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THERMOPHYSICAL PROPERTIES

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THERMOPHYSICAL PROPERTIES

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ABSTRACT

Numerous fluids have been identified as promising alternative refrigerants, but much of the information needed to predict their behavior as pure fluids and as components in mixtures does not exist. In particular, reliable thermophysical properties data and models are needed to predict the performance of the new refrigerants in heating and cooling equipment and to design and optimize equipment to be reliable and energy efficient. The objective of this project is to provide highly accurate, selected thermophysical properties data for Refrigerants 32, 123, 124, and 125, and to use these data to fit simple and complex equations of state and detailed transport property models. The new data will fill gaps in the existing data sets and resolve the problems and uncertainties that exist in and between the data sets. **This report describes the progress made during the fourth quarter of this fifteen-month project, which was initiated in late January, 1992.**

SCOPE

This project involves selected measurements of the thermodynamic properties of HFC-32, HCFC-124, and HFC-125, and the development of high-accuracy modified Benedict-Webb-Rubin (MBWR) equations of state and improved Carnahan-Starling-DeSantis (CSD) equations of state for each fluid. It also includes selected measurements of the transport properties of HFC-32 (viscosity and thermal conductivity) and HCFC-123 (thermal conductivity) and the development of detailed correlations for same. The experimental thermodynamic measurements will include, as appropriate, accurate determinations of the critical temperature, pressure, and density; vapor pressures and saturated liquid densities; ideal-gas heat capacity from measurements of the vapor-phase speed of sound; the pressure-volume-temperature (PVT) behavior in the superheated vapor region; the PVT behavior of the compressed liquid; and selected measurements of the liquid-phase heat capacity. The experimental transport measurements will cover the one-phase and saturated liquid and vapor states over the temperature range of interest. Efforts prior to this quarter were focused mostly on measurements of the vapor- and liquid-phase PVT behavior, vapor pressure, coexisting densities, isochoric heat capacity, and transport properties of HFC-32; the vapor pressure, coexisting densities, and speed of sound of HCFC-124; the vapor pressure, coexisting densities, and isochoric heat capacity of HFC-125; and the thermal conductivity of HCFC-123. Efforts during this quarter were focused mostly on completing measurements of the vapor pressure, isochoric heat capacity, supercritical thermal conductivity, and liquid-phase viscosity of HFC-32;

completing measurements of the low-temperature vapor pressure of HCFC-124; performing Burnett measurements of the vapor-phase PVT and high-temperature vapor pressure of HCFC-124; and completing measurements of the compressed liquid density and low-temperature vapor pressure of HFC-125.

SIGNIFICANT RESULTS

HFC-32

As reported previously, the Burnett apparatus has been used in the isochoric mode to determine the PVT relation for the vapor phase. Eleven isochores were completed spanning the ranges 268 to 373 K (23 to 212°F) and 0.018 to 1.3 times the critical density (7.5 to 550 kg/m^3; 0.47 to 34.3 lb/ft^3); the highest absolute pressure was 9.7 MPa (1400 psi). Two Burnett expansions were completed at 373 K (212°F) to establish the densities of the isochores. These 147 gas-phase data have now been analyzed, and the results are given in both SI and PI units in Table 1 (see Appendix A, which includes all tables).

In addition to the Burnett measurements, the vibrating tube densimeter was used previously to determine the PVT relation for the liquid phase. Twenty-one isotherms were completed spanning the ranges 243 to 343 K (-22 to 158°F) and 2000 to 6500 kPa (290 to 940 psi). These 654 liquid-phase data have now been analyzed, and the results are given in Table 2.

The Burnett apparatus has been used to measure the vapor pressure of HFC-32 at 18 temperatures in the range from 268 K (23°F) to the critical temperature at 351.36 K (172.78°F). These new vapor-pressure data are given in Table 3. As reported previously, an ebulliometer was used to measure the vapor pressure of HFC-32 at low temperatures in the range between 208 and 237 K (-85 and -32°F). A manuscript reporting these data has been accepted for publication in the Journal of Chemical and Engineering Data. The NIST Burnett and ebulliometric vapor-pressure data for HFC-32 have been correlated and their deviations from the resulting correlation are shown in Figure 1. Also shown in Figure 1 are the HFC-32 data of P.F. Malbrunot, et al. [J. Chem. & Eng. Data **13**, 16 (1968)]. The uncertainties in the NIST measurements are of order 0.05%.

The saturated vapor and liquid densities have been obtained by extrapolating the Burnett vapor-phase and vibrating tube liquid-phase PVT data to the vapor pressure curve. The saturated vapor and liquid densities so obtained are given in Tables 4 and 5, respectively.

An adiabatic calorimeter has been used to measure the molar heat capacity at constant volume $\{C_v\}$ for HFC-32 along five additional isochores, thereby extending the measurements to eight isochores. In total, 79 C_v values were measured in the liquid state and 105 values were measured in the vapor + liquid two-phase region. The sample purity was 0.9994 mole fraction. The temperatures ranged from 141 to 342 K (-206 to 156°F) with pressures to 35 MPa (5000 psi). Figure 2 illustrates the pressure and temperature range covered by this study, Figure 3 shows the liquid heat capacity data as a function of temperature, and Figure 4 gives the saturated liquid heat capacity, C_σ, derived from the two-phase measurements. The measured values are given in Tables 6 through 13 for the liquid phase and in Tables 14 through 16 for the two-phase

region. These values are preliminary and are subject to change by as much as $\pm 1\%$ when an accurate equation of state becomes available. In addition to the temperature-density-pressure (T-ρ-P) state conditions, the tables present estimated uncertainties of the measurements. Provided that an accurate equation of state is available for data reduction, the uncertainty of the heat capacity measurements is estimated to be $\pm 0.5\%$.

The transient hot-wire study of the thermal conductivity of HFC-32 has been extended to include two supercritical isotherms at 365 and 380 K (197 and 225°F). The thermal conductivity surface now includes 1926 data points over the region from 160 to 380 K (-167 to 225°F) at pressures to 70 MPa (10,000 psi). The data from 160 to 340 K (-167 to 152°F) were provided in the last progress report. A plot of the entire thermal conductivity surface is provided for reference in Figure 5. The thermal conductivity critical enhancement is clearly visible in the two supercritical isotherms.

Measurements of the thermal conductivity of HFC-32 at 400 K (260°F) were in progress when 3 of the 4 leads to the bottom of the hot wires failed. These leads were constructed of 0.003" diameter tantalum wire. When the cell was disassembled, a reddish-brown deposit was found coating the platinum hot wires and the 316 stainless steel cell walls. The tantalum leads were extremely corroded and quite brittle; they may have experienced some type of fluorine corrosion. A chemical analysis is planned of the fluid sample and reddish-brown deposit that were taken from the cell. The transient hot-wire cell has been rebuilt using copper leads instead of the tantalum leads. The new isotherms above 340 K (152°F) must be rechecked with the rebuilt cell since it is not known at what temperature the corrosion became a significant problem and whether it affected the thermal conductivity data. For this reason the new supercritical data points are not provided in this report.

Measurements of the shear viscosity of compressed fluid HFC-32 have been completed at temperatures between 150 and 315 K (-190 to 116°F) and at pressures to 30 MPa (4400 psi). At small molar volumes, the fluidity (reciprocal viscosity) increases linearly with molar volume, as indicated in Figure 6, with deviations as indicated in Figure 7. Most of the data of Phillips and Murphy [J. Chem. & Eng. Data **15**, 304 (1970)] and of Ripple and Matar (NIST Gaithersburg, 1992) differ from the present data by less than the combined experimental errors, as shown in Figures 8 and 9, respectively. Additional measurements at temperatures to 420 K (297°F) and pressures to 50 MPa (7300 psi) are in progress.

HCFC-124

The vibrating tube densimeter was used previously to determine the PVT relation for HCFC-124 in the liquid phase. Twenty-two isotherms were completed spanning the ranges 275 to 372 K (-35 to 210°F) and 396 to 6500 kPa (57 to 922 psi). These liquid-phase data have now been analyzed, and the results are given in Table 17.

An ebulliometer has been used to measure the vapor pressure of HCFC-124 at 44 temperatures between 222 and 286 K (-60 and 55°F); the corresponding pressures ranged from 14 to 259 kPa (2 to 37.5 psi). The new vapor-pressure data are very precise, with a standard deviation of 0.014%. These data are presented in Table 18, and the results of an Antoine equation fit are

given in Table 19. The vapor-pressure data and Antoine equation are plotted versus temperature in Figure 10, along with the deviations of the vapor-pressure data from the Antoine equation.

Burnett measurements of the gas-phase PVT behavior of HCFC-124 and of the vapor pressure at higher temperatures are in progress; approximately 150 data have been obtained between 278 and 423 K (41 and 302°F). These measurements will be completed by the end of January 1993.

HFC-125

The vibrating tube densimeter was used previously to determine the PVT relation for HFC-125 in the liquid phase. Fifteen isotherms were completed spanning the ranges 275 to 369 K (36 to 205°F) and 1500 to 6200 kPa (230 to 900 psi). These liquid-phase data have now been analyzed, and the results are given in Table 20.

An isochoric PVT apparatus has been used to measure the density of compressed liquid HFC-125. The sample purity is 0.9973 mole fraction. The measured temperatures ranged from 174 to 398 K (-146 to 257°F) with pressures to 35 MPa (5000 psi). Densities were measured at 87 liquid-state conditions, as shown in Figure 11. The pressures, temperatures, and densities are presented in Table 21. The uncertainty of the densities is estimated to be $\pm 0.1\%$.

An ebulliometer has been used to measure the vapor pressure of HFC-125 at 41 temperatures between 219 and 247 K (-65 and -15°F); the corresponding pressures ranged from 74 to 262 kPa (10.7 to 38 psi). The new vapor-pressure data are very precise, with a standard deviation of 0.01%. These data are presented in Table 22, and the results of an Antoine equation fit are given in Table 23. The vapor-pressure data and Antoine equation are plotted versus temperature in Figure 12, along with the deviations of the vapor-pressure data from the Antoine equation.

Burnett measurements of the gas-phase PVT behavior of HFC-125 and of the vapor pressure of HFC-125 at higher temperatures will be initiated when the work on HCFC-124 is complete.

A preliminary MBWR equation of state for HFC-125 has been developed during the current reporting period. It is valid at temperatures from 200 to 400 K (-100 to 260°F), and it appears to be reasonable upon extrapolation to 500 K (440°F); the maximum pressure is 20 MPa (3000 psi). Although this equation was developed for another sponsor and can not be released until approved by the sponsor, this work will greatly speed up the MBWR fit to be done for ARTI. The existing data for HFC-125 have been put into computer files in the form required by the fitting program, and preliminary evaluations of the data have been performed. The process of fitting this equation has revealed a number of gaps and inconsistencies in the existing data and has confirmed the need for the additional measurements on HFC-125 that are being carried out under the current project.

HCFC-123

The analysis of the HCFC-123 thermal conductivity data is proceeding and will be based on the new 32-term MBWR equation of state developed recently at NIST by McLinden, et al. (see below). The thermal conductivity data set includes 1618 transient hot-wire data points from 180

to 480 K (-130 to 405°F) at pressures to 70 MPa (10,000 psi). Preliminary data points were provided in the previous progress report based on densities and heat capacities obtained from NIST corresponding-states predictions. A plot of the entire thermal conductivity surface is provided for reference in Figure 13. The thermal conductivity critical enhancement is clearly visible in the supercritical isotherm, as was the case for HFC-32.

An isochoric PVT apparatus has been used to measure the density of compressed liquid HCFC-123 using the same cylinder of sample as used in a study of C_v (see below). The temperatures ranged from 176 to 380 K (-143 to 224°F) with pressures to 35 MPa (5000 psi). Densities were measured at 105 liquid-state conditions. The pressures, temperatures, and densities are presented in Table 24. The uncertainty of the densities is estimated to be $\pm 0.1\%$.

An adiabatic calorimeter has been used to measure the molar heat capacity at constant volume, C_v. The measurements were carried out at 79 single-phase-liquid states and 92 saturated-liquid states. Six isochores were completed on a sample of 0.9999 mole fraction purity. The temperatures ranged from 167 to 341 K (-159 to 155°F) with pressures to 35 MPa (5000 psi). The measurements for the liquid phase are presented in Tables 25 through 30 and for the two-phase region in Tables 31 and 32. These values are preliminary and are subject to change by as much as $\pm 1\%$.

The MBWR equation of state for HCFC-123 has been revised and considerably improved using the liquid-phase PVT and isochoric heat capacity data described above. This work was prompted by an evaluation of the equation of state for HCFC-123 carried out by Annex 18 of the International Energy Agency. Preliminary results of this evaluation revealed weaknesses in some of the derived properties (specifically, sound speed and heat capacity) for the previous HCFC-123 MBWR fit. The new equation is accurate for all thermodynamic properties from just above the triple point to about 550 K (530°F) and at pressures to 40 MPa (6000 psi). Although not part of the ARTI work, this equation is needed to analyze the completed thermal conductivity measurements (see above), and it should be of great interest to many ARI members. It is available upon request.

COMPLIANCE WITH AGREEMENT

NIST has complied with all terms of the grant agreement during the fourth quarter of calendar year 1992 modulo small shifts in the estimated level of effort from one property and/or fluid to another.

PRINCIPAL INVESTIGATOR EFFORT

Dr. Richard F. Kayser is the NIST Principal Investigator for the MCLR program. During the fourth quarter of calendar year 1992, Dr. Kayser devoted approximately one week to monitoring and reviewing the research, and preparing the quarterly report. The project involves multiple researchers and capabilities in Gaithersburg, MD and Boulder, CO.

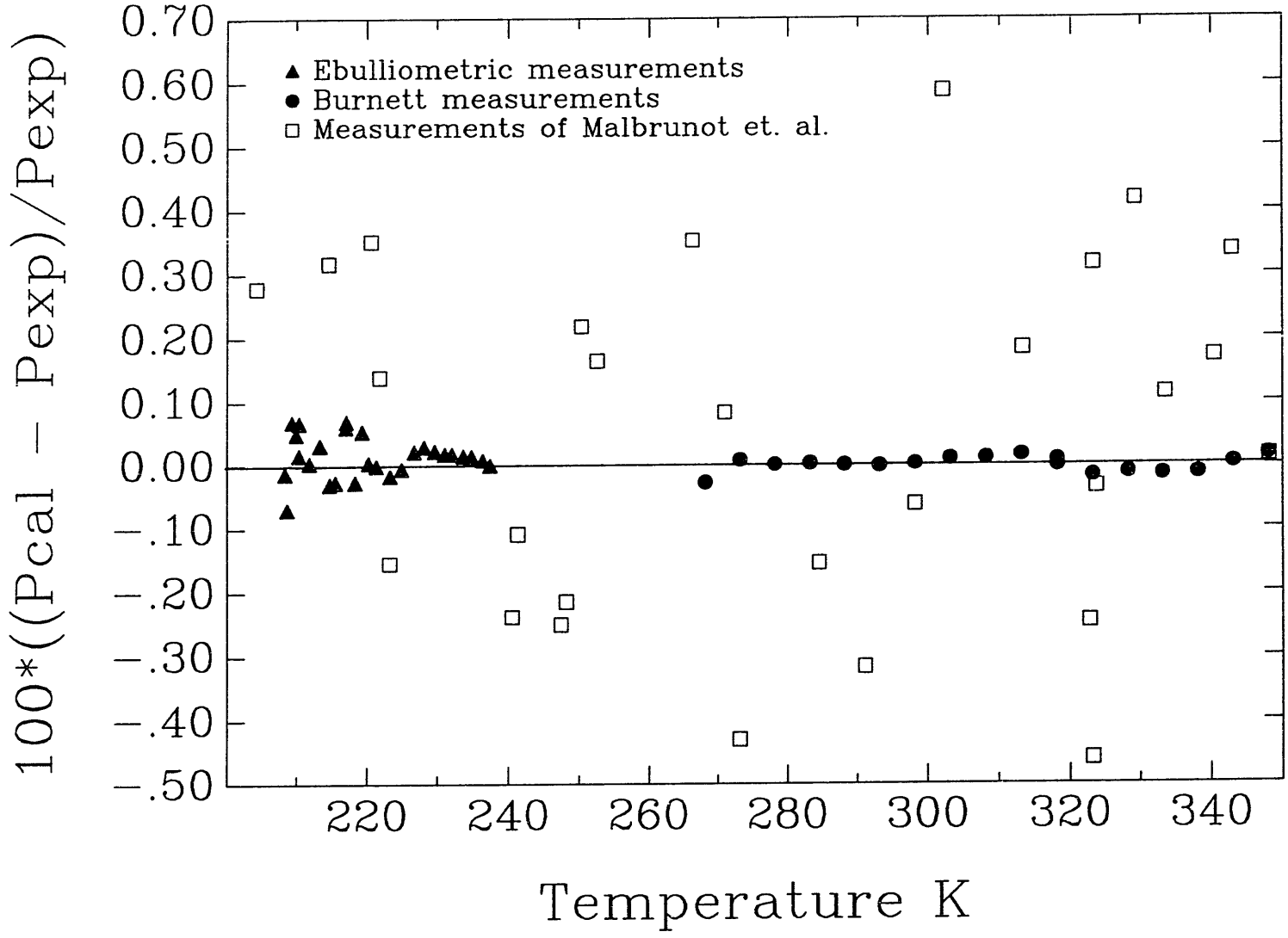


Figure 1. Deviations of HFC-32 (R-32) vapor pressure data from a correlation of the Burnett and ebulliometric vapor pressure data obtained at NIST. The open squares denote the data of P.F. Malbrunot, et al., J. Chem. & Eng. Data 13, 16 (1968).

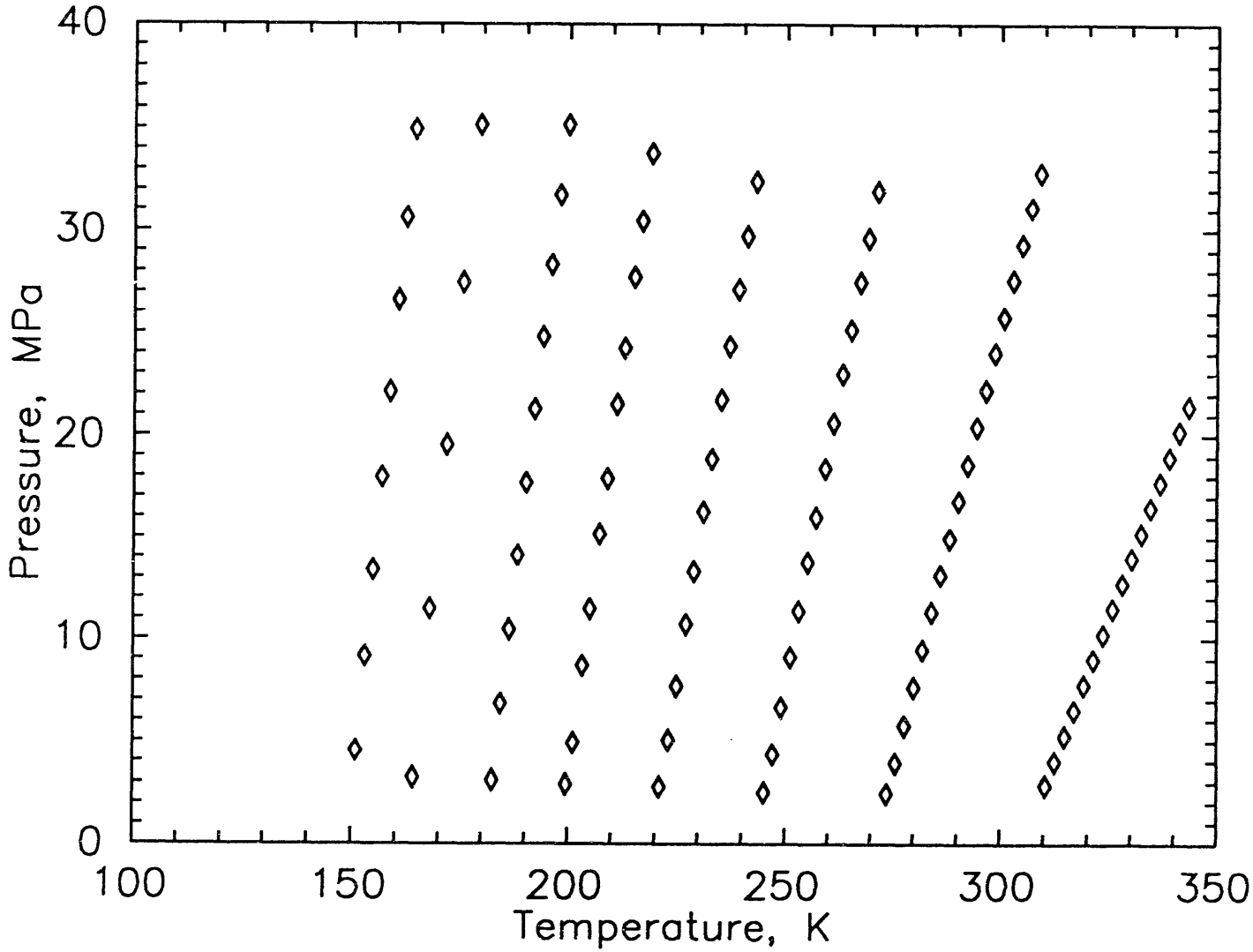


Figure 2. Range of measured temperatures and pressures for C_V study of HFC-32.

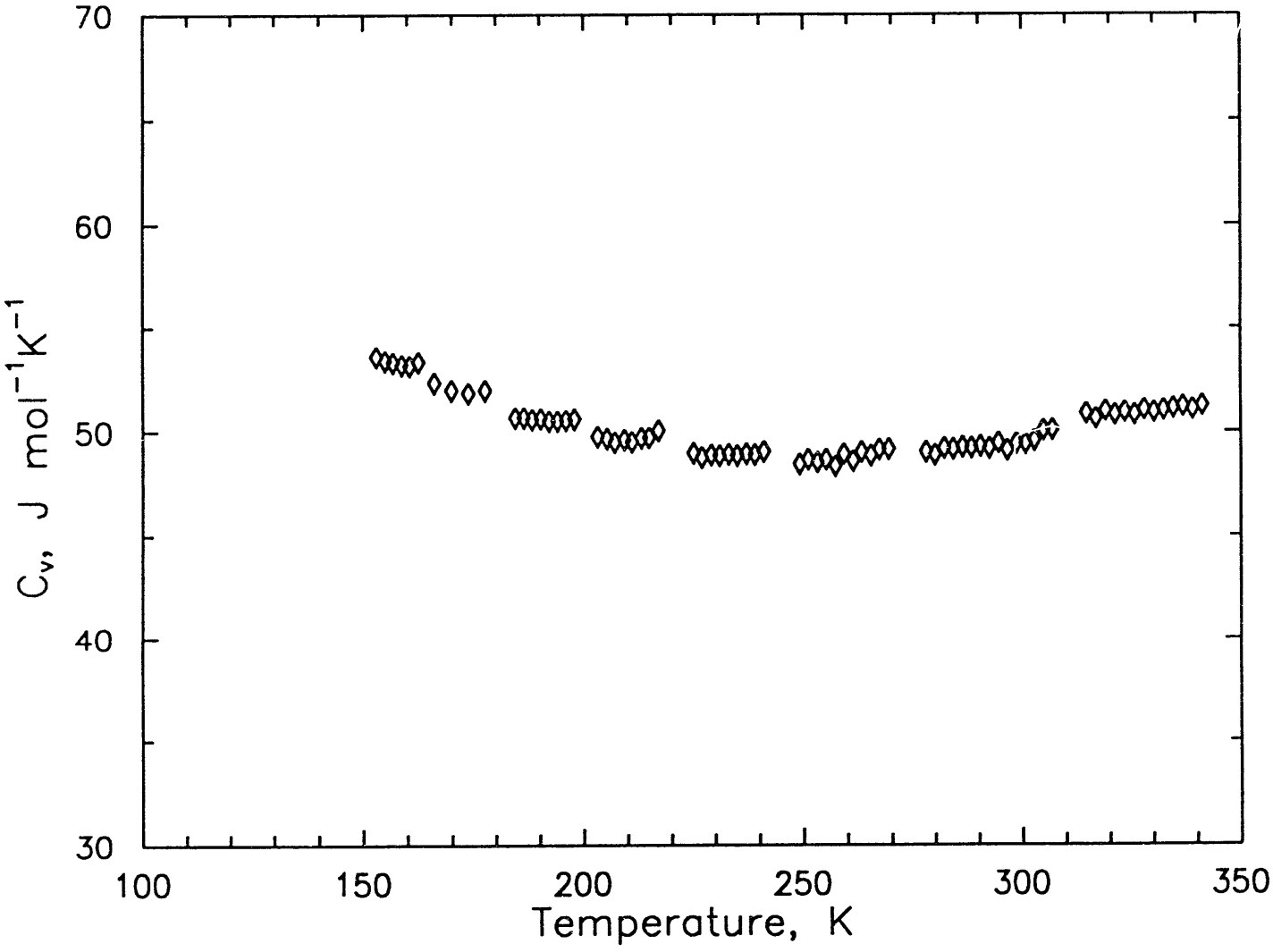


Figure 3. Measurements of heat capacity at constant volume {C_V} for HFC-32.

