02	1.2939	350.00	1.7251
286	2-Pentyl mercaptan	$C_5H_{12}S$	2084-19-7	104.214	188,200	–140.84	0.63581			160.75	1.8199	385.15	2.2827
287	Pentyl mercaptan	$C_5H_{12}S$	110-66-7	104.214	213,760	–324.4	0.9472			197.45	1.8664	399.79	2.3546
288	1-Pentyne	C_5H_8	627-19-0	68.117	86,200	256.6				200.00	1.3752	313.33	1.6660
289	2-Pentyne	C_5H_8	627-21-4	68.117	68,671	246.66				200.00	1.1800	329.27	1.4989
290	Phenanthrene	$C_{14}H_{10}$	85-01-8	178.229	103,370	527.03				372.39	2.9963	500.00	3.6688
291	Phenol	C_6H_6O	108-95-2	94.111	101,720	317.61				314.06	2.0147	425.00	2.3670
292	Phenyl isocyanate	C_7H_5NO	103-71-9	119.121	60,834	215.89	0.29552			243.15	1.3080	489.75	2.3745
293	Phthalic anhydride	$C_8H_4O_3$	85-44-9	148.116	145,400	252.4				404.15	2.4741	557.65	2.8615
294	Propadiene	C_3H_4	463-49-0	40.064	66,230	98.275				200.00	0.8589	238.65	0.8968
295	Propane [use Eq. (2)]	C_3H_8	74-98-6	44.096	62.983	113,630	633.21	–873.46		85.47	0.8488	360.00	2.6079
296	1-Propanol	C_3H_8O	71-23-8	60.095	158,760	–635	1.969			146.95	1.0797	400.00	2.1980
297	2-Propanol	C_3H_8O	67-63-0	60.095	471,710	–4,172.1	14.745	–0.0144		185.26	1.1329	355.30	2.0487
298	Propenylcyclohexene	C_9H_{14}	13511-13-2	122.207	201,400	–450.6	1.7053			199.00	1.7926	431.65	3.2463
299	Propionaldehyde	C_3H_6O	123-38-6	58.079	99,306	115.73				200.00	1.2245	328.75	1.3735

TABLE 2-153 Heat Capacities of Inorganic and Organic Liquids [J/(kmol·K)] (*Concluded*)

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1	C2	C3	C4	C5	T_{min}, K	C_p at T_{min} ×1E-05	T_{max}, K	C_p at T_{max} ×1E-05
300	Propionic acid	$C_3H_6O_2$	79-09-4	74.079	213,660	−702.7	1.6605			252.45	1.4209	414.32	2.0756
301	Propionitrile	C_3H_5N	107-12-0	55.079	118,190	−120.98	0.42075			180.26	1.1005	370.50	1.3112
302	Propyl acetate	$C_5H_{10}O_2$	109-60-4	102.132	83,400	384.1				274.70	1.8891	404.70	2.3885
303	Propyl amine	C_3H_9N	107-10-8	59.110	139,530	78				188.36	1.5422	340.00	1.6605
304	Propylbenzene	C_9H_{12}	103-65-1	120.192	174,380	−101.8	0.79			173.55	1.8051	432.39	2.7806
305	Propylene	C_3H_6	115-07-1	42.080	114,140	−343.72	1.0905			87.89	0.9235	225.45	0.9208
306	Propyl formate	$C_4H_8O_2$	110-74-7	88.105	75,700	326.1				298.15	1.7293	398.15	2.0554
307	2-Propyl mercaptan	C_3H_8S	75-33-2	76.161	138,390	−117.11	0.47059			142.61	1.3126	350.00	1.5505
308	Propyl mercaptan	C_3H_8S	107-03-9	76.161	167,330	−319.1	0.8127			159.95	1.3708	340.87	1.5299
309	1,2-Propylene glycol	$C_3H_8O_2$	57-55-6	76.094	58,080	445.2				213.15	1.5297	460.75	2.6321
310	Quinone	$C_6H_4O_2$	106-51-4	108.095	45,810	368.33				388.85	1.8904	683.00	2.9738
311	Silicon tetrafluoride	F_4Si	7783-61-1	104.079	829,380	−7,331.5	19.203			186.35	1.3000	253.15	2.0403
312	Styrene	C_8H_8	100-42-5	104.149	113,340	290.2	−0.6051	0.0013567		242.54	1.6749	418.31	2.2816
313	Succinic acid	$C_4H_6O_4$	110-15-6	118.088	244,770	−236.96	0.63148			460.65	2.6961	604.50	3.3228
314	Sulfur dioxide	O_2S	7446-09-5	64.064	85,743	5.7443				197.67	0.8688	350.00	0.8775
315	Sulfur hexafluoride	F_6S	2551-62-4	146.055	119,500					230.15	1.1950	230.15	1.1950
316	Sulfur trioxide	O_3S	7446-11-9	80.063	258,090					303.15	2.5809	303.15	2.5809
317	Terephthalic acid	$C_8H_6O_4$	100-21-0	166.131									
318	*o*-Terphenyl	$C_{18}H_{14}$	84-15-1	230.304	182,900	635.09				329.35	3.9207	609.15	5.6977
319	Tetradecane	$C_{14}H_{30}$	629-59-4	198.388	353,140	29.13	0.86116			279.01	4.2831	526.73	6.0741
320	Tetrahydrofuran	C_4H_8O	109-99-9	72.106	171,730	−800.47	2.8934	−0.0025015		164.65	1.0721	339.12	1.3546
321	1,2,3,4-Tetrahydronaphthalene	$C_{10}H_{12}$	119-64-2	132.202	81,760	455.38				237.38	1.8986	480.77	3.0069
322	Tetrahydrothiophene	C_4H_8S	110-01-0	88.171	123,300	−130.1	0.6229			176.98	1.1979	394.27	1.6883
323	2,2,3,3-Tetramethylbutane	C_8H_{18}	594-82-1	114.229	43,326	630.73				375.41	2.8011	426.00	3.1202
324	Thiophene	C_4H_4S	110-02-1	84.140	84,864	91.725	0.13243			234.94	1.1372	357.31	1.3455
325	Toluene	C_7H_8	108-88-3	92.138	140,140	−152.3	0.695			178.18	1.3507	500.00	2.3774
326	1,1,2-Trichloroethane	$C_2H_3Cl_3$	79-00-5	133.404	103,350	159.3				236.50	1.4102	300.00	1.5114
327	Tridecane	$C_{13}H_{28}$	629-50-5	184.361	350,180	−104.7	1.0022			267.76	3.9400	508.62	5.5619
328	Triethyl amine	$C_6H_{15}N$	121-44-8	101.190	111,480	368.13				200.00	1.8511	361.92	2.4471
329	Trimethyl amine	C_3H_9N	75-50-3	59.110	136,050	−288	0.9913			156.08	1.1525	276.02	1.3208
330	1,2,3-Trimethylbenzene	C_9H_{12}	526-73-8	120.192	119,450	324.54				247.79	1.9987	449.27	2.6526
331	1,2,4-Trimethylbenzene	C_9H_{12}	95-63-6	120.192	178,800	−128.47	0.83741			229.33	1.9338	350.00	2.3642
332	2,2,4-Trimethylpentane	C_8H_{18}	540-84-1	114.229	95,275	696.7	−1.3765	0.0021734		165.78	1.8285	520.00	3.9095
333	2,3,3-Trimethylpentane	C_8H_{18}	560-21-4	114.229	388,620	−1,439.5	3.2187			280.00	2.3791	320.00	2.5757
334	1,3,5-Trinitrobenzene	$C_6H_3N_3O_6$	99-35-4	213.105	40,364	664.46				398.40	3.0508	475.47	3.5629
335	2,4,6-Trinitrotoluene	$C_7H_5N_3O_6$	118-96-7	227.131	133,530	514.64				354.00	3.1571	475.00	3.7798
336	Undecane	$C_{11}H_{24}$	1120-21-4	156.308	293,980	−114.98	0.96936			247.57	3.2493	433.42	4.2624
337	1-Undecanol	$C_{11}H_{24}O$	112-42-5	172.308	129,450	−3,039.5	27.927	−0.061847	4.3042E-05	289.05	3.9103	520.30	5.5127
338	Vinyl acetate	$C_4H_6O_2$	108-05-4	86.089	136,300	−106.17	0.75175			259.56	1.5939	389.35	2.0892
339	Vinyl acetylene	C_4H_4	689-97-4	52.075	68,720	135				200.00	0.9572	278.25	1.0628
340	Vinyl chloride	C_2H_3Cl	75-01-4	62.498	−10,320	322.8				200.00	0.5424	400.00	1.1880
341	Vinyl trichlorosilane	$C_2H_3Cl_3Si$	75-94-5	161.490	49,516	420.35				178.35	1.2449	363.85	2.0246
342	Water	H_2O	7732-18-5	18.015	276,370	−2,090.1	8.125	−0.014116	9.3701E-06	273.16	0.7615	533.15	0.8939
343	*m*-Xylene	C_8H_{10}	108-38-3	106.165	133,860	7.8754	0.52265			217.00	1.6018	540.15	2.9060
344	*o*-Xylene	C_8H_{10}	95-47-6	106.165	36,500	1,017.5	−2.63	0.00302		247.98	1.7314	417.58	2.2269
345	*p*-Xylene	C_8H_{10}	106-42-3	106.165	−35,500	1,287.2	−2.599	0.002426		286.41	1.7697	600.00	3.2520

For the 11 substances, ammonia, 1,2-butanediol, 1,3-butanediol, carbon monoxide, 1,1-difluoroethane, ethane, heptane, hydrogen, hydrogen sulfide, methane, and propane, the liquid heat capacity C_{pL} is calculated with Eq. (2) below. For all other compounds, Eq. (1) is used. For benzene, fluorine, and helium, two sets of constants are given for Eq. (1) that cover different temperature ranges, as shown in the table.

(1) $$C_{pL} = C1 + C2T + C3T^2 + C4T^3 + C4T^4$$

(2) $$C_{pL} = \frac{C1^2}{t} + C2 - 2C1C3t - C1C4t^2 - \frac{C3^2t^3}{3} - \frac{C3C4t^4}{2} - \frac{C4^2t^5}{5}$$

where $t = 1 - T_r$, $T_r = T/T_c$, T_c is the critical temperature from Table 2-141, C_{pL} is in J/(kmol·K) and T is in K. All substances are listed by chemical family in Table 2-6 and by formula in Table 2-7. For temperatures less than the normal boiling point, the pressure is 1 atm. Above the normal boiling point, the pressure is the vapor pressure.

The number of digits provided for values at T_{min} and T_{max} was chosen for uniformity of appearance and formatting; these do not represent the uncertainties of the physical quantities, but are the result of calculations from the standard thermophysical property formulations within a fixed format.

