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Pressure-Density-Temperature Relations of Fluid Para Hydrogen From 15 to 100 °K at Pressures to 350 Atmospheres*

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Experimental data are presented at closely spaced intervals of temperature and density. The range of experimental densities is from 0.064 to 2.8 times the critical density. There are presented, in addition, tables interpolated uniformly in arguments density and temperature, and also in pressure and temperature.

1. Introduction

Very few data exist on the compressibility (PVT) behavior of 20 °K-equilibrium (i.e., "para") hydrogen in compressed liquid and dense fluid states [1–5].[1] The low-density PVT differences between normal and para hydrogen are known to be small in the neighborhood of 20 °K [6].

The purpose of this report is to place on record our experimental PVT observations on para hydrogen at high densities, together with useful interpolations to uniform values of all variables. Experimental second and third virial coefficients were reported in the apparatus publication supporting the present results [7]. Smoothing and representation of the temperature-dependence of these coefficients is in progress.

Data of this report are the basis for several related properties of para hydrogen. The observed vapor pressures have been represented analytically and compared with earlier data [8]. The derived orthobaric liquid-vapor densities have been reported [9, 10]. An empirical representation of the pressure-temperature relation at melting [11] has been used to obtain densities of liquid at freezing [12]. An equation of state, adjusted to the present PVT data, has been used to obtain a provisional set of thermodynamic functions [13]. These functions have been extended by others to lower temperatures and pressures [14].

2. Symbols, Dimensions and Constants

The term "parahydrogen" is employed for brevity here to mean 20 °K-equilibrium hydrogen [1]. Confirmation of para hydrogen in the piezometer has been described [7].

Pressures, P, are in standard atmospheres [17]. Temperatures, T, are on the NBS 1955 low-temperature scale, obtained by subtracting 0.01 °C from temperatures on the NBS 1939 scale of Hoge and Brickwedde [16]. Densities, ρ, are in gram moles per cubic centimeter. These derive from use of the gas constant, R, in conjunction with experimental quantities. Determination of the amount of sample as gas at normal conditions is based upon compressibility data of normal hydrogen with R=82.057 cm³ atm/g mol deg [7, 15]. Representations of isotherms of $(Pv\text{-}RT)v$ are based upon R=82.0597 cm³ atm/g mol deg, corresponding to the recent international temperature scale [17].

The largest experimental errors occur in density. Accuracy and precision in this variable have been estimated at 0.1 and 0.02 percent respectively [7].

3. Data Tables

Experimental data in table 1 result from the laboratory observations and computer program described for computation of apparatus adjustments [7]. They are arranged in the sequence of increasing densities, except as noted below. Each set of four columns represents an experimental "run" of increasing temperature at nearly constant density. Each run is identified by the first two digits in the fourth column.

The slight decrease of density with increasing pressure in each run is due to expulsion of fluid from the piezometer into the pressure gage diaphragm cell. Since temperatures are reproduced accurately from run to run, these data yield isotherms. Absence of an entry for density indicates that two phases coexist.

The last three runs in table 1 give closely spaced vapor pressures and densities in the critical region.

Table 2 presents the PVT data interpolated to isochores, that is to uniform densities at the experimental temperatures. Table entries are pressures in atmospheres.

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[1] Figures in brackets indicate the literature references at the end of this paper.

Table I Temperature-Pressure-Density Observations on Para Hydrogen

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
22	1.812		9401	23	2.069		9301	25	3.248		9201
23	1.785	.0010849	9402	24	2.459	.0014969	9302	26	3.644	.0021611	9202
24	1.878	.0010846	9403	25	2.592	.0014967	9303	27	3.843	.0021608	9203
25	1.972	.0010847	9404	26	2.726	.0014966	9304	28	4.040	.0021606	9204
26	2.066	.0010845	9405	27	2.858	.0014964	9305	29	4.235	.0021603	9205
27	2.160	.0010844	9406	28	2.990	.0014962	9306	30	4.430	.0021601	9206
28	2.254	.0010843	9407	29	3.121	.0014961	9307	31	4.624	.0021599	9207
29	2.347	.0010842	9408	30	3.251	.0014959	9308	32	4.817	.0021596	9208
30	2.440	.0010841	9409	31	3.382	.0014958	9309	33	5.010	.0021594	9209
31	2.533	.0010840	9410	32	3.513	.0014956	9310	34	5.203	.0021591	9210
32	2.626	.0010839	9411	33	3.643	.0014954	9311	35	5.395	.0021589	9211
33	2.719	.0010837	9412	34	3.773	.0014953	9312	36	5.587	.0021586	9212
34	2.812	.0010836	9413	35	3.903	.0014951	9313	37	5.779	.0021584	9213
35	2.904	.0010835	9414	36	4.032	.0014949	9314	38	5.970	.0021581	9214
36	2.997	.0010834	9415	37	4.162	.0014947	9315	39	6.161	.0021578	9215
37	3.089	.0010833	9416	38	4.291	.0014946	9316	40	6.352	.0021576	9216
38	3.181	.0010831	9417	39	4.421	.0014944	9317	42	6.732	.0021570	9217
39	3.273	.0010830	9418	40	4.550	.0014942	9318	44	7.111	.0021565	9218
40	3.366	.0010829	9419	42	4.807	.0014939	9319	46	7.489	.0021560	9219
42	3.550	.0010826	9420	44	5.064	.0014935	9320	48	7.867	.0021555	9220
44	3.731	.0010824	9421	46	5.320	.0014931	9321	50	8.244	.0021549	9221
46	3.916	.0010821	9422	48	5.576	.0014928	9322	55	9.184	.0021536	9222
48	4.099	.0010819	9423	50	5.832	.0014924	9323	60	10.119	.0021523	9223
50	4.282	.0010816	9424	55	6.471	.0014915	9324	65	11.054	.0021510	9224
55	4.738	.0010810	9425	60	7.106	.0014906	9325	70	11.984	.0021497	9225
60	5.193	.0010803	9426	65	7.741	.0014897	9326	75	12.912	.0021484	9226
65	5.646	.0010797	9427	70	8.375	.0014889	9327	80	13.839	.0021471	9227
70	6.101	.0010790	9428	75	9.005	.0014880	9328	85	14.763	.0021458	9228
75	6.553	.0010784	9429	80	9.635	.0014871	9329	90	15.687	.0021445	9229
80	7.005	.0010777	9430	85	10.269	.0014862	9330	95	16.608	.0021431	9230
85	7.457	.0010771	9431	90	10.894	.0014853	9331	100	17.526	.0021418	9231
90	7.907	.0010764	9432	95	11.521	.0014843	9332				
95	8.356	.0010758	9433	100	12.146	.0014834	9333				
100	8.805	.0010751	9434								

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
26	3.983		9101	27	4.829		9001	28	5.792		8901
27	4.304	.0025668	9102	28	5.305	.0033328	9002	29	6.589	.0039818	8902
28	4.603	.0025666	9103	29	5.829	.0033329	9003	30	6.901	.0039813	8903
29	4.840	.0025663	9104	30	6.142	.0033320	9004	31	7.287	.0039808	8904
30	5.076	.0025660	9105	31	6.457	.0033316	9005	32	7.673	.0039803	8905
31	5.311	.0025657	9106	32	6.770	.0033312	9006	33	8.056	.0039798	8906
32	5.544	.0025654	9107	33	7.082	.0033308	9007	34	8.436	.0039793	8907
33	5.777	.0025651	9108	34	7.393	.0033304	9008	35	8.816	.0039788	8908
34	6.009	.0025648	9109	35	7.703	.0033300	9009	36	9.193	.0039783	8909
35	6.242	.0025645	9110	36	8.012	.0033296	9010	37	9.570	.0039778	8910
36	6.473	.0025641	9111	37	8.321	.0033291	9011	38	9.945	.0039773	8911
37	6.704	.0025638	9112	38	8.628	.0033287	9012	39	10.319	.0039768	8912
38	6.934	.0025635	9113	39	8.934	.0033283	9013	40	10.692	.0039763	8913
39	7.164	.0025632	9114	40	9.240	.0033279	9014	42	11.436	.0039752	8914
40	7.393	.0025629	9115	42	9.849	.0033271	9015	44	12.177	.0039742	8915
42	7.851	.0025623	9116	44	10.457	.0033262	9016	46	12.914	.0039732	8916
44	8.308	.0025616	9117	46	11.062	.0033254	9017	48	13.650	.0039722	8917
46	8.763	.0025610	9118	48	11.666	.0033245	9018	50	14.385	.0039712	8918
48	9.217	.0025604	9119	50	12.269	.0033237	9019	55	16.213	.0039687	8919
50	9.670	.0025597	9120	55	13.771	.0033217	9020	60	18.031	.0039662	8920
55	10.800	.0025582	9121	60	15.265	.0033196	9021	65	19.845	.0039637	8921
60	11.924	.0025566	9122	65	16.755	.0033175	9022	70	21.651	.0039613	8922
65	13.047	.0025550	9123	70	18.240	.0033155	9023	75	23.448	.0039588	8923
70	14.166	.0025535	9124	75	19.718	.0033134	9024	80	25.245	.0039563	8924
75	15.280	.0025519	9125	80	21.194	.0033114	9025	85	27.031	.0039538	8925
80	16.391	.0025504	9126	85	22.666	.0033093	9025	90	28.821	.0039513	8926
85	17.505	.0025488	9127	90	24.134	.0033072	9026	95	30.600	.0039487	8927
90	18.615	.0025472	9128	95	25.601	.0033051	9028	100	32.369	.0039462	8928
95	19.720	.0025456	9129	100	27.059	.0033030	9024				
100	20.821	.0025440	9130								

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident	T, °K	P, atm	ρ, g mol/cc	Ident
29	6.884		8801	31	9.502		8701	32	10.946	.0083120	8601
30	7.603	.0046650	8802	32	10.286	.0067855	8702	33	11.878	.0083107	8602
31	8.309	.0046644	8803	33	10.989	.0067845	8703	34	12.794	.0083095	8603
32	8.808	.0046637	8804	34	11.702	.0067836	8704	35	13.699	.0083083	8604
33	9.303	.0046631	8805	35	12.411	.0067826	8705	36	14.597	.0083071	8605
34	9.794	.0046624	8806	36	13.114	.0067816	8706	37	15.489	.0083059	8606
35	10.283	.0046618	8807	37	13.814	.0067807	8707	38	16.378	.0083046	8607
36	10.771	.0046611	8808	38	14.511	.0067798	8708	39	17.261	.0083035	8608
37	11.256	.0046604	8809	39	15.206	.0067788	8709	40	18.142	.0083023	8609
38	11.738	.0046598	8810	40	15.896	.0067779	8710	42	19.894	.0082999	8610
39	12.220	.0046591	8811	42	17.271	.0067760	8711	44	21.639	.0082976	8611
40	12.700	.0046585	8812	44	18.640	.0067742	8712	46	23.377	.0082952	8612
42	13.658	.0046572	8813	46	20.003	.0067723	8713	48	25.110	.0082929	8613
44	14.609	.0046559	8814	48	21.360	.0067705	8714	50	26.839	.0082906	8614
46	15.554	.0046546	8815	50	22.714	.0067688	8715	55	31.138	.0082848	8615
48	16.498	.0046533	8816	55	26.087	.0067641	8716	60	35.414	.0082791	8616
50	17.443	.0046520	8817	60	29.435	.0067596	8717	65	39.675	.0082735	8617
55	19.788	.0046488	8820	65	32.775	.0067551	8718	70	43.911	.0082679	8618
60	22.120	.0046456	8821	70	36.097	.0067507	8719	75	48.125	.0082623	8619
65	24.446	.0046425	8822	75	39.398	.0067462	8720	80	52.326	.0082566	8620
70	26.760	.0046393	8823	80	42.694	.0067417	8721	85	56.514	.0082511	8621
75	29.062	.0046362	8824	85	45.978	.0067372	8722	90	60.691	.0082459	8622
80	31.360	.0046330	8825	90	49.262	.0067328	8723	95	64.844	.0082398	8623
85	33.653	.0046298	8826	95	52.518	.0067283	8724	100	68.980	.0082342	8624
90	35.941	.0046267	8827	100	55.759	.0067239	8725				
95	38.217	.0046234	8828								
100	40.483	.0046202	8829								

Table 1. Temperature-Pressure-Density Observations on Para Hydrogen - Continued

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
33	12.473	.0101447	8501	33	12.709	.0118152	8401	34	14.502	.0141933	8301
34	13.644	.0101931	8502	34	14.114	.0118153	8402	35	16.202	.0141310	8302
35	14.797	.0101415	8503	35	15.497	.0118115	8403	36	17.908	.0141287	8303
36	15.942	.0101400	8504	36	16.870	.0118096	8404	37	19.614	.0141264	8304
37	17.078	.0101384	8505	37	18.239	.0118078	8405	38	21.321	.0141241	8305
38	18.209	.0101369	8506	38	19.603	.0118059	8406	39	23.029	.0141218	8306
39	19.337	.0101354	8507	39	20.963	.0118041	8407	40	24.740	.0141195	8307
40	20.465	.0101339	8508	40	22.322	.0118023	8408	42	28.158	.0141150	8308
42	22.699	.0101309	8509	42	25.035	.0117987	8409	44	31.578	.0141104	8309
44	24.929	.0101279	8510	44	27.737	.0117951	8410	46	35.000	.0141059	8310
46	27.191	.0101249	8511	46	30.436	.0117915	8411	48	38.421	.0141013	8311
48	29.369	.0101219	8512	48	33.129	.0117879	8412	50	41.837	.0140969	8312
50	31.581	.0101190	8513	50	35.820	.0117843	8413	55	50.362	.0140858	8313
55	37.090	.0101116	8514	55	42.520	.0117755	8414	60	58.850	.0140748	8314
60	42.570	.0101044	8515	60	49.190	.0117668	8415	65	67.315	.0140641	8315
65	48.028	.0100971	8516	65	55.841	.0117582	8416	70	75.730	.0140534	8316
70	53.458	.0100902	8517	70	62.457	.0117496	8417	75	84.096	.0140428	8317
75	58.856	.0100831	8518	75	69.030	.0117411	8418	80	92.423	.0140322	8318
80	64.238	.0100760	8519	80	75.580	.0117327	8419	85	100.714	.0140218	8319
85	69.609	.0100689	8520	85	82.108	.0117241	8420	90	108.972	.0140114	8320
90	74.953	.0100619	8521	90	88.610	.0117157	8421	95	117.196	.0140010	8321
95	80.283	.0100548	8522	95	95.070	.0117074	8422	100	125.316	.0139907	8322
100	85.597	.0100477	8523	100	101.491	.0116990	8423				