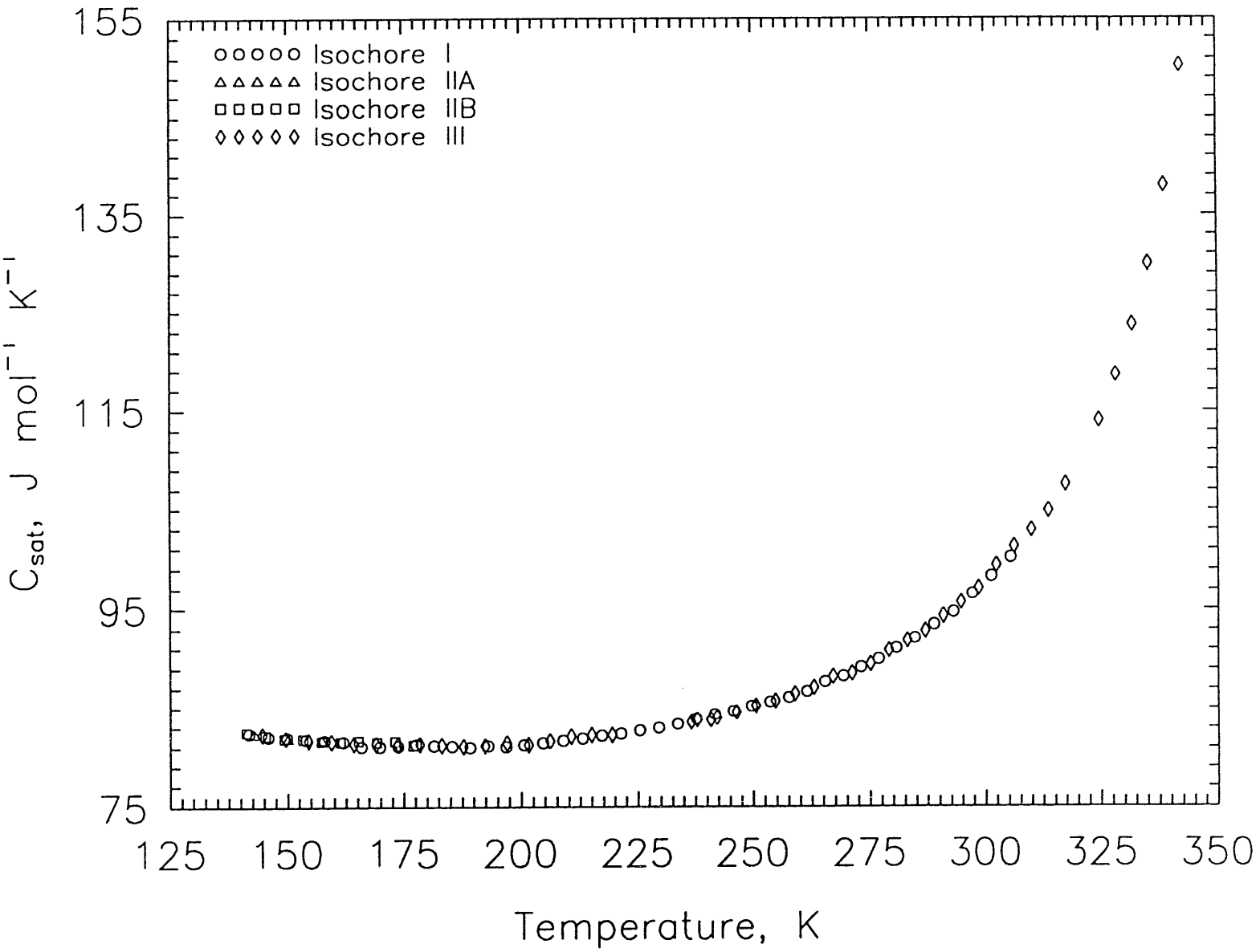


Figure 4. Measurements of saturated liquid heat capacity {C_σ} for HFC-32.

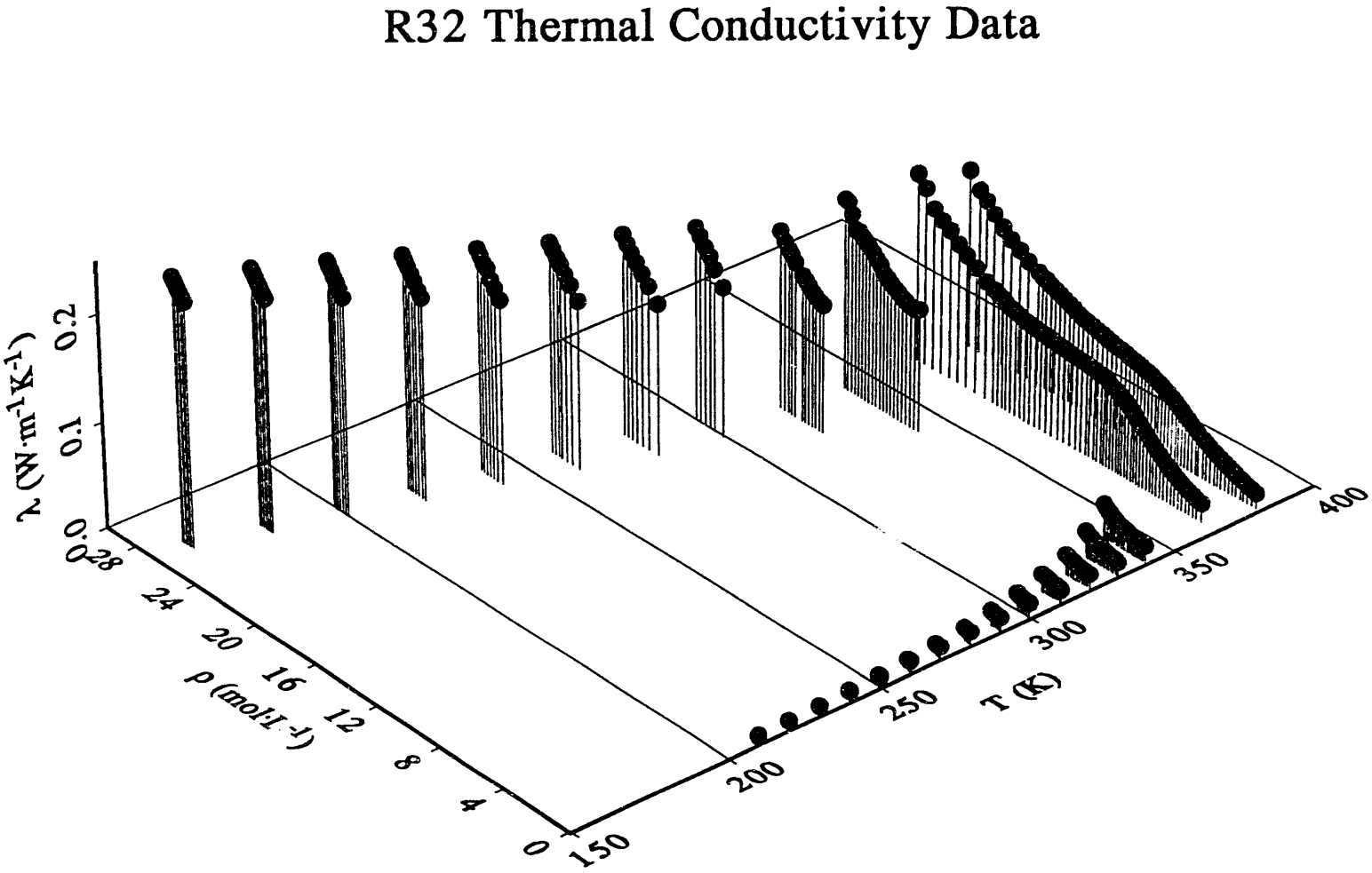


Figure 5. Thermal conductivity measurements for HFC-32 (R-32).

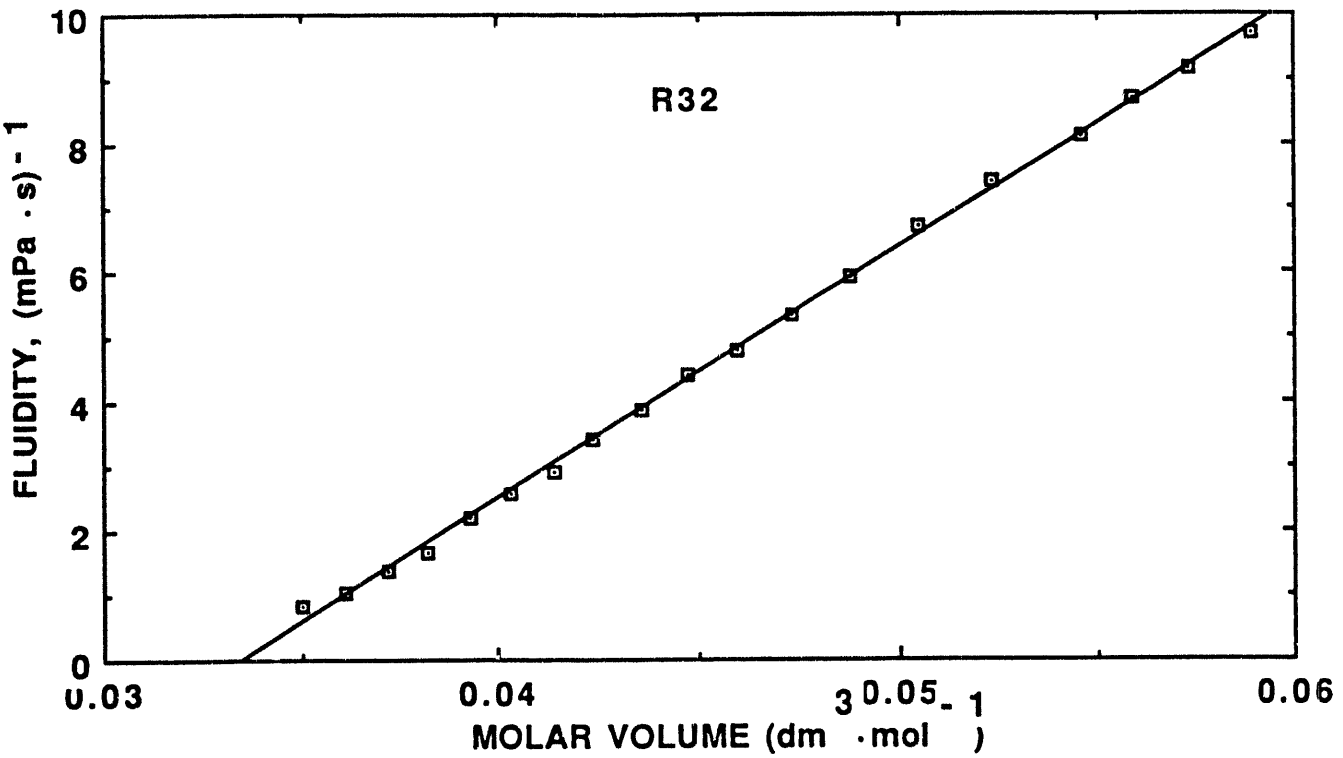


Figure 6. Dependence of HFC-32 (R-32) fluidity (reciprocal viscosity) data on molar volume. The data have been correlated with the equation, $1/\eta = 406.1\ (V - 0.034)$, where the viscosity, η, is in mPa·s and the molar volume, V, is in dm^3/mol.

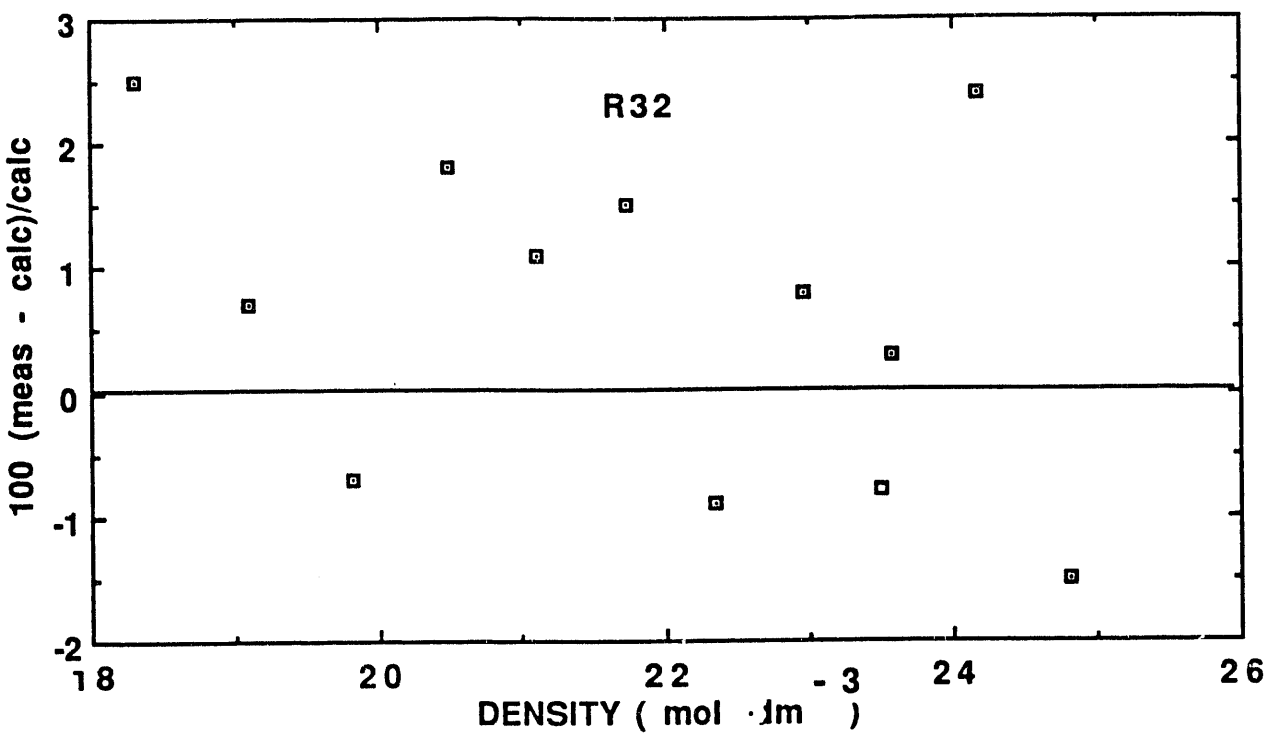


Figure 7. Comparison of HFC-32 (R-32) viscosity data with correlating equation. The differences are consistent with an imprecision of ±3 percent.

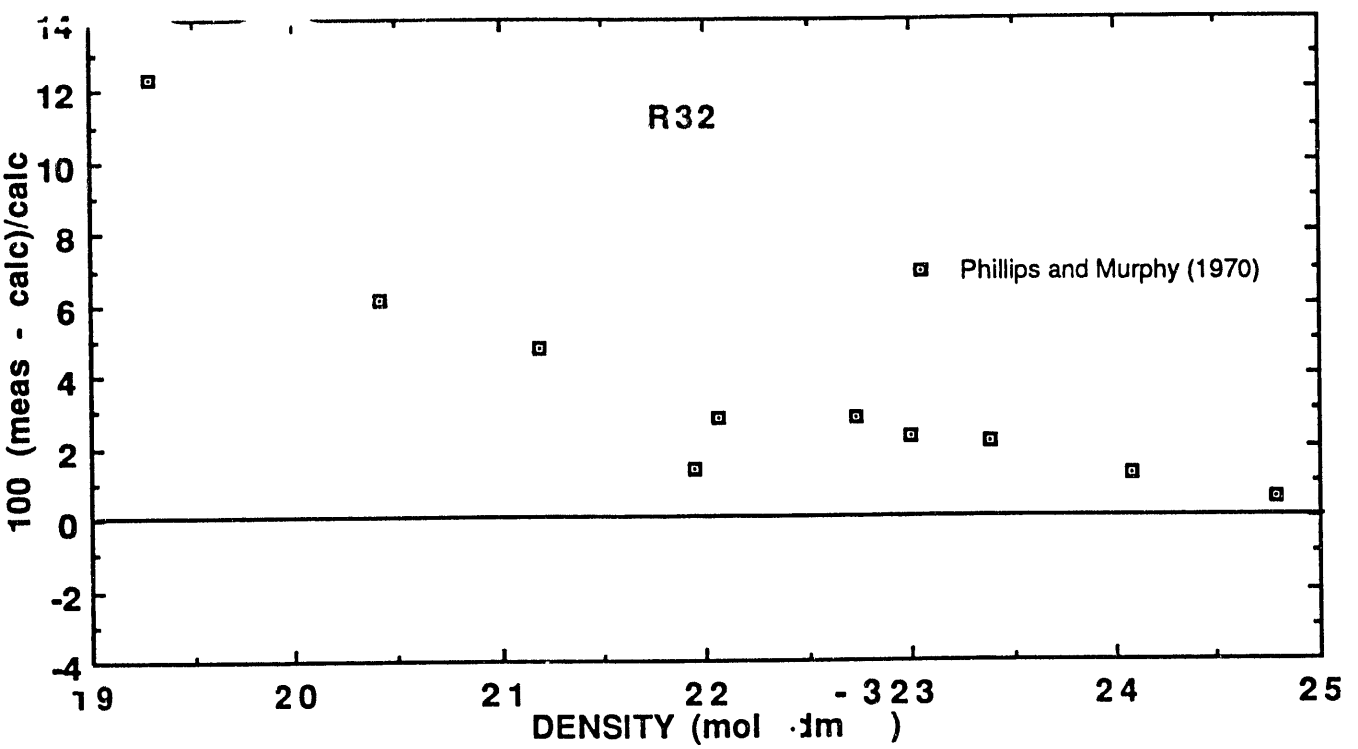


Figure 8. Comparison of Phillips and Murphy's HFC-32 (R-32) viscosity data with correlating equation. At high densities (low temperatures) the differences are within combined experimental errors.

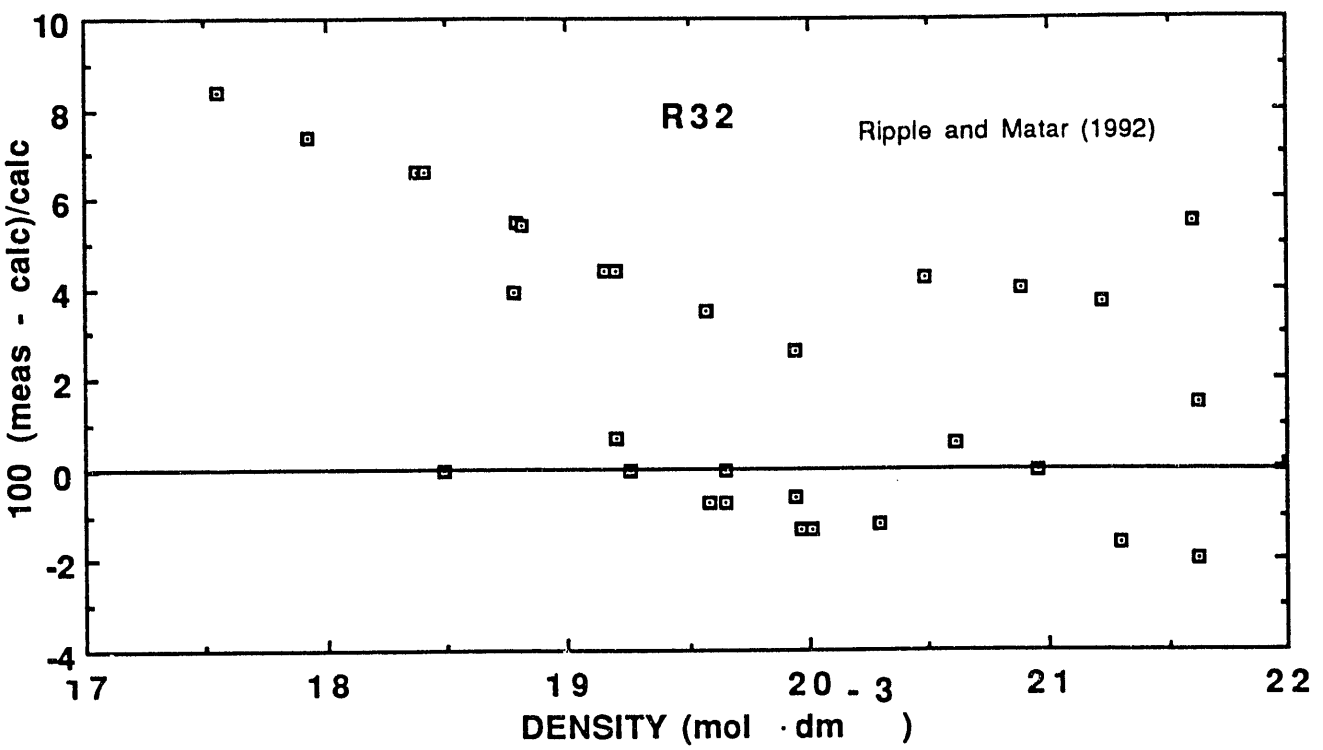
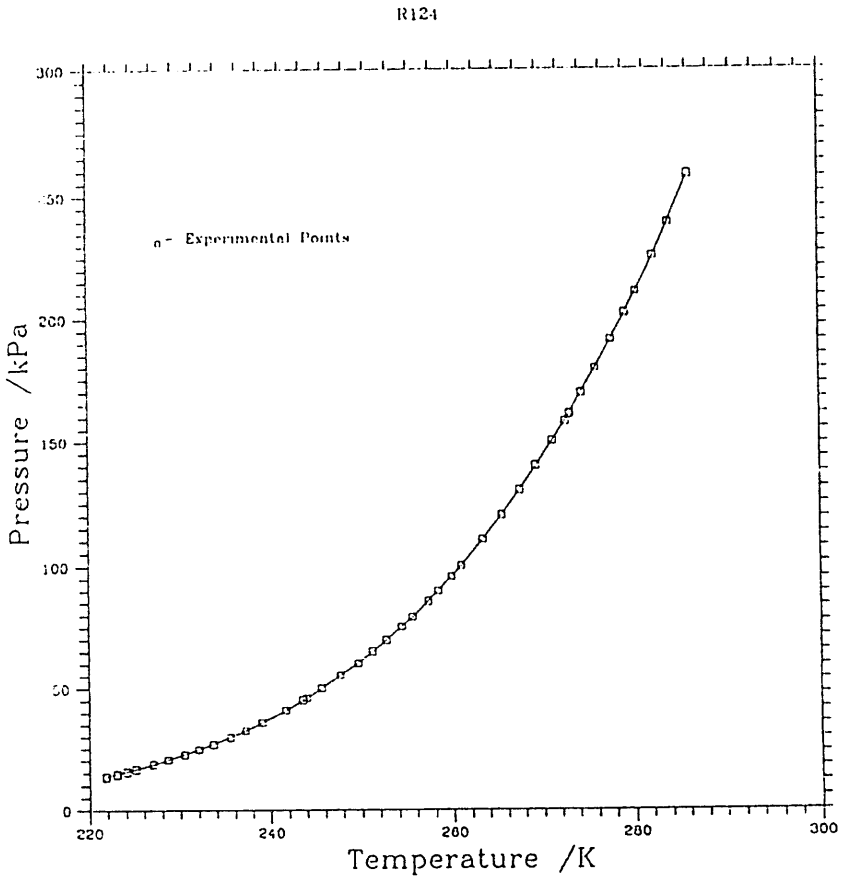


Figure 9. Comparison of Ripple and Matar's HFC-32 (R-32) viscosity data (NIST, Gaithersburg, MD, 1992) with correlating equation. At high densities (low temperatures), the differences are within combined experimental errors.