TABLE 2-154 Specific Heats of Organic Solids
Recalculated from *International Critical Tables*, vol. 5, pp. 101–105

Compound	Formula	Temperature, °C	sp ht, cal/(g·°C)
Acetic acid	$C_2H_4O_2$	–200 to +25	0.330 + 0.00080*t*
Acetone	C_3H_6O	–210 to –80	0.540 + 0.0156*t*
Aminobenzoic acid (*o*-)	$C_7H_7NO_2$	85 to mp	0.254 + 0.00136*t*
(*m*-)	$C_7H_7NO_2$	120 to mp	0.253 + 0.00122*t*
(*p*-)	$C_7H_7NO_2$	128 to mp	0.287 + 0.00088*t*
Aniline	C_6H_7N		0.741
Anthracene	$C_{14}H_{10}$	50	0.308
		100	0.350
		150	0.382
Anthraquinone	$C_{14}H_8O_2$	0 to 270	0.258 + 0.00069*t*
Apiol	$C_{12}H_{14}O_4$	10	0.299
Azobenzene	$C_{12}H_{10}N_2$	28	0.330
Benzene	C_6H_6	–250	0.0399
		–225	0.0908
		–200	0.124
		–150	0.170
		–100	0.227
		–50	0.299
		0	0.375
Benzoic acid	$C_7H_6O_2$	20 to mp	0.287 + 0.00050*t*
Benzophenone	$C_{13}H_{10}O$	–150	0.115
		–100	0.172
		–50	0.220
		0	0.275
		+20	0.303
Betol	$C_{17}H_{12}O_3$	–150	0.129
		–100	0.167
		0	0.248
		+50	0.308
Bromoiodobenzene (*o*-)	C_6H_4BrI	–50 to 0	0.143 + 0.00025*t*
(*m*-)	C_6H_4BrI	–75 to –15	0.143
(*p*-)	C_6H_4BrI	–40 to 50	0.116 + 0.00032*t*
Bromonaphthalene (β-)	$C_{10}H_7Br$	41	0.260
Bromophenol	C_6H_5BrO	32	0.263
Camphene	$C_{10}H_{16}$	35	0.380
Capric acid	$C_{10}H_{20}O_2$	8	0.695
Caprylic acid	$C_8H_{16}O_2$	–2	0.628
Carbon tetrachloride	CCl_4	–240	0.013
		–200	0.081
		–160	0.131
		–120	0.162
		–80	0.182
		–40	0.201
Cerotic acid	$C_{27}H_{54}O_2$	15	0.387
Chloral alcoholate	$C_4H_7Cl_3O_2$	78	0.509
hydrate	$C_2H_3Cl_3O_2$	32	0.213
Chloroacetic acid	$C_2H_3ClO_2$	60	0.363
Chlorobenzoic acid (*o*-)	$C_7H_5ClO_2$	80 to mp	0.228 + 0.00084*t*
(*m*-)	$C_7H_5ClO_2$	94 to mp	0.232 + 0.00073*t*
(*p*-)	$C_7H_5ClO_2$	180 to mp	0.242 + 0.00055*t*
Chlorobromobenzene (*o*-)	C_6H_4BrCl	–34	0.192
(*m*-)	C_6H_4BrCl	–52	0.150
(*p*-)	C_6H_4BrCl	–40	0.150
Crotonic acid	$C_4H_6O_2$	38 to 70	0.520 + 0.00020*t*
Cyamelide	$C_3H_3N_3O_3$	40	0.263
Cyanamide	CH_2N_2	20	0.547
Cyanuric acid	$C_3H_3N_3O_3$	40	0.318
Dextrin	$(C_6H_{10}O_5)x$	0 to 90	0.291 + 0.00096*t*
Dextrose	$C_6H_{12}O_6$	–250	0.016
		–200	0.077
		–100	0.160
		0	0.277
		20	0.300
Dibenzyl	$C_{14}H_{14}$	28	0.363
Dibromobenzene (*o*-)	$C_6H_4Br_2$	–36	0.248
(*m*-)	$C_6H_4Br_2$	–25	0.134
(*p*-)	$C_6H_4Br_2$	–50 to +50	0.139 + 0.00038*t*
Dichloroacetic acid	$C_2H_2Cl_2O_2$		0.406
Dichlorobenzene (*o*-)	$C_6H_4Cl_2$	–48.5	0.185
(*m*-)	$C_6H_4Cl_2$	–52	0.186
(*p*-)	$C_6H_4Cl_2$	–50 to +53	0.219 + 0.0021*t*
Dicyandiamide	$C_2H_4N_4$	0 to 204	0.456

TABLE 2-154 Specific Heats of Organic Solids (*Continued*)
Recalculated from *International Critical Tables,* vol. 5, pp. 101–105

Compound	Formula	Temperature, °C	sp. ht., cal/(g·°C)
Dihydroxybenzene (*o*-)	$C_6H_6O_2$	−163 to mp	0.278 + 0.00098*t*
(*m*-)	$C_6H_6O_2$	−160 to mp	0.269 + 0.00118*t*
(*p*-)	$C_6H_6O_2$	−250	0.025
		−240	0.038
		−220	0.061
		−200	0.081
		−150 to mp	0.268 + 0.00093*t*
Di-iodobenzene (*o*-)	$C_6H_4I_2$	−50 to +15	0.109 + 0.00026*t*
(*m*-)	$C_6H_4I_2$	−52 to −42	0.100 + 0.00026*t*
(*p*-)	$C_6H_4I_2$	−50 to +80	0.101 + 0.00026*t*
Dimethyl oxalate	$C_4H_6O_4$	10 to 50	0.212 + 0.0044*t*
Dimethylpyrene	$C_7H_8O_2$	50	0.368
Dinitrobenzene (*o*-)	$C_6H_4N_2O_4$	−160 to mp	0.252 + 0.00083*t*
(*m*-)	$C_6H_4N_2O_4$	−160 to mp	0.248 + 0.00077*t*
(*p*-)	$C_6H_4N_2O_4$	119 to mp	0.259 + 0.00057*t*
Diphenyl	$C_{12}H_{10}$	40	0.385
Diphenylamine	$C_{12}H_{11}N$	26	0.337
Dulcitol	$C_6H_{14}O_6$	20	0.282
Erythritol	$C_4H_{10}O_4$	60	0.351
Ethyl alcohol	C_2H_6O (crystalline)	−190	0.232
		−180	0.248
		−160	0.282
		−140	0.318
		−130	0.376
	(vitreous)	−190	0.260
		−180	0.296
		−175	0.380
		−170	0.399
Ethylene glycol	$C_2H_6O_2$	−190 to −40	0.366 + 0.00110*t*
Formic acid	CH_2O_2	−22	0.387
		0	0.430
Glutaric acid	$C_5H_8O_4$	20	0.299
Glycerol	$C_3H_8O_3$	−265	0.009
		−260	0.022
		−250	0.047
		−220	0.085
		−200	0.115
		−100	0.217
		0	0.330
Hexachloroethane	C_2Cl_6	25	0.174
Hexadecane	$C_{16}H_{34}$		0.495
Hydroxyacetanilide	$C_8H_9NO_2$	41 to mp	0.249 + 0.00154*t*
Iodobenzene	C_6H_5I	40	0.191
Isopropyl alcohol	C_3H_8O	−200 to −160	0.051 + 0.00165*t*
Lactose	$C_{12}H_{22}O_{11}$	20	0.287
	$C_{12}H_{22}O_{11}·H_2O$	20	0.299
Lauric acid	$C_{12}H_{24}O_2$	−30 to +40	0.430 + 0.000027*t*
Levoglucosane	$C_6H_{10}O_5$	40	0.607
Levulose	$C_6H_{12}O_6$	20	0.275
Malonic acid	$C_3H_4O_4$	20	0.275
Maltose	$C_{12}H_{22}O_{11}$	20	0.320
Mannitol	$C_6H_{14}O_6$	0 to 100	0.313 + 0.00025*t*
Melamine	$C_3H_6N_6$	40	0.351
Myristic acid	$C_{14}H_{28}O_2$	0 to 35	0.381 + 0.00545*t*
Naphthalene	$C_{10}H_8$	−130 to mp	0.281 + 0.00111*t*
Naphthol (α-)	$C_{10}H_8O$	50 to mp	0.240 + 0.00147*t*
(β-)	$C_{10}H_8O$	61 to mp	0.252 + 0.00128*t*
Naphthylamine (α-)	$C_{10}H_9N$	0 to 50	0.270 + 0.0031*t*
Nitroaniline (*o*-)	$C_6H_6N_2O_2$	−160 to mp	0.269 + 0.000920*t*
(*m*-)	$C_6H_6N_2O_2$	−160 to mp	0.275 + 0.000946*t*
(*p*-)	$C_6H_6N_2O_2$	−160 to mp	0.276 + 0.001000*t*
Nitrobenzoic acid (*o*-)	$C_7H_5NO_4$	−163 to mp	0.256 + 0.00085*t*
(*m*-)	$C_7H_5NO_4$	66 to mp	0.258 + 0.00091*t*
(*p*-)	$C_7H_5NO_4$	−160 to mp	0.247 + 0.00077*t*
Nitronaphthalene	$C_{10}H_7NO_2$	0 to 55	0.236 + 0.00215*t*

TABLE 2-154 Specific Heats of Organic Solids (*Concluded*)
Recalculated from *International Critical Tables*, vol. 5, pp. 101–105

Compound	Formula	Temperature, °C	sp ht, cal/(g·°C)
Oxalic acid	$C_2H_2O_4$	−200 to +50	$0.259 + 0.00076t$
	$C_2H_2O_4.2H_2O$	−200	0.117
		−100	0.239
		0	0.338
		+50	0.385
		100	0.416
Palmitic acid	$C_{16}H_{32}O_2$	−180	0.167
		−140	0.208
		−100	0.251
		−50	0.306
		0	0.382
		+20	0.430
Phenol	C_6H_6O	14 to 26	0.561
Phthalic acid	$C_8H_6O_4$	20	0.232
Picric acid	$C_6H_3N_3O_7$	−100	0.165
		0	0.240
		+50	0.263
		100	0.297
		120	0.332
Propionic acid	$C_3H_6O_2$	−33	0.726
Propyl alcohol (*n*-)	C_3H_8O	−200	0.170
		−175	0.363
		−150	0.471
		−130	0.497
Pyrotartaric acid	$C_6H_8O_4$	20	0.301
Quinhydrone	$C_{12}H_{10}O_4$	−250	0.017
		−225	0.061
		−200	0.098
		−100	0.191
		0	0.256
Quinone	$C_6H_4O_2$	−250	0.031
		−225	0.082
		−200	0.113
		−150 to mp	$0.282 + 0.00083t$
Salol	$C_{13}H_{10}O_3$	32	0.289
Stearic acid	$C_{18}H_{36}O_2$	15	0.399
Succinic acid	$C_4H_6O_4$	0 to 160	$0.248 + 0.00153t$
Sucrose	$C_{12}H_{22}O_{11}$	20	0.299
Sugar (cane)	$C_{12}H_{22}O_{11}$	22 to 51	0.301
Tartaric acid	$C_4H_6O_6$	36	0.287
Tartaric acid	$C_4H_6O_6{\cdot}H_2O$	−150	0.112
		−100	0.170
		−50	0.231
		0	0.308
		+50	0.366
Tetrachloroethylene	C_2Cl_4	−40 to 0	$0.198 + 0.00018t$
Tetryl	$C_7H_5N_5O_8$	−100	0.182
		−50	0.199
		0	0.212
		+100	0.236
1 Tetryl + 1 picric acid	$C_{13}H_8N_8O_{15}$	−100 to +100	$0.253 + 0.00072t$
1 Tetryl + 2 TNT	$C_{21}H_{15}N_{11}O_{20}$	−100	0.172
		0	0.280
		+50	0.325
Thymol	$C_{10}H_{14}O$	0 to 49	$0.315 + 0.0031t$
Toluic acid (*o*-)	$C_8H_8O_2$	54 to mp	$0.277 + 0.00120t$
(*m*-)	$C_8H_8O_2$	54 to mp	$0.239 + 0.00195t$
(*p*-)	$C_8H_8O_2$	130 to mp	$0.271 + 0.00106t$
Toluidine (*p*-)	C_7H_9N	0	0.337
		20	0.387
		40	0.440
Trichloroacetic acid	$C_2HCl_3O_2$	solid	0.459
Trimethyl carbinol	$C_4H_{10}O$	−4	0.559
Trinitrotoluene	$C_7H_5N_3O_6$	−100	0.170
		−50	0.253
		0	0.311
		+100	0.385
Trinitroxylene	$C_8H_7N_3O_6$	−185 to +23	0.241
		20 to 50	0.423
Triphenylmethane	$C_{19}H_{16}$	0 to 91	$0.189 + 0.0027t$
Urea	CH_4N_2O	20	0.320

TABLE 2-155 Heat Capacity at Constant Pressure of Inorganic and Organic Compounds in the Ideal Gas State Fit to a Polynomial *Cp* [J/(kmol·K)]