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
32	11.051		5101	34	14.798	.0163960	8201	33	12.841	.0181179	8101
33	12.801	.0151286	5102	35	16.833	.0163932	8202	34	15.098	.0181148	8102
34	14.630	.0151261	5103	36	18.891	.0163904	8203	35	17.432	.0181116	8103
35	16.477	.0151236	5104	37	20.962	.0163876	8204	36	19.792	.0181084	8104
36	18.332	.0151211	5105	38	23.043	.0163849	8205	37	22.175	.0181052	8105
37	20.192	.0151185	5106	39	25.132	.0163821	8206	38	24.583	.0181020	8106
38	22.061	.0151160	5107	40	27.227	.0163793	8207	39	26.990	.0180988	8107
39	23.930	.0151135	5108	42	31.430	.0163737	8208	40	29.413	.0180956	8108
40	25.800	.0151110	5109	44	35.648	.0163681	8209	42	34.260	.0180892	8109
42	29.549	.0151061	5110	46	39.835	.0163627	8210	44	39.153	.0180828	8110
44	33.305	.0151011	5111	48	44.054	.0163573	8211	46	44.039	.0180764	8111
46	37.060	.0150961	5112	50	48.269	.0163517	8212	48	48.928	.0180701	8112
48	40.816	.0150913	5113	55	58.797	.0163381	8213	50	53.820	.0180638	8113
50	44.576	.0150864	5114	60	69.274	.0163248	8214	55	66.031	.0180481	8114
55	53.985	.0150742	5115	65	79.725	.0163117	8215	60	78.193	.0180329	8115
60	63.280	.0150622	5116	70	90.114	.0162988	8216	65	90.309	.0180180	8116
65	72.593	.0150505	5117	75	100.493	.0162859	8217	70	102.345	.0180032	8117
70	81.854	.0150388	5118	80	110.701	.0162733	8218	75	114.296	.0179886	8118
75	91.053	.0150272	5119	85	120.913	.0162607	8219	80	126.175	.0179743	8119
80	100.208	.0150157	5120	90	131.078	.0162482	8220	85	137.978	.0179601	8120
85	109.316	.0150043	5121	95	141.168	.0162359	8221	90	149.739	.0179460	8121
90	118.392	.0149930	5122	100	151.191	.0162236	8222	95	161.397	.0179322	8122
95	127.405	.0149817	5123					100	172.960	.0179185	8123
100	136.361	.0149706	5124								

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
32	11.051		5001	33	13.216	.0207027	8001	33	13.595	.0216206	7901
33	12.999	.0198034	5002	34	16.041	.0206989	8002	34	16.665	.0216165	7902
34	15.605	.0197998	5003	35	18.932	.0206950	8003	35	19.794	.0216122	7903
35	18.264	.0197961	5004	36	21.862	.0206910	8004	36	22.961	.0216080	7904
36	21.002	.0197925	5005	37	24.820	.0206871	8005	37	26.153	.0216037	7905
37	23.749	.0197888	5006	38	27.794	.0206831	8006	38	29.359	.0215995	7906
38	26.514	.0197852	5007	39	30.782	.0206792	8007	39	32.582	.0215953	7907
39	29.283	.0197815	5008	40	33.781	.0206752	8008	40	35.810	.0215911	7908
40	32.084	.0197778	5009	42	39.802	.0206674	8009	42	42.290	.0215826	7909
42	37.661	.0197701	5010	44	45.837	.0206595	8010	44	48.779	.0215742	7910
44	43.268	.0197612	5011	46	51.870	.0206518	8011	46	55.273	.0215660	7911
46	48.887	.0197557	5012	48	57.920	.0206440	8012	48	61.770	.0215576	7912
48	54.512	.0197485	5013	50	63.961	.0206364	8013	50	68.258	.0215496	7913
50	60.131	.0197415	5014	55	79.026	.0206173	8014	55	84.439	.0215294	7914
55	74.196	.0197239	5015	60	94.015	.0205991	8015	60	100.505	.0215098	7915
60	88.108	.0197065	5016	65	108.922	.0205812	8016	65	116.494	.0214907	7916
65	101.998	.0196896	5017	70	123.721	.0205635	8017	70	132.353	.0214720	7917
70	115.808	.0196730	5018	75	138.375	.0205462	8018	75	148.082	.0214536	7918
75	129.495	.0196567	5019	80	152.940	.0205291	8019	80	163.658	.0214358	7919
80	143.069	.0196405	5020	85	167.419	.0205123	8020	85	179.153	.0214182	7920
85	156.597	.0196246	5021	90	181.791	.0204957	8021	90	194.540	.0214006	7921
90	170.026	.0196090	5022	95	196.036	.0204791	8022	95	209.772	.0213835	7922
95	183.348	.0195938	5023	100	210.149	.0204631	8023	100	224.862	.0213665	7923
100	196.571	.0195781	5024								

Table I Temperature-Pressure-Density Observations on Para Hydrogen Continued

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident
32	11.052		7401	32	11.879	.0238327	7701	31	9.499		4901
33	14.346	.0227217	7402	33	15.504	.0238277	7702	32	13.272	.0248963	4902
34	17.741	.0227171	7403	34	19.309	.0238227	7703	33	17.345	.0248908	4903
35	21.185	.0227125	7404	35	23.091	.0238176	7704	34	21.491	.0248853	4904
36	24.663	.0227079	7405	36	26.897	.0238125	7705	35	25.585	.0248798	4905
37	28.154	.0227033	7406	37	30.716	.0238075	7706	36	29.726	.0248744	4906
38	31.658	.0226986	7407	38	34.549	.0238024	7707	37	33.895	.0248690	4907
39	35.175	.0226940	7408	39	38.390	.0237975	7708	38	38.084	.0248634	4908
40	38.701	.0226894	7409	40	42.236	.0237925	7709	39	42.232	.0248580	4909
42	45.770	.0226803	7410	42	49.930	.0237828	7710	40	46.402	.0248527	4910
44	52.837	.0226712	7411	44	57.631	.0237728	7711	42	54.745	.0248422	4911
46	59.911	.0226622	7412	46	65.318	.0237631	7712	44	63.089	.0248316	4912
48	66.981	.0226533	7413	48	72.996	.0237535	7713	46	71.343	.0248210	4913
50	74.039	.0226445	7414	50	80.666	.0237440	7714	48	79.692	.0248109	4914
55	91.682	.0226229	7415	55	99.733	.0237209	7715	50	87.959	.0248008	4915
60	109.074	.0226018	7416	60	118.642	.0236983	7716	55	108.542	.0247761	4916
65	126.409	.0225814	7417	65	137.417	.0236766	7717	60	128.920	.0247518	4917
70	143.403	.0225615	7418	70	155.999	.0236596	7718	65	149.132	.0247290	4918
75	160.617	.0225421	7419	75	174.400	.0236347	7719	70	169.131	.0247063	4919
80	177.512	.0225237	7420	80	192.631	.0236149	7720	75	188.926	.0246846	4920
85	194.271	.0225039	7421	85	210.738	.0235947	7721	80	208.507	.0246628	4921
90	210.905	.0224853	7422	90	228.692	.0235749	7722	85	227.963	.0246421	4922
95	227.380	.0224673	7423	95	246.449	.0235557	7723	90	247.262	.0246214	4923
100	243.695	.0224491	7424	100	264.040	.0235368	7724	95	266.278	.0246015	4924
								100	285.168	.0245811	4925

T °K	P, atm	ρ, g mol/cc	Ident	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
31	10.210	.0255512	7601	31	11.524	.0262244	7501	30	8.628	.0269624	7401
32	14.476	.0255454	7602	32	16.044	.0262184	7502	31	13.404	.0269559	7402
33	18.781	.0255396	7603	33	20.594	.0262122	7503	32	18.222	.0269495	7403
34	23.122	.0255339	7604	34	25.170	.0262061	7504	33	23.056	.0269429	7404
35	27.483	.0255280	7605	35	29.765	.0262001	7505	34	27.908	.0269365	7405
36	31.848	.0255223	7606	36	34.370	.0261940	7506	35	32.765	.0269301	7406
37	36.221	.0255165	7607	37	38.961	.0261880	7507	36	37.630	.0269238	7407
38	40.599	.0255109	7608	38	43.589	.0261820	7508	37	42.499	.0269176	7408
39	44.974	.0255053	7609	39	48.197	.0261762	7509	38	47.362	.0269113	7409
40	49.356	.0254997	7610	40	52.805	.0261704	7510	39	52.222	.0269051	7410
42	58.116	.0254886	7611	42	62.000	.0261586	7511	40	57.076	.0268990	7411
44	66.868	.0254776	7612	44	71.169	.0261473	7512	42	66.763	.0268869	7412
46	75.566	.0254668	7613	46	80.330	.0261360	7513	44	76.419	.0268749	7413
48	84.267	.0254560	7614	48	89.445	.0261248	7514	46	86.036	.0268631	7414
50	92.929	.0254455	7615	50	98.529	.0261139	7515	48	95.622	.0268515	7415
55	114.456	.0254189	7616	55	121.078	.0260872	7516	50	105.176	.0268401	7416
60	135.767	.0253951	7617	60	143.396	.0260616	7517	55	128.858	.0268124	7417
65	156.903	.0253715	7618	65	165.485	.0260369	7518	60	152.275	.0267858	7418
70	177.888	.0253481	7619	70	187.342	.0260130	7519	65	175.469	.0267601	7419
75	198.459	.0253255	7620	75	208.921	.0259894	7520	70	198.386	.0267354	7420
80	218.934	.0253032	7621	80	230.298	.0259646	7521	75	221.003	.0267116	7421
85	239.206	.0252820	7622	85	251.477	.0259448	7522	80	243.406	.0266877	7422
90	259.343	.0252608	7623	90	272.490	.0259229	7523	85	265.994	.0266646	7423
95	279.231	.0252400	7624	99	293.213	.0259015	7524	90	287.572	.0266425	7424
100	298.903	.0252193	7625	100	313.734	.0258803	7525	99	309.280	.0266205	7425
								100	330.750	.0265987	7426

T °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
30	10.564	.0276407	7301	28	5.785		4801	28	6.096	.0293118	7201
31	15.690	.0276340	7302	29	8.951	.0284479	4802	29	11.854	.0293039	7202
32	20.728	.0276272	7303	30	13.426	.0284406	4803	30	17.617	.0292963	7203
33	25.829	.0276204	7304	31	18.812	.0284334	4804	31	23.372	.0292886	7204
34	30.960	.0276136	7305	32	24.239	.0284262	4805	32	29.138	.0292810	7205
35	36.055	.0276069	7306	33	29.649	.0284162	4806	33	34.899	.0292735	7206
36	41.170	.0276003	7307	34	35.069	.0284119	4807	34	40.653	.0292660	7207
37	46.279	.0275937	7308	35	40.490	.0284048	4808	35	46.400	.0292586	7208
38	51.383	.0275872	7309	36	45.910	.0283979	4809	36	52.149	.0292513	7209
39	56.478	.0275808	7310	37	51.314	.0283911	4810	37	57.874	.0292441	7210
40	61.570	.0275744	7311	38	56.712	.0283842	4811	38	63.600	.0292368	7211
42	71.715	.0275618	7312	39	62.099	.0283773	4812	39	69.307	.0292297	7212
44	81.818	.0275493	7313	40	67.480	.0283708	4813	40	74.991	.0292228	7213
46	91.889	.0275372	7314	42	78.209	.0283572	4814	42	86.331	.0292091	7214
48	101.916	.0275251	7315	44	88.893	.0283440	4815	44	97.610	.0291953	7215
50	111.909	.0275133	7316	46	99.520	.0283319	4816	46	108.831	.0291822	7216
55	136.662	.0274846	7317	48	110.097	.0283199	4817	48	120.008	.0291695	7217
60	161.135	.0274572	7318	50	120.628	.0283075	4818	50	131.123	.0291568	7218
65	185.348	.0274309	7319	55	146.709	.0282775	4819	55	158.695	.0291252	7219
70	209.268	.0274054	7320	60	172.441	.0282486	4820	60	185.821	.0290956	7220
75	232.871	.0273806	7321	65	197.902	.0282211	4821	65	212.670	.0290671	7221
80	256.235	.0273559	7322	70	223.023	.0281950	4822	70	239.174	.0290401	7222
85	279.383	.0273329	7323	75	247.840	.0281685	4823	75	265.294	.0290138	7223
90	302.286	.0273097	7324	80	272.351	.0281443	4824	80	291.120	.0289880	7224
95	324.948	.0272872	7325	85	296.625	.0281200	4825	85	316.681	.0289627	7225
				90	320.697	.0280984	4826	90	341.943	.0289386	7226
				95	344.394	.0280727	4827				

Table 1. Temperature-Pressure-Density Observations on Para Hydrogen - Continued

T, °K	P, atm	ρ, g mol/cc	Ident.
27	4.832		7101
26	10.553	.0301765	7102
29	16.474	.0301683	7103
30	22.802	.0301602	7104
31	28.917	.0301521	7105
32	35.025	.0301441	7106
33	41.134	.0301362	7107
34	47.229	.0301284	7108
35	53.324	.0301206	7109
36	59.402	.0301130	7110
37	65.461	.0301058	7111
38	71.518	.0300979	7112
39	77.545	.0300905	7113
40	83.571	.0300833	7114
42	95.571	.0300690	7115
44	107.495	.0300546	7116
46	119.346	.0300409	7117
48	131.139	.0300275	7118
50	142.862	.0300144	7119
55	171.896	.0299818	7120
60	200.511	.0299514	7121
65	228.784	.0299218	7122
70	256.676	.0298934	7123
75	284.197	.0298644	7124
80	311.342	.0298403	7125
85	338.184	.0298145	7126

T, °K	P, atm	ρ, g mol/cc	Ident.
24	7.464	.0332321	6601
25	14.928	.0332219	6602
26	22.366	.0332120	6603
27	29.775	.0332024	6604
28	37.161	.0331928	6605
29	44.525	.0331839	6606
30	51.869	.0331749	6607
31	59.230	.0331652	6608
32	66.583	.0331558	6609
33	73.901	.0331467	6610
34	81.220	.0331376	6611
35	88.520	.0331288	6612
36	95.813	.0331203	6613
37	103.078	.0331118	6614
38	110.314	.0331030	6615
39	117.553	.0330941	6616
40	124.716	.0330861	6617
42	139.026	.0330704	6618
44	153.257	.0330549	6619
46	167.344	.0330390	6620
48	181.403	.0330233	6621
50	195.374	.0330089	6622
55	229.844	.0329740	6623
60	263.808	.0329398	6624
65	297.292	.0329080	6625
70	330.271	.0328780	6626