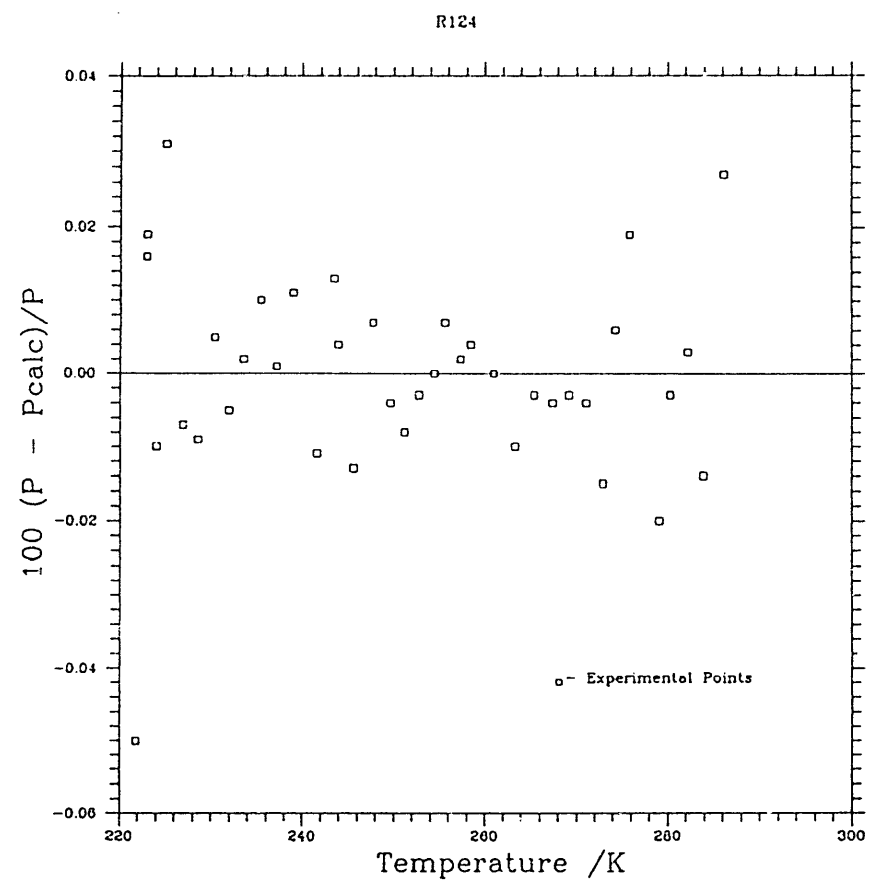


Figure 10. Left: Experimental vapor pressure data for HCFC-124 (R-124) (open squares) and Antoine equation fit (solid line). Right: Deviations of vapor pressure data from Antoine equation.

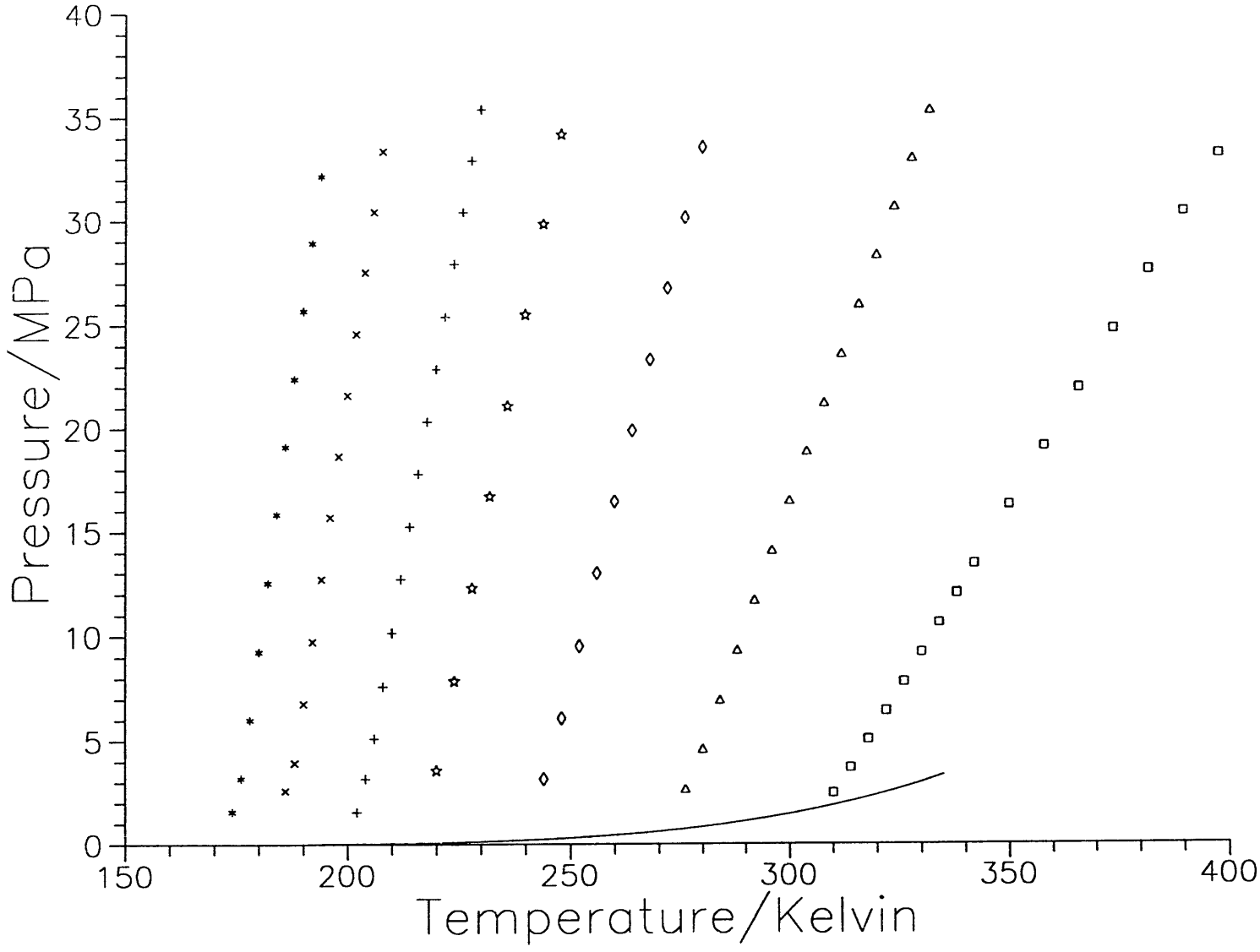


Figure 11. Range of measured temperatures and pressures for isochoric PVT study of HFC-125.

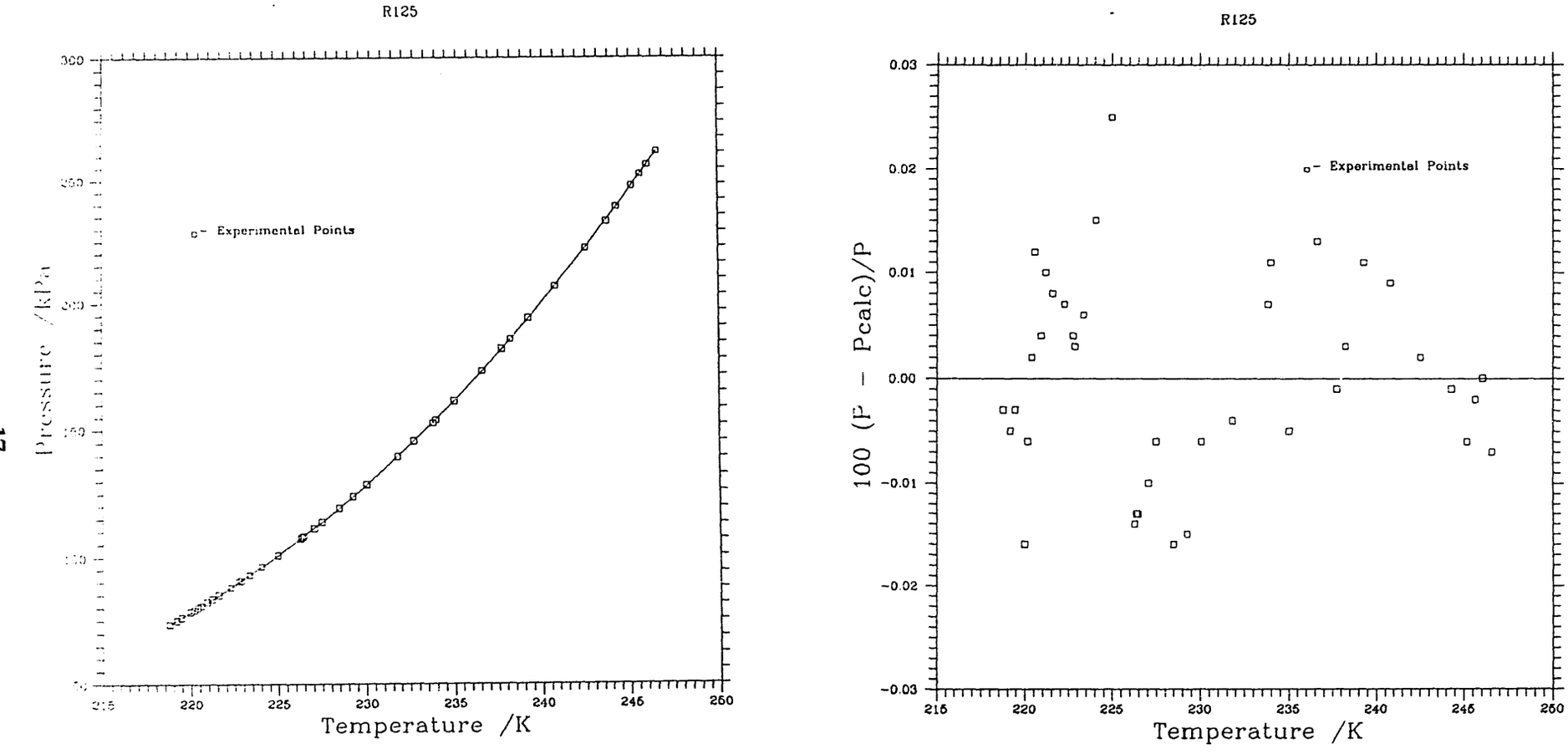


Figure 12. Left: Experimental vapor pressure data for HFC-125 (R-125) (open squares) and Antoine equation fit (solid line). Right: Deviations of vapor pressure data from Antoine equation.

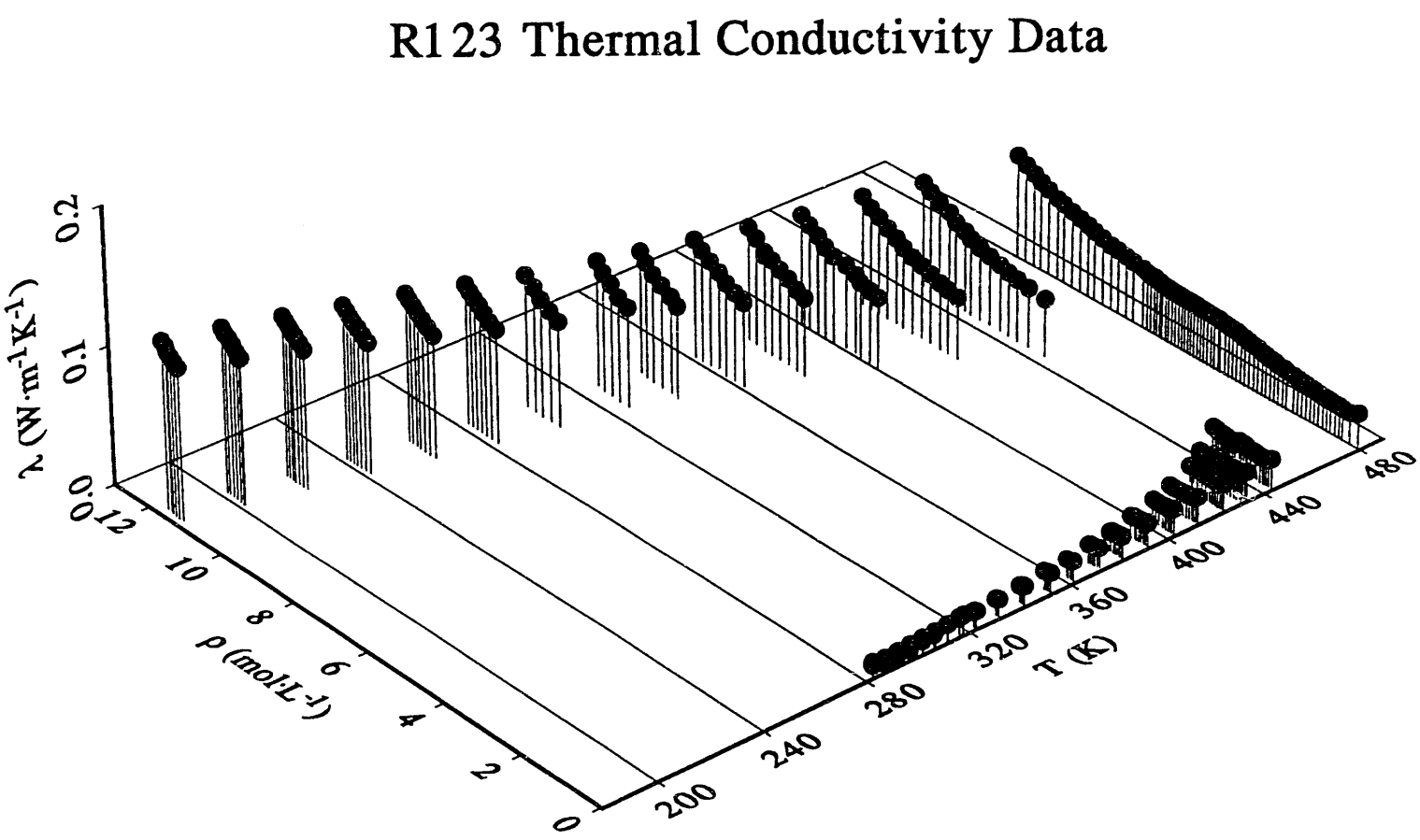


Figure 13. Thermal conductivity measurements for HCFC-123 (R-123).

APPENDIX A

TABLES OF THERMOPHYSICAL PROPERTIES DATA

NOTE: SOME OF THESE DATA ARE PRELIMINARY AND SUBJECT TO CHANGE

Table 1a. Vapor-phase PVT measurements for HFC-32 (SI units).

T/K	rho/g/cc	P/kPa
353.110	.55188	6145.1
358.089	.55176	7014.0
363.132	.55164	7921.3
368.149	.55153	8842.1
373.131	.55141	9769.8
353.111	.30979	5930.6
358.095	.30973	6387.2
363.135	.30966	6840.9
368.142	.30960	7286.7
373.145	.30953	7728.8
343.151	.17391	4724.2
348.130	.17388	4964.3
353.117	.17384	5199.1
358.101	.17380	5429.6
363.135	.17377	5658.7
368.142	.17373	5883.7
373.086	.17369	6103.1
338.104	.13323	4090.3
343.118	.13320	4265.1
348.125	.13318	4436.5
353.095	.13315	4603.9
358.084	.13312	4769.3
363.129	.13309	4934.4
363.143	.13309	4934.9
363.119	.13309	4934.1
368.129	.13306	5096.1
373.143	.13304	5256.4
328.222	.09765	3255.4
333.082	.09763	3373.7
338.103	.09761	3493.4
343.124	.09759	3611.0
348.141	.09757	3726.9
353.120	.09755	3840.4
358.145	.09753	3953.5
363.133	.09751	4064.4
368.140	.09749	4174.7
373.142	.09747	4283.8
318.099	.07486	2602.6
323.130	.07484	2692.8
333.119	.07481	2866.8
338.132	.07479	2952.1
343.139	.07478	3036.1
348.159	.07476	3119.3
353.128	.07475	3200.7
358.124	.07473	3281.8
363.121	.07472	3361.9
368.103	.07470	3441.3
372.442	.07469	3509.6
372.446	.07469	3509.6

308.164	.05484	1994.0
313.138	.05483	2055.9
318.131	.05482	2116.9
323.145	.05481	2177.3
328.145	.05480	2236.6
333.148	.05479	2295.2
338.150	.05477	2353.1
343.109	.05476	2409.9
348.136	.05475	2466.8
353.108	.05474	2522.6
358.138	.05473	2578.6
363.131	.05472	2633.8
368.139	.05470	2688.7
373.141	.05469	2743.1
308.177	.04202	1645.0
313.168	.04201	1689.5
318.143	.04201	1733.2
323.084	.04200	1776.2
323.135	.04200	1776.4
328.057	.04199	1818.8
333.165	.04198	1862.2
338.134	.04197	1904.0
343.100	.04196	1945.3
348.163	.04195	1987.3
353.127	.04194	2028.0
358.120	.04194	2068.6
363.115	.04193	2108.9
368.109	.04192	2149.1
278.145	.02361	882.3
281.187	.02361	897.1
283.166	.02361	907.1
288.132	.02360	930.7
293.172	.02360	954.2
298.125	.02359	977.1
303.140	.02359	1000.0
308.158	.02358	1022.7
313.101	.02358	1044.8
318.156	.02357	1067.2
323.155	.02357	1089.2
323.186	.02357	1089.4
328.073	.02356	1110.4
333.118	.02356	1132.2
338.128	.02355	1154.5
343.144	.02355	1175.4
348.152	.02354	1196.8
353.130	.02354	1217.9
358.128	.02353	1239.0
363.120	.02353	1259.9
368.106	.02352	1280.8
268.916	.01325	512.1
268.834	.01325	511.8
273.143	.01325	522.6
278.129	.01325	534.9
283.164	.01325	547.2

288.191	.01324	559.4
293.167	.01324	571.3
298.122	.01324	583.1
303.138	.01324	594.9
308.156	.01323	606.7
313.161	.01323	618.4
318.138	.01323	630.0
322.930	.01322	641.2
328.063	.01322	653.1
333.121	.01322	664.7
338.129	.01322	676.1
343.140	.01321	687.5
348.155	.01321	698.9
353.133	.01321	710.2
358.133	.01321	721.4
363.170	.01320	732.8
368.110	.01320	743.8
268.133	.00744	299.7
268.530	.00744	300.2
273.158	.00744	306.3
278.146	.00744	312.8
283.161	.00743	319.2
288.154	.00743	325.5
293.144	.00743	331.9
298.176	.00743	338.3
303.133	.00743	344.6
308.155	.00743	350.9
313.112	.00742	357.2
318.110	.00742	363.4
323.155	.00742	369.8
323.130	.00742	369.9
323.175	.00742	369.8
323.148	.00742	369.8
323.150	.00742	369.8
328.116	.00742	376.1
333.070	.00742	382.3
338.080	.00742	388.5
343.157	.00741	394.8
348.126	.00741	400.9
353.146	.00741	407.0
358.130	.00741	413.1
363.120	.00741	419.3
368.109	.00741	425.4

Table 1b. Vapor-phase PVT measurements for HFC-32 (PI units).

T/F	rho/lb/ft^3	P/psia
175.928	34.452	891.27
184.890	34.445	1017.30
193.968	34.438	1148.89
202.998	34.431	1282.43
211.966	34.424	1416.99
175.930	19.340	860.17
184.901	19.336	926.39
193.973	19.332	992.19
202.986	19.327	1056.85
211.991	19.323	1120.96
158.002	10.857	685.19
166.964	10.855	720.02
175.941	10.853	754.07
184.912	10.850	787.50
193.973	10.848	820.72
202.986	10.846	853.35
211.885	10.843	885.18
148.917	8.317	593.25
157.942	8.316	618.61
166.955	8.314	643.47
175.901	8.312	667.74
184.881	8.310	691.73
193.962	8.309	715.68
193.987	8.309	715.74
193.944	8.309	715.63
202.962	8.307	739.13
211.987	8.305	762.38
131.130	6.096	472.16
139.878	6.095	489.31
148.915	6.094	506.67
157.953	6.092	523.74
166.984	6.091	540.54
175.946	6.090	557.00
184.991	6.088	573.40
193.969	6.087	589.49
202.982	6.086	605.49
211.986	6.085	621.31
112.908	4.673	377.48
121.964	4.672	390.56
139.944	4.670	415.79
148.968	4.669	428.16
157.980	4.668	440.34
167.016	4.667	452.41
175.960	4.666	464.23
184.953	4.665	475.98
193.948	4.664	487.61
202.915	4.663	499.12
210.726	4.663	509.03
210.733	4.663	509.02

95.025	3.424	289.21
103.978	3.423	298.18
112.966	3.422	307.04
121.991	3.422	315.80
130.991	3.421	324.39
139.996	3.420	332.89
149.000	3.419	341.29
157.926	3.419	349.52
166.975	3.418	357.78
175.924	3.417	365.88
184.978	3.417	373.99
193.966	3.416	381.99
202.980	3.415	389.96
211.984	3.414	397.85
95.049	2.623	238.59
104.032	2.623	245.04
112.987	2.622	251.37
121.881	2.622	257.62
121.973	2.622	257.65
130.833	2.621	263.80
140.027	2.621	270.09
148.971	2.620	276.15
157.910	2.620	282.15
167.023	2.619	288.23
175.959	2.618	294.14
184.946	2.618	300.03
193.937	2.617	305.88
202.926	2.617	311.70
40.991	1.474	127.96
46.467	1.474	130.12
50.029	1.474	131.56
58.968	1.473	134.98
68.040	1.473	138.40
76.955	1.473	141.71
85.982	1.472	145.03
95.014	1.472	148.32
103.912	1.472	151.53
113.011	1.472	154.79
122.009	1.471	157.98
122.065	1.471	158.00
130.861	1.471	161.06
139.942	1.471	164.20
148.960	1.470	167.44
157.989	1.470	170.47
167.004	1.470	173.58
175.964	1.469	176.64
184.960	1.469	179.70
193.946	1.469	182.73
202.921	1.468	185.76
24.379	.827	74.27
24.231	.827	74.24
31.987	.827	75.79
40.962	.827	77.58
50.025	.827	79.37

59.074	.827	81.13
68.031	.827	82.86
76.950	.826	84.57
85.978	.826	86.28
95.011	.826	88.00
104.020	.826	89.70
112.978	.826	91.37
121.604	.826	93.00
130.843	.825	94.72
139.948	.825	96.40
148.962	.825	98.06
157.982	.825	99.72
167.009	.825	101.37
175.969	.825	103.00
184.969	.824	104.63
194.036	.824	106.28
202.928	.824	107.88
22.969	.464	43.47
23.684	.464	43.55
32.014	.464	44.43
40.993	.464	45.37
50.020	.464	46.29
59.007	.464	47.21
67.989	.464	48.13
77.047	.464	49.07
85.969	.464	49.97
95.009	.464	50.90
103.932	.463	51.80
112.928	.463	52.71
122.009	.463	53.63
121.964	.463	53.65
122.045	.463	53.64
121.996	.463	53.63
122.000	.463	53.64
130.939	.463	54.55
139.856	.463	55.44
148.874	.463	56.35
158.013	.463	57.26
166.957	.463	58.14
175.993	.463	59.04
184.964	.463	59.92
193.946	.463	60.81
202.926	.462	61.70

Table 2a. Compressed liquid density measurements for HFC-32 (SI units).