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1	C2	C3	C4 × 1E 05	C5 × 1E 10	T_{min}, K	C_p at T_{min} × 1E-05	T_{max}, K	C_p at T_{max} × 1E-05
1	Acetaldehyde	C_2H_4O	75-07-0	44.053	29,705	127.43	–0.21793			50	0.3553	200	0.4647
7	Acetylene	C_2H_2	74-86-2	26.037	30,800	–53.08	0.384			50	0.2911	200	0.3554
8	Acrolein	C_3H_4O	107-02-8	56.063	30,702	80.95	0.191			50	0.3523	200	0.5453
14	Argon	Ar	7440-37-1	39.948	20,786	0	0			100	0.2079	1,500	0.2079
16	Benzene	C_6H_6	71-43-2	78.112	35,978	–101.69	0.939			50	0.3324	200	0.5320
27	Bromoethane	C_2H_5Br	74-96-4	108.965	27,112	117.99	0			100	0.3891	200	0.5071
29	1,2-Butadiene	C_4H_6	590-19-2	54.090	27,400	177.6	0			50	0.3628	200	0.6292
31	Butane	C_4H_{10}	106-97-8	58.122	17,330	458.16	–0.816			50	0.3820	200	0.7632
34	1-Butanol	$C_4H_{10}O$	71-36-3	74.122	25,300	371.2	–0.461			50	0.4271	200	0.8110
37	*cis*-2-Butene	C_4H_8	590-18-1	56.106	39,760	108.8	0			50	0.4520	200	0.6152
38	*trans*-2-Butene	C_4H_8	624-64-6	56.106	20,908	324.73	–0.411			50	0.3612	200	0.6941
43	1-Butyne	C_4H_6	107-00-6	54.090	25,300	183.2	0			50	0.3446	200	0.6194
59	*m*-Cresol	C_7H_8O	108-39-4	108.138	29,002	158.79	0.635			50	0.3853	200	0.8616
60	*o*-Cresol	C_7H_8O	95-48-7	108.138	16,192	469.81	–0.479			50	0.3849	200	0.9099
61	*p*-Cresol	C_7H_8O	106-44-5	108.138	29,090	166	0.616			50	0.3893	200	0.8693
64	Cyclobutane	C_4H_8	287-23-0	56.106	31,863	37.226	0.23616			50	0.3432	200	0.4876
67	Cyclohexanone	$C_6H_{10}O$	108-94-1	98.143	32,182	116.87	0.547			50	0.3939	200	0.7744
81	1,1-Dibromoethane	$C_2H_4Br_2$	557-91-5	187.861	20,560	285.2	–0.332			100	0.4576	200	0.6432
88	1,1-Dichloroethane	$C_2H_4Cl_2$	75-34-3	98.959	19,560	249.01	–0.22187			100	0.4224	200	0.6049
95	Diethyl ether	$C_4H_{10}O$	60-29-7	74.122	26,040	388	–0.268			50	0.4477	200	0.9292
97	1,1-Difluoroethane	$C_2H_4F_2$	75-37-6	66.050	29,736	72.364	0.228			50	0.3392	200	0.5333
98	1,2-Difluoroethane	$C_2H_4F_2$	624-72-6	66.050	27,581	169.88	–0.1581			50	0.3568	200	0.5523
99	Difluoromethane	CH_2F_2	75-10-5	52.023	33,851	–20.966	0.17584			50	0.3324	200	0.3669
112	Dimethyl ether	C_2H_6O	115-10-6	46.068	25,940	178.46	–0.186			50	0.3440	200	0.5419
120	1,4-Dioxane	$C_4H_8O_2$	123-91-1	88.105	28,345	88.3	0.446			50	0.3388	200	0.6385
125	Ethane	C_2H_6	74-84-0	30.069	31,742	26.567	0.12927			50	0.3339	200	0.4223
126	Ethanol	C_2H_6O	64-17-5	46.068	32,585	87.4	0.05			50	0.3708	200	0.5207
134	Ethylcyclopentane	C_7H_{14}	1640-89-7	98.186	34,710	304.96	–0.084			50	0.4975	200	0.9234
145	Ethyl mercaptan	C_2H_6S	75-08-1	62.134	23,014	271.36	–0.4427			50	0.3548	200	0.5958
151	Fluoroethane	C_2H_5F	353-36-6	48.060	30,358	62.839	0.1067			50	0.3377	200	0.4719
156	Furan	C_4H_4O	110-00-9	68.074	40,860	–160.3	0.87			100	0.3353	200	0.4360
157	Helium-4	He	7440-59-7	4.003	20,786	0	0			100	0.2079	1,500	0.2079
182	Hydrazine	H_4N_2	302-01-2	32.045	32,998	–5.2147	0.21379			50	0.3327	200	0.4051
183	Hydrogen	H_2	1333-74-0	2.016	64,979	–788.17	5.8287	–1845.9	216400	50	0.3797	250	0.2834
190	Isopropyl amine	C_3H_9N	75-31-0	59.110	23,590	310.42	–0.274			50	0.3843	200	0.7471
194	Methanol	CH_4O	67-56-1	32.042	30,270	84.64	–0.188			50	0.3403	200	0.3968
197	Methyl acetylene	C_3H_4	74-99-7	40.064	30,810	35.8	0.27			50	0.3328	200	0.4877
217	Methylcyclopentane	C_6H_{12}	96-37-7	84.159	35,465	147.38	0.242			50	0.4344	200	0.7462
221	Methylethyl ether	C_3H_8O	540-67-0	60.095	23,337	309.03	–0.285			50	0.3808	200	0.7374
231	Methyl mercaptan	CH_4S	74-93-1	48.107	31,520	60.1	0			50	0.3453	200	0.4354
236	2-Methylpropane	C_4H_{10}	75-28-5	58.122	21,380	271.2	–0.092			50	0.3471	200	0.7194

237	2-Methyl-2-propanol	$C_4H_{10}O$	75-65-0	74.122	17,080	381.7	–0.199			50	0.3567	200	0.8546
238	2-Methyl propene	C_4H_8	115-11-7	56.106	24,970	211.8	0			50	0.3556	200	0.6733
243	alpha-Methyl styrene	C_9H_{10}	98-83-9	118.176	37,735	112.94	0.846			50	0.4550	200	0.9416
246	Naphthalene	$C_{10}H_8$	91-20-3	128.171	29,120	82.88	0.964			50	0.3567	200	0.8426
247	Neon	Ne	7440-01-9	20.180	20,786	0	0			100	0.2079	1,500	0.2079
248	Nitroethane	$C_2H_5NO_2$	79-24-3	75.067	33,055	89.54	0.238			50	0.3813	200	0.6048
251	Nitromethane	CH_3NO_2	75-52-5	61.040	38,782	–48.39	0.413			50	0.3740	200	0.4562
253	Nitric oxide	NO	10102-43-9	30.006	34,980	–35.32	0.07729	–5.7357	0.0014526	100	0.3217	1,500	0.3586
289	2-Pentyne	C_5H_8	627-21-4	68.117	24,330	335.7	–0.37			50	0.4019	200	0.7667
290	Phenanthrene	$C_{14}H_{10}$	85-01-8	178.229	27,700	210	1.24			50	0.4130	200	1.1930
294	Propadiene	C_3H_4	463-49-0	40.064	31,690	17.1	0.282			50	0.3325	200	0.4639
295	Propane	C_3H_8	74-98-6	44.096	26,675	147.04	0			50	0.3403	200	0.5608
296	1-Propanol	C_3H_8O	71-23-8	60.095	28,800	257	-0.35			50	0.4078	200	0.6620
304	Propylbenzene	C_9H_{12}	103-65-1	120.192	22,880	538.46	-0.546			50	0.4844	200	1.0873
310	Quinone	$C_6H_4O_2$	106-51-4	108.095	29,668	129.07	0.53105			50	0.3745	200	0.7672
320	Tetrahydrofuran	C_4H_8O	109-99-9	72.106	36,970	–12.28	0.444			50	0.3747	200	0.5227
321	1,2,3,4-Tetrahydronaphthalene	$C_{10}H_{12}$	119-64-2	132.202	28,560	225.1	0.616			50	0.4136	200	0.9822
322	Tetrahydrothiophene	C_4H_8S	110-01-0	88.171	41,195	–88.3	0.942			50	0.3914	200	0.6122
324	Thiophene	C_4H_4S	110-02-1	84.140	36,765	–112.82	0.862			50	0.3328	200	0.4868
331	1,2,4-Trimethylbenzene	C_9H_{12}	95-63-6	120.192	35,652	323.89	0.305			50	0.5261	200	1.1263

Constants in this table can be used in the following equation to calculate the ideal gas heat capacity C_p^0.

$$C_p^0 = C1 + C2T + C3T^2 + C4T^3 + C5T^4$$

where C_p^0 is in J/(kmol·K) and T is in K. All substances are listed by chemical family in Table 2-6 and by formula in Table 2-7.

Values in this table were taken from the Design Institute for Physical Properties (DIPPR) of the American Institute of Chemical Engineers (AIChE), copyright 2007 AIChE and reproduced with permission of AICHE and of the DIPPR Evaluated Process Design Data Project Steering Committee. Their source should be cited as R. L. Rowley, W. V. Wilding, J. L. Oscarson, Y. Yang, N. A. Zundel, T. E. Daubert, R. P. Danner, DIPPR® Data Compilation of Pure Chemical Properties, Design Institute for Physical Properties, AIChE, New York (2007).

The number of digits provided for values at T_{min} and T_{max} was chosen for uniformity of appearance and formatting; these do not represent the uncertainties of the physical quantities, but are the result of calculations from the standard thermophysical property formulations within a fixed format.

TABLE 2-156 Heat Capacity at Constant Pressure of Inorganic and Organic Compounds in the Ideal Gas State Fit to Hyperbolic Functions C_p [J/(kmol·K)]