T, °K	P, atm	ρ, g mol/cc	Ident.
21	5.063	.0349781	6701
22	13.271	.0349669	6702
23	21.288	.0349559	6703
24	29.416	.0349452	6704
25	37.544	.0349347	6705
26	45.662	.0349244	6706
27	53.768	.0349143	6707
28	61.862	.0349042	6708
29	69.938	.0348943	6709
30	77.994	.0348846	6710
31	86.033	.0348748	6711
32	94.049	.0348653	6712
33	102.047	.0348556	6713
34	110.028	.0348461	6714
35	118.048	.0348369	6715
36	126.044	.0348279	6716
37	133.981	.0348188	6717
38	141.906	.0348100	6718
39	149.803	.0348014	6719
40	157.684	.0347927	6720
42	173.343	.0347758	6721
44	188.932	.0347593	6722
46	204.384	.0347433	6723
48	219.720	.0347279	6724
50	235.012	.0347126	6725
55	273.753	.0346759	6726
60	309.912	.0346408	6727
65	346.529	.0346075	6728

T, °K	P, atm	ρ, g mol/cc	Ident.
26	3.978		4701
27	10.466	.0311387	4702
28	17.005	.0311299	4703
29	23.542	.0311212	4704
30	30.056	.0311127	4705
31	36.565	.0311043	4706
32	43.062	.0310960	4707
33	49.543	.0310877	4708
34	55.999	.0310795	4709
35	62.469	.0310712	4710
36	68.921	.0310634	4711
37	75.361	.0310557	4712
38	81.768	.0310475	4713
39	88.164	.0310398	4714
40	94.554	.0310322	4715
42	107.271	.0310174	4716
44	119.910	.0310025	4717
46	132.469	.0309879	4718
48	144.966	.0309736	4719
50	157.384	.0309603	4720
55	188.112	.0309271	4721
60	218.355	.0308951	4722
65	248.202	.0308648	4723
70	277.642	.0308358	4724
75	306.644	.0308080	4725
80	335.370	.0307810	4726

T, °K	P, atm	ρ, g mol/cc	Ident.
23	8.803	.0338749	6901
24	16.498	.0338469	6902
25	22.179	.0338561	6903
26	29.860	.0338460	6904
27	37.532	.0338361	6905
28	45.199	.0338263	6906
29	52.844	.0338167	6907
30	60.484	.0338072	6908
31	68.108	.0337978	6909
32	75.718	.0337884	6910
33	83.311	.0337791	6911
34	90.886	.0337699	6912
35	98.448	.0337609	6913
36	105.994	.0337522	6914
37	113.509	.0337435	6915
38	121.011	.0337346	6916
39	128.467	.0337261	6917
40	135.927	.0337179	6918
42	150.730	.0337016	6919
44	165.460	.0336852	6920
46	180.076	.0336697	6921
48	194.608	.0336545	6922
50	209.059	.0336396	6923
55	244.738	.0336031	6924
60	279.879	.0335690	6925
65	314.532	.0335363	6926
70	348.644	.0335040	6927

T, °K	P, atm	ρ, g mol/cc	Ident.
20	5.797	.0355896	4901
21	14.933	.0355780	4902
22	22.336	.0355670	4903
23	30.629	.0355561	4904
24	38.933	.0355454	4905
25	47.248	.0355348	4906
26	55.598	.0355244	4907
27	63.936	.0355143	4908
28	72.275	.0355040	4909
29	80.590	.0354940	4910
30	88.918	.0354840	4911
31	97.211	.0354743	4912
32	105.470	.0354649	4913
33	113.758	.0354548	4914
34	122.001	.0354447	4915
35	130.226	.0354347	4916
36	138.441	.0354249	4917
37	146.633	.0354174	4918
38	154.790	.0354087	4919
39	162.914	.0353996	4920
40	171.038	.0353911	4921
42	187.185	.0353744	4922
44	203.196	.0353578	4923
46	219.173	.0353410	4924
48	234.980	.0353244	4925
50	250.743	.0353086	4926
55	289.612	.0352724	4927
60	327.894	.0352373	4928

T, °K	P, atm	ρ, g mol/cc	Ident.
25	4.944	.0321463	7001
26	11.525	.0321367	7002
27	18.484	.0321273	7003
28	25.442	.0321181	7004
29	32.380	.0321091	7005
30	39.308	.0321002	7006
31	46.221	.0320913	7007
32	53.128	.0320826	7008
33	60.019	.0320738	7009
34	66.902	.0320652	7010
35	73.773	.0320566	7011
36	80.633	.0320483	7012
37	87.476	.0320400	7013
38	94.290	.0320319	7014
39	101.083	.0320238	7015
40	107.858	.0320159	7016
42	121.324	.0320004	7017
44	134.704	.0319848	7018
46	148.006	.0319700	7019
48	161.240	.0319554	7020
50	174.384	.0319412	7021
55	206.870	.0319067	7022
60	238.882	.0318738	7023
65	270.474	.0318423	7024
70	301.616	.0318125	7025
75	332.300	.0317841	7026

T, °K	P, atm	ρ, g mol/cc	Ident.
22	5.565	.0344165	6801
23	13.644	.0344057	6802
24	21.343	.0343950	6803
25	29.236	.0343846	6804
26	37.123	.0343744	6805
27	45.005	.0343644	6806
28	52.873	.0343544	6807
29	60.741	.0343447	6808
30	68.592	.0343351	6809
31	76.432	.0343255	6810
32	84.258	.0343160	6811
33	92.055	.0343066	6812
34	99.864	.0342972	6813
35	107.628	.0342879	6814
36	115.389	.0342789	6815
37	123.110	.0342702	6816
38	130.820	.0342612	6817
39	138.496	.0342527	6818
40	146.150	.0342442	6819
42	161.389	.0342274	6820
44	176.910	.0342112	6821
46	191.940	.0341951	6822
48	206.486	.0341800	6823
50	221.330	.0341646	6824
55	258.022	.0341280	6825
60	294.102	.0340935	6826
65	329.732	.0340607	6827
70	364.795	.0340293	6828

T, °K	P, atm	ρ, g mol/cc	Ident.
19	7.950	.0362394	6601
20	16.429	.0362277	6602
21	24.945	.0362163	6603
22	33.484	.0362052	6604
23	42.048	.0361943	6605
24	50.613	.0361835	6606
25	59.189	.0361729	6607
26	67.760	.0361624	6608
27	76.335	.0361521	6609
28	84.911	.0361418	6610
29	93.471	.0361318	6611
30	102.019	.0361217	6612
31	110.541	.0361117	6613
32	119.041	.0361019	6614
33	127.601	.0360919	6615
34	136.104	.0360823	6616
35	144.580	.0360728	6617
36	153.059	.0360636	6618
37	161.494	.0360545	6619
38	169.924	.0360452	6620
39	178.314	.0360365	6621
40	186.682	.0360278	6622
42	203.326	.0360102	6623
44	219.838	.0359936	6624
46	236.294	.0359775	6625
48	252.629	.0359617	6626
50	268.867	.0359460	6627
55	308.982	.0359089	6628
60	348.454	.0358731	6629

Table 1. Temperature-Pressure-Density Observations on Para Hydrogen - Continued

T, °K	P, atm	ρ, g mol/cc	Ident.
18	11.609	.0369239	5201
19	20.292	.0389121	5202
20	28.980	.0369006	5203
21	37.715	.0388894	5204
22	46.489	.0388786	5205
23	55.308	.0388671	5206
24	64.145	.0388562	5207
25	72.982	.0388494	5208
26	81.818	.0388340	5209
27	90.655	.0388245	5210
28	99.492	.0388139	5211
29	108.318	.0388039	5212
30	117.132	.0387938	5213
31	125.947	.0387835	5214
32	134.739	.0387737	5215
33	143.508	.0387635	5216
34	152.244	.0387538	5217
35	161.014	.0387444	5218
36	169.727	.0387351	5219
37	178.440	.0387257	5220
38	187.119	.0387164	5221
39	195.753	.0387076	5222
40	204.388	.0386986	5223
42	221.554	.0386819	5224
44	238.585	.0386645	5225
46	255.583	.0386481	5226
48	272.411	.0386325	5227
50	289.171	.0386173	5228
55	330.613	.0385789	5229

T, °K	P, atm	ρ, g mol/cc	Ident.
15	5.158	.0379143	5301
16	13.920	.0379020	5302
17	22.778	.0378903	5303
18	31.706	.0378784	5304
19	40.695	.0378665	5305
20	49.725	.0378551	5306
21	58.821	.0378438	5307
22	67.940	.0378328	5308
23	77.082	.0378216	5309
24	86.248	.0378104	5310
25	95.424	.0378003	5311
26	104.612	.0377895	5312
27	113.801	.0377789	5313
28	122.995	.0377686	5314
29	132.172	.0377586	5315
30	141.349	.0377481	5316
31	150.498	.0377380	5317
32	159.653	.0377279	5318
33	168.785	.0377181	5319
34	177.928	.0377084	5320
35	187.050	.0376984	5321
36	196.148	.0376889	5322
37	205.224	.0376799	5323
38	214.267	.0376711	5324
39	223.309	.0376615	5325
40	232.318	.0376527	5326
42	250.222	.0376357	5327
44	268.032	.0376182	5328
46	285.747	.0376017	5329
48	303.334	.0375859	5330
50	320.800	.0375706	5331

T, °K	P, atm	ρ, g mol/cc	Ident.
17	23.735	.0386924	5401
16	32.741	.0386809	5402
17	41.852	.0386693	5403
18	50.986	.0386571	5404
19	60.202	.0386456	5405
20	69.491	.0386344	5406
21	78.826	.0386232	5407
22	88.207	.0386121	5408
23	97.622	.0386012	5409
24	107.048	.0385904	5410
25	116.487	.0385796	5411
26	125.957	.0385689	5412
27	135.417	.0385583	5413
28	144.886	.0385475	5414
29	154.350	.0385371	5415
30	163.799	.0385271	5416
31	173.249	.0385179	5417
32	182.698	.0385071	5418
33	192.113	.0384974	5419
34	201.563	.0384880	5420
35	210.966	.0384775	5421
36	220.361	.0384684	5422
37	229.735	.0384593	5423
38	239.058	.0384505	5424
39	248.430	.0384407	5425
40	257.721	.0384318	5426
42	276.283	.0384145	5427
44	294.709	.0383976	5428
46	312.999	.0383812	5429
48	331.236	.0383652	5430

T, °K	P, atm	ρ, g mol/cc	Ident.
16	51.884	.0393822	5501
17	61.151	.0393704	5502
18	70.498	.0393593	5503
19	79.930	.0393477	5504
20	89.407	.0393362	5505
21	98.917	.0393250	5506
22	108.542	.0393141	5507
23	118.167	.0393033	5508
24	127.814	.0392924	5509
25	137.501	.0392818	5510
26	147.177	.0392712	5511
27	156.898	.0392602	5512
28	166.586	.0392504	5513
29	176.285	.0392397	5514
30	185.984	.0392300	5515
31	195.683	.0392195	5516
32	205.371	.0392102	5517
33	215.082	.0391988	5518
34	224.770	.0391896	5519
35	234.435	.0391799	5520
36	244.089	.0391705	5521
37	253.749	.0391617	5522
38	263.364	.0391529	5523
39	272.951	.0391438	5524
40	282.536	.0391352	5525
42	301.610	.0391175	5526
44	320.581	.0391007	5527
46	339.416	.0390842	5528

T, °K	P, atm	ρ, g mol/cc	Ident.
16	70.191		5601
17	80.524	.0400112	5602
18	89.882	.0399999	5603
19	99.626	.0399882	5604
20	109.313	.0399770	5605
21	119.068	.0399663	5606
22	128.898	.0399556	5607
23	138.692	.0399444	5608
24	148.557	.0399336	5609
25	158.454	.0399231	5610
26	168.348	.0399124	5611
27	178.294	.0399019	5612
28	188.237	.0398913	5613
29	198.158	.0398812	5614
30	208.095	.0398703	5615
31	218.021	.0398609	5616
32	227.936	.0398509	5617
33	237.806	.0398409	5618
34	247.801	.0398306	5619
35	257.693	.0398210	5620
36	267.620	.0398113	5621
37	277.513	.0398025	5622
38	287.371	.0397936	5623
39	297.230	.0397852	5624
40	307.045	.0397754	5625
42	326.594	.0397587	5626
44	346.055	.0397423	5627

T, °K	P, atm	ρ, g mol/cc	Ident.
17	100.092	.0405981	5701
18	109.767	.0405866	5702
19	119.534	.0405758	5703
20	129.390	.0405649	5704
21	139.304	.0405543	5705
22	149.274	.0405435	5706
23	159.301	.0405323	5707
24	169.350	.0405209	5708
25	179.412	.0405108	5709
26	189.508	.0405003	5710
27	199.671	.0404903	5711
28	209.801	.0404795	5712
29	219.950	.0404690	5713
30	230.060	.0404597	5714
31	240.224	.0404501	5715
32	250.354	.0404404	5716
33	260.518	.0404315	5717
34	270.648	.0404205	5718
35	280.812	.0404118	5719
36	290.946	.0404019	5720
37	301.074	.0403927	5721
38	311.103	.0403832	5722
39	321.187	.0403741	5723
40	331.248	.0403646	5724
42	351.221	.0403471	5725

T, °K	P, atm	ρ, g mol/cc	Ident.
18	129.341	.0411288	5801
19	139.238	.0411156	5802
20	149.277	.0411047	5803
21	159.539	.0410940	5804
22	169.469	.0410835	5805
23	179.660	.0410724	5806
24	189.888	.0410618	5807
25	200.134	.0410510	5808
26	210.411	.0410405	5809
27	220.711	.0410310	5810
28	231.035	.0410202	5811
29	241.346	.0410095	5812
30	251.681	.0409996	5813
31	261.976	.0409902	5814
32	272.316	.0409806	5815
33	282.673	.0409711	5816
34	292.986	.0409614	5817
35	303.344	.0409520	5818
36	313.622	.0409430	5819
37	323.923	.0409341	5820
38	334.229	.0409252	5821
39	344.492	.0409168	5822

T, °K	P, atm	ρ, g mol/cc	Ident.
19	159.487	.0416369	5901
20	169.617	.0416257	5902
21	179.819	.0416148	5903
22	190.119	.0416041	5904
23	200.419	.0415938	5905
24	210.814	.0415831	5906
25	221.252	.0415725	5907
26	231.654	.0415622	5908
27	242.158	.0415520	5909
28	252.697	.0415420	5910
29	263.201	.0415317	5911
30	273.706	.0415221	5912
31	284.235	.0415121	5913
32	294.716	.0415025	5914
33	305.255	.0414927	5915
34	315.794	.0414834	5916
35	326.300	.0414744	5917
36	336.840	.0414657	5918
37	347.312	.0414571	5919