T/K	rho/g/cc	P/kPa
242.593	1.1572	1999.3
242.596	1.1583	2499.3
242.583	1.1594	3001.3
242.584	1.1605	3501.1
242.583	1.1616	4001.1
242.588	1.1626	4502.0
242.586	1.1637	5002.4
242.594	1.1647	5502.3
242.588	1.1657	6002.1
242.592	1.1667	6503.0
246.019	1.1470	2000.8
246.023	1.1481	2500.0
246.033	1.1492	3000.9
246.053	1.1503	3501.2
246.062	1.1514	4000.9
246.064	1.1525	4502.1
246.077	1.1535	5003.0
246.091	1.1546	5503.3
246.108	1.1556	6003.1
246.102	1.1567	6503.9
250.555	1.1333	2000.6
250.570	1.1344	2500.8
250.568	1.1356	3000.9
250.578	1.1368	3501.2
250.581	1.1380	4001.2
250.581	1.1392	4502.0
250.572	1.1404	5002.9
250.582	1.1415	5503.3
250.587	1.1426	6003.0
250.572	1.1438	6503.9
255.116	1.1191	2000.5
255.120	1.1204	2500.8
255.125	1.1217	3001.1
255.130	1.1230	3501.3
255.135	1.1242	4000.9
255.136	1.1255	4501.9
255.141	1.1267	5002.7
255.142	1.1280	5503.2
255.146	1.1292	6003.2
255.133	1.1304	6504.0
259.752	1.1045	2000.7
259.754	1.1059	2500.8
259.766	1.1072	3001.0
259.771	1.1086	3501.3
259.771	1.1100	4001.1

259.779	1.1113	4502.3
259.790	1.1126	5002.9
259.799	1.1139	5503.2
259.798	1.1152	6003.0
259.806	1.1165	6503.9
264.488	1.0891	2000.5
264.488	1.0906	2500.5
264.501	1.0921	3000.9
264.507	1.0936	3501.5
264.529	1.0950	4001.1
264.505	1.0966	4502.0
264.520	1.0980	5002.6
264.518	1.0994	5503.0
264.511	1.1008	6002.9
264.524	1.1022	6503.9
269.378	1.0728	2000.4
269.382	1.0745	2500.8
269.382	1.0761	3000.9
269.388	1.0778	3501.1
269.397	1.0793	4001.2
269.398	1.0809	4502.2
269.398	1.0825	5003.0
269.401	1.0840	5503.1
269.394	1.0856	6003.1
269.397	1.0871	6503.9
274.000	1.0569	2000.4
274.003	1.0587	2500.6
274.003	1.0605	3001.0
274.005	1.0623	3501.6
274.009	1.0640	4001.3
274.008	1.0657	4502.2
274.010	1.0674	5003.0
274.005	1.0691	5503.4
274.009	1.0707	6003.2
274.011	1.0724	6504.0
278.813	1.0398	2000.3
278.813	1.0419	2500.7
278.817	1.0438	3001.0
278.828	1.0457	3501.7
278.827	1.0476	4001.4
278.834	1.0495	4502.2
278.836	1.0513	5002.9
278.828	1.0532	5503.2
278.823	1.0550	6003.0
278.816	1.0568	6504.0
283.647	1.0220	2000.3
283.647	1.0243	2500.3
283.647	1.0264	3001.5
283.647	1.0286	3501.6

283.647	1.0307	4001.3
283.643	1.0328	4502.3
283.642	1.0348	5003.0
283.643	1.0368	5503.4
283.643	1.0387	6003.3
283.643	1.0406	6504.1
288.527	1.0033	2000.6
288.530	1.0057	2500.5
288.533	1.0081	3001.5
288.526	1.0105	3501.5
288.529	1.0128	4001.2
288.530	1.0151	4502.2
288.531	1.0173	5003.0
288.530	1.0195	5503.5
288.532	1.0217	6003.3
288.532	1.0238	6504.2
293.459	.9833	2000.5
293.460	.9861	2500.4
293.460	.9888	3001.5
293.459	.9915	3501.5
293.465	.9941	4001.3
293.463	.9966	4502.2
293.462	.9991	5003.1
293.458	1.0015	5503.4
293.461	1.0039	6003.3
293.461	1.0062	6504.3
298.407	.9622	2000.5
298.410	.9653	2500.4
298.419	.9684	3001.4
298.415	.9714	3501.4
298.417	.9743	4001.4
298.419	.9771	4502.3
298.426	.9799	5003.2
298.425	.9826	5503.4
298.427	.9852	6003.2
303.425	.9428	2501.4
303.428	.9464	3001.4
303.425	.9499	3501.6
303.423	.9532	4001.5
303.421	.9564	4502.4
303.420	.9596	5003.2
303.418	.9626	5503.5
303.423	.9655	6003.3
303.347	.9687	6504.2
308.304	.9194	2501.2
308.288	.9235	3001.3
308.254	.9277	3501.6
308.253	.9316	4001.5
308.255	.9352	4502.4

308.262	.9388	5003.2
308.269	.9422	5503.4
308.267	.9455	6003.3
308.248	.9488	6504.2
313.123	.8989	3001.8
313.118	.9036	3501.7
313.127	.9081	4001.4
313.131	.9124	4502.4
313.134	.9165	5003.1
313.144	.9204	5503.5
313.156	.9242	6003.3
313.148	.9279	6504.2
318.251	.8756	3502.4
318.255	.8811	4001.7
318.255	.8863	4502.7
318.255	.8912	5003.6
318.253	.8959	5503.8
318.253	.9004	6003.7
318.252	.9046	6504.5
323.108	.8457	3502.4
323.111	.8526	4001.8
323.111	.8590	4502.7
323.110	.8650	5003.5
323.109	.8706	5503.8
323.111	.8758	6003.7
323.112	.8808	6504.6
327.961	.8162	3802.6
327.962	.8197	4001.9
327.963	.8281	4502.7
327.964	.8356	5003.5
327.964	.8426	5503.9
327.969	.8490	6003.7
327.965	.8550	6504.5
332.789	.7850	4202.4
332.796	.7918	4502.8
332.800	.8020	5003.5
332.800	.8110	5503.8
332.800	.8191	6003.6
332.801	.8266	6504.5
337.789	.7435	4503.0
337.792	.7594	5003.4
337.793	.7724	5503.7
337.791	.7835	6003.6
337.793	.7933	6504.5
347.638	.7057	6504.4
347.675	.6524	5604.4
347.702	.6673	5803.9

347.683	.6801	6003.4
347.659	.6912	6203.9
347.604	.7009	6404.0
347.562	.7057	6504.6
348.531	.6059	5303.7
348.538	.6104	5353.7
348.568	.6073	5403.5
348.569	.6143	5453.4
348.592	.6204	5503.3
348.608	.6260	5553.7
348.602	.6317	5603.6
348.599	.6370	5653.5
348.601	.6420	5703.4
348.605	.6466	5753.2
348.622	.6509	5803.8
348.630	.6547	5853.7
348.567	.6592	5903.5
348.579	.6632	5953.2
348.568	.6668	6003.0
348.569	.6701	6053.6
348.578	.6731	6103.5
348.584	.6760	6153.4
348.602	.6786	6203.4
348.612	.6812	6253.5
348.609	.6839	6304.1
348.608	.6864	6354.0
348.596	.6890	6403.9
348.605	.6914	6454.0
348.595	.6937	6504.0

Table 2b. Compressed liquid density measurements for HFC-32 (PI units).

T/F	rho/lb/ft^3	P/psia
-23.002	72.242	289.97
-22.997	72.311	362.50
-23.021	72.382	435.31
-23.018	72.448	507.79
-23.021	72.515	580.30
-23.011	72.580	652.97
-23.015	72.646	725.53
-23.001	72.709	798.04
-23.012	72.774	870.53
-23.004	72.838	943.19
-16.836	71.605	290.20
-16.829	71.675	362.59
-16.810	71.744	435.25
-16.774	71.810	507.81
-16.759	71.878	580.28
-16.754	71.947	652.98
-16.730	72.014	725.62
-16.706	72.079	798.18
-16.675	72.144	870.68
-16.686	72.211	943.31
-8.672	70.747	290.17
-8.645	70.819	362.70
-8.647	70.896	435.24
-8.629	70.969	507.80
-8.623	71.043	580.33
-8.625	71.117	652.96
-8.640	71.191	725.61
-8.623	71.261	798.18
-8.613	71.332	870.67
-8.640	71.405	943.32
-.461	69.865	290.14
-.454	69.946	362.71
-.445	70.026	435.28
-.436	70.106	507.81
-.428	70.184	580.28
-.425	70.263	652.95
-.416	70.340	725.58
-.414	70.417	798.17
-.407	70.493	870.69
-.431	70.570	943.32
7.884	68.950	290.18
7.886	69.037	362.71
7.909	69.123	435.26
7.918	69.208	507.82
7.917	69.294	580.31

7.933	69.377	653.00
7.952	69.459	725.61
7.969	69.541	798.17
7.966	69.623	870.66
7.981	69.702	943.32
16.408	67.992	290.15
16.408	68.087	362.67
16.433	68.179	435.24
16.443	68.272	507.85
16.482	68.361	580.31
16.439	68.456	652.96
16.467	68.544	725.56
16.463	68.633	798.14
16.450	68.722	870.65
16.473	68.807	943.31
25.211	66.975	290.13
25.218	67.078	362.70
25.217	67.181	435.25
25.227	67.282	507.79
25.245	67.381	580.32
25.247	67.479	652.98
25.246	67.577	725.63
25.251	67.674	798.15
25.239	67.770	870.68
25.244	67.864	943.31
33.529	65.977	290.13
33.536	66.091	362.69
33.536	66.204	435.26
33.538	66.314	507.87
33.546	66.423	580.34
33.544	66.530	652.99
33.549	66.636	725.63
33.539	66.741	798.20
33.545	66.844	870.69
33.550	66.945	943.33
42.193	64.915	290.12
42.194	65.041	362.70
42.200	65.163	435.26
42.220	65.282	507.87
42.219	65.401	580.35
42.231	65.516	652.98
42.234	65.632	725.61
42.221	65.746	798.17
42.211	65.859	870.67
42.198	65.971	943.33
50.895	63.804	290.12
50.895	63.942	362.64
50.896	64.079	435.33
50.895	64.212	507.86

50.895	64.343	580.34
50.887	64.473	653.00
50.886	64.599	725.62
50.888	64.723	798.19
50.887	64.844	870.70
50.888	64.964	943.35
59.679	62.632	290.17
59.685	62.786	362.66
59.690	62.937	435.33
59.677	63.086	507.85
59.683	63.230	580.33
59.684	63.372	652.99
59.686	63.511	725.63
59.684	63.647	798.22
59.688	63.780	870.71
59.687	63.911	943.36
68.556	61.388	290.14
68.558	61.561	362.65
68.558	61.731	435.33
68.557	61.897	507.85
68.567	62.058	580.34
68.564	62.216	653.00
68.562	62.371	725.63
68.555	62.522	798.21
68.560	62.669	870.71
68.561	62.814	943.36
77.463	60.066	290.14
77.467	60.264	362.66
77.484	60.455	435.32
77.477	60.643	507.84
77.481	60.824	580.35
77.484	61.001	653.01
77.497	61.172	725.65
77.495	61.340	798.20
77.498	61.504	870.70
86.495	58.858	362.80
86.500	59.081	435.32
86.495	59.298	507.87
86.491	59.506	580.37
86.488	59.707	653.02
86.486	59.903	725.65
86.483	60.093	798.22
86.492	60.276	870.70
86.355	60.473	943.36
95.277	57.393	362.77
95.248	57.655	435.31
95.187	57.912	507.86
95.185	58.155	580.37
95.189	58.385	653.02

95.201	58.606	725.65
95.214	58.819	798.21
95.211	59.026	870.71
95.177	59.234	943.36
103.952	56.115	435.37
103.943	56.410	507.87
103.958	56.690	580.35
103.966	56.958	653.01
103.971	57.215	725.65
103.989	57.459	798.22
104.012	57.694	870.71
103.997	57.924	943.36
113.183	54.664	507.97
113.190	55.006	580.40
113.190	55.330	653.06
113.189	55.637	725.71
113.186	55.929	798.26
113.186	56.208	870.77
113.183	56.474	943.40
121.924	52.793	507.98
121.929	53.224	580.41
121.929	53.624	653.07
121.928	53.997	725.70
121.927	54.347	798.26
121.930	54.676	870.76
121.931	54.988	943.41
130.659	50.954	551.52
130.662	51.175	580.42
130.663	51.695	653.06
130.665	52.166	725.70
130.665	52.599	798.27
130.673	52.999	870.76
130.667	53.375	943.40
139.351	49.006	609.50
139.362	49.429	653.07
139.371	50.065	725.69
139.369	50.628	798.26
139.370	51.135	870.75
139.371	51.600	943.40
148.350	46.414	653.11
148.356	47.407	725.68
148.358	48.219	798.25
148.354	48.912	870.75
148.357	49.522	943.39
166.079	44.053	943.39
166.145	40.729	812.84
166.193	41.658	841.78

166.159	42.459	870.71
166.117	43.149	899.80
166.017	43.758	928.82
165.942	44.055	943.41
167.685	37.824	769.24
167.698	38.108	776.48
167.753	37.912	783.71
167.755	38.349	790.96
167.796	38.727	798.18
167.825	39.079	805.50
167.814	39.434	812.74
167.809	39.768	819.97
167.812	40.078	827.20
167.820	40.368	834.43
167.850	40.632	841.77
167.864	40.869	849.00
167.751	41.156	856.23
167.772	41.401	863.44
167.752	41.627	870.66
167.754	41.832	878.00
167.770	42.019	885.23
167.781	42.203	892.47
167.813	42.363	899.73
167.831	42.525	906.99
167.827	42.693	914.34
167.824	42.850	921.57
167.803	43.014	928.81
167.819	43.160	936.07
167.802	43.308	943.32

Table 3. Vapor pressures of HFC-32 obtained using the NIST Burnett apparatus.

T/K	P/kPa	T/F	P/psia
268.154	690.56	23.007	10.015
273.163	813.62	32.023	11.800
278.137	951.22	40.976	13.796
283.184	1108.22	50.061	16.073
288.129	1280.21	58.962	18.567
293.121	1473.5	67.947	21.371
298.174	1690.81	77.043	24.523
303.122	1926.26	85.949	27.938
308.143	2189.5	94.987	31.756
313.122	2476.63	103.949	35.920
318.154	2794.65	113.007	40.532
318.169	2795.42	113.034	40.544
323.161	3140.65	122.019	45.551
328.202	3522.52	131.093	51.089
333.105	3927.61	139.919	56.965
338.150	4382.59	149.000	63.564
343.110	4871.98	157.928	70.662
348.081	5409.01	166.875	78.451

Table 4. Saturated vapor densities for HFC-32 (difluoromethane)

T/K	P/Bar	rho/mol/L	T/F	P/psia	rho/lbs/ft3
219	0.890	0.0509	-65.469	12.921	0.1653
224	1.149	0.0647	-56.469	16.669	0.2101
229	1.464	0.0813	-47.469	21.234	0.2640
234	1.843	0.1010	-38.469	26.737	0.3280
239	2.296	0.1244	-29.469	33.303	0.4040
244	2.831	0.1519	-20.469	41.067	0.4933
249	3.459	0.1840	-11.469	50.170	0.5975
254	4.189	0.2214	-2.469	60.760	0.7190
259	5.032	0.2645	6.530	72.993	0.8590
264	6.000	0.3142	15.530	87.029	1.0204
269	7.104	0.3713	24.530	103.037	1.2058
274	8.355	0.4367	33.530	121.190	1.4182
279	9.767	0.5114	42.530	141.668	1.6608
284	11.352	0.5967	51.530	164.646	1.9378
289	13.124	0.6941	60.530	190.347	2.2542
294	15.097	0.8054	69.530	218.963	2.6156
299	17.284	0.9326	78.530	250.683	3.0287
304	19.702	1.0785	87.530	285.753	3.5026
309	22.367	1.2466	96.530	324.405	4.0485
314	25.296	1.4414	105.530	366.887	4.6812
319	28.508	1.6690	114.530	413.473	5.4203
324	32.023	1.9385	123.530	464.454	6.2956
329	35.865	2.2631	132.530	520.177	7.3498
334	40.059	2.6649	141.530	581.006	8.6547
336	41.843	2.8552	145.130	606.881	9.2728
339	44.639	3.1841	150.530	647.434	10.3409
340	45.604	3.3084	152.330	661.430	10.7446
343	48.604	3.7403	157.730	704.941	12.1473

Table 5. Saturated liquid densities for HFC-32 (difluoromethane)

T/K	P/Bar	rho/mol/L	T/F	P/psia	rho/lbs/ft3
242.589	2.671	22.168	-23.009	38.739	71.994
246.063	3.079	21.974	-16.756	44.650	71.364
250.574	3.677	21.706	-8.636	53.330	70.494
255.132	4.370	21.433	-0.432	63.381	69.607
259.778	5.175	21.148	7.930	75.057	68.682
264.509	6.106	20.853	16.446	88.560	67.724
269.391	7.197	20.539	25.233	104.383	66.704
274.006	8.357	20.231	33.540	121.208	65.704
278.823	9.715	19.908	42.211	140.904	64.655
283.645	11.234	19.568	50.890	162.935	63.550
288.530	12.950	19.216	59.684	187.823	62.407
293.461	14.874	18.845	68.559	215.729	61.202
298.418	17.018	18.457	77.482	246.825	59.942
303.414	19.407	18.044	86.475	281.474	58.601
308.266	21.960	17.620	95.208	318.502	57.224
313.135	24.770	17.178	103.973	359.258	55.788
318.253	28.010	16.670	113.185	406.250	54.139
323.110	31.374	16.147	121.928	455.041	52.440
327.963	35.041	15.582	130.663	508.226	50.605
332.797	39.017	14.955	139.364	565.893	48.569
337.791	43.494	14.175	148.353	630.827	46.036

Table 6(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	δρ	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
201.4668	0.0031	24.463	0.023	5.477	0.107	52.76	0.20	0.39	a
203.1891	0.0031	24.451	0.025	8.169	0.107	49.77	0.17	0.34	b
205.3522	0.0031	24.437	0.028	11.744	0.107	49.68	0.14	0.28	a
207.1265	0.0033	24.424	0.031	14.723	0.107	49.51	0.13	0.26	b
209.2809	0.0031	24.409	0.035	18.306	0.107	49.62	0.12	0.24	a
211.0429	0.0030	24.397	0.037	21.173	0.107	49.52	0.11	0.23	b
213.1814	0.0031	24.383	0.040	24.573	0.107	49.72	0.11	0.22	a
214.9430	0.0031	24.371	0.043	27.330	0.107	49.73	0.11	0.22	b
217.0617	0.0031	24.357	0.046	30.654	0.107	50.07	0.11	0.21	a

Table 6(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	δρ	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} F^{-1}			
-97.030	0.006	79.45	0.07	794.3	15.6	0.24239	0.00094	0.39	a
-93.930	0.006	79.41	0.08	1184.8	15.6	0.22864	0.00077	0.34	b
-90.036	0.005	79.36	0.09	1703.3	15.6	0.22822	0.00063	0.28	a
-86.842	0.006	79.32	0.10	2135.4	15.6	0.22747	0.00058	0.26	b
-82.964	0.006	79.28	0.11	2655.1	15.6	0.22797	0.00054	0.24	a
-79.793	0.005	79.24	0.12	3070.9	15.6	0.22749	0.00053	0.23	b
-75.944	0.006	79.19	0.13	3564.0	15.6	0.22843	0.00051	0.22	a
-72.773	0.006	79.15	0.14	3963.9	15.6	0.22848	0.00051	0.22	b
-68.959	0.006	79.11	0.15	4446.0	15.6	0.23001	0.00049	0.21	a

Table 7(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
223.0399	0.0031	23.372	0.021	5.067	0.059	52.53	0.20	0.39	a
225.1392	0.0032	23.360	0.024	7.844	0.059	48.98	0.15	0.32	b
226.9877	0.0031	23.349	0.026	10.421	0.059	48.78	0.13	0.27	a
229.1349	0.0034	23.336	0.029	13.473	0.059	48.90	0.12	0.24	b
231.0003	0.0032	23.325	0.031	16.121	0.059	48.87	0.11	0.22	a
233.1008	0.0033	23.312	0.034	19.063	0.059	48.93	0.11	0.22	b
234.9878	0.0032	23.301	0.036	21.658	0.059	48.88	0.10	0.21	a
237.0561	0.0033	23.289	0.038	24.455	0.059	48.96	0.10	0.21	b
238.9546	0.0032	23.278	0.041	26.999	0.059	48.92	0.10	0.20	a
240.9935	0.0034	23.266	0.043	29.745	0.059	49.06	0.10	0.20	b

Table 7(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-58.198	0.006	75.90	0.07	734.9	8.5	0.24133	0.00094	0.39	a
-54.419	0.006	75.87	0.08	1137.7	8.5	0.22503	0.00071	0.32	b
-51.092	0.006	75.83	0.08	1511.4	8.5	0.22409	0.00060	0.27	a
-47.227	0.006	75.79	0.09	1954.1	8.5	0.22465	0.00054	0.24	b
-43.869	0.006	75.75	0.10	2338.2	8.5	0.22450	0.00050	0.22	a
-40.088	0.006	75.71	0.11	2764.9	8.5	0.22478	0.00048	0.22	b
-36.692	0.006	75.68	0.12	3141.2	8.5	0.22457	0.00047	0.21	a
-32.969	0.006	75.64	0.12	3546.9	8.5	0.22493	0.00046	0.21	b
-29.553	0.006	75.60	0.13	3916.0	8.5	0.22476	0.00045	0.20	a
-25.882	0.006	75.56	0.14	4314.2	8.5	0.22539	0.00045	0.20	b

Table 8(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
247.0969	0.0031	22.066	0.019	3.950	0.054	52.43	0.21	0.40	a
249.1753	0.0032	22.056	0.021	6.199	0.054	48.46	0.15	0.31	b
251.1224	0.0031	22.047	0.023	8.420	0.054	48.69	0.12	0.25	a
253.2549	0.0035	22.036	0.025	10.911	0.054	48.56	0.11	0.23	b
255.1851	0.0031	22.026	0.027	13.175	0.054	48.69	0.10	0.21	a
257.3175	0.0032	22.016	0.029	15.653	0.054	48.37	0.09	0.20	b
259.2450	0.0031	22.006	0.031	17.859	0.054	48.94	0.09	0.19	a
261.3647	0.0033	21.996	0.033	20.243	0.054	48.61	0.09	0.18	b
263.2759	0.0031	21.987	0.035	22.361	0.054	49.04	0.09	0.18	a
265.3986	0.0032	21.977	0.037	24.696	0.054	48.88	0.09	0.18	b
267.3116	0.0032	21.968	0.038	26.807	0.054	49.17	0.09	0.18	a
269.4156	0.0033	21.957	0.040	29.167	0.054	49.19	0.09	0.18	b

Table 8(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-14.896	0.006	71.67	0.06	572.9	7.8	0.24089	0.00096	0.40	a
-11.154	0.006	71.63	0.07	899.1	7.8	0.22264	0.00070	0.31	b
-7.650	0.006	71.60	0.07	1221.3	7.8	0.22370	0.00057	0.25	a
-3.811	0.006	71.57	0.08	1582.5	7.8	0.22309	0.00050	0.23	b
-0.337	0.006	71.54	0.09	1910.8	7.8	0.22370	0.00046	0.21	a
3.502	0.006	71.50	0.09	2270.3	7.8	0.22220	0.00044	0.20	b
6.971	0.006	71.47	0.10	2590.2	7.8	0.22483	0.00042	0.19	a
10.786	0.006	71.44	0.11	2936.0	7.8	0.22333	0.00041	0.18	b
14.227	0.006	71.41	0.11	3243.2	7.8	0.22530	0.00040	0.18	a
18.047	0.006	71.38	0.12	3581.9	7.8	0.22457	0.00040	0.18	b
21.491	0.006	71.35	0.12	3888.0	7.8	0.22589	0.00040	0.18	a
25.278	0.006	71.31	0.13	4230.3	7.8	0.22600	0.00040	0.18	b

Table 9(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
275.8475	0.0034	20.321	0.018	4.042	0.040	52.42	0.21	0.39	a
277.9247	0.0033	20.314	0.019	5.795	0.040	49.05	0.15	0.30	b
279.9747	0.0035	20.306	0.021	7.567	0.040	48.91	0.12	0.24	a
282.0959	0.0033	20.298	0.022	9.429	0.040	49.22	0.10	0.20	b
284.1547	0.0033	20.290	0.023	11.251	0.040	49.19	0.09	0.18	a
286.2690	0.0033	20.282	0.025	13.126	0.040	49.27	0.09	0.17	b
288.3385	0.0032	20.274	0.026	14.959	0.040	49.24	0.08	0.16	a
290.4273	0.0032	20.266	0.028	16.801	0.040	49.31	0.08	0.16	b
292.5119	0.0031	20.258	0.029	18.627	0.040	49.22	0.08	0.15	a
294.5814	0.0032	20.250	0.030	20.428	0.040	49.47	0.08	0.15	b
296.6696	0.0033	20.242	0.032	22.232	0.040	49.12	0.07	0.15	a
298.7243	0.0034	20.235	0.033	23.996	0.040	49.44	0.08	0.15	b
300.8062	0.0032	20.227	0.034	25.776	0.040	49.43	0.07	0.15	a
302.8544	0.0032	20.219	0.036	27.524	0.040	49.58	0.07	0.15	b
304.9452	0.0035	20.211	0.037	29.309	0.040	50.07	0.08	0.15	a
306.9722	0.0034	20.203	0.038	31.047	0.040	50.10	0.07	0.15	b

Table 9(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
36.855	0.006	66.00	0.06	586.3	5.8	0.24084	0.00094	0.39	a
40.594	0.006	65.97	0.06	840.5	5.8	0.22532	0.00067	0.30	b
44.285	0.006	65.95	0.07	1097.5	5.8	0.22468	0.00053	0.24	a
48.103	0.006	65.92	0.07	1367.6	5.8	0.22611	0.00046	0.20	b
51.808	0.006	65.90	0.08	1631.8	5.8	0.22598	0.00042	0.18	a
55.614	0.006	65.87	0.08	1903.8	5.8	0.22635	0.00039	0.17	b
59.339	0.006	65.84	0.09	2169.6	5.8	0.22621	0.00037	0.16	a
63.099	0.006	65.82	0.09	2436.7	5.8	0.22652	0.00036	0.16	b
66.851	0.006	65.79	0.09	2701.6	5.8	0.22612	0.00035	0.15	a
70.577	0.006	65.77	0.10	2962.8	5.8	0.22726	0.00035	0.15	b
74.335	0.006	65.74	0.10	3224.5	5.8	0.22568	0.00034	0.15	a
78.034	0.006	65.72	0.11	3480.4	5.8	0.22715	0.00034	0.15	b
81.781	0.006	65.69	0.11	3738.6	5.8	0.22710	0.00034	0.15	a
85.468	0.006	65.67	0.12	3992.0	5.8	0.22778	0.00034	0.15	b
89.231	0.006	65.64	0.12	4251.0	5.8	0.23001	0.00035	0.15	a
92.880	0.006	65.62	0.12	4503.0	5.8	0.23017	0.00034	0.15	b