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1 ×1E-05	C2 ×1E-05	C3 ×1E-03	C4 ×1E-05	C5	T_{min}, K	C_p at T_{min} ×1E-05	T_{max}, K	C_p at T_{max} ×1E-05
1	Acetaldehyde	C_2H_4O	75-07-0	44.053	0.4451	1.0687	1.6141	0.6135	737.8	200	0.4660	1500	1.2994
2	Acetamide	C_2H_5NO	60-35-5	59.067	0.342	1.294	1.075	0.64	502	100	0.3448	1500	1.4997
3	Acetic acid	$C_2H_4O_2$	64-19-7	60.052	0.402	1.3675	1.262	0.7003	569.7	50	0.4020	1500	1.5756
4	Acetic anhydride	$C_4H_6O_3$	108-24-7	102.089	0.713	2.222	1.6203	1.676	746.5	200	0.7665	1500	2.5675
5	Acetone	C_3H_6O	67-64-1	58.079	0.5704	1.632	1.607	0.968	731.5	200	0.6049	1500	1.8820
6	Acetonitrile	C_2H_3N	75-05-8	41.052	0.41914	0.8876	1.5818	0.5032	699.8	100	0.4192	1500	1.1285
7	Acetylene	C_2H_2	74-86-2	26.037	0.3199	0.5424	1.594	0.4325	607.1	200	0.3566	1500	0.7575
8	Acrolein	C_3H_4O	107-02-8	56.063	0.48449	1.2546	1.3979	0.87243	633.26	200	0.5467	1500	1.5620
9	Acrylic acid	$C_3H_4O_2$	79-10-7	72.063	0.6059	1.3703	1.6475	1.0446	751.49	250	0.6984	1500	1.7424
10	Acrylonitrile	C_3H_3N	107-13-1	53.063	0.4678	1.0366	1.3998	0.6536	629.35	200	0.5156	1500	1.3464
11	Air	Mixture	132259-10-0	28.960	0.28958	0.0939	3.012	0.0758	1484	50	0.2896	1500	0.3496
12	Ammonia	H_3N	7664-41-7	17.031	0.33427	0.4898	2.036	0.2256	882	100	0.3343	1500	0.6647
13	Anisole	C_7H_8O	100-66-3	108.138	0.7637	2.9377	1.6051	2.17	751.2	300	1.1302	1200	3.0226
15	Benzamide	C_7H_7NO	55-21-0	121.137	1.9581	1.7019	1.3257	−37.417	41.232	298.15	1.2745	1500	3.2501
16	Benzene	C_6H_6	71-43-2	78.112	0.44767	2.3085	1.4792	1.6836	677.66	200	0.5358	1500	2.4157
17	Benzenethiol	C_6H_6S	108-98-5	110.177	0.6895	2.3275	1.512	1.7516	697.9	200	0.7689	1500	2.6739
18	Benzoic acid	$C_7H_6O_2$	65-85-0	122.121	0.77594	2.6455	1.7925	2.2382	835.9	200	0.8126	1500	2.9712
19	Benzonitrile	C_7H_5N	100-47-0	103.121	0.7186	2.27	1.4669	1.693	680.77	200	0.8053	1500	2.6706
20	Benzophenone	$C_{13}H_{10}O$	119-61-9	182.218	1.0099	4.4898	1.311	2.8395	627.4	300	1.8001	1500	4.9311
21	Benzyl alcohol	C_9H_8O	100-51-6	108.138	0.84115	3.1428	1.9539	2.5743	850.06	298.15	1.1198	1500	3.2880
22	Benzyl ethyl ether	$C_9H_{12}O$	539-30-0	136.191	0.9521	2.8868	0.70207	1.6385	2002.6	300	1.5501	1500	4.3445
23	Benzyl mercaptan	C_7H_8S	100-53-8	124.203	0.99192	2.9633	1.5583	2.2116	719.16	300	1.4156	1200	3.2957
24	Biphenyl	$C_{12}H_{10}$	92-52-4	154.208	1.0759	4.2105	1.9041	4.1785	828.81	200	1.1481	1500	4.5557
25	Bromine	Br_2	7726-95-6	159.808	0.30113	0.08009	0.7514	0.1078	314.6	100	0.3090	1500	0.3794
26	Bromobenzene	C_6H_5Br	108-86-1	157.008	0.721	2.064	1.6504	1.687	765.3	200	0.7679	1500	2.4628
27	Bromoethane	C_2H_5Br	74-96-4	108.965	0.47191	1.2787	1.5957	0.85166	703.87	200	0.5089	1500	1.5121
28	Bromomethane	CH_3Br	74-83-9	94.939	0.3377	0.715	1.578	0.4175	691.4	100	0.3378	1500	0.9107
29	1,2-Butadiene	C_4H_6	590-19-2	54.090	0.575	1.6476	1.527	0.99	677.3	200	0.6269	1500	1.9202
30	1,3-Butadiene	C_4H_6	106-99-0	54.090	0.5095	1.705	1.5324	1.337	685.6	200	0.5756	1500	1.9555
31	Butane	C_4H_{10}	106-97-8	58.122	0.7134	2.43	1.63	1.5033	730.42	200	0.7673	1500	2.6602
32	1,2-Butanediol	$C_4H_{10}O_2$	584-03-2	90.121	1.0478	2.549	1.8776	1.875	833	298.15	1.2667	1500.1	3.0289
33	1,3-Butanediol	$C_4H_{10}O_2$	107-88-0	90.121	1.066	2.575	1.967	1.951	860.5	298.15	1.2679	1500.15	3.0311
34	1-Butanol	$C_4H_{10}O$	71-36-3	74.122	0.7454	2.5907	1.6073	1.732	712.4	200	0.8162	1500	2.8509
35	2-Butanol	$C_4H_{10}O$	78-92-2	74.122	0.90878	2.5508	1.893	1.852	832.13	298.15	1.1257	1500	2.8730
36	1-Butene	C_4H_8	106-98-9	56.106	0.64257	2.0618	1.6768	1.3324	757.06	250	0.7571	1500	2.2898
37	*cis*-2-Butene	C_4H_8	590-18-1	56.106	0.5765	2.115	1.6299	1.2872	739.1	200	0.6199	1500	2.2715
38	*trans*-2-Butene	C_4H_8	624-64-6	56.106	0.6592	2.07	1.6733	1.251	742.2	200	0.7004	1500	2.2904
39	Butyl acetate	$C_6H_{12}O_2$	123-86-4	116.158	1.1684	3.769	1.956	2.818	811.2	300	1.5358	1200	3.6724
40	Butylbenzene	$C_{10}H_{14}$	104-51-8	134.218	1.138	4.454	1.5507	3.0497	708.86	200	1.2659	1500	4.8435
41	Butyl mercaptan	$C_4H_{10}S$	109-79-5	90.187	0.92478	2.7795	1.6837	1.5974	758.68	200	0.9714	1500	3.1008
42	*sec*-Butyl mercaptan	$C_4H_{10}S$	513-53-1	90.187	0.92367	2.5166	1.6109	1.5641	739.2	200	0.9763	1500	2.9615
43	1-Butyne	C_4H_6	107-00-6	54.090	0.5587	1.6694	1.5328	1.07	656	200	0.6238	1500	1.9209
44	Butyraldehyde	C_4H_8O	123-72-8	72.106	0.89657	2.3731	1.9754	1.5866	904.13	200	0.9119	1500	2.6775
45	Butyric acid	$C_4H_8O_2$	107-92-6	88.105	1.488	1.3522	1.146	−678	6.98	298.15	1.1533	1500	2.5905
46	Butyronitrile	C_4H_7N	109-74-0	69.105	0.6906	1.9996	1.5494	1.3146	675	200	0.7607	1500	2.3273
47	Carbon dioxide	CO_2	124-38-9	44.010	0.2937	0.3454	1.428	0.264	588	50	0.2937	5000	0.6335
48	Carbon disulfide	CS_2	75-15-0	76.141	0.301	0.3338	0.896	0.2893	374.7	100	0.3100	1500	0.6148
49	Carbon monoxide	CO	630-08-0	28.010	0.29108	0.08773	3.0851	0.084553	1538.2	60	0.2911	1500	0.3521
50	Carbon tetrachloride	CCl_4	56-23-5	153.823	0.37582	0.7054	0.5121	0.485	236.1	100	0.4730	1500	1.0662
51	Carbon tetrafluoride	CF_4	75-73-0	88.004	0.92004	0.16446	1.0764	−5083.8	2.3486	298	0.6106	1500	1.0465
52	Chlorine	Cl_2	7782-50-5	70.906	0.29142	0.09176	0.949	0.1003	425	50	0.2914	1500	0.3793
53	Chlorobenzene	C_6H_5Cl	108-90-7	112.557	0.8011	2.31	2.157	2.046	897.6	200	0.8219	1500	2.5327
54	Chloroethane	C_2H_5Cl	75-00-3	64.514	0.4568	1.2967	1.5992	0.859	708.8	100	0.4569	1500	1.5112
55	Chloroform	$CHCl_3$	67-66-3	119.378	0.3942	0.6573	0.928	0.493	399.6	100	0.4048	1500	1.0063
56	Chloromethane	CH_3Cl	74-87-3	50.488	0.3409	0.7246	1.723	0.448	780.5	150	0.3424	1500	0.9097
57	1-Chloropropane	C_3H_7Cl	540-54-5	78.541	0.621	1.843	1.629	1.2337	724	200	0.6674	1500	2.1126
58	2-Chloropropane	C_3H_7Cl	75-29-6	78.541	0.61809	1.8023	1.5438	1.1893	685.93	200	0.6768	1500	2.1023
59	*m*-Cresol	C_7H_8O	108-39-4	108.138	0.7515	2.09	0.6666	1.212	2214	200	0.8701	1500	3.2075
60	*o*-Cresol	C_7H_8O	95-48-7	108.138	0.7988	2.853	1.4765	2.042	664.7	200	0.9158	1500	3.2163