T, °K	P, atm	ρ, g mol/cc	Ident.
19	179.205	.0421111	6001
20	189.505	.0421005	6002
21	199.858	.0420911	6003
22	210.248	.0420803	6004
23	220.744	.0420693	6005
24	231.314	.0420589	6006
25	241.885	.0420489	6007
26	252.494	.0420383	6008
27	263.135	.0420285	6009
28	273.810	.0420180	6010
29	284.449	.0420083	6011
30	295.112	.0419984	6012
31	305.784	.0419892	6013
32	316.473	.0419797	6014
33	327.149	.0419709	6015
34	337.824	.0419615	6016
35	348.500	.0419526	6017

Table 1. Temperature-Pressure-Density Observations on Para Hydrogen - Continued

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
20	231.053	.0429275	6101	21	241.086	.0430003	6201	21	263.293	.0434405	6301
21	221.489	.0429677	6102	22	252.926	.0429902	6202	22	274.103	.0434307	6302
22	232.016	.0429576	6103	23	263.069	.0429797	6203	23	284.982	.0434207	6303
23	242.665	.0429461	6104	24	273.812	.0429696	6204	24	295.928	.0434096	6304
24	253.306	.0429363	6105	25	284.690	.0429596	6205	25	306.909	.0433992	6305
25	264.015	.0429262	6106	26	295.535	.0429499	6206	26	317.991	.0433897	6306
26	274.757	.0429164	6107	27	306.448	.0429404	6207	27	329.040	.0433806	6307
27	285.534	.0429064	6108	28	317.428	.0429312	6208	28	340.124	.0433715	6308
28	296.311	.0429967	6109	29	328.340	.0429226	6209	29	351.242	.0433624	6309
29	307.155	.0429874	6110	30	339.320	.0429137	6210				
30	317.966	.0429782	6111	31	350.301	.0429046	6211				
31	328.811	.0429691	6112								
32	339.654	.0429598	6113								
33	350.502	.0429511	6114								

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
22	293.888	.0438029	6401	22	312.227		6501
23	304.767	.0437923	6402	23	324.091	.0441553	6502
24	315.748	.0437820	6403	24	335.208	.0441461	6503
25	326.762	.0437731	6404	25	346.427	.0441359	6504
26	337.870	.0437638	6405				
27	348.985	.0437540	6406				

T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.	T, °K	P, atm	ρ, g mol/cc	Ident.
30.0	8.117		9601	30.0	8.117		9701	30.0	8.116		9501
30.5	8.789		9602	30.5	8.789		9702	30.5	8.787		9502
31.0	9.500		9603	31.0	9.500		9703	31.0	9.503		9503
31.5	10.254		9604	31.5	10.254		9704	31.5	10.253		9504
32.0	11.052		9605	32.0	11.052		9705	32.0	11.050		9505
32.5	11.898		9606	32.5	11.899		9706	32.5	11.899		9506
32.6	12.074		9607	32.6	12.075		9707	32.6	12.075		9507
32.7	12.252		9608	32.7	12.254		9708	32.7	12.253		9508
32.8	12.433		9609	32.8	12.435		9709	32.8	12.433		9509
32.9	12.619		9610	32.9	12.618		9710	32.9	12.617		9510
33.0	12.794	.0140986	9611	33.0	12.804	.0155239	9711	33.0	12.807	.0163976	9511
33.1	12.966	.0140983	9612	33.1	12.991	.0155236	9712	33.1	13.003	.0163973	9512
33.2	13.137	.0140981	9613	33.2	13.178	.0155234	9713	33.2	13.200	.0163970	9513
33.3	13.308	.0140979	9614	33.3	13.369	.0155231	9714	33.3	13.397	.0163967	9514
33.4	13.478	.0140977	9615	33.4	13.562	.0155229	9715	33.4	13.596	.0163965	9515
33.5	13.648	.0140974	9616	33.5	13.740	.0155226	9716	33.5	13.795	.0163962	9516
34.0	14.497	.0140963	9617	34.0	14.683	.0155213	9717	34.0	14.799	.0163948	9517
35.0	16.194	.0140940	9618	35.0	16.583	.0155188	9718	35.0	16.832	.0163921	9518
36.0	17.892	.0140917	9619	36.0	18.498	.0155162	9719	36.0	18.886	.0163893	9519
37.0	19.593	.0140894	9620	37.0	20.422	.0155136	9720	37.0	20.955	.0163866	9520
38.0	21.294	.0140871	9621	38.0	22.353	.0155110	9721	38.0	23.035	.0163837	9521
39.0	22.997	.0140848	9622	39.0	24.289	.0155084	9722	39.0	25.123	.0163809	9522
40.0	24.699	.0140826	9623	40.0	26.228	.0155058	9723	40.0	27.216	.0163782	9523

Experimental isotherm functions $(Pv-RT)v$, where v is molal volume, were represented by polynomial expansions in density [18], using least-squares methods [19] and an electronic computer with eleven digits. The number of terms in each polynomial was selected by trial as the minimum number required to give deviations within experimental precision [7]. This number increases from five terms at 100 °K to fifteen terms at 33 °K. From 32 through 24 °K, data for both vapor and compressed liquid were represented simultaneously by single isotherm polynomials of nine terms. From 23 through 17 °K, data for the compressed liquid were represented with six terms.

Differences between experimental and calculated results were averaged for each run and converted to an assumed error in experimental determination of density (amount of sample) for that run. Fixed adjustments to the density throughout certain runs were applied for smoothing, as given in table 2A. These are within the experimental precision. A final set of polynomial representations of isotherms, obtained as above, then represents all pressures within the experimental precision. The first derivatives of pressure with respect to density, obtained from these polynomials, are smooth; the second derivatives are smooth and monotonically increasing. These representations were used to calculate pressures at the uniform densities in table 2. Some entries in table 2 are extrapolated beyond the maximum experimental pressure of 350 atm.

Table 2. Pressures in Atmospheres at Integral Densities and Temperatures

DENSITY MOL/CC	TEMPERATURE DEGREES K 17.000	18.000	19.000	20.000	21.000	22.000	23.000	24.000	25.000	26.000	27.000	28.000	29.000
.0005								.929	.972	1.014	1.056	1.098	1.140
.0010								1.750	1.836	1.923	2.009	2.095	2.181
.0015								2.462	2.597	2.730	2.863	2.996	3.127
.0020										3.438	3.620	3.801	3.981
.0025											4.283	4.515	4.745
.0030												5.139	5.422
.0035												5.677	6.015
.0040													6.526
.0285													8.317
.0290													10.400
.0295												6.950	12.833
.0300												9.543	15.645
.0305											6.210	12.545	18.867
.0310											9.444	15.988	22.531
.0315										6.349	13.145	19.905	26.667
.0320									3.327	10.337	17.349	24.327	31.309
.0325									7.625	14.861	22.088	29.288	36.489
.0330								5.059	12.500	19.956	27.398	34.820	42.240
.0335							2.688	10.320	17.986	25.658	33.314	40.959	48.596
.0340							8.364	16.232	24.118	32.001	39.870	47.738	55.592
.0345						6.732	14.743	22.830	30.929	39.021	47.102	55.191	63.262
.0350					5.379	13.615	21.851	30.146	38.454	46.754	55.047	63.355	71.641
.0355				4.452	12.799	21.250	29.719	38.217	46.730	55.237	63.741	72.264	80.764
.0360			3.880	12.456	21.026	29.678	38.378	47.076	55.791	64.505	73.219	81.954	90.668
.0365		3.784	12.501	21.285	30.094	38.942	47.862	56.761	65.675	74.596	83.519	92.463	101.389
.0370	4.207	13.087	22.027	30.998	40.038	49.081	58.207	67.306	76.418	85.546	94.679	103.827	112.964
.0375	14.275	23.360	32.491	41.642	50.895	60.134	69.451	78.751	88.060	97.394	106.734	116.084	125.430
.0380	25.354	34.619	43.927	53.261	62.703	72.138	81.635	91.133	100.639	110.177	119.724	129.273	138.825
.0385	37.468	46.885	56.368	65.888	75.499	85.130	94.797	104.492	114.195	123.934	133.685	143.431	153.187
.0390	50.640	60.185	69.848	79.557	89.323	99.146	108.982	118.869	128.768	138.704	148.657	158.599	168.556
.0395	64.891	74.555	84.403	94.294	104.214	114.223	124.230	134.305	144.399	154.527	164.678	174.815	184.970
.0400	80.240	90.036	100.067	110.131	120.212	130.397	140.583	150.843	161.129	171.442	181.787	192.128	202.468
.0405	96.705	106.680	116.878	127.100	137.357	147.707	158.084	168.523	178.998	189.490	200.024	210.554	221.092
.0410		124.549	134.872	145.244	155.668	166.193	176.772	187.389	198.046	208.711	219.429	230.156	240.879
.0415			154.088	164.614	175.246	185.898	196.686	207.477	218.312	229.146	240.041	250.965	261.870
.0420			174.564	185.280	196.067	206.869	217.860	228.826	239.831	250.895	261.901	273.019	284.103
.0425				207.393	218.189	229.157	240.327	251.465	262.636	273.817	285.050	296.354	307.616
.0430					241.649	252.819	264.111	275.418	286.753	298.132	309.527	321.004	332.443
.0435					266.479	277.921	289.235	300.699	312.202	323.816	335.374	346.996	358.619
.0440						304.594	315.711	327.308	338.994	350.903	362.630	374.358	386.174

Table 2. Pressures in Atmospheres at Integral Densities and Temperatures - Continued

DENSITY MOL/CC	TEMPERATURE DEGREES K											
	30.000	31.000	32.000	33.000	34.000	35.000	36.000	37.000	38.000	39.000	40.000	42.000	44.000
.0005	1.182	1.223	1.265	1.307	1.349	1.391	1.433	1.475	1.517	1.559	1.600	1.684	1.767
.0010	2.267	2.352	2.438	2.524	2.609	2.695	2.780	2.866	2.951	3.036	3.121	3.291	3.461
.0015	3.259	3.390	3.521	3.652	3.783	3.914	4.044	4.175	4.305	4.435	4.565	4.825	5.084
.0020	4.160	4.339	4.518	4.696	4.874	5.051	5.229	5.406	5.583	5.759	5.936	6.288	6.639
.0025	4.975	5.203	5.431	5.658	5.884	6.111	6.336	6.562	6.787	7.011	7.235	7.683	8.129
.0030	5.704	5.984	6.263	6.541	6.818	7.095	7.370	7.645	7.920	8.194	8.468	9.013	9.557
.0035	6.352	6.685	7.017	7.348	7.677	8.006	8.333	8.660	8.986	9.311	9.635	10.282	10.927
.0040	6.920	7.309	7.697	8.083	8.465	8.848	9.229	9.608	9.987	10.364	10.741	11.492	12.240
.0045	7.412	7.859	8.305	8.747	9.186	9.624	10.059	10.493	10.926	11.358	11.788	12.646	13.500
.0050	7.831	8.339	8.844	9.344	9.842	10.336	10.828	11.318	11.807	12.293	12.779	13.747	14.709
.0055		8.751	9.319	9.879	10.436	10.989	11.539	12.086	12.632	13.175	13.718	14.798	15.872
.0060		9.101	9.732	10.354	10.972	11.584	12.194	12.801	13.404	14.006	14.607	15.801	16.990
.0065		9.392	10.087	10.773	11.454	12.127	12.797	13.464	14.128	14.789	15.449	16.761	18.066
.0070			10.388	11.140	11.884	12.620	13.352	14.081	14.805	15.527	16.248	17.680	19.105
.0075			10.638	11.458	12.266	13.066	13.862	14.653	15.440	16.224	17.006	18.561	20.108
.0080			10.842	11.730	12.605	13.470	14.330	15.185	16.035	16.882	17.727	19.407	21.080
.0085			11.003	11.961	12.903	13.834	14.759	15.679	16.593	17.505	18.414	20.221	22.022
.0090				12.155	13.164	14.162	15.153	16.138	17.119	18.096	19.070	21.006	22.938
.0095				12.314	13.392	14.458	15.516	16.567	17.615	18.658	19.698	21.767	23.832
.0100				12.442	13.590	14.725	15.850	16.969	18.083	19.194	20.301	22.505	24.706
.0105				12.544	13.762	14.966	16.159	17.345	18.528	19.708	20.883	23.225	25.564
.0110				12.622	13.912	15.184	16.445	17.700	18.953	20.202	21.446	23.928	26.409
.0115				12.681	14.041	15.382	16.712	18.037	19.359	20.679	21.995	24.620	27.244
.0120				12.724	14.154	15.564	16.963	18.358	19.752	21.143	22.531	25.303	28.073
.0125				12.754	14.252	15.731	17.200	18.666	20.132	21.596	23.058	25.979	28.900
.0130				12.775	14.339	15.886	17.427	18.965	20.504	22.042	23.580	26.654	29.727
.0135				12.787	14.417	16.033	17.645	19.256	20.871	22.485	24.099	27.329	30.559
.0140				12.795	14.488	16.172	17.858	19.544	21.235	22.926	24.619	28.010	31.400
.0145				12.799	14.554	16.308	18.068	19.831	21.600	23.370	25.144	28.699	32.254
.0150				12.800	14.617	16.442	18.278	20.120	21.968	23.820	25.677	29.400	33.124
.0155				12.801	14.679	16.578	18.491	20.414	22.345	24.280	26.222	30.118	34.017
.0160				12.803	14.743	16.717	18.711	20.717	22.732	24.753	26.783	30.857	34.935
.0165				12.806	14.811	16.863	18.940	21.032	23.135	25.245	27.364	31.622	35.885
.0170				12.811	14.886	17.019	19.182	21.364	23.557	25.759	27.971	32.418	36.872
.0175				12.821	14.970	17.189	19.442	21.717	24.004	26.301	28.608	33.250	37.902
.0180				12.837	15.068	17.377	19.724	22.095	24.480	26.875	29.282	34.124	38.980
.0185				12.864	15.183	17.588	20.033	22.504	24.990	27.488	29.997	35.047	40.114
.0190				12.904	15.321	17.827	20.375	22.950	25.542	28.146	30.761	36.026	41.310
.0195				12.963	15.487	18.100	20.755	23.439	26.141	28.856	31.581	37.068	42.577
.0200				13.047	15.687	18.414	21.181	23.978	26.795	29.625	32.464	38.182	43.923
.0205				13.164	15.929	18.775	21.661	24.577	27.513	30.462	33.420	39.375	45.356
.0210				13.322	16.221	19.193	22.202	25.242	28.302	31.376	34.457	40.658	46.886
.0215				13.533	16.573	19.677	22.816	25.984	29.174	32.376	35.585	42.041	48.523
.0220				13.806	16.995	20.237	23.511	26.814	30.137	33.473	36.815	43.535	50.279
.0225				14.155	17.498	20.885	24.300	27.742	31.205	34.678	38.159	45.151	52.165