Table 10(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	δρ	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
312.5690	0.0035	17.508	0.016	4.054	0.012	53.52	0.16	0.29	b
314.7177	0.0035	17.502	0.016	5.241	0.012	50.89	0.12	0.23	a
316.9402	0.0038	17.497	0.017	6.484	0.012	50.63	0.10	0.19	b
319.1431	0.0033	17.491	0.018	7.726	0.012	51.00	0.08	0.16	a
321.3493	0.0035	17.486	0.019	8.975	0.012	50.81	0.08	0.15	b
323.5644	0.0034	17.480	0.020	10.231	0.012	50.94	0.07	0.14	a
325.7710	0.0035	17.475	0.020	11.483	0.012	50.82	0.07	0.14	b
327.9769	0.0036	17.469	0.021	12.733	0.012	51.06	0.07	0.13	a
330.1818	0.0035	17.464	0.022	13.980	0.012	50.94	0.07	0.13	b
332.3890	0.0035	17.458	0.023	15.227	0.012	51.05	0.07	0.13	a
334.5961	0.0039	17.453	0.024	16.471	0.012	51.13	0.07	0.13	b
336.8003	0.0033	17.447	0.024	17.713	0.012	51.21	0.06	0.12	a
339.0053	0.0035	17.442	0.025	18.956	0.012	51.08	0.06	0.13	b
341.2046	0.0034	17.436	0.026	20.198	0.012	51.26	0.06	0.12	a

Table 10(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	δρ	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
102.954	0.006	56.86	0.05	587.9	1.7	0.24587	0.00071	0.29	b
106.822	0.006	56.84	0.05	760.2	1.7	0.23379	0.00054	0.23	a
110.822	0.007	56.83	0.06	940.5	1.7	0.23260	0.00045	0.19	b
114.788	0.006	56.81	0.06	1120.6	1.7	0.23430	0.00038	0.16	a
118.759	0.006	56.79	0.06	1301.7	1.7	0.23342	0.00036	0.15	b
122.746	0.006	56.77	0.06	1484.0	1.7	0.23403	0.00033	0.14	a
126.718	0.006	56.75	0.07	1665.5	1.7	0.23348	0.00032	0.14	b
130.688	0.006	56.74	0.07	1846.8	1.7	0.23456	0.00031	0.13	a
134.657	0.006	56.72	0.07	2027.7	1.7	0.23403	0.00030	0.13	b
138.630	0.006	56.70	0.07	2208.4	1.7	0.23452	0.00030	0.13	a
142.603	0.007	56.68	0.08	2388.9	1.7	0.23492	0.00031	0.13	b
146.570	0.006	56.67	0.08	2569.0	1.7	0.23527	0.00029	0.12	a
150.539	0.006	56.65	0.08	2749.3	1.7	0.23469	0.00029	0.13	b
154.498	0.006	56.63	0.08	2929.5	1.7	0.23549	0.00029	0.12	a

Table 11(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
152.9366	0.0029	26.811	0.028	8.918	0.029	53.60	0.19	0.35	a
154.9359	0.0029	26.793	0.033	13.597	0.029	53.40	0.16	0.30	b
156.7176	0.0030	26.776	0.037	17.743	0.029	53.31	0.15	0.28	a
158.7148	0.0029	26.758	0.042	22.343	0.029	53.21	0.14	0.26	b
160.4805	0.0030	26.742	0.046	26.357	0.029	53.16	0.14	0.26	a
162.4557	0.0030	26.724	0.051	30.788	0.029	53.34	0.13	0.25	c

Table 11(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-184.384	0.005	87.08	0.09	1293.5	4.3	0.24624	0.00086	0.35	a
-180.785	0.005	87.02	0.11	1972.1	4.3	0.24531	0.00073	0.30	b
-177.578	0.005	86.96	0.12	2573.4	4.3	0.24490	0.00068	0.28	a
-173.983	0.005	86.90	0.14	3240.6	4.3	0.24445	0.00064	0.26	b
-170.805	0.005	86.85	0.15	3822.8	4.3	0.24420	0.00062	0.26	a
-167.250	0.005	86.79	0.16	4465.4	4.3	0.24505	0.00061	0.25	c

Table 12(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
166.0437	0.0030	26.184	0.026	7.359	0.009	52.34	0.20	0.39	a
169.8697	0.0029	26.151	0.034	15.507	0.009	51.99	0.15	0.28	a
173.6822	0.0030	26.119	0.042	23.506	0.009	51.86	0.13	0.26	a
177.4754	0.0029	26.087	0.050	31.315	0.009	51.99	0.13	0.24	a

Table 12(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-160.791	0.005	85.04	0.08	1067.3	1.3	0.24047	0.00093	0.39	a
-153.904	0.005	84.93	0.11	2249.0	1.3	0.23886	0.00067	0.28	a
-147.042	0.005	84.83	0.14	3409.2	1.3	0.23826	0.00061	0.26	a
-140.214	0.005	84.72	0.16	4541.8	1.3	0.23886	0.00058	0.24	a

Table 13(a). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
184.3432	0.0030	25.322	0.025	6.772	0.010	50.68	0.20	0.40	a
186.3054	0.0030	25.307	0.028	10.466	0.010	50.69	0.16	0.31	b
188.2313	0.0030	25.292	0.032	14.071	0.010	50.60	0.14	0.28	a
190.1865	0.0030	25.277	0.035	17.707	0.010	50.64	0.13	0.26	b
192.1069	0.0030	25.262	0.039	21.252	0.010	50.53	0.12	0.25	a
194.0462	0.0031	25.248	0.042	24.802	0.010	50.53	0.12	0.24	b
195.9596	0.0030	25.233	0.045	28.274	0.010	50.56	0.12	0.23	a
197.8910	0.0031	25.219	0.049	31.747	0.010	50.61	0.12	0.23	b

Table 13(b). Experimental liquid heat capacity data for HFC-32.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-127.852	0.005	82.24	0.08	982.2	1.5	0.23285	0.00092	0.40	a
-124.320	0.005	82.19	0.09	1517.9	1.5	0.23288	0.00073	0.31	b
-120.854	0.005	82.14	0.10	2040.9	1.5	0.23248	0.00064	0.28	a
-117.334	0.005	82.09	0.11	2568.2	1.5	0.23265	0.00060	0.26	b
-113.878	0.005	82.05	0.13	3082.4	1.5	0.23215	0.00057	0.25	a
-110.387	0.006	82.00	0.14	3597.3	1.5	0.23216	0.00056	0.24	b
-106.943	0.005	81.95	0.15	4100.8	1.5	0.23230	0.00055	0.23	a
-103.466	0.006	81.90	0.16	4604.5	1.5	0.23249	0.00054	0.23	b

Table 14(a). Experimental two-phase heat capacity data for HFC-32.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
K		mol dm^{-3}	MPa	J mol^{-1} K^{-1}						
141.7357	0.0030	27.556	0.0001	82.41	0.06	0.08	82.41	0.06	0.08	a
145.8061	0.0029	27.313	0.0002	82.07	0.06	0.07	82.06	0.06	0.07	a
149.8458	0.0029	27.075	0.0003	82.03	0.06	0.08	82.02	0.06	0.08	a
153.8710	0.0030	26.841	0.0005	81.83	0.06	0.08	81.81	0.06	0.08	a
157.8716	0.0029	26.611	0.0008	81.75	0.06	0.08	81.72	0.06	0.08	a
161.8533	0.0029	26.386	0.0012	81.61	0.06	0.08	81.58	0.06	0.08	a
165.8155	0.0030	26.164	0.0018	81.16	0.06	0.08	81.12	0.06	0.08	a
169.7495	0.0030	25.946	0.0026	81.18	0.06	0.08	81.12	0.07	0.08	a
173.6717	0.0029	25.730	0.0038	81.23	0.06	0.08	81.15	0.07	0.08	a
177.5690	0.0030	25.518	0.0053	81.45	0.06	0.08	81.35	0.07	0.09	a
181.4505	0.0030	25.308	0.0074	81.33	0.07	0.08	81.21	0.07	0.09	a
185.3072	0.0030	25.100	0.0101	81.29	0.07	0.08	81.15	0.08	0.10	a
189.1516	0.0030	24.895	0.0135	81.20	0.06	0.08	81.03	0.09	0.11	a
192.9702	0.0029	24.691	0.0179	81.39	0.06	0.08	81.19	0.09	0.11	a
196.7737	0.0030	24.489	0.0233	81.33	0.07	0.08	81.09	0.10	0.13	a
200.5483	0.0030	24.288	0.0299	81.55	0.07	0.08	81.27	0.11	0.14	a
204.5556	0.0030	24.076	0.0385	81.80	0.06	0.07	81.48	0.12	0.15	a
208.7849	0.0030	23.852	0.0498	82.07	0.06	0.07	81.71	0.14	0.17	a
212.9828	0.0030	23.629	0.0635	82.34	0.06	0.07	81.92	0.16	0.19	a
217.1603	0.0030	23.406	0.0799	82.66	0.06	0.07	82.20	0.17	0.21	a
221.3115	0.0030	23.184	0.0995	82.91	0.06	0.08	82.40	0.19	0.24	a
225.4342	0.0031	22.963	0.1226	83.27	0.06	0.08	82.72	0.21	0.26	a
229.5376	0.0031	22.741	0.1496	83.58	0.07	0.08	82.99	0.23	0.28	a
233.6094	0.0031	22.519	0.1808	84.01	0.07	0.08	83.37	0.26	0.31	a
237.6613	0.0030	22.297	0.2167	84.57	0.07	0.08	83.90	0.28	0.33	a
241.6846	0.0030	22.074	0.2577	85.05	0.07	0.08	84.36	0.30	0.35	a
245.6850	0.0031	21.849	0.3042	85.38	0.07	0.08	84.68	0.31	0.37	a
249.6596	0.0031	21.624	0.3566	85.90	0.07	0.08	85.20	0.33	0.39	a
253.6128	0.0030	21.397	0.4153	86.31	0.07	0.08	85.63	0.35	0.41	a
257.5429	0.0030	21.168	0.4807	86.74	0.07	0.08	86.10	0.36	0.42	a
261.4430	0.0031	20.938	0.5532	87.28	0.07	0.08	86.69	0.38	0.43	a
265.3195	0.0032	20.705	0.6332	88.21	0.07	0.08	87.70	0.39	0.44	a
269.1857	0.0030	20.469	0.7215	88.67	0.07	0.08	88.27	0.39	0.44	a
273.0159	0.0033	20.230	0.8178	89.41	0.08	0.09	89.16	0.39	0.44	a
276.8306	0.0032	19.988	0.9230	90.05	0.08	0.09	89.97	0.39	0.44	a
280.6208	0.0030	19.741	1.0374	90.93	0.08	0.08	91.07	0.39	0.43	a
284.6251	0.0030	19.475	1.1694	91.68	0.07	0.08	92.11	0.38	0.41	a
288.8352	0.0031	19.187	1.3213	92.66	0.07	0.08	93.47	0.36	0.39	a
293.0161	0.0031	18.893	1.4863	93.41	0.07	0.08	94.68	0.34	0.36	a
297.1666	0.0030	18.591	1.6648	94.70	0.08	0.08	96.54	0.31	0.32	a
301.2947	0.0031	18.280	1.8577	95.73	0.08	0.08	98.28	0.28	0.29	a
305.3859	0.0030	17.960	2.0648	96.80	0.08	0.08	100.15	0.28	0.28	a

Table 14(b). Experimental two-phase heat capacity data for HFC-32.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
°F		lb ft^{-3}	psia	Btu lb^{-1} °F^{-1}						
-204.546	0.005	89.50	0.01	0.37860	0.00029	0.08	0.37858	0.00029	0.08	a
-197.219	0.005	88.71	0.02	0.37705	0.00028	0.07	0.37701	0.00028	0.07	a
-189.947	0.005	87.93	0.04	0.37685	0.00029	0.08	0.37680	0.00029	0.08	a
-182.702	0.005	87.17	0.07	0.37593	0.00029	0.08	0.37586	0.00030	0.08	a
-175.501	0.005	86.43	0.11	0.37555	0.00029	0.08	0.37545	0.00029	0.08	a
-168.334	0.005	85.69	0.17	0.37494	0.00029	0.08	0.37479	0.00029	0.08	a
-161.202	0.005	84.97	0.26	0.37287	0.00029	0.08	0.37267	0.00030	0.08	a
-154.121	0.005	84.27	0.38	0.37293	0.00029	0.08	0.37267	0.00030	0.08	a
-147.061	0.005	83.57	0.55	0.37317	0.00029	0.08	0.37284	0.00031	0.08	a
-140.046	0.005	82.88	0.77	0.37417	0.00030	0.08	0.37375	0.00033	0.09	a
-133.059	0.005	82.19	1.07	0.37363	0.00030	0.08	0.37310	0.00034	0.09	a
-126.117	0.005	81.52	1.46	0.37345	0.00030	0.08	0.37280	0.00037	0.10	a
-119.197	0.005	80.85	1.96	0.37304	0.00030	0.08	0.37225	0.00039	0.11	a
-112.324	0.005	80.19	2.59	0.37391	0.00030	0.08	0.37298	0.00043	0.11	a
-105.477	0.005	79.53	3.37	0.37362	0.00030	0.08	0.37253	0.00047	0.13	a
-98.683	0.005	78.88	4.34	0.37465	0.00031	0.08	0.37339	0.00052	0.14	a
-91.470	0.005	78.19	5.59	0.37581	0.00028	0.07	0.37435	0.00056	0.15	a
-83.857	0.005	77.46	7.22	0.37706	0.00028	0.07	0.37538	0.00064	0.17	a
-76.301	0.005	76.74	9.21	0.37826	0.00028	0.07	0.37636	0.00072	0.19	a
-68.781	0.005	76.02	11.59	0.37975	0.00028	0.07	0.37762	0.00080	0.21	a
-61.309	0.005	75.30	14.43	0.38090	0.00029	0.08	0.37856	0.00089	0.24	a
-53.888	0.006	74.58	17.78	0.38257	0.00030	0.08	0.38001	0.00098	0.26	a
-46.502	0.006	73.86	21.70	0.38400	0.00030	0.08	0.38125	0.00108	0.28	a
-39.173	0.006	73.14	26.22	0.38594	0.00030	0.08	0.38301	0.00117	0.31	a
-31.880	0.005	72.41	31.43	0.38852	0.00030	0.08	0.38545	0.00126	0.33	a
-24.638	0.005	71.69	37.38	0.39072	0.00030	0.08	0.38755	0.00136	0.35	a
-17.437	0.005	70.96	44.12	0.39223	0.00031	0.08	0.38901	0.00144	0.37	a
-10.283	0.006	70.23	51.71	0.39464	0.00032	0.08	0.39144	0.00153	0.39	a
-3.167	0.005	69.49	60.23	0.39651	0.00031	0.08	0.39338	0.00160	0.41	a
3.907	0.005	68.75	69.73	0.39851	0.00032	0.08	0.39555	0.00167	0.42	a
10.927	0.006	68.00	80.24	0.40098	0.00033	0.08	0.39828	0.00172	0.43	a
17.905	0.006	67.24	91.84	0.40524	0.00034	0.08	0.40291	0.00177	0.44	a
24.864	0.005	66.48	104.64	0.40736	0.00033	0.08	0.40553	0.00180	0.44	a
31.759	0.006	65.70	118.61	0.41078	0.00036	0.09	0.40960	0.00181	0.44	a
38.625	0.006	64.91	133.88	0.41371	0.00036	0.09	0.41335	0.00181	0.44	a
45.447	0.005	64.12	150.46	0.41775	0.00035	0.08	0.41841	0.00178	0.43	a
52.655	0.005	63.25	169.60	0.42118	0.00032	0.08	0.42317	0.00173	0.41	a
60.233	0.006	62.32	191.64	0.42569	0.00034	0.08	0.42941	0.00165	0.39	a
67.759	0.006	61.36	215.56	0.42914	0.00034	0.08	0.43497	0.00155	0.36	a
75.230	0.005	60.38	241.45	0.43509	0.00035	0.08	0.44350	0.00144	0.32	a
82.660	0.006	59.37	269.43	0.43980	0.00036	0.08	0.45152	0.00130	0.29	a
90.025	0.005	58.33	299.48	0.44472	0.00036	0.08	0.46009	0.00127	0.28	a

Table 15(a). Experimental two-phase heat capacity data for HFC-32.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
K		mol dm^{-3}	MPa	J mol^{-1} K^{-1}						
141.1591	0.0030	27.591	0.0001	82.53	0.06	0.08	82.53	0.06	0.08	d
142.8524	0.0029	27.489	0.0001	82.39	0.04	0.05	82.39	0.04	0.05	c
145.2086	0.0029	27.348	0.0002	82.20	0.06	0.07	82.20	0.06	0.07	d
149.2430	0.0029	27.110	0.0003	81.90	0.06	0.07	81.90	0.06	0.07	d
150.0449	0.0030	27.063	0.0003	81.95	0.04	0.05	81.95	0.04	0.05	c
153.2491	0.0030	26.877	0.0004	81.85	0.06	0.08	81.85	0.06	0.08	d
157.1710	0.0029	26.651	0.0007	81.81	0.04	0.05	81.81	0.04	0.05	c
157.2459	0.0030	26.647	0.0007	81.64	0.06	0.08	81.63	0.06	0.08	d
161.2207	0.0031	26.421	0.0011	81.59	0.06	0.08	81.59	0.06	0.08	d
165.1870	0.0030	26.199	0.0017	81.70	0.06	0.08	81.69	0.06	0.08	d
169.1335	0.0029	25.980	0.0025	81.55	0.06	0.08	81.55	0.06	0.08	d
173.0592	0.0030	25.764	0.0036	81.63	0.06	0.08	81.63	0.06	0.08	d
176.9858	0.0030	25.550	0.0051	81.26	0.06	0.08	81.26	0.06	0.08	d

Table 15(b). Experimental two-phase heat capacity data for HFC-32.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
°F		lb ft^{-3}	psia	Btu lb^{-1} °F^{-1}						
-205.584	0.005	89.61	0.01	0.37916	0.00029	0.08	0.37915	0.00029	0.08	d
-202.536	0.005	89.28	0.02	0.37850	0.00017	0.05	0.37850	0.00017	0.05	c
-198.294	0.005	88.82	0.02	0.37764	0.00028	0.07	0.37763	0.00028	0.07	d
-191.033	0.005	88.05	0.04	0.37628	0.00028	0.07	0.37628	0.00028	0.07	d
-189.589	0.005	87.89	0.04	0.37649	0.00017	0.05	0.37649	0.00017	0.05	c
-183.822	0.005	87.29	0.06	0.37602	0.00029	0.08	0.37602	0.00029	0.08	d
-176.762	0.005	86.56	0.10	0.37585	0.00017	0.05	0.37584	0.00017	0.05	c
-176.627	0.005	86.54	0.10	0.37505	0.00029	0.08	0.37504	0.00029	0.08	d
-169.472	0.005	85.81	0.16	0.37484	0.00030	0.08	0.37483	0.00030	0.08	d
-162.333	0.005	85.09	0.24	0.37532	0.00029	0.08	0.37532	0.00029	0.08	d
-155.230	0.005	84.38	0.36	0.37466	0.00029	0.08	0.37466	0.00029	0.08	d
-148.164	0.005	83.67	0.52	0.37503	0.00029	0.08	0.37504	0.00029	0.08	d
-141.096	0.005	82.98	0.74	0.37331	0.00029	0.08	0.37333	0.00029	0.08	d

Table 16(a). Experimental two-phase heat capacity data for HFC-32.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
K		mol dm^{-3}	MPa	J mol^{-1} K^{-1}						
144.5737	0.0030	27.386	0.0001	82.33	0.05	0.07	82.32	0.05	0.07	a
149.5238	0.0030	27.094	0.0003	81.96	0.05	0.07	81.94	0.06	0.07	a
154.4251	0.0029	26.809	0.0005	81.76	0.05	0.07	81.72	0.06	0.07	a
159.2977	0.0030	26.530	0.0009	81.66	0.06	0.07	81.60	0.06	0.07	a
164.1292	0.0030	26.258	0.0015	81.51	0.06	0.07	81.42	0.06	0.08	a
168.9241	0.0030	25.991	0.0024	81.51	0.06	0.07	81.38	0.07	0.08	a
173.6834	0.0030	25.730	0.0038	81.54	0.06	0.07	81.36	0.08	0.10	a
178.4073	0.0030	25.472	0.0057	81.61	0.06	0.07	81.37	0.09	0.11	a
183.0937	0.0031	25.219	0.0085	81.56	0.06	0.07	81.25	0.11	0.14	a
187.7483	0.0031	24.970	0.0122	81.54	0.06	0.07	81.14	0.14	0.17	a
192.3683	0.0030	24.723	0.0171	81.71	0.06	0.07	81.20	0.17	0.21	a
196.9571	0.0030	24.479	0.0236	82.11	0.06	0.07	81.48	0.21	0.25	a
201.5127	0.0030	24.237	0.0318	82.06	0.06	0.07	81.29	0.25	0.30	a
206.0239	0.0030	23.998	0.0422	82.59	0.06	0.07	81.67	0.30	0.36	a
210.5109	0.0031	23.760	0.0551	83.23	0.06	0.07	82.13	0.35	0.43	a
214.9647	0.0031	23.523	0.0709	83.54	0.06	0.07	82.26	0.41	0.50	a
219.3819	0.0031	23.287	0.0900	83.75	0.06	0.08	82.27	0.47	0.58	a
223.7718	0.0032	23.052	0.1128	83.74	0.07	0.08	82.05	0.54	0.66	a
228.1108	0.0032	22.818	0.1397	84.23	0.07	0.08	82.32	0.62	0.75	a
232.4360	0.0031	22.583	0.1713	85.01	0.07	0.08	82.87	0.70	0.84	a
236.5785	0.0032	22.356	0.2066	85.94	0.07	0.08	83.58	0.78	0.93	b
237.8819	0.0031	22.284	0.2188	86.25	0.07	0.08	83.81	0.80	0.96	c
240.8376	0.0032	22.121	0.2486	86.41	0.07	0.08	83.81	0.86	1.03	b
242.1397	0.0031	22.048	0.2627	86.71	0.07	0.08	84.03	0.89	1.06	c
246.3710	0.0031	21.811	0.3128	87.50	0.07	0.08	84.57	0.98	1.16	c
250.5591	0.0032	21.573	0.3693	88.40	0.07	0.08	85.24	1.07	1.26	c
254.7161	0.0032	21.333	0.4329	89.13	0.07	0.08	85.74	1.16	1.36	c
258.8504	0.0032	21.092	0.5042	90.09	0.07	0.08	86.47	1.26	1.45	c
262.9482	0.0032	20.848	0.5833	90.95	0.08	0.08	87.12	1.35	1.55	c
267.0143	0.0032	20.602	0.6709	92.26	0.08	0.08	88.23	1.45	1.64	c
271.0637	0.0033	20.352	0.7676	92.76	0.08	0.09	88.56	1.54	1.74	c
275.0627	0.0032	20.101	0.8731	93.83	0.08	0.09	89.48	1.64	1.83	c
279.0430	0.0034	19.845	0.9886	95.33	0.09	0.09	90.87	1.73	1.90	c
282.9958	0.0032	19.584	1.1142	96.42	0.09	0.09	91.87	1.82	1.98	c
286.9244	0.0034	19.319	1.2506	97.41	0.09	0.09	92.83	1.91	2.06	c
290.8218	0.0032	19.049	1.3979	98.87	0.09	0.09	94.31	1.99	2.11	c
294.6918	0.0033	18.772	1.5565	100.14	0.09	0.09	95.67	2.07	2.17	c
298.5375	0.0031	18.489	1.7271	101.41	0.09	0.09	97.10	2.15	2.21	c
302.3528	0.0032	18.199	1.9097	103.37	0.10	0.09	99.38	2.20	2.21	c
306.1487	0.0034	17.899	2.1053	104.91	0.10	0.10	101.22	2.28	2.25	c
309.9108	0.0034	17.591	2.3134	106.05	0.11	0.10	102.92	2.32	2.25	c
313.6483	0.0034	17.271	2.5351	107.36	0.11	0.10	104.86	2.38	2.27	c
317.3440	0.0033	16.941	2.7696	109.16	0.12	0.11	107.54	2.41	2.25	c
320.9909	0.0033	16.598	3.0166	108.38	3.84	3.54	107.85	4.55	4.22	c
324.5868	0.0034	16.241	3.2760	113.01	0.12	0.11	114.03	2.45	2.14	c
328.2040	0.0036	15.859	3.5539	115.64	0.13	0.11	118.61	2.45	2.06	c
331.7698	0.0034	15.456	3.8451	118.15	0.13	0.11	123.73	2.42	1.96	c
335.2937	0.0036	15.025	4.1506	120.84	0.14	0.11	129.96	2.38	1.83	c
338.7664	0.0033	14.559	4.4700	123.92	0.14	0.11	138.00	2.34	1.70	c
342.1731	0.0032	14.048	4.8020	128.97	0.14	0.11	150.25	2.35	1.57	c