61	*p*-Cresol	C_7H_8O	106-44-5	108.138	0.7384	2.908	1.4559	2.091	650.42	200	0.8707	1500	3.2102
62	Cumene	C_9H_{12}	98-82-8	120.192	1.081	3.7932	1.7505	3.0027	794.8	200	1.1480	1500	4.1808
63	Cyanogen	C_2N_2	460-19-5	52.035	0.3545	0.5015	1.057	0.452	396	100	0.3648	1500	0.8100
64	Cyclobutane	C_4H_8	287-23-0	56.106	0.44004	2.3074	1.6283	1.5571	744.9	200	0.4903	1500	2.3234
65	Cyclohexane	C_6H_{12}	110-82-7	84.159	0.432	3.735	1.192	1.635	530.1	100	0.4366	1500	3.6516
66	Cyclohexanol	$C_6H_{12}O$	108-93-0	100.159	0.9043	2.5771	0.7882	1.3068	1952.2	200	0.9648	1500	3.8251
67	Cyclohexanone	$C_6H_{10}O$	108-94-1	98.143	0.67384	3.2598	1.3955	2.0209	677.33	200	0.7802	1500	3.4743
68	Cyclohexene	C_6H_{10}	110-83-8	82.144	0.58171	3.1717	1.5435	2.1273	701.62	150	0.5978	1500	3.2132
69	Cyclopentane	C_5H_{10}	287-92-3	70.133	0.416	3.014	1.4617	1.8095	668.8	100	0.4165	1500	2.9298
70	Cyclopentene	C_5H_8	142-29-0	68.117	0.48074	2.5159	1.5803	1.7454	718.37	150	0.4918	1500	2.5619
71	Cyclopropane	C_3H_6	75-19-4	42.080	0.338	1.6894	1.6135	1.1768	722.8	100	0.3381	1500	1.7213
72	Cyclohexyl mercaptan	$C_6H_{12}S$	1569-69-3	116.224	0.54305	3.9962	1.3575	2.5623	618.54	300	1.2644	1200	3.7236
73	Decanal	$C_{10}H_{20}O$	112-31-2	156.265	1.9641	5.1412	1.8989	4.1278	862.51	200	2.0192	1500	6.0539
74	Decane	$C_{10}H_{22}$	124-18-5	142.282	1.672	5.353	1.6141	3.782	742	200	1.7967	1500	6.0932
75	Decanoic acid	$C_{10}H_{20}O_2$	334-48-5	172.265	0.24457	6.546	1.0899	4.8642	424	298.15	2.5232	1500	6.1099
76	1-Decanol	$C_{10}H_{22}O$	112-30-1	158.281	1.6984	5.392	1.568	3.938	720.5	200	1.8502	1500	6.2186
77	1-Decene	$C_{10}H_{20}$	872-05-9	140.266	1.7101	5.2089	1.7265	3.5935	782.92	298.15	2.2304	1500	5.8745
78	Decyl mercaptan	$C_{10}H_{22}S$	143-10-2	174.347	1.931	5.4815	1.6085	3.74	754.75	200	2.0434	1500	6.4613
79	1-Decyne	$C_{10}H_{18}$	764-93-2	138.250	1.5045	4.3794	1.3291	2.5557	632.01	298	2.1938	1500	5.2794
80	Deuterium	D_2	7782-39-0	4.032	0.3029	0.0975	2.515	–0.0275	368	100	0.3020	1500	0.3425
81	1,1-Dibromoethane	$C_2H_4Br_2$	557-91-5	187.861	0.5927	1.158	1.4931	0.8428	655.5	200	0.6442	1500	1.5673
82	1,2-Dibromoethane	$C_2H_4Br_2$	106-93-4	187.861	0.74906	1.2725	1.981	0.9437	845.2	200	0.7635	1500	1.7041
83	Dibromomethane	CH_2Br_2	74-95-3	173.835	0.391	0.648	1.194	0.42	501	100	0.3929	1500	0.9599
84	Dibutyl ether	$C_8H_{18}O$	142-96-1	130.228	1.6122	4.4777	1.6831	2.918	781.6	200	1.6841	1500	5.2145
85	*m*-Dichlorobenzene	$C_6H_4Cl_2$	541-73-1	147.002	0.7	2.0746	1.3664	1.5983	620.16	200	0.8245	1500	2.5161
86	*o*-Dichlorobenzene	$C_6H_4Cl_2$	95-50-1	147.002	0.6948	2.0804	1.3632	1.594	619.2	200	0.8198	1500	2.5161
87	*p*-Dichlorobenzene	$C_2H_4Cl_2$	106-46-7	147.002	0.6978	2.078	1.3635	1.5965	619.37	200	0.8228	1500	2.5175
88	1,1-Dichloroethane	$C_2H_4Cl_2$	75-34-3	98.959	0.5521	1.205	1.502	0.8719	653.5	200	0.6061	1500	1.5615
89	1,2-Dichloroethane	$C_2H_4Cl_2$	107-06-2	98.959	0.65271	1.1254	1.7376	0.878	795.45	200	0.6722	1500	1.5743
90	Dichloromethane	CH_2Cl_2	75-09-2	84.933	0.3628	0.6804	1.256	0.4275	548	100	0.3637	1500	0.9543
91	1,1-Dichloropropane	$C_3H_6Cl_2$	78-99-9	112.986	0.7145	1.7344	1.524	1.223	674.2	150	0.7268	1500	2.1609
92	1,2-Dichloropropane	$C_3H_6Cl_2$	78-87-5	112.986	0.78658	1.7429	1.7157	1.2627	765.1	200	0.8217	1500	2.1894
93	Diethanol amine	$C_4H_{11}NO_2$	111-42-2	105.136	1.208	3.066	2.089	2.343	891	298.15	1.4197	1500.1	3.4674
94	Diethyl amine	$C_4H_{11}N$	109-89-7	73.137	0.9102	2.674	1.719	1.7926	794.94	200	0.9502	1500	3.0519
95	Diethyl ether	$C_4H_{10}O$	60-29-7	74.122	0.8621	2.551	1.5413	1.437	688.9	200	0.9316	1500	2.9244
96	Diethyl sulfide	$C_4H_{10}S$	352-93-2	90.187	0.91273	2.41	1.6686	1.652	771.08	200	0.9567	1500	2.8724
97	1,1-Difluoroethane	$C_2H_4F_2$	75-37-6	66.050	0.49653	1.2546	1.5394	0.87561	694.17	200	0.5373	1500	1.5424
98	1,2-Difluoroethane	$C_2H_4F_2$	624-72-6	66.050	0.51889	1.2431	1.5048	0.76269	697.51	200	0.5536	1500	1.5510
99	Difluoromethane	CH_2F_2	75-10-5	52.023	0.35489	0.71002	1.5936	0.4622	762	200	0.3681	1500	0.9419
100	Di-isopropyl amine	$C_6H_{15}N$	108-18-9	101.190	1.1384	2.5747	0.7384	1.62	2143	300	1.5995	1500	4.1941
101	Di-isopropyl ether	$C_6H_{14}O$	108-20-3	102.175	1.093	3.683	1.6057	2.342	699	298.15	1.5669	1500	4.0535
102	Di-isopropyl ketone	$C_7H_{14}O$	565-80-0	114.185	1.0869	4.054	1.7802	2.9786	791.6	300	1.5102	1500	4.3093
103	1,1-Dimethoxyethane	$C_4H_{10}O_2$	534-15-6	90.121	1.1556	1.8305	0.95919	0.99605	2826.3	298.15	1.2777	1500	3.0678
104	1,2-Dimethoxypropane	$C_5H_{12}O_2$	7778-85-0	104.148	1.0113	3.2393	1.5611	2.1501	689.3	298.15	1.4638	1500	3.6669
105	Dimethyl acetylene	C_4H_6	503-17-3	54.090	0.6534	1.6179	1.7837	1.0242	821.4	200	0.6721	1500	1.9148
106	Dimethyl amine	C_2H_7N	124-40-3	45.084	0.5565	1.6384	1.7341	1.0899	793.04	200	0.5812	1500	1.8585
107	2,3-Dimethylbutane	C_6H_{14}	79-29-8	86.175	0.7772	4.032	1.544	2.508	649.95	200	0.9363	1500	4.0353
108	1,1-Dimethylcyclohexane	C_8H_{16}	590-66-9	112.213	1.0776	4.6718	1.654	3.3397	792.5	200	1.1535	1500	4.9543
109	*cis*-1,2-Dimethylcyclohexane	C_8H_{16}	2207-01-4	112.213	1.1039	4.6445	1.6943	3.3949	798.35	200	1.1777	1500	4.9243
110	*trans*-1,2-Dimethylcyclohexane	C_8H_{16}	6876-23-9	112.213	1.0991	4.6401	1.6679	3.3736	781.97	200	1.1820	1500	4.9275
111	Dimethyl disulfide	$C_2H_6S_2$	624-92-0	94.199	0.7843	1.4364	1.5836	0.871	730.65	200	0.8155	1500	1.9523
112	Dimethyl ether	C_2H_6O	115-10-6	46.068	0.5148	1.442	1.6034	0.7747	725.4	200	0.5436	1500	1.6581
113	*N,N*-Dimethyl formamide	C_3H_7NO	68-12-2	73.094	0.722	1.783	1.532	1.31	762	200	0.7594	1500	2.2596
114	2,3-Dimethylpentane	C_7H_{16}	565-59-3	100.202	0.85438	4.5772	1.5181	2.974	641.01	200	1.0550	1500	4.5983
115	Dimethyl phthalate	$C_{10}H_{10}O_4$	131-11-3	194.184	1.396	4.78	2.19	3.9705	900.6	300	1.7481	1200	4.4740
116	Dimethylsilane	C_2H_8Si	1111-74-6	60.170	0.61453	1.7438	1.3418	1.0102	592.09	200	0.7095	1500	2.0944
117	Dimethyl sulfide	C_2H_6S	75-18-3	62.134	0.6037	1.3747	1.641	0.7988	743.5	200	0.6298	1500	1.6949
118	Dimethyl sulfoxide	C_2H_6OS	67-68-5	78.133	0.6949	1.524	1.6514	1.0658	722.2	200	0.7355	1500	1.9255
119	Dimethyl terephthalate	$C_{10}H_{10}O_4$	120-61-6	194.184	1.174	5.32	2.105	4.1	818	298.15	1.6816	1000.15	4.1139
120	1,4-Dioxane	$C_4H_8O_2$	123-91-1	88.105	0.56184	2.7034	1.5171	1.7658	700.76	200	0.6403	1500	2.8174
121	Diphenyl ether	$C_{12}H_{10}O$	101-84-8	170.207	1.0985	4.3412	1.6222	3.6455	743.62	300	1.7298	1200	4.5143
122	Dipropyl amine	$C_6H_{15}N$	142-84-7	101.190	1.2114	2.6127	0.78956	1.6903	2394.4	300	1.5900	1500	4.2484
123	Dodecane	$C_{12}H_{26}$	112-40-3	170.335	2.1295	6.633	1.7155	4.5161	777.5	200	2.2442	1500	7.4325

TABLE 2-156 Heat Capacity at Constant Pressure of Inorganic and Organic Compounds in the Ideal Gas State Fit to Hyperbolic Functions C_p [J/(kmol·K)] (*Continued*)

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1 × 1E-05	C2 × 1E-05	C3 × 1E-03	C4 × 1E-05	C5	T_{min}, K	C_p at T_{min} × 1E-05	T_{max}, K	C_p at T_{max} × 1E-05
124	Eicosane	$C_{20}H_{42}$	112-95-8	282.547	3.2481	11.09	1.636	7.45	726.27	200	3.5235	1500	12.2110
125	Ethane	C_2H_6	74-84-0	30.069	0.40326	1.3422	1.6555	0.73223	752.87	200	0.4256	1500	1.4562
126	Ethanol	C_2H_6O	64-17-5	46.068	0.492	1.4577	1.6628	0.939	744.7	200	0.5224	1500	1.6576
127	Ethyl acetate	$C_4H_8O_2$	141-78-6	88.105	0.9981	2.0931	2.0226	1.803	928.05	200	1.0126	1500	2.6594
128	Ethyl amine	C_2H_7N	75-04-7	45.084	0.594	1.618	1.812	1.078	820	200	0.6139	1500	1.8528
129	Ethylbenzene	C_8H_{10}	100-41-4	106.165	0.7844	3.399	1.559	2.426	702	200	0.8912	1500	3.6147
130	Ethyl benzoate	$C_9H_{10}O_2$	93-89-0	150.175	1.0944	4.1794	0.88375	−1.609	1183.1	300	1.4598	1500	4.2540
131	2-Ethyl butanoic acid	$C_6H_{12}O_2$	88-09-5	116.158	1.0455	2.3148	0.71	1.471	2061.6	300	1.5102	1200.15	3.6330
132	Ethyl butyrate	$C_6H_{12}O_2$	105-54-4	116.158	1.115	3.391	1.6705	2.518	733.6	298	1.5583	1200	3.6213
133	Ethylcyclohexane	C_8H_{16}	1678-91-7	112.213	1.1059	4.6306	1.6628	3.299	781.1	200	1.1875	1500	4.9184
134	Ethylcyclopentane	C_7H_{14}	1640-89-7	98.186	0.82052	4.0342	1.567	2.6697	715.52	200	0.9272	1500	4.1472
135	Ethylene	C_2H_4	74-85-1	28.053	0.3338	0.9479	1.596	0.551	740.8	60	0.3338	1500	1.0987
136	Ethylenediamine	$C_2H_8N_2$	107-15-3	60.098	0.7286	1.8436	1.688	1.199	767.3	300	0.9178	1500	2.2016
137	Ethylene glycol	$C_2H_6O_2$	107-21-1	62.068	0.63012	1.4584	1.673	0.97296	773.65	300	0.7800	1500	1.8095
138	Ethyleneimine	C_2H_5N	151-56-4	43.068	0.343	1.427	1.638	1.037	744.7	150	0.3480	1500	1.5178
139	Ethylene oxide	C_2H_4O	75-21-8	44.053	0.3346	1.2116	1.6084	0.8241	737.3	50	0.3346	1500	1.3297
140	Ethyl formate	$C_3H_6O_2$	109-94-4	74.079	0.537	1.886	1.207	0.864	496	100	0.5412	1500	2.1485
141	2-Ethyl hexanoic acid	$C_8H_{16}O_2$	149-57-5	144.211	1.5777	4.4017	1.7494	3.2378	792.34	298.15	2.0279	1500	5.1201
142	Ethylhexyl ether	$C_8H_{18}O$	5756-43-4	130.228	1.634	4.5119	1.7532	3.1032	809.75	298.15	2.0360	1200	4.8744
143	Ethylisopropyl ether	$C_5H_{12}O$	625-54-7	88.148	1.0953	3.0032	1.7988	2.1311	817.35	298.15	1.3620	1200	3.2289
144	Ethylisopropyl ketone	$C_6H_{12}O$	565-69-5	100.159	1.24	3.2	1.967	2.346	896	298.15	1.4479	1200	3.4234
145	Ethyl mercaptan	C_2H_6S	75-08-1	62.134	0.5576	1.3617	1.5221	0.8073	687.5	200	0.5970	1500	1.6729
146	Ethyl propionate	$C_5H_{10}O_2$	105-37-3	102.132	0.937	2.829	1.648	2.155	724.7	300	1.3377	1200	3.0569
147	Ethylpropyl ether	$C_5H_{12}O$	628-32-0	88.148	1.132	2.94	1.827	2.055	852	298.15	1.3538	1500	3.4535
148	Ethyltrichlorosilane	$C_2H_5Cl_3Si$	115-21-9	163.506	0.85105	1.0378	0.59737	0.94745	2122.7	167	0.8926	1500	2.2349
149	Fluorine	F_2	7782-41-4	37.997	0.29122	0.10132	1.453	0.094101	662.91	50	0.2912	1500	0.3812
150	Fluorobenzene	C_6H_5F	462-06-6	96.102	0.62653	2.1646	1.564	1.7278	724.29	200	0.6914	1500	2.4736
151	Fluoroethane	C_2H_5F	353-36-6	48.060	0.44373	1.3119	1.6422	0.85441	738.77	200	0.4726	1500	1.5008
152	Fluoromethane	CH_3F	593-53-3	34.033	0.33289	0.73989	1.8639	0.46079	891.16	50	0.3329	1500	0.9024
153	Formaldehyde	CH_2O	50-00-0	30.026	0.3327	0.49542	1.8666	0.28075	934.9	50	0.3327	1500	0.7113
154	Formamide	CH_3NO	75-12-7	45.041	0.3822	0.93	1.845	0.69	850	150	0.3833	1500	1.1203
155	Formic acid	CH_2O_2	64-18-6	46.026	0.3381	0.7593	1.1925	0.318	550	50	0.3381	1500	0.9933
156	Furan	C_4H_4O	110-00-9	68.074	0.3727	1.6606	1.5112	1.3145	686	200	0.4376	1500	1.7940
158	Heptadecane	$C_{17}H_{36}$	629-78-7	240.468	2.7878	9.5247	1.6935	6.6651	744.57	200	3.0034	1500	10.4160
159	Heptanal	$C_7H_{14}O$	111-71-7	114.185	1.404	2.5907	0.8315	1.312	2201	200	1.4479	1500	4.2863
160	Heptane	C_7H_{16}	142-82-5	100.202	1.2015	4.001	1.6766	2.74	756.4	200	1.2828	1500	4.4283
161	Heptanoic acid	$C_7H_{14}O_2$	111-14-8	130.185	1.3135	2.3317	0.67567	1.824	1846	300	1.8497	1500	4.2941
162	1-Heptanol	$C_7H_{16}O$	111-70-6	116.201	1.2215	3.991	1.58	2.835	717.7	200	1.3330	1500	4.5346
163	2-Heptanol	$C_7H_{16}O$	543-49-7	116.201	1.4569	2.8252	0.81695	1.766	2537.2	298.15	1.8136	1500	4.6604
164	3-Heptanone	$C_7H_{14}O$	106-35-4	114.185	1.2768	3.381	1.3831	1.888	650.3	200	1.3968	1500	4.1386
165	2-Heptanone	$C_7H_{14}O$	110-43-0	114.185	1.2507	2.148	0.6912	1.619	1759.3	150	1.2688	1200	3.8446
166	1-Heptene	C_7H_{14}	592-76-7	98.186	1.1851	3.6362	1.7359	2.5048	785.73	298.15	1.5434	1500	4.0836
167	Heptyl mercaptan	$C_7H_{16}S$	1639-09-4	132.267	1.442	4.1603	1.6603	2.6572	759.39	200	1.5191	1500	4.7831
168	1-Heptyne	C_7H_{12}	628-71-7	96.170	1.0712	3.0258	1.5273	2.0975	689.62	200	1.1721	1500	3.5985
169	Hexadecane	$C_{16}H_{34}$	544-76-3	226.441	2.6283	8.9733	1.6912	6.264	744.41	200	2.8312	1500	9.8182
170	Hexanal	$C_6H_{12}O$	66-25-1	100.159	1.232	2.2146	0.84	1.219	2205	200	1.2672	1500	3.7314
171	Hexane	C_6H_{14}	110-54-3	86.175	1.044	3.523	1.6946	2.369	761.6	200	1.1117	1500	3.8620
172	Hexanoic acid	$C_6H_{12}O_2$	142-62-1	116.158	1.1622	2.0708	0.68661	1.5355	1932.5	298.15	1.6107	1500	3.7636
173	1-Hexanol	$C_6H_{14}O$	111-27-3	102.175	1.0625	3.521	1.5835	2.462	715.75	200	1.1607	1500	3.9726
174	2-Hexanol	$C_6H_{14}O$	626-93-7	102.175	1.2615	3.5964	1.8445	2.594	819.17	298.15	1.5829	1500	4.0672
175	2-Hexanone	$C_6H_{12}O$	591-78-6	100.159	1.094	1.807	0.689	1.474	1772	200	1.1815	1200	3.3207
176	3-Hexanone	$C_6H_{12}O$	589-38-8	100.159	1.1237	2.936	1.401	1.601	650.5	150	1.1443	1500	3.5874
177	1-Hexene	C_6H_{12}	592-41-6	84.159	1.0434	3.0749	1.7459	2.0728	793.53	298	1.3301	1500	3.4819
178	3-Hexyne	C_6H_{10}	928-49-4	82.144	0.9376	3.015	1.9057	1.986	817	300	1.1909	1500	3.1889
179	Hexyl mercaptan	$C_6H_{14}S$	111-31-9	118.240	1.2662	3.7294	1.6574	2.308	757.8	200	1.3340	1500	4.2483
180	1-Hexyne	C_6H_{10}	693-02-7	82.144	0.9129	2.5577	1.529	1.737	683	200	1.0004	1500	3.0371
181	2-Hexyne	C_6H_{10}	764-35-2	82.144	1.036	3.009	2.116	2.106	902.4	300	1.2215	1500	3.1894
182	Hydrazine	H_4N_2	302-01-2	32.045	0.38711	0.8576	1.7228	0.56635	733.53	200	0.4070	1500	1.0571
183	Hydrogen	H_2	1333-74-0	2.016	0.27617	0.0956	2.466	0.0376	567.6	250	0.2843	1500	0.3225