Table 2. Pressures in Atmospheres at Integral Densities and Temperatures - Continued

DENSITY MOL/CC	TEMPERATURE DEGREES K												
	30.000	31.000	32.000	33.000	34.000	35.000	36.000	37.000	38.000	39.000	40.000	42.000	44.000
.0230			11.170	14.594	18.095	21.633	25.195	28.782	32.388	36.004	39.628	46.902	54.194
.0235			11.552	15.137	18.801	22.494	26.209	29.946	33.701	37.465	41.236	48.801	56.379
.0240			12.046	15.799	19.629	23.483	27.356	31.249	35.157	39.074	42.998	50.862	58.735
.0245			12.669	16.599	20.597	24.617	28.653	32.707	36.773	40.847	44.929	53.101	61.276
.0250			13.440	17.552	21.721	25.911	30.116	34.335	38.565	42.800	47.044	55.533	64.020
.0255		10.116	14.377	18.677	23.020	27.385	31.764	36.153	40.550	44.951	49.361	58.177	66.983
.0260		11.041	15.501	19.994	24.513	29.057	33.614	38.178	42.747	47.319	51.899	61.049	70.182
.0265		12.172	16.832	21.522	26.222	30.948	35.687	40.430	45.175	49.922	54.675	64.168	73.639
.0270	8.718	13.530	18.394	23.289	28.167	33.080	38.004	42.991	47.856	52.781	57.712	67.555	77.371
.0275	10.115	15.140	20.208	25.299	30.371	35.474	40.588	45.701	50.811	55.919	61.031	71.231	81.401
.0280	11.783	17.024	22.298	27.592	32.859	38.155	43.462	48.766	54.064	59.357	64.653	75.218	85.749
.0285	13.751	19.209	24.691	30.187	35.654	41.148	46.650	52.147	57.637	63.120	68.602	79.540	90.440
.0290	16.046	21.721	27.412	33.112	38.784	44.478	50.178	55.872	61.557	67.233	72.904	84.219	95.497
.0295	18.695	24.587	30.487	36.391	42.274	48.172	54.072	59.965	65.849	71.720	77.584	89.285	100.944
.0300	21.727	27.836	33.946	40.055	46.153	52.257	58.360	64.454	70.539	76.609	82.668	94.756	106.807
.0305	25.173	31.495	37.817	44.133	50.449	56.761	63.069	69.367	75.656	81.927	88.184	100.667	113.113
.0310	29.061	35.597	42.131	48.655	55.191	61.715	68.230	74.739	81.229	87.703	94.160	107.043	119.889
.0315	33.423	40.172	46.919	53.655	60.410	67.147	73.870	80.581	87.285	93.965	100.626	113.912	127.162
.0320	38.290	45.251	52.213	59.164	66.137	73.088	80.022	86.941	93.857	100.744	107.611	121.306	134.962
.0325	43.694	50.868	58.046	65.214	72.403	79.570	86.716	93.846	100.973	108.069	115.146	129.253	143.317
.0330	49.668	57.056	64.451	71.840	79.241	86.625	93.984	101.328	108.665	115.973	123.261	137.785	152.257
.0335	56.244	63.850	71.461	79.074	86.685	94.284	101.859	109.413	116.966	124.485	131.989	146.932	161.814
.0340	63.456	71.282	79.112	86.948	94.766	102.582	110.373	118.141	125.907	133.639	141.360	156.725	172.018
.0345	71.339	79.387	87.436	95.496	103.520	111.551	119.559	127.542	135.522	143.468	151.407	167.196	182.901
.0350	79.929	88.201	96.468	104.751	112.981	121.225	129.451	137.649	145.842	154.003	162.160	178.376	194.494
.0355	89.261	97.758	106.242	114.745	123.182	131.640	140.083	148.497	156.901	165.278	173.653	190.296	206.829
.0360	99.371	108.092	116.792	125.506	134.159	142.829	151.489	160.119	168.734	177.327	185.917	202.988	219.941
.0365	110.298	119.239	128.152	137.077	145.947	154.828	163.704	172.550	181.374	190.184	198.985	216.484	233.860
.0370	122.078	131.234	140.357	149.492	158.582	167.673	176.762	185.824	194.857	203.884	212.891	230.817	248.622
.0375	134.750	144.113	153.443	162.776	172.098	181.400	190.700	199.977	209.216	218.460	227.669	246.020	264.259
.0380	148.353	157.915	167.448	176.988	186.534	196.045	205.553	215.043	224.488	233.949	243.357	262.130	280.806
.0385	162.924	172.676	182.410	192.161	201.925	211.647	221.359	231.059	240.711	250.386	259.993	279.185	298.297
.0390	178.502	188.439	198.372	208.320	218.309	228.242	238.155	248.063	257.921	267.809	277.623	297.230	316.768
.0395	195.124	205.244	215.376	225.536	235.727	245.870	255.982	266.095	276.161	286.256	296.295	316.316	336.255
.0400	212.830	223.135	233.468	243.842	254.218	264.569	274.882	285.196	295.471	305.766	316.070	336.503	356.794
.0405	231.655	242.154	252.691	263.280	273.824	284.380	294.899	305.411	315.898	326.382	337.016	357.864	378.424
.0410	251.635	262.343	273.085	283.862	294.590	305.344	316.084	326.789	337.490	348.147	359.218	380.492	
.0415	272.806	283.734	294.680	305.640	316.560	327.505	338.489	349.386	360.304	371.108	382.782		
.0420	295.202	306.349	317.483	328.635	339.783	350.906	362.177	373.264	384.400	395.318			
.0425	318.859	330.186	341.467	352.805	364.303	375.596	387.215	398.495					
.0430	343.810	355.205	366.746	378.247	390.168								
.0435	370.092	381.308	392.547										
.0440	397.745												

Table 2. Pressures in Atmospheres at Integral Densities and Temperatures - Continued

DENSITY MOL/CC	TEMPERATURE DEGREES K 46.000	48.000	50.000	55.000	60.000	65.000	70.000	75.000	80.000	85.000	90.000	95.000	100.000
.0005	1.851	1.934	2.018	2.226	2.434	2.643	2.851	3.059	3.267	3.475	3.683	3.891	4.098
.0010	3.631	3.800	3.970	4.393	4.816	5.238	5.461	6.082	6.504	6.927	7.348	7.769	8.190
.0015	5.343	5.601	5.859	6.504	7.148	7.791	8.434	9.075	9.716	10.358	11.000	11.640	12.279
.0020	6.990	7.340	7.690	8.563	9.433	10.304	11.173	12.039	12.907	13.774	14.641	15.506	16.369
.0025	8.574	9.019	9.463	10.571	11.676	12.779	13.881	14.979	16.078	17.176	18.275	19.371	20.464
.0030	10.100	10.642	11.183	12.533	13.878	15.221	16.561	17.897	19.234	20.570	21.905	23.238	24.567
.0035	11.570	12.211	12.852	14.451	16.042	17.632	19.217	20.798	22.378	23.957	25.536	27.112	28.682
.0040	12.986	13.730	14.474	16.327	18.172	20.014	21.851	23.683	25.513	27.341	29.170	30.995	32.813
.0045	14.352	15.201	16.050	18.165	20.270	22.372	24.467	26.556	28.643	30.727	32.812	34.892	36.963
.0050	15.670	16.628	17.584	19.967	22.339	24.708	27.068	29.420	31.771	34.117	36.465	38.806	41.137
.0055	16.944	18.012	19.080	21.737	24.383	27.024	29.656	32.279	34.900	37.516	40.133	42.741	45.338
.0060	18.176	19.358	20.539	23.478	26.404	29.326	32.236	35.136	38.034	40.926	43.820	46.701	49.571
.0065	19.369	20.667	21.964	25.192	28.405	31.614	34.810	37.995	41.176	44.352	47.529	50.690	53.840
.0070	20.527	21.944	23.360	26.883	30.391	33.894	37.382	40.858	44.330	47.797	51.264	54.712	58.148
.0075	21.652	23.191	24.728	28.553	32.363	36.168	39.956	43.730	47.500	51.265	55.029	58.771	62.501
.0080	22.748	24.411	26.073	30.208	34.326	38.439	42.535	46.614	50.690	54.761	58.829	62.872	66.903
.0085	23.818	25.608	27.396	31.848	36.283	40.712	45.123	49.514	53.904	58.289	62.668	67.019	71.358
.0090	24.864	26.784	28.702	33.479	38.238	42.990	47.723	52.435	57.146	61.852	66.549	71.218	75.872
.0095	25.890	27.943	29.994	35.103	40.194	45.277	50.341	55.382	60.421	65.455	70.479	75.472	80.450
.0100	26.900	29.088	31.275	36.725	42.155	47.577	52.980	58.357	63.733	69.103	74.461	79.787	85.096
.0105	27.896	30.223	32.549	38.347	44.125	49.895	55.644	61.366	67.087	72.801	78.501	84.169	89.817
.0110	28.882	31.351	33.820	39.974	46.109	52.234	58.339	64.414	70.488	76.554	82.605	88.623	94.618
.0115	29.861	32.476	35.090	41.609	48.110	54.599	61.068	67.506	73.941	80.368	86.777	93.154	99.505
.0120	30.838	33.601	36.364	43.258	50.132	56.995	63.838	70.647	77.453	84.247	91.023	97.769	104.485
.0125	31.815	34.731	37.646	44.923	52.181	59.427	66.652	73.843	81.027	88.199	95.351	102.474	109.564
.0130	32.797	35.869	38.940	46.610	54.261	61.900	69.517	77.099	84.671	92.229	99.766	107.276	114.748
.0135	33.787	37.019	40.251	48.324	56.377	64.419	72.438	80.421	88.391	96.343	104.275	112.181	120.044
.0140	34.790	38.186	41.582	50.068	58.535	66.989	75.421	83.815	92.193	100.549	108.885	117.196	125.461
.0145	35.810	39.374	42.939	51.849	60.739	69.618	78.479	87.288	96.083	104.854	113.604	122.330	131.005
.0150	36.851	40.589	44.327	53.671	62.996	72.311	81.599	90.847	100.069	109.265	118.439	127.589	136.685
.0155	37.919	41.834	45.750	55.541	65.313	75.074	84.807	94.498	104.158	113.789	123.398	132.982	142.508
.0160	39.018	43.116	47.214	57.464	67.694	77.914	88.104	98.249	108.358	118.435	128.491	138.517	148.484
.0165	40.154	44.439	48.726	59.446	70.148	80.839	91.496	102.107	112.677	123.212	133.725	144.203	154.621
.0170	41.333	45.811	50.291	61.495	72.680	83.855	94.993	106.081	117.123	128.127	139.109	150.050	160.929
.0175	42.560	47.237	51.916	63.618	75.300	86.971	98.601	110.179	121.704	133.191	144.653	156.065	167.417
.0180	43.842	48.723	53.607	65.822	78.014	90.195	102.330	114.409	126.431	138.412	150.366	162.260	174.094
.0185	45.186	50.278	55.373	68.114	80.831	93.535	106.189	118.781	131.311	143.800	156.259	168.645	180.973
.0190	46.600	51.909	57.221	70.504	83.760	97.001	110.186	123.305	136.356	149.366	162.341	175.230	188.063
.0195	48.091	53.623	59.160	73.000	86.810	100.602	114.332	127.989	141.575	155.119	168.624	182.026	195.375
.0200	49.668	55.431	61.197	75.612	89.991	104.348	118.637	132.846	146.980	161.071	175.117	189.045	202.921

Table 2. Pressures in Atmospheres at Integral Densities and Temperatures - Continued

DENSITY MOL/CC	TEMPERATURE DEGREES K												
	46.000	48.000	50.000	55.000	60.000	65.000	70.000	75.000	80.000	85.000	90.000	95.000	100.000
.0205	51.340	57.340	63.344	78.349	93.313	108.249	123.111	137.885	152.581	167.232	181.832	196.298	210.714
.0210	53.117	59.361	65.610	81.222	96.786	112.317	127.766	143.119	158.391	173.615	188.781	203.798	218.764
.0215	55.009	61.505	68.005	84.241	100.423	116.562	132.614	148.559	164.420	180.232	195.976	211.558	227.086
.0220	57.027	63.783	70.542	87.420	104.234	120.998	137.667	154.218	170.683	187.094	203.430	219.590	235.692
.0225	59.184	66.207	73.231	90.769	108.233	125.637	142.938	160.109	177.192	194.216	211.154	227.908	244.597
.0230	61.491	68.789	76.087	94.303	112.432	130.491	148.440	166.246	183.962	201.610	219.163	236.527	253.813
.0235	63.962	71.544	79.122	98.033	116.846	135.576	154.187	172.643	191.006	209.290	227.470	245.461	263.356
.0240	66.612	74.485	82.351	101.976	121.488	140.905	160.195	179.316	198.339	217.272	236.092	254.724	273.241
.0245	69.456	77.628	85.790	106.146	126.374	146.495	166.478	186.279	205.978	225.570	245.042	264.332	283.483
.0250	72.510	80.989	89.454	110.559	131.520	152.360	173.052	193.550	213.937	234.201	254.338	274.302	294.098
.0255	75.791	84.584	93.360	115.231	136.942	158.518	179.935	201.145	222.235	243.182	263.997	284.650	305.102
.0260	79.316	88.432	97.526	120.180	142.657	164.987	187.143	209.081	230.888	252.531	274.039	295.392	316.513
.0265	83.105	92.551	101.970	125.426	148.685	171.785	194.696	217.377	239.914	262.267	284.483	306.546	328.347
.0270	87.177	96.962	106.713	130.986	155.044	178.930	202.611	226.052	249.332	272.409	295.351	318.129	340.623
.0275	91.554	101.683	111.775	136.881	161.755	186.443	210.909	235.126	259.162	282.981	306.667	330.162	353.358
.0280	96.256	106.738	117.176	143.132	168.837	194.345	219.609	244.617	269.423	294.004	318.456	342.661	366.572
.0285	101.307	112.148	122.940	149.761	176.314	202.656	228.734	254.548	280.137	305.509	330.747	355.648	380.283
.0290	106.731	117.937	129.089	156.791	184.208	211.400	238.305	264.938	291.324	317.506	343.571	369.141	394.512
.0295	112.551	124.128	135.647	164.246	192.542	220.599	248.345	275.811	303.006	330.040	356.961	383.162	
.0300	118.793	130.748	142.640	172.149	201.340	230.277	258.877	287.188	315.207	343.136	370.954	397.731	
.0305	125.483	137.821	150.093	180.528	210.629	240.459	269.927	299.092	327.950	356.829	385.592		
.0310	132.649	145.374	158.031	189.408	220.433	251.169	281.519	311.546	341.258	371.154			
.0315	140.319	153.435	166.484	198.815	230.779	262.432	293.680	324.572	355.156	386.151			
.0320	148.520	162.032	175.477	208.777	241.694	274.276	306.437	338.196	369.670				
.0325	157.281	171.193	185.040	219.323	253.205	286.725	319.816	352.439	384.826				
.0330	166.634	180.948	195.201	230.479	265.337	299.805	333.848	367.326					
.0335	176.607	191.327	205.990	242.275	278.119	313.544	348.560	382.880					
.0340	187.232	202.361	217.436	254.738	291.574	327.965	363.984	399.124					
.0345	198.539	214.079	229.570	267.896	305.726	343.095	380.151						
.0350	210.559	226.513	242.420	281.775	320.600	358.956	397.090						
.0355	223.324	239.694	256.018	296.400	336.212	375.571							
.0360	236.865	253.653	270.393	311.795	352.581	392.961							
.0365	251.213	268.422	285.574	327.981	369.718								
.0370	266.399	284.032	301.590	344.977	387.629								
.0375	282.452	300.514	318.469	362.795									
.0380	299.403	317.898	336.239	381.446									
.0385	317.282	336.214	354.926										
.0390	336.115	355.493	374.554										
.0395	355.932	375.762	395.148										
.0400	376.757	397.049											
.0405	398.616												

Table 2-A. Density Adjustments for Smoothing
(In sequence of increasing densities of runs.)