Table 16(b). Experimental two-phase heat capacity data for HFC-32.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
°F		lb ft^{-3}	psia	Btu lb^{-1} °F^{-1}						
-199.437	0.005	88.94	0.02	0.37824	0.00025	0.07	0.37818	0.00025	0.07	a
-190.527	0.005	87.99	0.04	0.37655	0.00025	0.07	0.37644	0.00025	0.07	a
-181.705	0.005	87.07	0.07	0.37561	0.00025	0.07	0.37543	0.00026	0.07	a
-172.934	0.005	86.16	0.13	0.37514	0.00026	0.07	0.37487	0.00027	0.07	a
-164.237	0.005	85.28	0.22	0.37447	0.00026	0.07	0.37406	0.00029	0.08	a
-155.607	0.005	84.41	0.35	0.37447	0.00026	0.07	0.37389	0.00031	0.08	a
-147.040	0.005	83.56	0.55	0.37459	0.00026	0.07	0.37379	0.00036	0.10	a
-138.537	0.005	82.73	0.83	0.37491	0.00026	0.07	0.37382	0.00043	0.11	a
-130.101	0.006	81.91	1.23	0.37470	0.00027	0.07	0.37327	0.00052	0.14	a
-121.723	0.005	81.10	1.77	0.37461	0.00027	0.07	0.37276	0.00063	0.17	a
-113.407	0.005	80.29	2.48	0.37537	0.00027	0.07	0.37303	0.00077	0.21	a
-105.147	0.005	79.50	3.42	0.37721	0.00027	0.07	0.37431	0.00094	0.25	a
-96.947	0.005	78.72	4.61	0.37699	0.00027	0.07	0.37346	0.00114	0.30	a
-88.827	0.005	77.94	6.12	0.37943	0.00028	0.07	0.37519	0.00136	0.36	a
-80.750	0.006	77.17	7.99	0.38236	0.00028	0.07	0.37733	0.00161	0.43	a
-72.734	0.006	76.40	10.28	0.38381	0.00029	0.07	0.37793	0.00188	0.50	a
-64.783	0.006	75.63	13.05	0.38475	0.00029	0.08	0.37796	0.00218	0.58	a
-56.881	0.006	74.87	16.36	0.38473	0.00030	0.08	0.37697	0.00250	0.66	a
-49.071	0.006	74.11	20.26	0.38695	0.00031	0.08	0.37818	0.00284	0.75	a
-41.285	0.006	73.34	24.85	0.39056	0.00031	0.08	0.38073	0.00320	0.84	a
-33.829	0.006	72.61	29.97	0.39484	0.00031	0.08	0.38396	0.00357	0.93	b
-31.483	0.006	72.37	31.74	0.39625	0.00031	0.08	0.38504	0.00368	0.96	c
-26.162	0.006	71.84	36.06	0.39699	0.00032	0.08	0.38501	0.00396	1.03	b
-23.819	0.006	71.61	38.10	0.39836	0.00031	0.08	0.38605	0.00408	1.06	c
-16.202	0.006	70.84	45.36	0.40197	0.00032	0.08	0.38854	0.00450	1.16	c
-8.664	0.006	70.06	53.57	0.40614	0.00033	0.08	0.39161	0.00492	1.26	c
-1.181	0.006	69.29	62.79	0.40950	0.00034	0.08	0.39390	0.00534	1.36	c
6.261	0.006	68.50	73.13	0.41389	0.00034	0.08	0.39726	0.00578	1.45	c
13.637	0.006	67.71	84.60	0.41786	0.00035	0.08	0.40026	0.00622	1.55	c
20.956	0.006	66.91	97.30	0.42384	0.00036	0.08	0.40534	0.00666	1.64	c
28.245	0.006	66.10	111.33	0.42614	0.00037	0.09	0.40684	0.00709	1.74	c
35.443	0.006	65.28	126.63	0.43106	0.00037	0.09	0.41108	0.00752	1.83	c
42.607	0.006	64.45	143.38	0.43797	0.00040	0.09	0.41746	0.00795	1.90	c
49.722	0.006	63.60	161.61	0.44296	0.00039	0.09	0.42209	0.00836	1.98	c
56.794	0.006	62.74	181.39	0.44751	0.00042	0.09	0.42648	0.00877	2.06	c
63.809	0.006	61.87	202.74	0.45421	0.00041	0.09	0.43328	0.00915	2.11	c
70.775	0.006	60.97	225.75	0.46008	0.00043	0.09	0.43954	0.00952	2.17	c
77.697	0.006	60.05	250.49	0.46589	0.00042	0.09	0.44610	0.00986	2.21	c
84.565	0.006	59.11	276.98	0.47488	0.00044	0.09	0.45655	0.01010	2.21	c
91.398	0.006	58.13	305.34	0.48198	0.00048	0.10	0.46504	0.01048	2.25	c
98.169	0.006	57.13	335.54	0.48719	0.00049	0.10	0.47283	0.01065	2.25	c
104.897	0.006	56.09	367.69	0.49322	0.00051	0.10	0.48174	0.01093	2.27	c
111.549	0.006	55.02	401.70	0.50151	0.00053	0.11	0.49407	0.01109	2.25	c
118.114	0.006	53.91	437.53	0.49791	0.01764	3.54	0.49550	0.02092	4.22	c
124.586	0.006	52.75	475.15	0.51919	0.00055	0.11	0.52387	0.01124	2.14	c
131.097	0.006	51.51	515.45	0.53129	0.00060	0.11	0.54491	0.01124	2.06	c
137.516	0.006	50.20	557.68	0.54281	0.00059	0.11	0.56843	0.01113	1.96	c
143.859	0.006	48.80	602.00	0.55514	0.00063	0.11	0.59707	0.01096	1.83	c
150.110	0.006	47.28	648.32	0.56930	0.00062	0.11	0.63399	0.01077	1.70	c
156.242	0.006	45.62	696.48	0.59249	0.00064	0.11	0.69025	0.01081	1.57	c

Table 17a. Compressed liquid density measurements for HCFC-124 (SI units).

T/K	rho/g/cc	P/kPa
275.247	1.4312	396.9
275.196	1.4350	493.1
275.202	1.4354	603.5
275.195	1.4369	1050.7
275.213	1.4346	1575.7
275.159	1.4366	2058.1
275.146	1.4380	2469.2
275.188	1.4398	3036.4
275.175	1.4417	3592.0
275.071	1.4436	3951.7
275.123	1.4449	4507.3
275.180	1.4464	4948.2
275.143	1.4480	5470.6
275.606	1.4480	6023.4
275.219	1.4505	6361.0
278.752	1.4202	406.6
278.779	1.4236	493.6
278.700	1.4246	604.6
278.699	1.4258	1050.3
278.702	1.4238	1578.8
278.723	1.4256	2060.2
278.695	1.4272	2474.9
278.725	1.4291	3039.7
278.697	1.4311	3600.1
278.714	1.4324	3957.9
278.669	1.4344	4514.5
278.702	1.4358	4944.6
278.740	1.4374	5475.5
278.763	1.4391	6022.7
278.733	1.4403	6371.2
283.658	1.4043	410.6
283.727	1.4077	494.0
283.630	1.4086	605.9
283.621	1.4100	1051.1
283.635	1.4082	1582.6
283.631	1.4101	2063.0
283.609	1.4119	2480.0
283.647	1.4139	3044.1
283.636	1.4161	3608.2
283.657	1.4174	3964.2
283.617	1.4196	4522.8
283.625	1.4211	4948.2
283.640	1.4229	5483.9
283.656	1.4247	6029.4
283.647	1.4260	6384.5
288.544	1.3882	412.6

288.611	1.3916	494.6
288.538	1.3924	607.6
288.526	1.3941	1052.6
288.538	1.3924	1585.4
288.540	1.3944	2065.9
288.490	1.3964	2486.7
288.538	1.3985	3043.9
288.568	1.4007	3614.7
288.549	1.4022	3961.5
288.514	1.4046	4531.6
288.529	1.4062	4957.1
288.551	1.4082	5495.6
288.543	1.4102	6038.9
288.555	1.4114	6395.6
293.534	1.3713	413.8
293.555	1.3748	495.6
293.482	1.3756	608.9
293.483	1.3776	1054.3
293.483	1.3761	1589.4
293.517	1.3760	1589.8
293.488	1.3782	2067.2
293.525	1.3802	2492.4
293.475	1.3827	3045.9
293.516	1.3851	3624.9
293.484	1.3867	3958.4
293.468	1.3892	4540.6
293.473	1.3909	4965.8
293.489	1.3931	5505.2
293.490	1.3952	6049.3
293.490	1.3966	6410.0
298.571	1.1061	430.3
298.546	1.3574	496.5
298.475	1.3581	610.4
298.468	1.3606	1056.2
298.477	1.3616	2069.8
298.520	1.3636	2497.5
298.471	1.3664	3051.1
298.510	1.3690	3629.1
298.471	1.3707	3968.2
298.464	1.3734	4551.2
298.466	1.3753	4973.2
298.481	1.3776	5513.0
298.486	1.3799	6059.0
298.487	1.3813	6425.9
303.543	1.2562	516.7
303.470	1.3403	612.1
303.482	1.3368	726.6
303.472	1.3432	1058.4
303.488	1.3392	1149.6
303.499	1.3418	1596.2
303.475	1.3445	2073.3

303.515	1.3467	2503.3
303.467	1.3497	3056.8
303.500	1.3525	3635.5
303.473	1.3544	3974.1
303.459	1.3573	4563.1
303.468	1.3593	4979.2
303.479	1.3618	5519.9
303.488	1.3642	6070.1
303.492	1.3658	6441.2
308.372	1.3223	613.4
308.377	1.3259	1060.6
308.390	1.3274	1599.5
308.377	1.3273	2077.2
308.416	1.3297	2508.9
308.366	1.3330	3062.3
308.405	1.3360	3644.8
308.373	1.3380	3979.3
308.376	1.3412	4576.8
308.373	1.3433	4986.7
308.387	1.3460	5538.0
308.391	1.3486	6081.2
308.394	1.3504	6453.1
313.327	1.3066	1094.1
313.338	1.3098	1559.9
313.328	1.3131	2062.6
313.331	1.3164	2596.0
313.336	1.3192	3044.4
313.395	1.3220	3568.6
313.364	1.3219	4091.3
313.360	1.3246	4537.0
313.363	1.3272	4997.2
313.373	1.3310	5590.8
313.396	1.3359	6012.6
313.352	1.3354	6520.7
318.224	1.2876	1097.2
318.252	1.2911	1568.3
318.234	1.2948	2068.7
318.236	1.2985	2612.2
318.256	1.3014	3052.0
318.304	1.3046	3582.8
318.287	1.3047	4103.8
318.277	1.3077	4549.1
318.283	1.3105	5017.2
318.283	1.3146	5604.9
318.300	1.3165	6023.7
318.271	1.3193	6533.0
323.093	1.2681	1099.9
323.134	1.2718	1572.8
323.094	1.2760	2073.2
323.107	1.2800	2622.3

323.137	1.2833	3060.2
323.121	1.2979	5592.8
323.184	1.2867	3591.7
323.168	1.2871	4110.4
323.159	1.2903	4557.9
323.166	1.2934	5023.3
323.184	1.2998	6039.3
323.158	1.3029	6545.9
327.958	1.2476	1102.6
328.000	1.2517	1577.1
327.979	1.2564	2080.2
327.897	1.2612	2629.4
328.032	1.2644	3069.7
328.058	1.2682	3596.9
328.042	1.2690	4119.5
328.031	1.2726	4571.1
328.036	1.2759	5036.0
328.008	1.2807	5599.8
328.062	1.2828	6060.8
328.023	1.2862	6558.6
332.790	1.2262	1105.3
332.841	1.2310	1582.3
332.778	1.2362	2085.4
332.807	1.2410	2635.9
332.836	1.2450	3084.7
332.884	1.2492	3602.2
332.885	1.2506	4127.8
332.875	1.2543	4582.7
332.882	1.2579	5044.0
332.850	1.2636	5610.3
332.906	1.2654	6077.1
332.870	1.2691	6572.6
337.833	1.2083	1583.8
337.777	1.2141	2090.8
337.804	1.2197	2644.2
337.828	1.2241	3089.9
337.884	1.2288	3610.2
337.903	1.2306	4136.0
337.876	1.2349	4593.3
337.877	1.2387	5051.2
337.848	1.2472	5620.8
337.906	1.2471	6089.6
337.866	1.2510	6586.3
342.787	1.1843	1588.3
342.733	1.1910	2096.7
342.758	1.1974	2651.8
342.779	1.2024	3098.2
342.879	1.2076	3623.9
342.867	1.2105	4147.5
342.823	1.2149	4601.9

342.839	1.2193	5065.9
342.808	1.2280	5632.8
342.877	1.2283	6112.2
342.824	1.2335	6600.7
347.706	1.1587	1593.0
347.635	1.1666	2103.5
347.598	1.1742	2659.2
347.696	1.1797	3110.8
347.622	1.1863	3630.5
347.781	1.1891	4155.1
347.761	1.1942	4615.9
347.760	1.1991	5081.9
347.738	1.2081	5644.6
347.796	1.2091	6128.0
347.750	1.2141	6615.5
352.517	1.1405	2110.0
352.485	1.1496	2666.3
352.556	1.1558	3116.4
352.640	1.1628	3647.6
352.675	1.1669	4168.0
352.646	1.1726	4624.3
352.647	1.1781	5091.7
352.612	1.1878	5658.0
352.626	1.1896	6146.8
352.637	1.1947	6631.1
357.370	1.1122	2111.6
357.392	1.1227	2673.3
357.280	1.1307	3123.4
357.500	1.1384	3655.8
357.520	1.1437	4181.5
357.514	1.1503	4632.3
357.523	1.1562	5107.5
357.479	1.1667	5670.1
357.498	1.1691	6159.0
357.499	1.1748	6646.9
362.220	1.0805	2117.4
362.239	1.0938	2683.9
362.286	1.1023	3133.6
362.312	1.1127	3669.5
362.331	1.1191	4196.0
362.307	1.1266	4648.1
362.335	1.1353	5125.8
362.289	1.1448	5684.1
362.302	1.1482	6178.7
362.314	1.1544	6663.9
367.101	1.0612	2693.5
367.106	1.0728	3143.1
367.128	1.0846	3680.5
367.154	1.0951	4198.7

367.124	1.1038	4651.9
367.128	1.1114	5138.9
367.101	1.1219	5697.6
367.126	1.1257	6172.3
367.121	1.1332	6681.5
368.942	1.0730	3671.9
369.038	1.0839	4200.9
369.063	1.0929	4647.8
368.995	1.1014	5144.2
369.175	1.1106	5709.0
369.195	1.1157	6165.5
368.579	1.1263	6685.8
372.090	1.0221	2694.7
372.366	1.0356	3147.6

Table 17b. Compressed liquid density measurements for HCFC-124 (PI units).

T/F	rho/lb/ft^3	P/psia
35.775	89.346	57.567
35.684	89.584	71.513
35.694	89.608	87.532
35.680	89.704	152.390
35.714	89.558	228.529
35.616	89.683	298.496
35.593	89.771	358.133
35.669	89.886	440.392
35.645	90.005	520.970
35.457	90.120	573.140
35.552	90.202	653.728
35.654	90.297	717.669
35.587	90.395	793.447
36.421	90.398	873.617
35.724	90.552	922.591
42.084	88.658	58.974
42.133	88.875	71.585
41.989	88.933	87.685
41.989	89.008	152.335
41.993	88.883	228.982
42.031	88.995	298.800
41.981	89.094	358.958
42.035	89.216	440.876
41.984	89.344	522.145
42.015	89.422	574.048
41.935	89.550	654.768
41.993	89.634	717.150
42.062	89.735	794.148
42.103	89.842	873.514
42.050	89.917	924.066
50.914	87.667	59.556
51.038	87.879	71.645
50.864	87.938	87.877
50.848	88.023	152.453
50.873	87.910	229.536
50.866	88.031	299.216
50.826	88.144	359.692
50.894	88.268	441.510
50.874	88.403	523.323
50.912	88.484	574.959
50.841	88.622	655.982
50.856	88.715	717.670
50.882	88.831	795.372
50.911	88.944	874.495
50.895	89.020	925.995
59.709	86.662	59.843

59.830	86.874	71.741
59.698	86.923	88.130
59.678	87.031	152.670
59.699	86.922	229.937
59.703	87.052	299.636
59.612	87.177	360.669
59.699	87.306	441.481
59.753	87.446	524.266
59.718	87.539	574.571
59.656	87.687	657.253
59.682	87.787	718.966
59.721	87.910	797.069
59.708	88.033	875.864
59.729	88.111	927.607
68.692	85.609	60.016
68.730	85.828	71.874
68.597	85.876	88.315
68.600	86.000	152.920
68.599	85.907	230.530
68.661	85.899	230.576
68.608	86.041	299.816
68.676	86.161	361.485
68.586	86.318	441.773
68.659	86.469	525.753
68.601	86.568	574.114
68.573	86.727	658.561
68.582	86.834	720.234
68.609	86.968	798.462
68.612	87.100	877.373
68.612	87.184	929.692
77.757	69.052	62.403
77.712	84.742	72.009
77.585	84.786	88.537
77.572	84.941	153.196
77.589	85.001	300.205
77.667	85.129	362.237
77.578	85.300	442.530
77.647	85.463	526.359
77.578	85.571	575.541
77.565	85.740	660.091
77.568	85.855	721.296
77.596	85.999	799.588
77.604	86.141	878.785
77.606	86.233	931.996
86.708	78.424	74.942
86.576	83.674	88.785
86.598	83.453	105.390
86.579	83.854	153.511
86.608	83.601	166.732
86.628	83.767	231.515
86.585	83.935	300.710

86.657	84.075	363.080
86.571	84.259	443.354
86.629	84.435	527.284
86.581	84.550	576.395
86.555	84.733	661.822
86.572	84.856	722.169
86.591	85.013	800.587
86.609	85.167	880.391
86.615	85.267	934.212
95.399	82.551	88.972
95.409	82.775	153.821
95.433	82.864	231.985
95.409	82.864	301.268
95.480	83.012	363.885
95.389	83.216	444.156
95.458	83.406	528.636
95.401	83.528	577.146
95.407	83.725	663.804
95.401	83.858	723.261
95.427	84.030	803.219
95.434	84.193	882.008
95.439	84.302	935.943
104.319	81.568	158.686
104.338	81.766	226.239
104.321	81.973	299.153
104.326	82.183	376.519
104.335	82.354	441.552
104.441	82.532	517.583
104.385	82.525	593.389
104.378	82.694	658.035
104.384	82.852	724.782
104.401	83.091	810.874
104.443	83.399	872.051
104.363	83.367	945.746
113.134	80.385	159.133
113.184	80.600	227.459
113.152	80.830	300.036
113.155	81.062	378.865
113.191	81.244	442.659
113.277	81.444	519.648
113.246	81.451	595.202
113.228	81.635	659.797
113.239	81.813	727.680
113.239	82.066	812.921
113.271	82.188	873.658
113.218	82.361	947.537
121.898	79.162	159.522
121.971	79.396	228.118
121.900	79.656	300.692
121.923	79.909	380.331

121.976	80.113	443.845
121.948	81.022	811.173
122.060	80.326	520.936
122.033	80.353	596.166
122.017	80.552	661.060
122.028	80.745	728.564
122.062	81.144	875.926
122.014	81.338	949.409
130.654	77.883	159.918
130.730	78.144	228.746
130.691	78.432	301.711
130.544	78.731	381.360
130.788	78.932	445.225
130.834	79.170	521.680
130.805	79.224	597.485
130.785	79.445	662.984
130.795	79.650	730.417
130.744	79.952	812.177
130.841	80.081	879.041
130.771	80.294	951.248
139.352	76.548	160.316
139.443	76.849	229.496
139.331	77.171	302.463
139.383	77.475	382.305
139.435	77.724	447.394
139.521	77.983	522.461
139.522	78.071	598.680
139.505	78.304	664.663
139.517	78.526	731.564
139.459	78.886	813.711
139.562	78.999	881.413
139.496	79.228	953.277
148.430	75.429	229.710
148.329	75.795	303.247
148.377	76.140	383.515
148.420	76.419	448.146
148.521	76.709	523.616
148.555	76.823	599.876
148.506	77.090	666.208
148.508	77.330	732.614
148.456	77.861	815.226
148.560	77.853	883.223
148.490	78.098	955.268
157.346	73.933	230.365
157.249	74.351	304.107
157.295	74.749	384.616
157.333	75.063	449.353
157.512	75.385	525.609
157.491	75.570	601.542
157.412	75.842	667.456

157.441	76.117	734.747
157.384	76.659	816.963
157.509	76.680	886.501
157.413	77.005	957.355
166.201	72.337	231.049
166.073	72.829	305.093
166.007	73.305	385.691
166.183	73.649	451.180
166.049	74.059	526.561
166.335	74.231	602.643
166.300	74.549	669.486
166.298	74.855	737.067
166.258	75.421	818.685
166.363	75.479	888.788
166.281	75.795	959.493
174.861	71.202	306.025
174.803	71.768	386.715
174.930	72.154	451.997
175.081	72.593	529.037
175.145	72.845	604.524
175.093	73.202	670.697
175.095	73.544	738.490
175.031	74.152	820.630
175.057	74.264	891.523
175.076	74.586	961.766
183.595	69.432	306.258
183.636	70.089	387.726
183.433	70.590	453.010
183.829	71.067	530.230
183.867	71.397	606.478
183.856	71.808	671.863
183.872	72.182	740.775
183.792	72.832	822.374
183.827	72.983	893.281
183.828	73.342	964.049
192.326	67.453	307.107
192.360	68.283	389.264
192.445	68.814	454.492
192.492	69.466	532.216
192.526	69.865	608.574
192.483	70.333	674.151
192.533	70.874	743.427
192.449	71.468	824.413
192.473	71.679	896.146
192.496	72.066	966.523
201.111	66.249	390.658
201.121	66.971	455.875
201.161	67.711	533.805
201.208	68.363	608.965

201.153	68.906	674.695
201.160	69.384	745.329
201.111	70.037	826.363
201.157	70.273	895.214
201.148	70.742	969.063
204.426	66.984	532.559
204.598	67.663	609.294
204.643	68.229	674.104
204.521	68.759	746.106
204.846	69.334	828.026
204.881	69.651	894.235
203.773	70.313	969.697
210.092	63.809	390.833
210.588	64.650	456.514

Table 18. Ebulliometric vapor pressure measurements for HCFC-124 (R-124).

Vapor Pressure of 2, Chloro - 1,1,1,2 - Tetrafluoroethane (R124)

Point Number	T (K)	P (kPa)	T (F)	P (psia)
1	221.808	13.6130	-60.417	1.974
2	223.005	14.6632	-58.261	2.127
3	222.957	14.6194	-58.348	2.120
4	224.068	15.6360	-56.348	2.268
5	225.082	16.6252	-54.522	2.411
6	226.970	18.5812	-51.124	2.695
7	228.600	20.4246	-48.190	2.962
8	230.427	22.6687	-44.902	3.288
9	231.986	24.7343	-42.095	3.587
10	233.583	27.0102	-39.220	3.918
11	235.514	29.9858	-35.745	4.349
12	237.217	32.8220	-32.679	4.760
13	239.027	36.0745	-29.422	5.232
14	241.623	41.1778	-24.748	5.972
15	243.917	46.1688	-20.620	6.696
16	243.488	45.2053	-21.392	6.556
17	245.627	50.1826	-17.542	7.278
18	247.696	55.4309	-13.818	8.040
19	249.587	60.5849	-10.414	8.787
20	251.187	65.2398	-7.534	9.462
21	252.720	69.9698	-4.774	10.148
22	254.415	75.5098	-1.724	10.952
23	255.598	79.5825	0.406	11.543
24	257.300	85.7325	3.470	12.434
25	258.405	89.9264	5.460	13.043
26	259.892	95.8242	8.136	13.898
27	260.959	100.2267	10.056	14.537
28	263.330	110.5957	14.325	16.041
29	265.432	120.4906	18.108	17.476
30	267.404	130.3797	21.658	18.910
31	269.214	140.0035	24.915	20.306
32	271.077	150.4806	28.269	21.825
33	272.883	161.1857	31.519	23.378
34	274.270	169.8534	34.017	24.635
35	275.821	179.9463	36.808	26.099
36	277.550	191.6724	39.920	27.800
37	279.074	202.4828	42.663	29.368
38	280.273	211.3804	44.821	30.658
39	282.200	226.2593	48.290	32.816
40	283.872	239.7535	51.299	34.773
41	286.098	258.8288	55.307	37.540

Table 19a. Fit of the HCFC-124 (R-124) vapor pressure measurements to an Antoine equation (SI units). The percent deviation is $100x(P-P_{calc})/P_{calc}$.