184	Hydrogen bromide	HBr	10035-10-6	80.912	0.2912	0.0953	2.142	0.0157	1400	50	0.2912	1500	0.3479
185	Hydrogen chloride	HCl	7647-01-0	36.461	0.29157	0.09048	2.0938	–0.00107	120	50	0.2914	1500	0.3406
186	Hydrogen cyanide	CHN	74-90-8	27.025	0.30125	0.3171	1.6102	0.2179	626	100	0.3014	1500	0.5522
187	Hydrogen fluoride	HF	7664-39-3	20.006	0.29134	0.093252	2.905	1.95E–03	1.33E+03	50	0.2913	1500	0.3224
188	Hydrogen sulfide	H_2S	7783-06-4	34.081	0.33288	0.26086	0.9134	–0.17979	949.4	100	0.3329	1500	0.5143
189	Isobutyric acid	$C_4H_8O_2$	79-31-2	88.105	0.74694	2.4356	1.715	1.8484	757.75	298.15	1.0427	1200	2.5383
190	Isopropyl amine	C_3H_9N	75-31-0	59.110	0.68545	2.1876	1.5831	1.3855	691.76	200	0.7510	1500	2.4540
191	Malonic acid	$C_3H_4O_4$	141-82-2	104.061	0.49522	1.8718	1.2958	1.4852	569.96	300	0.9790	1200	2.0517
192	Methacrylic acid	$C_4H_6O_2$	79-41-4	86.089	0.7251	2.089	1.8516	1.6483	798.43	298.15	0.9475	1200.1	2.2057
193	Methane	CH_4	74-82-8	16.042	0.33298	0.79933	2.0869	0.41602	991.96	50	0.3330	1500	0.8890
194	Methanol	CH_4O	67-56-1	32.042	0.39252	0.879	1.9165	0.53654	896.7	200	0.3980	1500	1.0533
195	*N*-Methyl acetamide	C_3H_7NO	79-16-3	73.094	0.6116	2.029	1.7683	1.3302	835.5	300	0.7698	1500	2.2209
196	Methyl acetate	$C_3H_6O_2$	79-20-9	74.079	0.555	1.782	1.26	0.853	562	298	0.8489	1500	2.0754
197	Methyl acetylene	C_3H_4	74-99-7	40.064	0.4478	1.0917	1.5508	0.675	658.2	200	0.4882	1500	1.3293
198	Methyl acrylate	$C_4H_6O_2$	96-33-3	86.089	0.1206	2.3766	1.0543	1.8186	418.8	298.15	0.9908	1200.1	2.1663
199	Methyl amine	CH_5N	74-89-5	31.057	0.41	1.0578	1.708	0.6836	735	150	0.4136	1500	1.2388
200	Methyl benzoate	$C_8H_8O_2$	93-58-3	136.148	0.9396	2.559	0.825	1.36	3000	300	1.2586	1200	3.3569
201	3-Methyl-1,2-butadiene	C_5H_8	598-25-4	68.117	0.671	2.222	1.421	1.194	614.7	150	0.6931	1500	2.5028
202	2-Methylbutane	C_5H_{12}	78-78-4	72.149	0.746	3.265	1.545	1.923	666.7	200	0.8546	1500	3.3792
203	2-Methylbutanoic acid	$C_5H_{10}O_2$	116-53-0	102.132	1.8458	1.743	1.22	–56.11	31.2	300	1.2793	1500	3.2262
204	3-Methyl-1-butanol	$C_5H_{12}O$	123-51-3	88.148	0.92165	3.3371	1.8365	2.4645	757.99	298.15	1.3135	1500	3.4856
205	2-Methyl-1-butene	C_5H_{10}	563-46-2	70.133	0.87026	2.5556	1.7757	1.7636	807.82	200	0.9060	1500	2.8923
206	2-Methyl-2-butene	C_5H_{10}	513-35-9	70.133	0.81924	2.6038	1.7593	1.7195	800.93	200	0.8559	1500	2.8709
207	2-Methyl -1-butene-3-yne	C_5H_6	78-80-8	66.101	0.7906	1.656	1.6926	1.2167	788.4	298.15	0.9632	1500.15	2.1502
208	Methylbutyl ether	$C_5H_{12}O$	628-28-4	88.148	0.82051	3.0869	1.3864	1.7886	613.87	300	1.3300	1200	3.1994
209	Methylbutyl sulfide	$C_5H_{12}S$	628-29-5	104.214	1.0785	2.7388	1.5885	1.9067	749.6	273.15	1.3173	1200	3.1687
210	3-Methyl-1-butyne	C_5H_8	598-23-2	68.117	0.8274	2.1377	1.755	1.5149	782	200	0.8646	1500	2.5255
211	Methyl butyrate	$C_5H_{10}O_2$	623-42-7	102.132	0.894	2.91	1.57	2.073	678.3	298	1.3461	1200	3.0766
212	Methylchlorosilane	CH_5ClSi	993-00-0	80.589	0.59895	1.1636	1.565	0.81581	690.39	200	0.6380	1500	1.5593
213	Methylcyclohexane	C_7H_{14}	108-87-2	98.186	0.9227	4.115	1.6504	2.9006	779.48	200	0.9953	1500	4.3180
214	1-Methylcyclohexanol	$C_7H_{14}O$	590-67-0	114.185	0.7959	2.596	0.6213	2.288	1698.6	300	1.5302	1200	4.1359
215	*cis*-2-Methylcyclohexanol	$C_7H_{14}O$	7443-70-1	114.185	0.92279	2.6709	0.68784	1.9847	1732.4	300	1.5099	1200	4.1467
216	*trans*-2-Methylcyclohexanol	$C_7H_{14}O$	7443-52-9	114.185	0.92279	2.6709	0.68784	1.9847	1732.4	300	1.5099	1200	4.1467
217	Methylcyclopentane	C_6H_{12}	96-37-7	84.159	0.66456	3.507	1.5892	2.3526	727.13	200	0.7510	1500	3.5495
218	1-Methylcyclopentene	C_6H_{10}	693-89-0	82.144	0.69411	3.0209	1.6903	2.1209	781.56	200	0.7464	1500	3.1496
219	3-Methylcyclopentene	C_6H_{10}	1120-62-3	82.144	0.6422	3.0711	1.6387	2.1298	750.25	200	0.7083	1500	3.1549
220	Methyldichlorosilane	CH_4Cl_2Si	75-54-7	115.034	0.7283	1.0307	1.5429	0.7811	668.94	200	0.7717	1500	1.5893
221	Methylethyl ether	C_3H_8O	540-67-0	60.095	0.68681	1.9959	1.5534	1.1168	692.04	200	0.7396	1500	2.2931
222	Methylethyl ketone	C_4H_8O	78-93-3	72.106	0.784	2.1032	1.5488	1.1855	693	200	0.8397	1500	2.4816
223	Methylethyl sulfide	C_3H_8S	624-89-5	76.161	0.75083	1.9577	1.6424	1.1949	749.19	273.16	0.9004	1500	2.3178
224	Methyl formate	$C_2H_4O_2$	107-31-3	60.052	0.506	1.219	1.637	0.894	743	250	0.5888	1500	1.5109
225	Methylisobutyl ether	$C_5H_{12}O$	625-44-5	88.148	0.7284	3.1713	1.352	1.8948	585.14	300	1.3200	1200	3.1987
226	Methylisobutyl ketone	$C_6H_{12}O$	108-10-1	100.159	1.227	2.195	0.842	1.191	2460	298.15	1.4755	1500.15	3.6532
227	Methyl Isocyanate	C_2H_3NO	624-83-9	57.051	0.474	1.226	2.188	0.85983	1008.2	298.15	0.5195	1500	1.3595
228	Methylisopropyl ether	$C_4H_{10}O$	598-53-8	74.122	0.89232	2.4765	1.696	1.5598	791.4	200	0.9280	1500	2.8696
229	Methylisopropyl ketone	$C_5H_{10}O$	563-80-4	86.132	1.5914	1.764	1.2076	–407.4	10.503	300	1.1291	1500	2.9991
230	Methylisopropyl sulfide	$C_4H_{10}S$	1551-21-9	90.187	0.99247	2.7275	2.003	1.8974	849.64	273	1.1377	1500	2.9952
231	Methyl mercaptan	CH_4S	74-93-1	48.107	0.4146	0.8307	1.589	0.4612	716.7	200	0.4329	1500	1.0781
232	Methyl methacrylate	$C_5H_8O_2$	80-62-6	100.116	0.864	1.811	0.7543	0.8	2160	298.15	1.1621	1500	2.8637
233	2-Methyloctanoic acid	$C_9H_{18}O_2$	3004-93-1	158.238	1.7483	4.9288	1.7384	3.5897	788.01	298.15	2.2567	1500	5.7177
234	2-Methylpentane	C_6H_{14}	107-83-5	86.175	0.903	3.801	1.602	2.453	691.6	200	1.0192	1500	3.9617
235	Methyl pentyl ether	$C_6H_{14}O$	628-80-8	102.175	0.94326	3.5965	1.3533	2.0569	599.92	300	1.5600	1200	3.7409
236	2-Methylpropane	C_4H_{10}	75-28-5	58.122	0.6549	2.4776	1.587	1.575	706.99	200	0.7218	1500	2.6656
237	2-Methyl-2-propanol	$C_4H_{10}O$	75-65-0	74.122	0.7704	2.539	1.5502	1.669	679.3	200	0.8567	1500	2.8508
238	2-Methyl propene	C_4H_8	115-11-7	56.106	0.6125	2.066	1.545	1.2057	676	200	0.6763	1500	2.2814
239	Methyl propionate	$C_4H_8O_2$	554-12-1	88.105	0.7765	2.442	1.714	1.818	716	300	1.1242	1200	2.5276
240	Methylpropyl ether	$C_4H_{10}O$	557-17-5	74.122	0.92151	2.3943	1.6936	1.4896	797.79	298	1.1251	1200	2.6391
241	Methylpropyl sulfide	$C_4H_{10}S$	3877-15-4	90.187	0.93775	2.6178	1.7291	1.6236	783.23	298.15	1.1728	1500	2.9904
242	Methylsilane	CH_6Si	992-94-9	46.144	0.46149	1.2781	1.4565	0.79115	643.23	200	0.5141	1500	1.5253
243	alpha-Methyl styrene	C_9H_{10}	98-83-9	118.176	0.78548	3.5969	1.4342	2.5336	651.69	200	0.9445	1500	3.8592
244	Methyl *tert*-butyl ether	$C_5H_{12}O$	1634-04-4	88.148	0.9779	3.091	1.643	2.099	731.191	298	1.3522	1500	3.4779
245	Methyl vinyl ether	C_3H_6O	107-25-5	58.079	0.60865	1.5965	1.619	0.93783	739.55	300	0.7748	1500	1.8871
246	Naphthalene	$C_{10}H_8$	91-20-3	128.171	0.6805	3.5494	1.4262	2.5984	650.1	200	0.8454	1500	3.7359