Run No.	$\Delta\rho \cdot 10^6$	Run No.	$\Delta\rho \cdot 10^6$	Run No.	$\Delta\rho \cdot 10^6$
94	-0.04	50	+0.20	67	+5.01
93	+.29	80	+2.20	45	-2.25
92	-.40	79	+1.55	66	+3.34
91	-.41	78	+0.19	52	-0.76
90	+.02	77	-1.99	53	-2.53
89	+.66	49	-1.02	54	+1.39
88	+1.17	76	+0.36	55	+0.85
87	-0.92	75	+1.01	56	-1.32
86	-1.90	74	+1.08	57	+0.46
85	+0.68	73	+2.35	58	+1.90
84	+2.36	48	-10.33	59	-2.01
96	0.00	72	+2.31	60	-1.98
83	-2.21	71	+1.59	61	+3.67
51	+1.38	47	+2.47	62	-1.26
97	0.00	70	+0.18	63	-1.97
95	.00	46	+2.15	64	0.00
82	-.89	69	-6.09	65	.00
81	-1.79	68	-3.07		

Table 3 presents the data interpolated to isobars, that is to uniform pressures at the experimental temperatures. Table entries are densities in gram moles per cubic centimeter, multiplied by 1000. An iterative computer program was applied to locate these densities corresponding to assigned pressures on each isotherm, represented by the polynomial expansion described above.

The above polynomial representations of isotherms provide a smoothing in one of the two independent variables only. The interpolated isochores of table 2 have been given polynomial representations for the purpose of computing changes in thermodynamic functions. Comparison of the interpolated isochore data with these representations shows a behavior which is smooth within the precision of pressure measurements [7]. Entries in the tables of this report may contain more than an experimentally significant number of digits. These are useful in smoothed data for obtaining derivatives by numerical methods.

Table 3. Densities in g mol/cc x 10^3, at Integral Pressures and Temperatures

PRESSURE ATM	TEMPERATURE DEGREES K 17.000	18.000	19.000	20.000	21.000	22.000	23.000	24.000	25.000	26.000	27.000	28.000	29.000
1.0	36.8295	36.3394	35.8205	35.2681				.5408	.5155	.4930	.4723	.4536	.4363
2.0	36.8833	36.3977	35.8836	35.3364	34.7520	34.1221		1.1672	1.1020	1.0453	.9949	.9501	.9097
3.0	36.9365	36.4553	35.9459	35.4037	34.8275	34.2046	33.5291	32.7862	1.7974	1.6825	1.5860	1.5026	1.4297
4.0	36.9892	36.5122	36.0073	35.4702	34.9009	34.2857	33.6211	32.8915	32.0828	31.1707	2.2782	2.1329	2.0116
5.0	37.0413	36.5684	36.0680	35.5359	34.9730	34.3653	33.7110	32.9940	32.2025	31.3146	30.2928	2.8822	2.6809
6.0	37.0928	36.6239	36.1278	35.6007	35.0440	34.4436	33.7990	33.0940	32.3185	31.4529	30.4649	29.2953	3.4868
7.0	37.1438	36.6788	36.1870	35.6646	35.1139	34.5205	33.8852	33.1916	32.4312	31.5862	30.6288	29.5104	28.1349
8.0	37.1943	36.7330	36.2454	35.7278	35.1828	34.5962	33.9696	33.2869	32.5408	31.7150	30.7853	29.7117	28.4162
9.0	37.2442	36.7867	36.3031	35.7901	35.2507	34.6707	34.0524	33.3800	32.6474	31.8395	30.9354	29.9014	28.6731
10.0	37.2937	36.8397	36.3602	35.8518	35.3176	34.7440	34.1337	33.4712	32.7512	31.9602	31.0795	30.0809	28.9100
11.0	37.3427	36.8922	36.4165	35.9126	35.3835	34.8162	34.2135	33.5605	32.8525	32.0773	31.2183	30.2516	29.1305
12.0	37.3913	36.9441	36.4723	35.9728	35.4486	34.8873	34.2918	33.6479	32.9514	32.1910	31.3521	30.4143	29.3372
13.0	37.4394	36.9955	36.5274	36.0322	35.5128	34.9574	34.3688	33.7337	33.0480	32.3017	31.4815	30.5701	29.5318
14.0	37.4870	37.0464	36.5820	36.0910	35.5762	35.0264	34.4445	33.8178	33.1425	32.4094	31.6068	30.7195	29.7162
15.0	37.5342	37.0968	36.6359	36.1491	35.6388	35.0945	34.5190	33.9003	33.2350	32.5145	31.7283	30.8631	29.8914
16.0	37.5810	37.1467	36.6893	36.2065	35.7005	35.1617	34.5923	33.9814	33.3255	32.6169	31.8461	31.0016	30.0585
17.0	37.6274	37.1961	36.7422	36.2634	35.7615	35.2279	34.6645	34.0610	33.4142	32.7170	31.9607	31.1353	30.2184
18.0	37.6734	37.2451	36.7945	36.3195	35.8218	35.2933	34.7356	34.1393	33.5012	32.8148	32.0723	31.2646	30.3718
19.0	37.7189	37.2936	36.8463	36.3751	35.8814	35.3578	34.8057	34.2163	33.5865	32.9104	32.1809	31.3899	30.5193
20.0	37.7641	37.3416	36.8976	36.4301	35.9403	35.4215	34.8747	34.2920	33.6703	33.0041	32.2868	31.5114	30.6614
22.0	37.8534	37.4365	36.9986	36.5384	36.0560	35.5465	35.0099	34.4400	33.8333	33.1856	32.4912	31.7443	30.9313
24.0	37.9413	37.5297	37.0978	36.6445	36.1693	35.6685	35.1415	34.5835	33.9909	33.3602	32.6865	31.9650	31.1845
26.0	38.0278	37.6213	37.1953	36.7486	36.2801	35.7877	35.2698	34.7229	34.1434	33.5284	32.8736	32.1750	31.4232
28.0	38.1130	37.7115	37.2909	36.8506	36.3886	35.9042	35.3949	34.8585	34.2912	33.6907	33.0533	32.3755	31.6494
30.0	38.1969	37.8002	37.3850	36.9507	36.4951	36.0182	35.5170	34.9905	34.4347	33.8478	33.2264	32.5675	31.8646
32.0	38.2796	37.8876	37.4775	37.0491	36.5994	36.1297	35.6363	35.1192	34.5742	33.9999	33.3934	32.7518	32.0699
34.0	38.3612	37.9736	37.5685	37.1456	36.7018	36.2390	35.7530	35.2447	34.7100	34.1475	33.5548	32.9291	32.2664
36.0	38.4417	38.0584	37.6581	37.2406	36.8023	36.3461	35.8673	35.3673	34.8422	34.2909	33.7110	33.1001	32.4550
38.0	38.5210	38.1421	37.7463	37.3339	36.9011	36.4512	35.9791	35.4872	34.9712	34.4303	33.8624	33.2653	32.6364
40.0	38.5993	38.2245	37.8331	37.4257	36.9982	36.5543	36.0888	35.6044	35.0970	34.5660	34.0094	33.4251	32.8113
42.0	38.6767	38.3058	37.9187	37.5161	37.0936	36.6555	36.1963	35.7191	35.2200	34.6982	34.1523	33.5800	32.9801
44.0	38.7530	38.3861	38.0031	37.6050	37.1875	36.7549	36.3017	35.8315	35.3401	34.8273	34.2914	33.7303	33.1434
46.0	38.8285	38.4653	38.0862	37.6926	37.2799	36.8527	36.4053	35.9416	35.4577	34.9532	34.4268	33.8764	33.3016
48.0	38.9030	38.5435	38.1683	37.7789	37.3708	36.9487	36.5070	36.0496	35.5729	35.0763	34.5589	34.0184	33.4551
50.0	38.9766	38.6207	38.2492	37.8639	37.4604	37.0432	36.6069	36.1556	35.6856	35.1967	34.6877	34.1567	33.6042
55.0	39.1571	38.8097	38.4470	38.0713	37.6785	37.2730	36.8495	36.4123	35.9581	35.4866	34.9972	34.4877	33.9595
60.0	39.3327	38.9933	38.6386	38.2719	37.8891	37.4942	37.0825	36.6581	36.2182	35.7624	35.2902	34.7999	34.2928
65.0	39.5037	39.1718	38.8247	38.4661	38.0927	37.7076	37.3069	36.8942	36.4672	36.0255	35.5689	35.0956	34.6074
70.0	39.6705	39.3456	39.0054	38.6545	38.2899	37.9139	37.5234	37.1214	36.7062	36.2774	35.8349	35.3769	34.9054
75.0	39.8333	39.5149	39.1813	38.8376	38.4812	38.1135	37.7326	37.3405	36.9363	36.5192	36.0894	35.6454	35.1890

Table 3. Densities in g mol/cc x 10^3, at Integral Pressures and Temperatures - Continued

PRESSURE ATM	TEMPERATURE DEGREES K											
	17.000	18.000	19.000	20.000	21.000	22.000	23.000	24.000	25.000	26.000	27.000	28.000	29.000
80.0	39.9925	39.6801	39.3527	39.0156	38.6670	38.3072	37.9352	37.5522	37.1581	36.7518	36.3337	35.9024	35.4597
85.0	40.1481	39.8413	39.5197	39.1890	38.8477	38.4952	38.1315	37.7572	37.3723	36.9760	36.5687	36.1491	35.7188
90.0	40.3005	39.9989	39.6828	39.3581	39.0236	38.6780	38.3221	37.9558	37.5796	37.1925	36.7951	36.3863	35.9675
95.0	40.4498	40.1529	39.8422	39.5231	39.1950	38.8559	38.5074	38.1486	37.7805	37.4020	37.0138	36.6150	36.2068
100.0	40.5961	40.3036	39.9979	39.6842	39.3622	39.0293	38.6877	38.3360	37.9755	37.6050	37.2254	36.8359	36.4374
105.0	40.7397	40.4511	40.1504	39.8418	39.5254	39.1984	38.8633	38.5183	38.1649	37.8020	37.4304	37.0499	36.6601
110.0		40.5956	40.2996	39.9960	39.6849	39.3635	39.0345	38.6959	38.3491	37.9933	37.6292	37.2565	36.8755
115.0		40.7372	40.4458	40.1470	39.8409	39.5248	39.2016	38.8689	38.5286	38.1794	37.8224	37.4572	37.0842
120.0		40.8760	40.5892	40.2949	39.9936	39.6826	39.3648	39.0379	38.7034	38.3607	38.0102	37.6523	37.2867
125.0		41.0122	40.7298	40.4399	40.1431	39.8370	39.5243	39.2028	38.8741	38.5373	38.1932	37.8419	37.4834
130.0		41.1458	40.8679	40.5822	40.2896	39.9881	39.6804	39.3640	39.0407	38.7096	38.3714	38.0266	37.6746
135.0		41.2770	41.0034	40.7218	40.4332	40.1363	39.8331	39.5217	39.2035	38.8778	38.5453	38.2065	37.8608
140.0		41.4058	41.1366	40.8589	40.5742	40.2815	39.9827	39.6760	39.3627	39.0423	38.7151	38.3820	38.0422
145.0			41.2675	40.9935	40.7125	40.4240	40.1294	39.8272	39.5186	39.2030	38.8810	38.5533	38.2192
150.0			41.3963	41.1258	40.8483	40.5638	40.2732	39.9753	39.6712	39.3604	39.0432	38.7207	38.3920
155.0			41.5230	41.2559	40.9818	40.7011	40.4143	40.1206	39.8207	39.5144	39.2020	38.8844	38.5608
160.0			41.6476	41.3838	41.1130	40.8361	40.5528	40.2631	39.9673	39.6654	39.3574	39.0445	38.7258
165.0			41.7703	41.5096	41.2420	40.9687	40.6888	40.4029	40.1111	39.8134	39.5097	39.2013	38.8872
170.0			41.8912	41.6335	41.3690	41.0991	40.8225	40.5403	40.2523	39.9586	39.6590	39.3549	39.0453
175.0			42.0103	41.7553	41.4939	41.2274	40.9539	40.6753	40.3909	40.1011	39.8055	39.5055	39.2002
180.0			42.1277	41.8753	41.6169	41.3536	41.0832	40.8080	40.5271	40.2411	39.9493	39.6532	39.3520
185.0				41.9934	41.7381	41.4779	41.2104	40.9384	40.6610	40.3786	40.0904	39.7981	39.5009
190.0				42.1098	41.8575	41.6003	41.3356	41.0668	40.7926	40.5137	40.2291	39.9404	39.6470
195.0				42.2244	41.9751	41.7208	41.4589	41.1931	40.9221	40.6465	40.3654	40.0802	39.7904
200.0				42.3373	42.0911	41.8396	41.5803	41.3175	41.0496	40.7772	40.4994	40.2176	39.9313
210.0				42.5583	42.3184	42.0721	41.8179	41.5607	41.2986	41.0324	40.7609	40.4854	40.2059
220.0				42.7730	42.5396	42.2982	42.0489	41.7969	41.5403	41.2799	41.0143	40.7447	40.4715
230.0					42.7553	42.5183	42.2738	42.0267	41.7752	41.5203	41.2602	40.9961	40.7288
240.0					42.9658	42.7328	42.4929	42.2504	42.0038	41.7539	41.4990	41.2402	40.9784
250.0					43.1713	42.9420	42.7067	42.4685	42.2265	41.9813	41.7314	41.4774	41.2208
260.0					43.3722	43.1461	42.9155	42.6814	42.4436	42.2028	41.9577	41.7083	41.4566
270.0						43.3454	43.1196	42.8893	42.6556	42.4189	42.1782	41.9332	41.6861
280.0						43.5401	43.3193	43.0926	42.8627	42.6298	42.3933	42.1525	41.9098
290.0						43.7306	43.5148	43.2916	43.0653	42.8358	42.6034	42.3666	42.1280
300.0						43.9168	43.7064	43.4865	43.2635	43.0373	42.8086	42.5757	42.3411
310.0						44.0992	43.8943	43.6776	43.4578	43.2344	43.0094	42.7801	42.5492
320.0							44.0787	43.8651	43.6481	43.4274	43.2058	42.9802	42.7528
330.0							44.2597	44.0492	43.8349	43.6165	43.3982	43.1760	42.9520
340.0							44.4377	44.2302	44.0183	43.8019	43.5867	43.3680	43.1470
350.0							44.6126	44.4081	44.1984	43.9837	43.7716	43.5561	43.3382