Antoine equation - R124 (metric units)

Pcalc = exp(A+(B/(T+C)))

A = 13.93900
B = -2073.45
C = -38.76133

Point Number	T (K)	P (kPa)	Pcalc (kPa)	Deviat %
1	221.808	13.613	13.620	-0.050
2	223.005	14.663	14.660	0.019
3	222.957	14.619	14.617	0.016
4	224.068	15.636	15.638	-0.010
5	225.082	16.625	16.620	0.031
6	226.970	18.581	18.583	-0.007
7	228.600	20.425	20.426	-0.009
8	230.427	22.669	22.668	0.005
9	231.986	24.734	24.736	-0.005
10	233.583	27.010	27.010	0.002
11	235.514	29.986	29.983	0.010
12	237.217	32.822	32.822	0.001
13	239.027	36.075	36.071	0.011
14	241.623	41.178	41.182	-0.011
15	243.917	46.169	46.167	0.004
16	243.488	45.205	45.199	0.013
17	245.627	50.183	50.189	-0.013
18	247.696	55.431	55.427	0.007
19	249.587	60.585	60.588	-0.004
20	251.187	65.240	65.245	-0.008
21	252.720	69.970	69.972	-0.003
22	254.415	75.510	75.510	0.000
23	255.598	79.582	79.577	0.007
24	257.300	85.732	85.731	0.002
25	258.405	89.926	89.922	0.004
26	259.892	95.824	95.814	0.010
27	260.959	100.227	100.227	-0.000
28	263.330	110.596	110.607	-0.010
29	265.432	120.491	120.494	-0.003
30	267.404	130.380	130.385	-0.004
31	269.214	140.004	140.008	-0.003
32	271.077	150.481	150.486	-0.004
33	272.883	161.186	161.209	-0.015
34	274.270	169.853	169.843	0.006
35	275.821	179.946	179.913	0.019
36	277.550	191.672	191.673	-0.000
37	279.074	202.483	202.523	-0.020
38	280.273	211.380	211.388	-0.003
39	282.200	226.259	226.252	0.003
40	283.872	239.753	239.786	-0.014
41	286.098	258.829	258.760	0.027

Table 19b. Fit of the HCFC-124 (R-124) vapor pressure measurements to an Antoine equation (PI units). The percent deviation is $100x(P-P_{calc})/P_{calc}$.

Antoine equation - R124 (eng. units)

Pcalc = exp(A+(B/(T+C)))

A = 12.00824
B = -3732.21
C = 389.89961

Point Number	T (F)	P (psia)	Pcalc (psia)	Deviat %
1	-60.417	1.974	1.975	-0.050
2	-58.261	2.127	2.126	0.020
3	-58.348	2.120	2.120	0.016
4	-56.348	2.268	2.268	-0.010
5	-54.522	2.411	2.411	0.032
6	-51.124	2.695	2.695	-0.007
7	-48.190	2.962	2.963	-0.009
8	-44.902	3.288	3.288	0.005
9	-42.095	3.587	3.588	-0.005
10	-39.220	3.918	3.917	0.002
11	-35.745	4.349	4.349	0.010
12	-32.679	4.760	4.760	0.001
13	-29.422	5.232	5.232	0.011
14	-24.748	5.972	5.973	-0.010
15	-20.620	6.696	6.696	0.004
16	-21.392	6.556	6.556	0.014
17	-17.542	7.278	7.279	-0.013
18	-13.818	8.040	8.039	0.007
19	-10.414	8.787	8.787	-0.004
20	-7.534	9.462	9.463	-0.008
21	-4.774	10.148	10.149	-0.003
22	-1.724	10.952	10.952	0.000
23	0.406	11.543	11.542	0.007
24	3.470	12.434	12.434	0.002
25	5.460	13.043	13.042	0.005
26	8.136	13.898	13.897	0.011
27	10.056	14.537	14.537	0.000
28	14.325	16.041	16.042	-0.010
29	18.108	17.476	17.476	-0.003
30	21.658	18.910	18.911	-0.004
31	24.915	20.306	20.306	-0.003
32	28.269	21.825	21.826	-0.003
33	31.519	23.378	23.381	-0.014
34	34.017	24.635	24.634	0.007
35	36.808	26.099	26.094	0.019
36	39.920	27.800	27.800	-0.000
37	42.663	29.368	29.374	-0.020
38	44.821	30.658	30.659	-0.003
39	48.290	32.816	32.815	0.004
40	51.299	34.773	34.778	-0.013
41	55.307	37.540	37.530	0.027

Table 20a. Compressed liquid density measurements for HFC-125 (SI units).

T/K	P/kPa	rho g/cc
275.559	1590.1	1.3160
275.553	2019.8	1.3194
275.412	3006.5	1.3272
275.407	3996.3	1.3341
275.368	4958.9	1.3406
275.374	6213.0	1.3484
283.966	1607.4	1.2745
283.978	2019.9	1.2783
283.985	3024.5	1.2873
283.997	4057.0	1.2958
284.000	5070.0	1.3037
284.003	6238.5	1.3122
293.477	1586.8	1.2217
293.479	2054.7	1.2275
293.482	3005.2	1.2384
293.483	4035.0	1.2493
293.484	5073.5	1.2593
293.482	6266.3	1.2700
303.313	1616.2	1.1586
303.323	2026.6	1.1659
303.326	3053.0	1.1824
303.331	4021.6	1.1960
303.330	5049.6	1.2089
303.353	6283.0	1.2226
313.940	2496.4	1.0951
313.934	3057.2	1.1094
313.932	4044.2	1.1302
313.930	5001.2	1.1471
313.935	6263.2	1.1663
323.873	2811.2	1.0067
323.872	3039.2	1.0178
323.873	4016.5	1.0534
323.877	5027.3	1.0807
323.872	6212.2	1.1059
333.921	3389.5	.8857
333.919	4088.8	.9498
333.909	5063.8	.9977
333.916	6184.0	1.0345
339.059	3816.3	.8179
339.072	4067.3	.8618
339.062	4547.7	.9098
339.051	5069.3	.9440

339.057	5535.5	.9671
339.062	6168.6	.9922
340.499	3556.5	.3437
340.504	3645.2	.4761
340.494	3689.5	.6451
340.499	3856.1	.7717
340.509	4078.5	.8272
340.520	4172.2	.8429
340.605	4403.9	.8710
340.598	4646.5	.8945
340.594	4865.4	.9118
340.571	5053.0	.9246
340.576	5235.1	.9355
340.603	5467.7	.9476
340.598	5672.5	.9576
340.577	5879.3	.9671
340.499	6328.8	.9855
343.332	3542.8	.2906
343.338	3645.5	.3194
343.363	3747.6	.3633
343.361	3851.0	.4748
343.358	3950.3	.6392
343.347	4081.3	.7250
343.371	4345.8	.7993
343.346	4570.0	.8369
343.345	5070.8	.8883
343.347	5551.8	.9212
343.358	6083.4	.9486
348.423	3551.5	.2584
348.409	3638.6	.2734
348.428	3740.4	.2933
348.412	3854.5	.3198
348.431	3946.2	.3445
348.448	4041.8	.3778
348.444	4152.0	.4362
348.453	4251.6	.5078
348.448	4348.2	.5809
348.513	4581.2	.6915
348.441	4863.6	.7662
348.520	5056.5	.7972
348.439	5302.9	.8300
348.517	5542.6	.8525
348.444	5845.1	.8778
348.516	6150.1	.8973
353.548	3782.0	.2694
353.570	3905.1	.2897
353.565	3999.3	.3070
353.581	4105.9	.3287
353.602	4208.7	.3524
353.592	4307.0	.3792

353.549	4411.5	.4138
353.262	4503.4	.4579
353.262	4599.4	.5020
353.268	4685.0	.5425
353.253	4800.1	.5933
353.255	4903.5	.6316
353.265	5008.3	.6644
353.278	5075.3	.6829
353.188	5328.9	.7399
353.282	5548.4	.7735
353.164	5849.9	.8116
353.283	6161.8	.8389
358.631	4129.3	.2973
358.636	4193.6	.3078
358.652	4301.3	.3263
358.628	4379.2	.3412
358.651	4505.2	.3673
358.643	4599.5	.3890
358.643	4599.5	.3890
358.630	4700.7	.4150
358.642	4810.0	.4454
358.646	4904.2	.4743
358.652	5005.6	.5060
358.661	5105.2	.5381
358.669	5208.1	.5700
358.641	5284.8	.5927
358.675	5393.9	.6211
358.695	5603.8	.6692
358.698	5801.0	.7062
358.675	6212.2	.7647
363.827	4206.3	.2826
363.806	4296.1	.2950
363.813	4387.6	.3080
363.828	4503.4	.3255
363.839	4604.7	.3421
363.903	4703.8	.3590
363.254	4799.1	.3823
363.255	4898.2	.4029
363.268	4998.8	.4248
363.285	5092.2	.4463
363.414	5196.3	.4689
363.675	5310.8	.4939
363.567	5415.6	.5210
363.606	5498.2	.5407
363.670	5611.2	.5662
363.661	5798.9	.6080
363.655	5911.1	.6307
363.680	6000.4	.6471
363.678	6105.5	.6655
363.675	6254.7	.6893
369.108	4411.1	.2870

369.134	4509.1	.2991
369.134	4600.3	.3111
368.406	5410.4	.4495
368.468	5505.8	.4677
368.565	5604.2	.4862
368.483	5705.9	.5089
368.304	5804.5	.5302
368.436	5900.0	.5477
368.525	5966.2	.5584
368.525	5966.2	.5584
368.578	6086.1	.5800
368.586	6226.9	.6048
369.188	4704.1	.3249
369.173	4798.6	.3384
369.192	4921.1	.3568
369.292	5003.3	.3687
369.292	5003.3	.3687
369.347	5096.6	.3832
369.361	5194.2	.3994
369.449	5320.5	.4206

Table 20b. Compressed liquid density measurements for HFC-125 (PI units).

T/F	P/psia	rho/lb/ft^3
36.336	230.62	82.155
36.325	292.95	82.367
36.072	436.06	82.854
36.063	579.61	83.285
35.992	719.23	83.691
36.003	901.12	84.178
51.469	233.13	79.564
51.490	292.96	79.802
51.503	438.67	80.364
51.525	588.42	80.894
51.530	735.34	81.387
51.535	904.82	81.918
68.589	230.15	76.268
68.592	298.01	76.630
68.598	435.87	77.311
68.599	585.23	77.991
68.601	735.85	78.616
68.598	908.85	79.284
86.293	234.41	72.329
86.311	293.93	72.785
86.317	442.80	73.815
86.326	583.28	74.664
86.324	732.38	75.469
86.365	911.27	76.324
105.422	362.07	68.365
105.411	443.41	69.258
105.408	586.56	70.556
105.404	725.36	71.611
105.413	908.40	72.810
123.301	407.73	62.846
123.300	440.80	63.539
123.301	582.54	65.762
123.309	729.15	67.466
123.300	901.00	69.039
141.388	491.61	55.292
141.384	593.03	59.294
141.366	734.44	62.284
141.379	896.91	64.582
150.636	553.51	51.060
150.660	589.91	53.800
150.642	659.59	56.797
150.622	735.24	58.932

150.633	802.86	60.374
150.642	894.68	61.941
153.228	515.83	21.456
153.237	528.69	29.722
153.219	535.12	40.272
153.228	559.28	48.176
153.246	591.54	51.640
153.266	605.13	52.621
153.419	638.73	54.375
153.406	673.92	55.842
153.399	705.67	56.922
153.358	732.88	57.721
153.367	759.29	58.401
153.415	793.02	59.157
153.406	822.73	59.781
153.369	852.72	60.374
153.228	917.91	61.523
158.328	513.84	18.142
158.338	528.74	19.940
158.383	543.54	22.680
158.380	558.54	29.641
158.374	572.94	39.904
158.355	591.94	45.260
158.398	630.30	49.899
158.353	662.82	52.246
158.351	735.46	55.455
158.355	805.22	57.509
158.374	882.32	59.219
167.491	515.10	16.131
167.466	527.73	17.068
167.500	542.50	18.310
167.472	559.05	19.964
167.506	572.35	21.506
167.536	586.21	23.585
167.529	602.20	27.231
167.545	616.64	31.701
167.536	630.65	36.264
167.653	664.45	43.169
167.524	705.41	47.832
167.666	733.38	49.768
167.520	769.12	51.815
167.661	803.89	53.220
167.529	847.76	54.799
167.659	892.00	56.017
176.716	548.53	16.818
176.756	566.39	18.085
176.747	580.05	19.165
176.776	595.51	20.520
176.814	610.42	22.000
176.796	624.68	23.673

176.718	639.83	25.833
176.202	653.16	28.586
176.202	667.09	31.339
176.212	679.50	33.867
176.185	696.20	37.039
176.189	711.19	39.430
176.207	726.39	41.477
176.230	736.11	42.632
176.068	772.89	46.190
176.238	804.73	48.288
176.025	848.46	50.667
176.239	893.69	52.371
185.866	598.90	18.560
185.875	608.23	19.215
185.904	623.85	20.370
185.860	635.15	21.300
185.902	653.42	22.930
185.887	667.10	24.284
185.887	667.10	24.284
185.864	681.78	25.908
185.886	697.63	27.805
185.893	711.29	29.610
185.904	726.00	31.589
185.920	740.45	33.592
185.934	755.37	35.584
185.884	766.50	37.001
185.945	782.32	38.774
185.981	812.76	41.777
185.986	841.36	44.087
185.945	901.00	47.739
195.219	610.07	17.642
195.181	623.10	18.416
195.193	636.37	19.228
195.220	653.16	20.320
195.240	667.86	21.357
195.355	682.23	22.412
194.187	696.05	23.866
194.189	710.42	25.152
194.212	725.01	26.519
194.243	738.56	27.862
194.475	753.66	29.272
194.945	770.27	30.833
194.751	785.47	32.525
194.821	797.45	33.755
194.936	813.84	35.347
194.920	841.06	37.956
194.909	857.33	39.373
194.954	870.28	40.397
194.950	885.53	41.546
194.945	907.17	43.032
204.724	639.78	17.917

204.771	653.99	18.672
204.771	667.22	19.421
203.461	784.71	28.061
203.572	798.55	29.198
203.747	812.82	30.352
203.599	827.57	31.770
203.277	841.87	33.099
203.515	855.72	34.192
203.675	865.32	34.860
203.675	865.32	34.860
203.770	882.71	36.208
203.785	903.14	37.756
204.868	682.27	20.283
204.841	695.98	21.126
204.876	713.75	22.274
205.056	725.67	23.017
205.056	725.67	23.017
205.155	739.20	23.922
205.180	753.36	24.934
205.338	771.67	26.257

Table 21(a). Isochoric PVT Measurements for HCFC-125 in SI units.

Temperature Kelvin	Pressure MPa	Density mol/dm^3
174.001	1.572130	14.06486
176.000	3.186809	14.05461
178.000	6.011646	14.02624
180.001	9.259311	14.02117
182.000	12.535940	14.01707
184.000	15.826000	14.01339
186.001	19.108860	14.00994
188.001	22.384900	14.00667
190.002	25.655180	14.00352
192.000	28.904070	14.00046
194.001	32.147290	13.99746
185.999	2.588665	13.76481
188.000	3.931049	13.73541
190.000	6.785781	13.72883
192.001	9.737449	13.72439
194.000	12.702930	13.72062
196.000	15.672670	13.71718
198.000	18.642740	13.71395
200.000	21.605980	13.71085
202.000	24.559160	13.70785
204.001	27.505050	13.70493
205.999	30.429050	13.70208
208.000	33.352820	13.69928
202.000	1.547702	13.31333
204.000	3.168674	13.30339
206.001	5.107316	13.27617
208.001	7.612479	13.27139
210.000	10.149190	13.26759
212.000	12.695070	13.26421
214.000	15.243050	13.26107
216.000	17.786270	13.25810
217.999	20.321700	13.25524
219.999	22.850930	13.25247
221.999	25.373530	13.24975
223.998	27.893440	13.24709
226.000	30.405660	13.24446
228.000	32.905790	13.24188
230.001	35.396040	13.23931
220.000	3.584159	12.85620
223.999	7.887842	12.84580
228.000	12.303330	12.83926
232.000	16.710760	12.83358
236.000	21.108060	12.82829
240.000	25.487380	12.82321
244.001	29.846050	12.81830
248.000	34.172920	12.81348

Table 21(a) (continued). Isochoric PVT Measurements for HCFC-125 in SI units.

Temperature Kelvin	Pressure MPa	Density mol/dm^3
244.001	3.150607	12.13794
248.001	6.081187	12.10767
252.001	9.523219	12.10132
256.002	12.978420	12.09596
260.000	16.431190	12.09103
263.998	19.871730	12.08633
267.998	23.300320	12.08178
271.998	26.721690	12.07733
275.999	30.125850	12.07296
279.999	33.511270	12.06868
276.001	2.664308	11.01460
279.999	4.587385	10.98287
284.001	6.952455	10.97676
288.001	9.330561	10.97185
292.001	11.714370	10.96739
296.001	14.099870	10.96318
300.002	16.483800	10.95911
304.002	18.866340	10.95515
308.002	21.235980	10.95125
311.999	23.607610	10.94741
316.001	25.974380	10.94359
320.001	28.340110	10.93980
323.998	30.694960	10.93605
327.999	33.033720	10.93242
332.001	35.372100	10.92885
310.000	2.472744	9.38636
313.999	3.683955	9.35658
318.000	5.050635	9.35113
322.001	6.431671	9.34684
326.001	7.823143	9.34301
330.000	9.220093	9.33942
334.002	10.622020	9.33598
338.000	12.025280	9.33293
342.001	13.435840	9.32983
350.002	16.261530	9.32336
358.000	19.091220	9.31698
366.000	21.921170	9.31066
374.001	24.747190	9.30436
382.000	27.567680	9.29806
389.998	30.378470	9.29176
398.001	33.180550	9.28542

Table 21(b). Isochoric PVT Measurements for HCFC-125 in PI units.

Temperature Fahrenheit	Pressure psia	Density lb-mass/ft^3
-146.47	228.019	105.382
-142.87	462.208	105.306
-139.27	871.917	105.093
-135.67	1342.952	105.055
-132.07	1818.188	105.024
-128.47	2295.371	104.997
-124.87	2771.511	104.971
-121.27	3246.661	104.946
-117.67	3720.976	104.923
-114.07	4192.188	104.900
-110.47	4662.578	104.877
-124.87	375.455	103.134
-121.27	570.151	102.914
-117.67	984.196	102.865
-114.07	1412.300	102.831
-110.47	1842.407	102.803
-106.87	2273.133	102.777
-103.27	2703.906	102.753
-99.67	3133.688	102.730
-96.07	3562.011	102.708
-92.47	3989.277	102.686
-88.87	4413.368	102.664
-85.27	4837.426	102.643
-96.07	224.476	99.752
-92.47	459.578	99.677
-88.87	740.755	99.473
-85.27	1104.099	99.437
-81.67	1472.018	99.409
-78.07	1841.267	99.383
-74.47	2210.821	99.360
-70.87	2579.685	99.338
-67.27	2947.419	99.316
-63.67	3314.253	99.296
-60.07	3680.126	99.275
-56.47	4045.609	99.255
-52.87	4409.976	99.236
-49.27	4772.590	99.216
-45.67	5133.771	99.197
-63.67	519.839	96.326
-56.47	1144.037	96.249
-49.27	1784.450	96.200
-42.07	2423.695	96.157
-34.87	3061.471	96.117
-27.67	3696.638	96.079
-20.47	4328.811	96.042
-13.27	4956.372	96.006

Table 21(b) (continued). Isochoric PVT Measurements for HCFC-125 in PI units.

Temperature Fahrenheit	Pressure psia	Density lb-mass/ft^3
-20.47	456.958	90.945
-13.27	882.003	90.718
-6.07	1381.229	90.670
1.13	1882.364	90.630
8.33	2383.147	90.593
15.53	2882.156	90.558
22.73	3379.432	90.524
29.93	3875.660	90.491
37.13	4369.393	90.458
44.33	4860.407	90.426
37.13	386.426	82.528
44.33	665.345	82.290
51.53	1008.370	82.245
58.73	1353.286	82.208
65.93	1699.029	82.174
73.13	2045.017	82.143
80.33	2390.777	82.112
87.53	2736.336	82.083
94.73	3080.024	82.053
101.93	3424.000	82.025
109.13	3767.272	81.996
116.33	4110.393	81.968
123.53	4451.935	81.940
130.73	4791.144	81.912
137.93	5130.298	81.886
98.33	358.642	70.328
105.53	534.313	70.105
112.73	732.534	70.064
119.93	932.837	70.032
127.13	1134.653	70.003
134.33	1337.264	69.977
141.53	1540.596	69.951
148.73	1744.122	69.928
155.93	1948.707	69.905
170.33	2358.540	69.856
184.73	2768.952	69.808
199.13	3179.403	69.761
213.53	3589.283	69.714
227.93	3998.361	69.667
242.33	4406.032	69.619
256.73	4812.440	69.572

Table 22. Ebulliometric vapor pressure measurements for HFC-125 (R-125).

Vapor Pressure of Pentafluoroethane (R125)

Point Number	T (K)	P (kPa)	T (F)	P (psia)
1	218.762	73.7126	-65.898	10.691
2	219.175	75.3215	-65.154	10.925
3	219.444	76.3836	-64.671	11.079
4	219.978	78.5190	-63.710	11.388
5	220.174	79.3263	-63.357	11.505
6	220.381	80.1824	-62.985	11.630
7	220.553	80.9071	-62.674	11.735
8	220.916	82.4188	-62.022	11.954
9	221.185	83.5673	-61.537	12.120
10	221.575	85.2409	-60.836	12.363
11	222.257	88.2381	-59.608	12.798
12	222.855	90.9315	-58.531	13.189
13	222.736	90.3914	-58.745	13.110
14	223.343	93.1839	-57.652	13.515
15	224.053	96.5393	-56.375	14.002
16	224.984	101.0860	-54.698	14.661
17	226.262	107.5412	-52.398	15.598
18	226.442	108.4831	-52.074	15.734
19	226.371	108.1079	-52.203	15.680
20	227.055	111.7351	-50.971	16.206
21	227.495	114.1230	-50.178	16.552
22	228.491	119.6434	-48.387	17.353
23	229.270	124.1224	-46.983	18.002
24	230.070	128.8654	-45.543	18.690
25	231.835	139.8029	-42.367	20.277
26	233.989	154.1359	-38.491	22.356
27	233.825	153.0023	-38.786	22.191
28	235.033	161.4451	-36.611	23.416
29	236.643	173.3154	-33.713	25.137
30	238.261	185.8698	-30.800	26.958
31	237.774	182.0049	-31.678	26.398
32	239.292	194.2497	-28.945	28.174
33	240.801	207.0155	-26.228	30.025
34	242.532	222.4285	-23.113	32.261
35	244.317	239.2461	-19.900	34.700
36	245.180	247.7090	-18.347	35.927
37	245.662	252.5508	-17.479	36.630
38	246.052	256.5198	-16.777	37.205
39	246.589	262.0412	-15.809	38.006

Table 23a. Fit of the HFC-125 (R-125) vapor pressure measurements to an Antoine equation (SI units). The percent deviation is $100x(P-P_{calc})/P_{calc}$.