TABLE 2-156 Heat Capacity at Constant Pressure of Inorganic and Organic Compounds in the Ideal Gas State Fit to Hyperbolic Functions C_p [J/(kmol·K)] (*Concluded*)

Cmpd. no.	Name	Formula	CAS no.	Mol. wt.	C1 ×1E-05	C2 ×1E-05	C3 ×1E-03	C4 ×1E-05	C5	T_{min}, K	C_p at T_{min} ×1E-05	T_{max}, K	C_p at T_{max} ×1E-05
248	Nitroethane	$C_2H_5NO_2$	79-24-3	75.067	0.54619	1.6492	1.4803	1.0635	666.94	200	0.6062	1500	1.9237
249	Nitrogen	N_2	7727-37-9	28.013	0.29105	0.086149	1.7016	0.0010347	909.79	50	0.2911	1500	0.3484
250	Nitrogen trifluoride	F_3N	7783-54-2	71.002	0.33284	0.49837	0.7093	0.23264	372.91	100	0.3404	1500	0.8092
251	Nitromethane	CH_3NO_2	75-52-5	61.040	0.42267	1.0842	1.4885	0.68603	683.57	200	0.4571	1500	1.3280
252	Nitrous oxide	N_2O	10024-97-2	44.013	0.29338	0.3236	1.1238	0.2177	479.4	100	0.2948	1500	0.5828
254	Nonadecane	$C_{19}H_{40}$	629-92-5	268.521	3.1062	10.575	0.76791	–4.5661	912.03	200	3.3533	1500	11.6130
255	Nonanal	$C_9H_{18}O$	124-19-6	142.239	1.7347	4.5115	1.712	3.3256	810.96	200	1.8005	1500	5.4439
256	Nonane	C_9H_{20}	111-84-2	128.255	1.5175	4.915	1.6448	3.47	749.6	200	1.6257	1500	5.5407
257	Nonanoic acid	$C_9H_{18}O_2$	112-05-0	158.238	0.1266	6.011	1.0815	4.5946	418.2	298.15	2.2953	1500	5.5267
258	1-Nonanol	$C_9H_{20}O$	143-08-8	144.255	1.54	4.936	1.578	3.588	721.11	200	1.6777	1500	5.6606
259	2-Nonanol	$C_9H_{20}O$	628-99-9	144.255	1.8197	3.5542	0.81514	2.1974	2508.8	298.15	2.2720	1500	5.8526
260	1-Nonene	C_9H_{18}	124-11-8	126.239	1.5352	4.6844	1.7288	3.2304	783.67	298.15	2.0014	1500	5.2776
261	Nonyl mercaptan	$C_9H_{20}S$	1455-21-6	160.320	1.7646	5.044	1.6182	3.3857	755.48	200	1.8658	1500	5.9082
262	1-Nonyne	C_9H_{16}	3452-09-3	124.223	1.6289	3.9708	1.8928	3.2136	855.52	298.15	1.9693	1500	4.7924
263	Octadecane	$C_{18}H_{38}$	593-45-3	254.494	2.9502	10.034	0.77107	-4.3012	916.73	200	3.1800	1500	11.0160
264	Octanal	$C_8H_{16}O$	124-13-0	128.212	1.6088	4.218	1.9126	3.278	869	200	1.6504	1500	4.9286
265	Octane	C_8H_{18}	111-65-9	114.229	1.3554	4.431	1.6356	3.054	746.4	200	1.4529	1500	4.9764
266	Octanoic acid	$C_8H_{16}O_2$	124-07-2	144.211	1.4082	4.3436	1.4662	2.7687	659.38	298.15	2.0652	1500	5.0411
267	1-Octanol	$C_8H_{18}O$	111-87-5	130.228	1.3805	4.459	1.5751	3.2016	718.8	200	1.5055	1500	5.0965
268	2-Octanol	$C_8H_{18}O$	123-96-6	130.228	1.6383	3.1897	0.81595	1.9814	2521.3	298.15	2.0428	1500	5.2565
269	2-Octanone	$C_8H_{16}O$	111-13-7	128.212	1.3901	3.806	1.3717	2.2573	660.96	150	1.4162	1500	4.6547
270	3-Octanone	$C_8H_{16}O$	106-68-3	128.212	1.4952	4.4103	0.80211	–2.0958	981.95	200	1.5775	1500	4.9067
271	1-Octene	C_8H_{16}	111-66-0	112.213	1.3599	4.1605	1.7317	2.8675	784.47	298.15	1.7723	1500	4.6807
272	Octyl mercaptan	$C_8H_{18}S$	111-88-6	146.294	1.5981	4.6063	1.6295	3.0301	756.28	200	1.6881	1500	5.3549
273	1-Octyne	C_8H_{14}	629-05-0	110.197	1.2307	3.4942	1.528	2.4617	694.81	200	1.3448	1500	4.1604
274	Oxalic acid	$C_2H_2O_4$	144-62-7	90.035	0.25751	1.1734	2.7969	0.65788	878.91	298.15	0.3201	1000.1	0.6502
275	Oxygen	O_2	7782-44-7	31.999	0.29103	0.1004	2.5265	0.09356	1153.8	50	0.2910	1500	0.3653
276	Ozone	O_3	10028-15-6	47.998	0.33483	0.29577	1.5217	0.27151	680.35	100	0.3349	1500	0.5928
277	Pentadecane	$C_{15}H_{32}$	629-62-9	212.415	2.4679	8.4212	1.6865	5.8537	743.6	200	2.6586	1500	9.2209
278	Pentanal	$C_5H_{10}O$	110-62-3	86.132	1.0743	2.8363	1.9549	2.0146	890.44	200	1.0960	1500	3.2404
279	Pentane	C_5H_{12}	109-66-0	72.149	0.8805	3.011	1.6502	1.892	747.6	200	0.9404	1500	3.2927
280	Pentanoic acid	$C_5H_{10}O_2$	109-52-4	102.132	2.836	1.08	2.107	–3.56	283	298.15	1.3824	1500	3.2952
281	1-Pentanol	$C_5H_{12}O$	71-41-0	88.148	0.906	3.062	1.6054	2.115	717.97	200	0.9890	1500	3.4133
282	2-Pentanol	$C_5H_{12}O$	6032-29-7	88.148	1.0853	3.0747	1.8672	2.2271	825.4	298.15	1.3539	1500	3.4701
283	2-Pentanone	$C_5H_{10}O$	107-87-9	86.132	0.90053	2.7085	1.6592	1.8012	743.96	200	0.9591	1500	3.0797
284	3-Pentanone	$C_5H_{10}O$	96-22-0	86.132	0.96896	2.4907	1.4177	1.301	646.7	200	1.0536	1500	3.0358
285	1-Pentene	C_5H_{10}	109-67-1	70.133	0.82523	2.5943	1.7291	1.768	778.7	298.15	1.0856	1500	2.8897
286	2-Pentyl mercaptan	$C_5H_{12}S$	2084-19-7	104.214	1.1327	2.947	1.7418	2.0987	795.78	298	1.4202	1500	3.4994
287	Pentyl mercaptan	$C_5H_{12}S$	110-66-7	104.214	1.0974	3.2959	1.6761	1.9486	757.67	200	1.1547	1500	3.6956
288	1-Pentyne	C_5H_8	627-19-0	68.117	0.753	2.0905	1.5307	1.378	672.8	200	0.8276	1500	2.4754
289	2-Pentyne	C_5H_8	627-21-4	68.117	0.70737	2.2229	1.557	1.3125	690.78	200	0.7700	1500	2.5052
290	Phenanthrene	$C_{14}H_{10}$	85-01-8	178.229	0.9374	4.758	1.382	3.485	627.4	200	1.1959	1500	5.0645
291	Phenol	C_6H_6O	108-95-2	94.111	0.434	2.445	1.152	1.512	507	100	0.4401	1500	2.6045
292	Phenyl isocyanate	C_7H_5NO	103-71-9	119.121	0.59683	2.5533	1.2397	1.5519	576.78	298.15	1.1054	1500	2.8390
293	Phthalic anhydride	$C_8H_4O_3$	85-44-9	148.116	0.7364	2.544	1.0852	0.808	573	298.15	1.0745	1000.15	2.6737
294	Propadiene	C_3H_4	463-49-0	40.064	0.426	1.1194	1.5772	0.7546	680.8	200	0.4646	1500	1.3376
295	Propane	C_3H_8	74-98-6	44.096	0.5192	1.9245	1.6265	1.168	723.6	200	0.5632	1500	2.0556
296	1-Propanol	C_3H_8O	71-23-8	60.095	0.619	2.0213	1.6293	1.2956	727.4	200	0.6665	1500	2.2458
297	2-Propanol	C_3H_8O	67-63-0	60.095	0.73145	2.0313	1.9375	1.4815	843.37	298.15	0.8966	1500	2.2760
298	Propenylcyclohexene	C_9H_{14}	13511-13-2	122.207	1.0563	4.3397	1.6098	3.181	729.66	300	1.6392	1500	4.6527
299	Propionaldehyde	C_3H_6O	123-38-6	58.079	0.7174	1.914	2.0144	1.1708	930.6	200	0.7266	1500	2.1149
300	Propionic acid	$C_3H_6O_2$	79-09-4	74.079	0.6959	1.7778	1.7098	1.2654	763.78	298.15	0.8938	1500	2.1248
301	Propionitrile	C_3H_5N	107-12-0	55.079	0.5357	1.4617	1.553	0.91197	678.2	200	0.5832	1500	1.7235
302	Propyl acetate	$C_5H_{10}O_2$	109-60-4	102.132	1.7994	1.753	1.196	–4.12	108.2	298.15	1.3594	1500	3.2024
303	Propyl amine	C_3H_9N	107-10-8	59.110	0.76078	2.1049	1.7256	1.3936	789.03	200	0.7933	1500	2.4353