Table 3. Densities in g mol/cc x 10^3, at Integral Pressures and Temperatures - Continued

PRESSURE ATM	TEMPERATURE DEGREES K											
	30.000	31.000	32.000	33.000	34.000	35.000	36.000	37.000	38.000	39.000	40.000	42.000	44.000
1.0	.4204	.4057	.3920	.3792	.3673	.3561	.3457	.3358	.3265	.3177	.3094	.2941	.2803
2.0	.8729	.8395	.8086	.7802	.7538	.7294	.7066	.6853	.6654	.6466	.6289	.5965	.5674
3.0	1.3650	1.3069	1.2543	1.2064	1.1624	1.1221	1.0847	1.0500	1.0177	.9875	.9592	.9076	.8618
4.0	1.9074	1.8159	1.7348	1.6623	1.5965	1.5367	1.4819	1.4314	1.3848	1.3415	1.3011	1.2281	1.1637
5.0	2.5165	2.3779	2.2583	2.1537	2.0604	1.9766	1.9008	1.8317	1.7683	1.7099	1.6557	1.5586	1.4736
6.0	3.2208	3.0107	2.8367	2.6885	2.5598	2.4460	2.3445	2.2530	2.1699	2.0939	2.0241	1.8998	1.7919
7.0	4.0764	3.7447	3.4880	3.2786	3.1026	2.9503	2.8169	2.6983	2.5917	2.4953	2.4074	2.2523	2.1192
8.0	5.2291	4.6396	4.2423	3.9413	3.6996	3.4966	3.3228	3.1710	3.0364	2.9159	2.8071	2.6171	2.4558
9.0	27.1088	5.8469	5.1568	4.7053	4.3666	4.0947	3.8687	3.6754	3.5068	3.3578	3.2247	2.9950	2.8023
10.0	27.4623	25.4290	6.3695	5.6218	5.1284	4.7587	4.4631	4.2170	4.0068	3.8237	3.6620	3.3869	3.1593
11.0	27.7759	25.9797	8.4901	6.8014	6.0275	5.5091	5.1173	4.8028	4.5408	4.3166	4.1213	3.7940	3.5274
12.0	28.0591	26.4298	23.9583	8.5927	7.1458	6.3786	5.8477	5.4419	5.1143	4.8400	4.6047	4.2174	3.9071
13.0	28.3183	26.8151	24.7272	19.7426	8.6788	7.4227	6.6778	6.1463	5.7342	5.3982	5.1152	4.6584	4.2993
14.0	28.5580	27.1546	25.3100	22.2921	11.3328	8.7465	7.6434	6.9323	6.4092	5.9962	5.6558	5.1185	4.7044
15.0	28.7813	27.4597	25.7879	23.3835	17.6605	10.5749	8.8006	7.8222	7.1501	6.6399	6.2301	5.5990	5.1232
16.0	28.9907	27.7378	26.1972	24.1344	20.6298	13.3863	10.2381	8.8457	7.9698	7.3361	6.8421	6.1017	5.5564
17.0	29.1883	27.9940	26.5576	24.7211	22.0056	16.9414	12.0760	10.0406	8.8841	8.0925	7.4959	6.6279	6.0047
18.0	29.3754	28.2322	26.8810	25.2090	22.9256	19.3244	14.3387	11.4443	9.9092	8.9169	8.1959	7.1793	6.4686
19.0	29.5534	28.4551	27.1754	25.6299	23.6276	20.7778	16.6267	13.0600	11.0572	9.8161	8.9459	7.7572	6.9486
20.0	29.7233	28.6648	27.4463	26.0021	24.2007	21.7969	18.4487	14.7932	12.3248	10.7936	9.7482	8.3626	7.4452
22.0	30.0420	29.0516	27.9327	26.6427	25.1135	23.2218	20.8204	17.8783	15.0425	12.9522	11.5051	9.6564	8.4882
24.0	30.3367	29.4026	28.3622	27.1856	25.8357	24.2362	22.3172	20.0189	17.4958	15.1974	13.4046	11.0513	9.5954
26.0	30.6115	29.7250	28.7484	27.6598	26.4387	25.0320	23.4021	21.5099	19.3861	17.2258	15.2981	12.5153	10.7573
28.0	30.8693	30.0238	29.1004	28.0828	26.9596	25.6912	24.2558	22.6293	20.8142	18.8921	17.0232	13.9928	11.9558
30.0	31.1125	30.3027	29.4247	28.4659	27.4200	26.2569	24.9623	23.5219	21.9318	20.2292	18.5020	15.4187	13.1645
32.0	31.3429	30.5646	29.7258	28.8168	27.8340	26.7541	25.5672	24.2645	22.8417	21.3175	19.7419	16.7402	14.3523
34.0	31.5621	30.8119	30.0074	29.1411	28.2111	27.1991	26.0976	24.9014	23.6071	22.2247	20.7847	17.9306	15.4908
36.0	31.7714	31.0463	30.2721	29.4432	28.5580	27.6026	26.5709	25.4600	24.2672	22.9985	21.6736	18.9871	16.5592
38.0	31.9716	31.2693	30.5223	29.7263	28.8798	27.9725	26.9991	25.9582	24.8479	23.6718	22.4432	19.9207	17.5466
40.0	32.1638	31.4822	30.7596	29.9929	29.1803	28.3145	27.3906	26.4085	25.3665	24.2672	23.1198	20.7481	18.4510
42.0	32.3487	31.6860	30.9855	30.2450	29.4626	28.6330	27.7522	26.8199	25.8357	24.8010	23.7223	21.4856	19.2758
44.0	32.5268	31.8815	31.2013	30.4845	29.7289	28.9314	28.0881	27.1991	26.2643	25.2848	24.2652	22.1481	20.0278
46.0	32.6989	32.0696	31.4079	30.7126	29.9812	29.2123	28.4021	27.5510	26.6592	25.7274	24.7589	22.7476	20.7146
48.0	32.8653	32.2509	31.6062	30.9306	30.2212	29.4779	28.6972	27.8797	27.0255	26.1355	25.2119	23.2942	21.3439
50.0	33.0264	32.4259	31.7969	31.1394	30.4500	29.7299	28.9759	28.1882	27.3675	26.5143	25.6302	23.7959	21.9228
55.0	33.4090	32.8390	32.2448	31.6265	30.9808	30.3102	29.6123	28.8872	28.1356	27.3583	26.5556	24.8938	23.1888
60.0	33.7661	33.2223	32.6575	32.0719	31.4624	30.8322	30.1794	29.5041	28.8068	28.0886	27.3494	25.8222	24.2536
65.0	34.1014	33.5804	33.0408	32.4831	31.9043	31.3078	30.6924	30.0578	29.4046	28.7340	28.0457	26.6267	25.1697
70.0	34.4181	33.9169	33.3994	32.8656	32.3135	31.7456	31.1617	30.5613	29.9447	29.3134	28.6671	27.3370	25.9725
75.0	34.7183	34.2347	33.7366	33.2238	32.6950	32.1520	31.5951	31.0238	30.4382	29.8401	29.2291	27.9736	26.6869

Table 3. Densities in g mol/cc x 10^3, at Integral Pressures and Temperatures - Continued

PRESSURE ATM	TEMPERATURE DEGREES K												
	30.000	31.000	32.000	33.000	34.000	35.000	36.000	37.000	38.000	39.000	40.000	42.000	44.000
80.0	35.0040	34.5361	34.0554	33.5610	33.0529	32.5317	31.9983	31.4522	30.8933	30.3236	29.7428	28.5510	27.3305
85.0	35.2767	34.8231	34.3579	33.8801	33.3904	32.8885	32.3757	31.8517	31.3161	30.7711	30.2164	29.0797	27.9165
90.0	35.5379	35.0972	34.6461	34.1832	33.7100	33.2253	32.7310	32.2265	31.7115	31.1881	30.6562	29.5678	28.4547
95.0	35.7886	35.3597	34.9214	34.4720	34.0139	33.5447	33.0668	32.5798	32.0831	31.5789	31.0672	30.0214	28.9525
100.0	36.0298	35.6118	35.1852	34.7482	34.3036	33.8486	33.3855	32.9142	32.4339	31.9470	31.4533	30.4455	29.4160
105.0	36.2623	35.8544	35.4386	35.0129	34.5808	34.1386	33.6890	33.2320	32.7665	32.2951	31.8176	30.8439	29.8497
110.0	36.4869	36.0883	35.6825	35.2673	34.8466	34.4162	33.9789	33.5348	33.0830	32.6257	32.1626	31.2198	30.2577
115.0	36.7040	36.3142	35.9177	35.5122	35.1020	34.6826	34.2566	33.8244	33.3849	32.9405	32.4907	31.5759	30.6429
120.0	36.9144	36.5328	36.1449	35.7485	35.3480	34.9387	34.5231	34.1019	33.6738	33.2411	32.8035	31.9143	31.0079
125.0	37.1185	36.7447	36.3649	35.9772	35.5854	35.1855	34.7795	34.3684	33.9509	33.5291	33.1025	32.2369	31.3550
130.0	37.3167	36.9502	36.5780	36.1983	35.8148	35.4236	35.0267	34.6250	34.2172	33.8055	33.3892	32.5452	31.6860
135.0	37.5095	37.1499	36.7849	36.4127	36.0369	35.6539	35.2654	34.8724	34.4738	34.0714	33.6645	32.8406	32.0024
140.0	37.6971	37.3441	36.9859	36.6209	36.2521	35.8769	35.4962	35.1114	34.7213	34.3276	33.9296	33.1243	32.3056
145.0	37.8800	37.5332	37.1814	36.8231	36.4611	36.0931	35.7198	35.3426	34.9605	34.5749	34.1852	33.3972	32.5967
150.0	38.0583	37.7175	37.3717	37.0200	36.6642	36.3030	35.9367	35.5666	35.1920	34.8140	34.4320	33.6603	32.8769
155.0	38.2323	37.8972	37.5573	37.2115	36.8617	36.5069	36.1472	35.7839	35.4164	35.0456	34.6709	33.9143	33.1469
160.0	38.4024	38.0727	37.7383	37.3982	37.0541	36.7054	36.3519	35.9950	35.6342	35.2701	34.9022	34.1600	33.4076
165.0	38.5686	38.2441	37.9150	37.5804	37.2416	36.8987	36.5511	36.2003	35.8458	35.4881	35.1267	34.3979	33.6596
170.0	38.7312	38.4118	38.0876	37.7583	37.4245	37.0871	36.7452	36.4001	36.0516	35.6999	35.3446	34.6285	33.9036
175.0	38.8904	38.5758	38.2564	37.9320	37.6032	37.2710	36.9344	36.5948	36.2519	35.9059	35.5565	34.8524	34.1402
180.0	39.0464	38.7363	38.4216	38.1019	37.7777	37.4505	37.1191	36.7846	36.4472	36.1066	35.7628	35.0700	34.3698
185.0	39.1993	38.8936	38.5833	38.2681	37.9484	37.6259	37.2994	36.9699	36.6376	36.3022	35.9637	35.2818	34.5929
190.0	39.3492	39.0478	38.7417	38.4309	38.1154	37.7975	37.4756	37.1509	36.8235	36.4930	36.1596	35.4880	34.8099
195.0	39.4964	39.1990	38.8970	38.5903	38.2790	37.9653	37.6480	37.3278	37.0052	36.6794	36.3508	35.6890	35.0211
200.0	39.6408	39.3473	39.0493	38.7467	38.4392	38.1297	37.8167	37.5008	37.1827	36.8614	36.5376	35.8850	35.2270
210.0	39.9221	39.6360	39.3453	39.0501	38.7503	38.4487	38.1438	37.8361	37.5264	37.2136	36.8986	36.2636	35.6237
220.0	40.1940	39.9146	39.6307	39.3426	39.0499	38.7555	38.4582	38.1580	37.8562	37.5511	37.2443	36.6254	36.0022
230.0	40.4572	40.1840	39.9065	39.6245	39.3389	39.0512	38.7610	38.4679	38.1733	37.8753	37.5762	36.9723	36.3643
240.0	40.7124	40.4449	40.1733	39.8974	39.6182	39.3368	39.0531	38.7666	38.4787	38.1875	37.8955	37.3055	36.7115
250.0	40.9602	40.6978	40.4318	40.1617	39.8885	39.6130	39.3355	39.0551	38.7735	38.4886	38.2032	37.6262	37.0452
260.0	41.2010	40.9435	40.6826	40.4177	40.1505	39.8805	39.6088	39.3342	39.0585	38.7795	38.5002	37.9355	37.3666
270.0	41.4353	41.1823	40.9262	40.6664	40.4047	40.1399	39.8736	39.6046	39.3343	39.0609	38.7873	38.2342	37.6767
280.0	41.6637	41.4147	41.1632	40.9084	40.6517	40.3919	40.1306	39.8668	39.6017	39.3336	39.0653	38.5232	37.9763
290.0	41.8863	41.6413	41.3940	41.1434	40.8919	40.6368	40.3802	40.1214	39.8612	39.5981	39.3346	38.8030	38.2663
300.0	42.1036	41.8623	41.6191	41.3728	41.1257	40.8752	40.6230	40.3689	40.1133	39.8551	39.5959	39.0743	38.5473
310.0	42.3159	42.0783	41.8388	41.5970	41.3536	41.1074	40.8593	40.6097	40.3585	40.1049	39.8496	39.3376	38.8199
320.0	42.5235	42.2894	42.0537	41.8154	41.5758	41.3337	41.0894	40.8442	40.5971	40.3461	40.0960	39.5934	39.0848
330.0	42.7265	42.4962	42.2639	42.0294	41.7927	41.5546	41.3138	41.0728	40.8297	40.5850	40.3357	39.8420	39.3424
340.0	42.9253	42.6989	42.4701	42.2384	42.0046	41.7703	41.5327	41.2957	41.0564	40.8160	40.5689	40.0838	39.5931
350.0	43.1201	42.8978	42.6724	42.4436	42.2116	41.9811	41.7464	41.5132	41.2776	41.0414	40.7960	40.3192	39.8375

Table 3. Densities in g mol/cc x 10^3, at Integral Pressures and Temperatures - Continued

PRESSURE ATM	TEMPERATURE DEGREES K											
	46.000	48.000	50.000	55.000	60.000	65.000	70.000	75.000	80.000	85.000	90.000	95.000	100.000
1.0	.2677	.2562	.2457	.2229	.2041	.1881	.1746	.1628	.1526	.1435	.1355	.1283	.1219
2.0	.5412	.5173	.4955	.4486	.4100	.3776	.3500	.3263	.3056	.2873	.2712	.2568	.2439
3.0	.8206	.7834	.7496	.6771	.6178	.5683	.5264	.4904	.4590	.4315	.4071	.3854	.3659
4.0	1.1062	1.0546	1.0079	.9083	.8275	.7604	.7037	.6551	.6129	.5759	.5432	.5141	.4880
5.0	1.3984	1.3312	1.2706	1.1424	1.0392	.9537	.8818	.8204	.7672	.7205	.6794	.6429	.6101
6.0	1.6973	1.6132	1.5378	1.3794	1.2527	1.1483	1.0608	.9863	.9218	.8655	.8158	.7717	.7323
7.0	2.0032	1.9010	1.8097	1.6193	1.4681	1.3442	1.2407	1.1528	1.0769	1.0107	.9524	.9007	.8545
8.0	2.3166	2.1946	2.0864	1.8621	1.6853	1.5419	1.4214	1.3199	1.2324	1.1561	1.0891	1.0298	.9767
9.0	2.6376	2.4943	2.3679	2.1078	1.9045	1.7396	1.6029	1.4875	1.3882	1.3018	1.2259	1.1589	1.0990
10.0	2.9666	2.8002	2.6544	2.3566	2.1255	1.9392	1.7852	1.6556	1.5443	1.4477	1.3629	1.2880	1.2213
11.0	3.3040	3.1126	2.9460	2.6083	2.3484	2.1399	1.9683	1.8242	1.7008	1.5938	1.5000	1.4173	1.3435
12.0	3.6500	3.4317	3.2428	2.8630	2.5731	2.3418	2.1521	1.9934	1.8576	1.7400	1.6372	1.5465	1.4658
13.0	4.0051	3.7576	3.5449	3.1207	2.7997	2.5449	2.3368	2.1630	2.0147	1.8865	1.7745	1.6759	1.5881
14.0	4.3696	4.0905	3.8524	3.3815	3.0281	2.7491	2.5221	2.3331	2.1721	2.0332	1.9119	1.8052	1.7104
15.0	4.7437	4.4306	4.1654	3.6453	3.2582	2.9545	2.7082	2.5036	2.3297	2.1800	2.0494	1.9346	1.8326
16.0	5.1280	4.7781	4.4839	3.9121	3.4902	3.1609	2.8949	2.6745	2.4877	2.3269	2.1869	2.0639	1.9549
17.0	5.5225	5.1330	4.8080	4.1820	3.7239	3.3684	3.0823	2.8459	2.6458	2.4740	2.3245	2.1933	2.0770
18.0	5.9277	5.4955	5.1377	4.4548	3.9594	3.5769	3.2703	3.0176	2.8042	2.6212	2.4622	2.3227	2.1992
19.0	6.3437	5.8657	5.4731	4.7305	4.1965	3.7865	3.4590	3.1897	2.9628	2.7686	2.5998	2.4521	2.3213
20.0	6.7706	6.2435	5.8141	5.0092	4.4353	3.9970	3.6482	3.3622	3.1216	2.9160	2.7376	2.5814	2.4434
22.0	7.6572	7.0221	6.5127	5.5750	4.9176	4.4208	4.0283	3.7081	3.4398	3.2111	3.0130	2.8400	2.6873
24.0	8.5863	7.8304	7.2328	6.1516	5.4059	4.8481	4.4105	4.0551	3.7585	3.5064	3.2885	3.0984	2.9310
26.0	9.5540	8.6659	7.9728	6.7382	5.8997	5.2785	4.7944	4.4031	4.0777	3.8019	3.5639	3.3566	3.1743
28.0	10.5526	9.5248	8.7304	7.3338	6.3984	5.7116	5.1799	4.7519	4.3972	4.0973	3.8391	3.6145	3.4173
30.0	11.5709	10.4015	9.5022	7.9370	6.9013	6.1471	5.5666	5.1013	4.7169	4.3927	4.1140	3.8720	3.6598
32.0	12.5944	11.2884	10.2841	8.5464	7.4077	6.5845	5.9542	5.4511	5.0366	4.6879	4.3886	4.1291	3.9018
34.0	13.6067	12.1768	11.0710	9.1602	7.9167	7.0233	6.3426	5.8011	5.3563	4.9827	4.6627	4.3858	4.1433
36.0	14.5921	13.0573	11.8573	9.7765	8.4275	7.4631	6.7313	6.1511	5.6756	5.2772	4.9364	4.6418	4.3842
38.0	15.5373	13.9208	12.6372	10.3932	8.9391	7.9034	7.1201	6.5009	5.9946	5.5711	5.2095	4.8973	4.6245
40.0	16.4331	14.7590	13.4048	11.0080	9.4504	8.3435	7.5086	6.8503	6.3131	5.8645	5.4819	5.1520	4.8641
42.0	17.2745	15.5656	14.1550	11.6189	9.9605	8.7829	7.8964	7.1991	6.6309	6.1570	5.7535	5.4061	5.1030
44.0	18.0600	16.3359	14.8834	12.2235	10.4683	9.2211	8.2833	7.5470	6.9478	6.4488	6.0244	5.6594	5.3411
46.0	18.7910	17.0675	15.5865	12.8199	10.9727	9.6575	8.6690	7.8938	7.2638	6.7396	6.2943	5.9118	5.5784
48.0	19.4702	17.7594	16.2619	13.4062	11.4728	10.0915	9.0530	8.2394	7.5786	7.0294	6.5633	6.1633	5.8149
50.0	20.1017	18.4123	16.9084	13.9807	11.9676	10.5226	9.4351	8.5834	7.8922	7.3180	6.8313	6.4138	6.0504
55.0	21.4977	19.8833	18.3961	15.3568	13.1757	11.5841	10.3796	9.4355	8.6696	8.0340	7.4962	7.0357	6.6351
60.0	22.6808	21.1521	19.7093	16.6368	14.3336	12.6167	11.3051	10.2738	9.4361	8.7408	8.1531	7.6504	7.2134
65.0	23.7000	22.2549	20.8681	17.8158	15.4339	13.6140	12.2075	11.0953	10.1897	9.4372	8.8011	8.2573	7.7846
70.0	24.5917	23.2238	21.8956	18.8963	16.4704	14.5717	13.0834	11.8976	10.9287	10.1219	9.4394	8.8556	8.3483
75.0	25.3827	24.0842	22.8132	19.8850	17.4437	15.4868	13.9300	12.6788	11.6516	10.7939	10.0671	9.4449	8.9039

Table 3. Densities in g mol/cc x 10^3, at Integral Pressures and Temperatures - Continued

PRESSURE ATM	TEMPERATURE DEGREES K											
	46.000	48.000	50.000	55.000	60.000	65.000	70.000	75.000	80.000	85.000	90.000	95.000	100.000
80.0	26.0930	24.8564	23.6390	20.7904	18.3545	16.3581	14.7458	13.4372	12.3572	11.4521	10.6835	10.0244	9.4512
85.0	26.7372	25.5557	24.3879	21.6217	19.2057	17.1856	15.5296	14.1719	13.0446	12.0959	11.2881	10.5939	9.9897
90.0	27.3266	26.1944	25.0719	22.3875	20.0014	17.9702	16.2813	14.8821	13.7130	12.7247	11.8803	11.1529	10.5192
95.0	27.8699	26.7818	25.7007	23.0956	20.7457	18.7136	17.0010	15.5677	14.3620	13.3379	12.4598	11.7011	11.0394
100.0	28.3740	27.3256	26.2823	23.7529	21.4431	19.4177	17.6895	16.2287	14.9914	13.9353	13.0262	12.2383	11.5501
105.0	28.8443	27.8319	26.8231	24.3654	22.0976	20.0850	18.3478	16.8654	15.6013	14.5167	13.5794	12.7643	12.0511
110.0	29.2852	28.3055	27.3284	24.9383	22.7134	20.7178	18.9771	17.4785	16.1917	15.0821	14.1192	13.2790	12.5425
115.0	29.7004	28.7505	27.8025	25.4760	23.2939	21.3185	19.5788	18.0685	16.7631	15.6316	14.6457	13.7825	13.0241
120.0	30.0928	29.1704	28.2490	25.9823	23.8425	21.8894	20.1544	18.6364	17.3158	16.1653	15.1588	14.2745	13.4958
125.0	30.4650	29.5678	28.6711	26.4605	24.3620	22.4327	20.7053	19.1830	17.8503	16.6836	15.6587	14.7554	13.9579
130.0	30.8191	29.9452	29.0714	26.9135	24.8550	22.9504	21.2329	19.7092	18.3673	17.1867	16.1456	15.2251	14.4102
135.0	31.1569	30.3045	29.4521	27.3437	25.3240	23.4445	21.7387	20.2160	18.8672	17.6750	16.6197	15.6838	14.8529
140.0	31.4799	30.6477	29.8150	27.7532	25.7708	23.9167	22.2239	20.7043	19.3509	18.1490	17.0814	16.1317	15.2862
145.0	31.7895	30.9760	30.1618	28.1439	26.1975	24.3686	22.6900	21.1751	19.8189	18.6092	17.5308	16.5690	15.7101
150.0	32.0868	31.2909	30.4940	28.5175	26.6056	24.8017	23.1379	21.6292	20.2718	19.0560	17.9684	16.9958	16.1248
155.0	32.3729	31.5934	30.8128	28.8754	26.9966	25.2173	23.5690	22.0676	20.7104	19.4898	18.3945	17.4125	16.5304
160.0	32.6487	31.8847	31.1193	29.2188	27.3718	25.6167	23.9842	22.4909	21.1353	19.9113	18.8094	17.8193	16.9272
165.0	32.9149	32.1655	31.4145	29.5490	27.7325	26.0010	24.3844	22.9001	21.5471	20.3209	19.2136	18.2164	17.3154
170.0	33.1723	32.4366	31.6992	29.8669	28.0795	26.3711	24.7707	23.2959	21.9464	20.7190	19.6074	18.6042	17.6952
175.0	33.4215	32.6989	31.9742	30.1734	28.4141	26.7281	25.1439	23.6790	22.3338	21.1061	19.9911	18.9828	18.0667
180.0	33.6631	32.9527	32.2403	30.4693	28.7368	27.0728	25.5046	24.0501	22.7098	21.4828	20.3652	19.3526	18.4302
185.0	33.8975	33.1989	32.4980	30.7554	29.0487	27.4059	25.8537	24.4097	23.0750	21.8493	20.7301	19.7138	18.7859
190.0	34.1253	33.4377	32.7478	31.0323	29.3504	27.7282	26.1919	24.7586	23.4298	22.2063	21.0859	20.0668	19.1340
195.0	34.3468	33.6698	32.9904	31.3007	29.6424	28.0404	26.5197	25.0972	23.7748	22.5539	21.4332	20.4117	19.4747
200.0	34.5624	33.8955	33.2261	31.5610	29.9256	28.3430	26.8377	25.4260	24.1105	22.8927	21.7721	20.7489	19.8083
210.0	34.9774	34.3293	33.6785	32.0594	30.4670	28.9216	27.4464	26.0565	24.7553	23.5453	22.4264	21.4010	20.4549
220.0	35.3726	34.7418	34.1081	32.5312	30.9785	29.4682	28.0219	26.6535	25.3674	24.1665	23.0512	22.0251	21.0753
230.0	35.7502	35.1351	34.5172	32.9791	31.4632	29.9860	28.5675	27.2203	25.9497	24.7591	23.6486	22.6230	21.6712
240.0	36.1117	35.5113	34.9080	33.4057	31.9241	30.4780	29.0861	27.7596	26.5047	25.3251	24.2207	23.1965	22.2440
250.0	36.4588	35.8719	35.2822	33.8131	32.3634	30.9467	29.5802	28.2738	27.0347	25.8666	24.7690	23.7473	22.7952
260.0	36.7927	36.2183	35.6413	34.2032	32.7833	31.3941	30.0519	28.7652	27.5417	26.3854	25.2954	24.2768	23.3261
270.0	37.1146	36.5518	35.9867	34.5775	33.1854	31.8224	30.5032	29.2356	28.0275	26.8831	25.8012	24.7865	23.8380
280.0	37.4254	36.8734	36.3195	34.9375	33.5715	32.2330	30.9358	29.6867	28.4938	27.3611	26.2878	25.2776	24.3320
290.0	37.7260	37.1842	36.6409	35.2844	33.9428	32.6275	31.3512	30.1202	28.9420	27.8208	26.7563	25.7514	24.8091
300.0	38.0171	37.4848	36.9515	35.6192	34.3007	33.0073	31.7507	30.5372	29.3734	28.2634	27.2079	26.2089	25.2704
310.0	38.2995	37.7761	37.2524	35.9430	34.6462	33.3733	32.1355	30.9392	29.7893	28.6899	27.6435	26.6511	25.7168
320.0	38.5738	38.0587	37.5441	36.2565	34.9803	33.7268	32.5067	31.3270	30.1906	29.1013	28.0640	27.0790	26.1492
330.0	38.8404	38.3332	37.8273	36.5607	35.3039	34.0686	32.8652	31.7019	30.5785	29.4985	28.4702	27.4934	26.5684
340.0	39.1000	38.6002	38.1027	36.8561	35.6178	34.3996	33.2120	32.0646	30.9537	29.8823	28.8629	27.8951	26.9751
350.0	39.3529	38.8601	38.3706	37.1433	35.9227	34.7206	33.5477	32.4159	31.3170	30.2534	29.2428	28.2849	27.3699

The self-consistency of a thermodynamic network is under investigation, using numerical methods of computation with the present data in conjunction with spectroscopic [1] and calorimetric [20, 21] specific heats.

Thomas R. Strobridge kindly gave to us his computer program [22] of the least-squares method of William B. Jones [19]. Among present authors, the preparation, examination, and interpolation of isotherm polynomials was carried through by L. A. Weber and H. M. Roder. R. J. Corruccini and R. B. Scott have given encouragement throughout this lengthy investigation.

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