304	Propylbenzene	C_9H_{12}	103-65-1	120.192	0.96885	3.7954	1.5168	2.6618	694.3	200	1.0927	1500	4.1613
305	Propylene	C_3H_6	115-07-1	42.080	0.43852	1.506	1.3988	0.74754	616.46	130	0.4436	1500	1.6817
306	Propyl formate	$C_4H_8O_2$	110-74-7	88.105	0.871	2.447	1.9254	1.888	821.3	298.15	1.1022	1500	2.7484
307	2-Propyl mercaptan	C_3H_8S	75-33-2	76.161	0.73815	1.9529	1.5954	1.2356	730.5	200	0.7825	1500	2.3287
308	Propyl mercaptan	C_3H_8S	107-03-9	76.161	0.7474	1.9523	1.631	1.2112	750.92	200	0.7848	1500	2.3216
309	1,2-Propylene glycol	$C_3H_8O_2$	57-55-6	76.094	2.0114	0.8082	1.8656	–2.4404	279.98	298.15	1.0218	1000.15	2.1175
310	Quinone	$C_6H_4O_2$	106-51-4	108.095	0.6487	2.1227	1.3491	1.514	614.8	200	0.7711	1500	2.4969
311	Silicon tetrafluoride	F_4Si	7783-61-1	104.079	0.3681	0.71245	0.65201	0.46721	286.03	100	0.4182	1500	1.0537
312	Styrene	C_8H_8	100-42-5	104.149	0.893	2.1503	0.772	0.999	2442	100	0.8931	1500	3.2416
313	Succinic acid	$C_4H_6O_4$	110-15-6	118.088	0.71806	2.2669	1.2739	1.7342	537.65	300	1.3370	1200	2.5823
314	Sulfur dioxide	O_2S	7446-09-5	64.064	0.33375	0.25864	0.9328	0.1088	423.7	100	0.3354	1500	0.5695
315	Sulfur hexafluoride	F_6S	2551-62-4	146.055	0.35256	1.227	0.67938	0.78407	351.27	100	0.3872	1500	1.5397
316	Sulfur trioxide	O_3S	7446-11-9	80.063	0.33408	0.49677	0.87322	0.28563	393.74	100	0.3408	1500	0.7967
317	Terephthalic acid	$C_8H_6O_4$	100-21-0	166.131	0.945	2.526	0.829	0.5	2010	298.15	1.2478	1500	3.4444
318	*o*-Terphenyl	$C_{18}H_{14}$	84-15-1	230.304	2.0719	6.2668	2.4044	6.345	967.71	298.15	2.4763	1500	6.6947
319	Tetradecane	$C_{14}H_{30}$	629-59-4	198.388	2.3082	7.8678	1.6823	5.4486	743.1	200	2.4864	1500	8.6225
320	Tetrahydrofuran	C_4H_8O	109-99-9	72.106	0.46905	2.5314	1.5998	1.7051	740.64	200	0.5259	1500	2.5538
321	1,2,3,4-Tetrahydronaphthalene	$C_{10}H_{12}$	119-64-2	132.202	0.8145	4.395	1.471	3.065	666.4	200	0.9881	1500	4.5348
322	Tetrahydrothiophene	C_4H_8S	110-01-0	88.171	0.51848	2.4535	1.5018	1.6871	665.31	200	0.6147	1500	2.5679
323	2,2,3,3-Tetramethylbutane	C_8H_{18}	594-82-1	114.229	1.1352	5.6331	1.6211	3.3829	681.9	200	1.3069	1500	5.5784
324	Thiophene	C_4H_4S	110-02-1	84.140	0.40399	1.627	1.4562	1.322	648.81	200	0.4886	1500	1.8098
325	Toluene	C_7H_8	108-88-3	92.138	0.5814	2.863	1.4406	1.898	650.43	200	0.7016	1500	3.0029
326	1,1,2-Trichloroethane	$C_2H_3Cl_3$	79-00-5	133.404	0.66554	1.1257	1.5454	0.97196	717.04	298.15	0.8496	1500	1.6433
327	Tridecane	$C_{13}H_{28}$	629-50-5	184.361	2.1496	7.3045	1.6695	4.9998	741.02	200	2.3156	1500	8.0251
328	Triethyl amine	$C_6H_{15}N$	121-44-8	101.190	1.2766	2.5559	0.80937	1.4829	2231.7	200	1.3278	1500	4.2046
329	Trimethyl amine	C_3H_9N	75-50-3	59.110	0.7107	1.5051	0.79662	0.84537	2187.6	200	0.7439	1500	2.4322
330	1,2,3-Trimethylbenzene	C_9H_{12}	526-73-8	120.192	1.052	3.79	1.4814	2.331	667.3	200	1.1832	1500	4.1983
331	1,2,4-Trimethylbenzene	C_9H_{12}	95-63-6	120.192	1.0106	3.8314	1.501	2.395	678.3	200	1.1354	1500	4.1854
332	2,2,4-Trimethylpentane	C_8H_{18}	540-84-1	114.229	1.139	5.286	1.594	3.351	677.94	200	1.3139	1500	5.3769
333	2,3,3-Trimethylpentane	C_8H_{18}	560-21-4	114.229	0.982	5.402	1.531	3.493	639.9	200	1.2194	1500	5.3754
334	1,3,5-Trinitrobenzene	$C_6H_3N_3O_6$	99-35-4	213.105	2.0367	1.8181	1.2089	0.79777	1060.8	298.15	2.1054	1500	3.7585
335	2,4,6-Trinitrotoluene	$C_7H_5N_3O_6$	118-96-7	227.131	2.154	2.4432	1.1126	0.58651	950.59	298.15	2.2726	1500	4.3560
336	Undecane	$C_{11}H_{24}$	1120-21-4	156.308	1.9529	6.0998	1.7087	4.1302	775.4	200	2.0594	1500	6.8342
337	1-Undecanol	$C_{11}H_{24}O$	112-42-5	172.308	1.859	5.869	1.5718	4.326	722.7	200	2.0232	1500	6.7834
338	Vinyl acetate	$C_4H_6O_2$	108-05-4	86.089	0.536	2.119	1.198	1.147	510	100	0.5404	1500	2.3750
339	Vinyl acetylene	C_4H_4	689-97-4	52.075	0.55978	1.2141	1.6102	0.89079	710.4	200	0.5967	1500	1.5590
340	Vinyl chloride	C_2H_3Cl	75-01-4	62.498	0.42364	0.8735	1.6492	0.6556	739.07	200	0.4457	1500	1.1423
341	Vinyl trichlorosilane	$C_2H_3Cl_3Si$	75-94-5	161.490	0.84894	1.1471	1.38	0.9	644.61	298.15	1.0788	1500	1.8595
342	Water	H_2O	7732-18-5	18.015	0.33363	0.2679	2.6105	0.08896	1169	100	0.3336	2273.15	0.5276
343	*m*-Xylene	C_8H_{10}	108-38-3	106.165	0.7568	3.3924	1.496	2.247	675.9	200	0.8759	1500	3.5920
344	*o*-Xylene	C_8H_{10}	95-47-6	106.165	0.8521	3.2954	1.4944	2.115	675.8	200	0.9643	1500	3.5965
345	*p*-Xylene	C_8H_{10}	106-42-3	106.165	0.7512	3.397	1.4928	2.247	675.1	200	0.8710	1500	3.5923

Constants in this table can be used in the following equation to calculate the ideal gas heat capacity C_p^0.

$$C_p^0 = \mathrm{C1} + \mathrm{C2}\left[\frac{\mathrm{C3}/T}{\sinh(\mathrm{C3}/T)}\right]^2 + \mathrm{C4}\left[\frac{\mathrm{C5}/T}{\cosh(\mathrm{C5}/T)}\right]^2$$

where C_p^0 is in J/(kmol·K) and T is in K. All substances are listed by chemical family in Table 2-6 and by formula in Table 2-7.

Values in this table were taken from the Design Institute for Physical Properties (DIPPR) of the American Institute of Chemical Engineers (AIChE), copyright 2007 AIChE and reproduced with permission of AICHE and of the DIPPR Evaluated Process Design Data Project Steering Committee. Their source should be cited as R. L. Rowley, W. V. Wilding, J. L. Oscarson, Y. Yang, N. A. Zundel, T. E. Daubert, R. P. Danner, DIPPR® Data Compilation of Pure Chemical Properties, Design Institute for Physical Properties, AIChE, New York (2007).

The number of digits provided for values at T_{min} and T_{max} was chosen for uniformity of appearance and formatting; these do not represent the uncertainties of the physical quantities, but are the result of calculations from the standard thermophysical property formulations within a fixed format.

TABLE 2-157 C_p/C_v: Ratios of Specific Heats of Gases at 1 atm Pressure*

Compound	Formula	Temperature, °C	Ratio of specific heats, $(\gamma) = C_p/C_v$	Compound	Formula	Temperature, °C	Ratio of specific heats, $(\gamma) = C_p/C_v$
Acetaldehyde	C_2H_4O	30	1.14	Hydrogen (*Cont.*)			
Acetic acid	$C_2H_4O_2$	136	1.15	iodide	HI	20–100	1.40
Acetylene	C_2H_2	15	1.26	sulfide	H_2S	15	1.332
		–71	1.31			–45	1.350
Air		925	1.36			–57	1.356
		17	1.403				
		–78	1.408	Iodine	I_2	185	1.30
		–118	1.415	Isobutane	C_4H_{10}	15	1.110
Ammonia	NH_3	15	1.320				
Argon	Ar	15	1.670	Krypton	Kr	19	1.672
		–180	1.715				
		0–100	1.67	Mercury	Hg	360	1.67
				Methane	CH_4	600	1.113
Benzene	C_6H_6	90	1.10			300	1.196
Bromine	Br_2	20–350	1.32			15	1.310
						–80	1.339
Carbon dioxide	CO_2	15	1.299			–115	1.347
		–75	1.37	Methyl acetate	$C_3H_6O_2$	15	1.14
disulfide	CS_2	100	1.21	alcohol	CH_4O	77	1.237
monoxide	CO	15	1.402	ether	C_2H_6O	6–30	1.11
		–180	1.433	Methylal	$C_3H_8O_2$	13	1.06
Chlorine	Cl_2	15	1.355			40	1.09
Chloroform	$CHCl_3$	100	1.15				
Cyanogen	$(CN)_2$	15	1.256	Neon	Ne	19	1.667
Cyclohexane	C_6H_{12}	80	1.315	Nitric oxide	NO	15	1.400
						–45	1.39
Dichlorodifluormethane	CCl_2F_2	25	1.139			–80	1.38
				Nitrogen	N_2	15	1.402
Ethane	C_2H_6	100	1.157			–181	1.433
		15	1.200	Nitrous oxide	N_2O	100	1.28
		–82	1.28			15	1.303
Ethyl alcohol	C_2H_6O	90	1.13			–30	1.31
ether	$C_4H_{10}O$	35	1.08			–70	1.34
		80	1.086				
Ethylene	C_2H_4	100	1.201	Oxygen	O_2	15	1.398
		15	1.253			–76	1.405
		–91	1.345			–181	1.439
Helium	He	–180	1.667	Pentane (*n*-)	C_5H_{12}	86	1.071
Hexane (*n*-)	C_6H_{14}	80	1.066	Phosphorus	P	300	1.17
Hydrogen	H_2	15	1.407	Potassium	K	850	1.77
		–76	1.441				
		–181	1.607	Sodium	Na	750–920	1.68
bromide	HBr	20	1.42	Sulfur dioxide	SO_2	15	1.290
chloride	HCl	15	1.41				
		100	1.40	Xenon	Xe	19	1.678
cyanide	HCN	65	1.31				
		140	1.28				
		210	1.24				

*For compounds that appear in Table 2-184, values are from E. W. Lemmon, M. O. McLinden, and D. G. Friend, "Thermophysical Properties of Fluid Systems" in *NIST Chemistry WebBook*, **NIST Standard Reference Database Number 69**, Eds. P. J. Linstrom and W. G. Mallard, June 2005, National Institute of Standards and Technology, Gaithersburg, Md. (http://webbook.nist.gov). Values for other compounds are from *International Critical Tables*, vol. 5, pp. 80–82.