Antoine equation - R125 (metric units)

Pcalc = exp(A+(B/(T+C)))

A = 14.03892
B = -1809.80
C = -32.92627

Point Number	T (K)	P (kPa)	Pcalc (kPa)	Deviat %
1	218.762	73.713	73.715	-0.003
2	219.175	75.322	75.325	-0.005
3	219.444	76.384	76.386	-0.003
4	219.978	78.519	78.531	-0.016
5	220.174	79.326	79.331	-0.006
6	220.381	80.182	80.181	0.002
7	220.553	80.907	80.898	0.012
8	220.916	82.419	82.415	0.004
9	221.185	83.567	83.559	0.010
10	221.575	85.241	85.234	0.008
11	222.257	88.238	88.232	0.007
12	222.855	90.931	90.929	0.003
13	222.736	90.391	90.388	0.004
14	223.343	93.184	93.178	0.006
15	224.053	96.539	96.525	0.015
16	224.984	101.086	101.061	0.025
17	226.262	107.541	107.556	-0.014
18	226.442	108.483	108.497	-0.013
19	226.371	108.108	108.122	-0.013
20	227.055	111.735	111.746	-0.010
21	227.495	114.123	114.130	-0.006
22	228.491	119.643	119.662	-0.016
23	229.270	124.122	124.141	-0.015
24	230.070	128.865	128.873	-0.006
25	231.835	139.803	139.808	-0.004
26	233.989	154.136	154.119	0.011
27	233.825	153.002	152.991	0.007
28	235.033	161.445	161.453	-0.005
29	236.643	173.315	173.293	0.013
30	238.261	185.870	185.865	0.003
31	237.774	182.005	182.006	-0.001
32	239.292	194.250	194.229	0.011
33	240.801	207.015	206.997	0.009
34	242.532	222.429	222.424	0.002
35	244.317	239.246	239.248	-0.001
36	245.180	247.709	247.724	-0.006
37	245.662	252.551	252.555	-0.002
38	246.052	256.520	256.520	-0.000
39	246.589	262.041	262.059	-0.007

Table 23b. Fit of the HFC-125 (R-125) vapor pressure measurements to an Antoine equation (PI units). The percent deviation is $100x(P-P_{calc})/P_{calc}$.

Antoine equation - R125 (Eng. units)

Pcalc = exp(A+(B/(T+C)))

A = 12.10816
B = -3257.64
C = 400.40271

Point Number	T (F)	P (psia)	Pcalc (psia)	Deviat %
1	-65.898	10.691	10.691	-0.003
2	-65.154	10.925	10.925	-0.005
3	-64.671	11.079	11.079	-0.003
4	-63.710	11.388	11.390	-0.015
5	-63.357	11.505	11.506	-0.006
6	-62.985	11.630	11.629	0.002
7	-62.674	11.735	11.733	0.012
8	-62.022	11.954	11.953	0.005
9	-61.537	12.120	12.119	0.010
10	-60.836	12.363	12.362	0.008
11	-59.608	12.798	12.797	0.007
12	-58.531	13.189	13.188	0.003
13	-58.745	13.110	13.110	0.004
14	-57.652	13.515	13.514	0.007
15	-56.375	14.002	14.000	0.015
16	-54.698	14.661	14.658	0.025
17	-52.398	15.598	15.600	-0.014
18	-52.074	15.734	15.736	-0.012
19	-52.203	15.680	15.682	-0.013
20	-50.971	16.206	16.207	-0.010
21	-50.178	16.552	16.553	-0.005
22	-48.387	17.353	17.356	-0.015
23	-46.983	18.002	18.005	-0.015
24	-45.543	18.690	18.691	-0.006
25	-42.367	20.277	20.277	-0.004
26	-38.491	22.356	22.353	0.011
27	-38.786	22.191	22.190	0.008
28	-36.611	23.416	23.417	-0.005
29	-33.713	25.137	25.134	0.013
30	-30.800	26.958	26.957	0.003
31	-31.678	26.398	26.398	-0.000
32	-28.945	28.174	28.171	0.011
33	-26.228	30.025	30.022	0.009
34	-23.113	32.261	32.260	0.002
35	-19.900	34.700	34.700	-0.000
36	-18.347	35.927	35.929	-0.006
37	-17.479	36.630	36.630	-0.001
38	-16.777	37.205	37.205	0.000
39	-15.809	38.006	38.008	-0.007

Table 24(a). Isochoric PVT measurements for HCFC-123 in SI units.

Temperature Kelvin	Pressure MPa	Density mol/dm^3
176.002	3.932390	11.45442
178.000	7.843969	11.45196
180.000	11.739300	11.44954
182.000	15.603580	11.44714
184.000	19.436470	11.44478
186.000	23.250830	11.44245
188.001	27.043330	11.44013
190.000	30.799040	11.43783
191.999	34.545520	11.43554
189.999	1.769352	11.23640
191.999	5.297392	11.23405
194.000	8.795440	11.23174
195.999	12.283070	11.22947
198.001	15.750070	11.22721
199.999	19.196620	11.22498
202.000	22.624520	11.22276
204.000	26.034240	11.22056
206.000	29.415060	11.21838
207.999	32.774780	11.21621
206.000	2.124055	11.00625
208.002	5.273329	11.00404
210.001	8.411843	11.00186
212.001	11.535470	10.99970
214.000	14.637850	10.99757
216.000	17.722830	10.99544
218.000	20.796100	10.99333
220.000	23.850750	10.99124
222.000	26.891850	10.98916
224.001	29.917650	10.98708
226.000	32.929010	10.98501
225.000	.434245	10.71137
226.002	1.810371	10.71033
228.001	4.549389	10.70826
230.000	7.273252	10.70621
231.999	9.988414	10.70419
234.000	12.691280	10.70218
236.001	15.380230	10.70018
238.000	18.056130	10.69819
240.001	20.727310	10.69620
241.998	23.377690	10.69423
244.001	26.022690	10.69226
245.999	28.650340	10.69030
248.002	31.271920	10.68834
250.001	33.876820	10.68639

Table 24(a) (continued). Isochoric PVT measurements for HCFC-123 in SI units.

Temperature Kelvin	Pressure MPa	Density mol/dm^3
249.001	.840899	10.35636
250.002	2.001339	10.35539
252.000	4.321377	10.35347
254.000	6.631163	10.35157
255.999	8.930861	10.34968
258.000	11.225400	10.34779
259.999	13.508870	10.34592
262.001	15.785470	10.34405
263.999	18.049410	10.34218
266.000	20.311120	10.34033
268.001	22.560400	10.33847
270.000	24.798100	10.33662
272.000	27.035190	10.33478
274.000	29.259860	10.33293
276.001	31.475760	10.33109
278.000	33.681210	10.32925
269.999	2.688618	10.05904
272.000	4.698253	10.05723
274.001	6.704591	10.05543
275.998	8.712440	10.05363
278.002	10.701840	10.05184
280.002	12.696030	10.05005
282.001	14.687050	10.04828
284.001	16.671610	10.04650
286.002	18.649080	10.04473
288.001	20.612280	10.04296
290.002	22.580660	10.04119
291.998	24.538400	10.03942
293.999	26.489790	10.03765
296.000	28.434620	10.03589
298.001	30.368990	10.03412
300.000	32.300790	10.03236
302.001	34.214710	10.03060
298.001	3.166692	9.62720
300.001	4.822544	9.62552
302.000	6.475250	9.62384
303.999	8.125226	9.62217
306.001	9.771155	9.62049
307.998	11.406540	9.61885
310.001	13.050340	9.61715
312.001	14.683990	9.61549
313.999	16.310520	9.61382
316.001	17.932590	9.61216
320.000	21.172570	9.60883
324.000	24.392040	9.60549
328.001	27.589630	9.60217
332.001	30.772140	9.59883

Table 24(a) (continued). Isochoric PVT measurements for HCFC-123 in SI units.

Temperature Kelvin	Pressure MPa	Density mol/dm^3
336.001	33.932900	9.59549
332.002	2.588553	9.04028
336.000	5.132132	9.03719
340.002	7.654527	9.03426
344.001	10.190930	9.03104
348.000	12.699880	9.02799
352.000	15.210770	9.02503
356.002	17.703940	9.02200
360.000	20.191730	9.01891
364.000	22.681310	9.01580
368.000	25.146830	9.01269
372.001	27.601790	9.00957
376.000	30.049470	9.00644
379.999	32.487460	9.00331

Table 24(b). Isochoric PVT measurements for HCFC-123 in PI units.

Temperature Fahrenheit	Pressure psia	Density lb-mass/ft^3
-142.87	570.346	109.356
-139.27	1137.674	109.333
-135.67	1702.645	109.310
-132.07	2263.112	109.287
-128.47	2819.027	109.264
-124.87	3372.254	109.242
-121.27	3922.310	109.220
-117.67	4467.031	109.198
-114.07	5010.413	109.176
-117.67	256.623	107.275
-114.07	768.323	107.253
-110.47	1275.673	107.231
-106.87	1781.512	107.209
-103.27	2284.359	107.187
-99.67	2784.239	107.166
-96.07	3281.415	107.145
-92.47	3775.954	107.124
-88.87	4266.301	107.103
-85.27	4753.588	107.082
-88.87	308.069	105.078
-85.27	764.833	105.057
-81.67	1220.037	105.036
-78.07	1673.081	105.015
-74.47	2123.044	104.995
-70.87	2570.484	104.975
-67.27	3016.225	104.954
-63.67	3459.265	104.934
-60.07	3900.340	104.915
-56.47	4339.196	104.895
-52.87	4775.958	104.875
-54.67	62.982	102.263
-52.87	262.573	102.253
-49.27	659.834	102.233
-45.67	1054.898	102.213
-42.07	1448.700	102.194
-38.47	1840.718	102.175
-34.87	2230.718	102.156
-31.27	2618.825	102.137
-27.67	3006.247	102.118
-24.07	3390.653	102.099
-20.47	3774.279	102.080
-16.87	4155.388	102.061
-13.27	4535.617	102.043
-9.67	4913.426	102.024
-11.47	121.962	98.873

Table 24(b) (continued). Isochoric PVT measurements for HCFC-123 in PI units.

Temperature Fahrenheit	Pressure psia	Density lb-mass/ft^3
-9.67	290.270	98.864
-6.07	626.764	98.846
-2.47	961.771	98.827
1.13	1295.314	98.809
4.73	1628.110	98.791
8.33	1959.299	98.774
11.93	2289.493	98.756
15.53	2617.850	98.738
19.13	2945.884	98.720
22.73	3272.115	98.702
26.33	3596.667	98.685
29.93	3921.130	98.667
33.53	4243.791	98.650
37.13	4565.181	98.632
40.73	4885.055	98.614
26.33	389.952	96.035
29.93	681.425	96.017
33.53	972.420	96.000
37.13	1263.635	95.983
40.73	1552.173	95.966
44.33	1841.407	95.949
47.93	2130.180	95.932
51.53	2418.017	95.915
55.13	2704.825	95.898
58.73	2989.564	95.881
62.33	3275.054	95.864
65.93	3559.000	95.847
69.53	3842.026	95.830
73.13	4124.100	95.814
76.73	4404.657	95.797
80.33	4684.842	95.780
83.93	4962.433	95.763
76.73	459.291	91.912
80.33	699.452	91.896
83.93	939.157	91.880
87.53	1178.466	91.864
91.13	1417.189	91.848
94.73	1654.382	91.832
98.33	1892.795	91.816
101.93	2129.736	91.800
105.53	2365.645	91.784
109.13	2600.907	91.768
116.33	3070.827	91.736
123.53	3537.773	91.705
130.73	4001.545	91.673
137.93	4463.129	91.641
145.13	4921.560	91.609

Table 24(b) (continued). Isochoric PVT measurements for HCFC-123 in PI units.

Temperature Fahrenheit	Pressure psia	Density lb-mass/ft^3
137.93	375.439	86.308
145.13	744.354	86.279
152.33	1110.197	86.251
159.53	1478.072	86.220
166.73	1841.965	86.191
173.93	2206.140	86.163
181.13	2567.744	86.134
188.33	2928.568	86.104
195.53	3289.652	86.075
202.73	3647.246	86.045
209.93	4003.308	86.015
217.13	4358.315	85.985
224.33	4711.916	85.956

Table 25(a). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
257.8615	0.0034	10.241	0.009	3.163	0.033	103.93	0.64	0.62	a
259.8746	0.0032	10.237	0.010	5.244	0.033	104.12	0.39	0.38	b
261.9246	0.0035	10.232	0.011	7.357	0.033	105.04	0.29	0.28	a
263.9040	0.0033	10.228	0.011	9.390	0.033	105.11	0.25	0.24	b
265.9697	0.0036	10.224	0.012	11.502	0.033	106.26	0.22	0.21	a
267.9195	0.0031	10.220	0.013	13.484	0.033	106.39	0.21	0.19	b
269.9803	0.0034	10.216	0.014	15.565	0.033	106.68	0.20	0.19	a
271.9136	0.0032	10.212	0.014	17.504	0.033	106.51	0.19	0.18	b
273.9567	0.0033	10.208	0.015	19.539	0.033	107.52	0.19	0.17	a
275.8598	0.0032	10.204	0.016	21.420	0.033	107.07	0.18	0.17	b
277.9191	0.0032	10.200	0.017	23.440	0.033	108.29	0.18	0.16	a
279.7909	0.0032	10.196	0.017	25.263	0.033	108.26	0.18	0.16	b
283.6947	0.0032	10.188	0.019	29.024	0.033	109.19	0.17	0.16	b
287.5835	0.0033	10.180	0.020	32.720	0.033	110.20	0.17	0.16	b

Table 25(b). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
4.481	0.006	97.77	0.09	458.8	4.8	0.16243	0.00100	0.62	a
8.104	0.006	97.73	0.10	760.6	4.8	0.16272	0.00061	0.38	b
11.794	0.006	97.69	0.11	1067.0	4.8	0.16416	0.00045	0.28	a
15.357	0.006	97.65	0.11	1361.9	4.8	0.16427	0.00039	0.24	b
19.075	0.006	97.61	0.11	1668.2	4.8	0.16607	0.00034	0.21	a
22.585	0.006	97.57	0.12	1955.7	4.8	0.16627	0.00033	0.19	b
26.295	0.006	97.53	0.13	2257.5	4.8	0.16672	0.00031	0.19	a
29.774	0.006	97.49	0.13	2538.7	4.8	0.16646	0.00030	0.18	b
33.452	0.006	97.46	0.14	2833.9	4.8	0.16804	0.00030	0.17	a
36.878	0.006	97.42	0.15	3106.7	4.8	0.16733	0.00028	0.17	b
40.584	0.006	97.38	0.16	3399.7	4.8	0.16924	0.00028	0.16	a
43.954	0.006	97.34	0.16	3664.1	4.8	0.16919	0.00028	0.16	b
50.980	0.006	97.27	0.18	4209.6	4.8	0.17065	0.00027	0.16	b
57.980	0.006	97.19	0.19	4745.6	4.8	0.17223	0.00027	0.16	b

Table 26(a). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	δρ	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
284.2425	0.0035	9.846	0.009	3.642	0.012	108.44	0.54	0.50	a
286.1803	0.0031	9.843	0.009	5.340	0.012	108.36	0.35	0.33	b
288.2634	0.0037	9.839	0.010	7.157	0.012	109.32	0.28	0.25	a
290.1925	0.0032	9.836	0.011	8.832	0.012	109.06	0.23	0.21	b
292.2663	0.0032	9.832	0.011	10.624	0.012	110.08	0.21	0.19	a
294.1864	0.0032	9.828	0.012	12.275	0.012	109.76	0.19	0.18	b
296.2546	0.0032	9.825	0.013	14.044	0.012	110.48	0.18	0.17	a
298.1617	0.0031	9.821	0.013	15.668	0.012	110.60	0.18	0.16	b
300.2107	0.0032	9.818	0.014	17.404	0.012	111.31	0.17	0.16	a
302.1200	0.0032	9.814	0.014	19.013	0.012	111.02	0.17	0.15	b
304.1621	0.0033	9.810	0.015	20.725	0.012	111.47	0.17	0.15	a
306.0576	0.0031	9.807	0.016	22.306	0.012	111.52	0.16	0.15	b
308.0901	0.0034	9.803	0.016	23.992	0.012	111.57	0.17	0.15	a
309.9691	0.0033	9.800	0.017	25.542	0.012	111.91	0.16	0.15	b
311.9977	0.0033	9.797	0.017	27.206	0.012	112.82	0.16	0.15	a
313.8777	0.0032	9.793	0.018	28.738	0.012	113.25	0.16	0.14	b

Table 26(b). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	δρ	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
51.966	0.006	94.00	0.09	528.2	1.7	0.16947	0.00084	0.50	a
55.455	0.006	93.97	0.09	774.5	1.7	0.16935	0.00055	0.33	b
59.204	0.007	93.93	0.10	1038.0	1.7	0.17085	0.00044	0.25	a
62.676	0.006	93.91	0.11	1281.0	1.7	0.17044	0.00036	0.21	b
66.409	0.006	93.87	0.11	1540.9	1.7	0.17204	0.00033	0.19	a
69.865	0.006	93.83	0.11	1780.3	1.7	0.17154	0.00030	0.18	b
73.588	0.006	93.80	0.12	2036.9	1.7	0.17266	0.00028	0.17	a
77.021	0.006	93.76	0.12	2272.5	1.7	0.17285	0.00028	0.16	b
80.709	0.006	93.73	0.13	2524.2	1.7	0.17396	0.00027	0.16	a
84.146	0.006	93.70	0.13	2757.6	1.7	0.17351	0.00027	0.15	b
87.822	0.006	93.66	0.14	3005.9	1.7	0.17421	0.00027	0.15	a
91.234	0.006	93.63	0.15	3235.2	1.7	0.17429	0.00025	0.15	b
94.892	0.006	93.59	0.15	3479.8	1.7	0.17437	0.00027	0.15	a
98.274	0.006	93.56	0.16	3704.6	1.7	0.17490	0.00025	0.15	b
101.926	0.006	93.53	0.16	3945.9	1.7	0.17632	0.00025	0.15	a
105.310	0.006	93.49	0.17	4168.1	1.7	0.17699	0.00025	0.14	b

Table 27(a). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
313.2597	0.0033	9.375	0.008	3.311	0.010	112.31	0.56	0.50	e
315.3753	0.0034	9.372	0.009	4.819	0.010	112.74	0.36	0.32	f
317.3023	0.0031	9.369	0.009	6.188	0.010	112.95	0.28	0.25	e
319.3942	0.0031	9.366	0.010	7.670	0.010	113.07	0.23	0.20	f
321.3426	0.0032	9.363	0.010	9.046	0.010	113.36	0.21	0.18	e
323.3948	0.0032	9.360	0.011	10.491	0.010	114.01	0.19	0.17	f
325.3607	0.0031	9.357	0.011	11.871	0.010	114.06	0.18	0.16	e
327.4009	0.0032	9.354	0.012	13.298	0.010	114.27	0.17	0.15	f
329.3804	0.0030	9.351	0.012	14.678	0.010	114.04	0.16	0.14	e
331.3872	0.0033	9.348	0.013	16.071	0.010	114.69	0.16	0.14	f
333.3849	0.0031	9.344	0.013	17.452	0.010	115.02	0.16	0.14	e
335.3769	0.0031	9.341	0.014	18.824	0.010	115.25	0.16	0.14	f
337.3937	0.0032	9.338	0.014	20.207	0.010	115.36	0.16	0.14	e
339.3594	0.0036	9.335	0.015	21.548	0.010	116.06	0.16	0.14	f
341.3919	0.0031	9.332	0.015	22.928	0.010	115.66	0.15	0.13	e

Table 27(b). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
104.197	0.006	89.50	0.08	480.2	1.5	0.17552	0.00088	0.50	e
108.006	0.006	89.48	0.09	698.9	1.5	0.17619	0.00056	0.32	f
111.474	0.006	89.45	0.09	897.5	1.5	0.17652	0.00044	0.25	e
115.240	0.006	89.42	0.10	1112.4	1.5	0.17671	0.00036	0.20	f
118.747	0.006	89.39	0.10	1312.0	1.5	0.17716	0.00033	0.18	e
122.441	0.006	89.36	0.11	1521.6	1.5	0.17818	0.00030	0.17	f
125.979	0.006	89.33	0.11	1721.7	1.5	0.17826	0.00028	0.16	e
129.652	0.006	89.30	0.11	1928.7	1.5	0.17859	0.00027	0.15	f
133.215	0.005	89.27	0.11	2128.9	1.5	0.17823	0.00025	0.14	e
136.827	0.006	89.25	0.12	2330.9	1.5	0.17924	0.00025	0.14	f
140.423	0.006	89.21	0.12	2531.2	1.5	0.17976	0.00025	0.14	e
144.008	0.006	89.18	0.13	2730.2	1.5	0.18012	0.00025	0.14	f
147.639	0.006	89.15	0.13	2930.8	1.5	0.18029	0.00025	0.14	e
151.177	0.006	89.12	0.14	3125.3	1.5	0.18138	0.00025	0.14	f
154.835	0.006	89.09	0.14	3325.4	1.5	0.18076	0.00023	0.13	e

Table 28(a). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
195.5984	0.0030	11.163	0.010	4.003	0.068	97.54	0.56	0.57	b
197.6426	0.0031	11.157	0.011	7.174	0.068	97.65	0.35	0.36	a
199.8128	0.0031	11.151	0.013	10.491	0.068	98.48	0.29	0.29	b
201.8289	0.0030	11.145	0.014	13.538	0.068	98.44	0.25	0.26	a
203.9834	0.0031	11.139	0.015	16.765	0.068	99.22	0.24	0.24	b
205.9799	0.0030	11.133	0.017	19.729	0.068	99.38	0.22	0.22	a
208.1146	0.0030	11.127	0.018	22.872	0.068	99.82	0.22	0.22	b
210.0943	0.0030	11.122	0.019	25.758	0.068	100.55	0.21	0.21	a
212.2068	0.0032	11.116	0.020	28.803	0.068	100.79	0.21	0.21	b
214.1706	0.0031	11.110	0.022	31.596	0.068	101.74	0.21	0.20	a

Table 28(b). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-107.593	0.005	106.57	0.10	580.6	9.9	0.15244	0.00088	0.57	b
-103.913	0.006	106.52	0.11	1040.5	9.9	0.15261	0.00055	0.36	a
-100.007	0.006	106.46	0.12	1521.6	9.9	0.15391	0.00045	0.29	b
-96.378	0.005	106.40	0.13	1963.5	9.9	0.15385	0.00039	0.26	a
-92.500	0.006	106.35	0.14	2431.6	9.9	0.15507	0.00038	0.24	b
-88.906	0.005	106.29	0.16	2861.5	9.9	0.15532	0.00034	0.22	a
-85.064	0.005	106.23	0.17	3317.3	9.9	0.15600	0.00034	0.22	b
-81.500	0.005	106.18	0.18	3735.9	9.9	0.15714	0.00033	0.21	a
-77.698	0.006	106.13	0.19	4177.5	9.9	0.15752	0.00033	0.21	b
-74.163	0.006	106.07	0.21	4582.6	9.9	0.15900	0.00033	0.20	a

Table 29(a). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v, %	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
215.2794	0.0030	10.874	0.010	3.334	0.020	99.37	0.63	0.64	a
217.3735	0.0031	10.868	0.011	6.184	0.020	99.71	0.38	0.38	b
219.4251	0.0030	10.863	0.012	8.959	0.020	99.79	0.29	0.29	a
221.5092	0.0030	10.858	0.013	11.760	0.020	100.25	0.25	0.25	b
223.5372	0.0030	10.852	0.014	14.464	0.020	100.93	0.23	0.23	a
225.6081	0.0031	10.847	0.015	17.203	0.020	100.90	0.22	0.22	b
227.6234	0.0031	10.842	0.016	19.845	0.020	101.41	0.21	0.21	a
229.6749	0.0031	10.837	0.017	22.511	0.020	101.75	0.21	0.20	b
231.6692	0.0031	10.831	0.018	25.080	0.020	102.09	0.20	0.20	a
233.7101	0.0030	10.826	0.019	27.686	0.020	102.37	0.20	0.19	b
235.6875	0.0030	10.821	0.020	30.188	0.020	102.90	0.20	0.19	a

Table 29(b). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v, %	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-72.167	0.005	103.82	0.10	483.6	2.9	0.15530	0.00098	0.64	a
-68.398	0.006	103.76	0.11	896.9	2.9	0.15583	0.00059	0.38	b
-64.705	0.005	103.71	0.11	1299.4	2.9	0.15596	0.00045	0.29	a
-60.953	0.005	103.66	0.12	1705.6	2.9	0.15667	0.00039	0.25	b
-57.303	0.005	103.61	0.13	2097.8	2.9	0.15774	0.00036	0.23	a
-53.575	0.006	103.56	0.14	2495.1	2.9	0.15769	0.00034	0.22	b
-49.948	0.006	103.51	0.15	2878.3	2.9	0.15849	0.00033	0.21	a
-46.255	0.006	103.46	0.16	3265.0	2.9	0.15902	0.00033	0.20	b
-42.665	0.006	103.40	0.17	3637.6	2.9	0.15955	0.00031	0.20	a
-38.992	0.005	103.36	0.18	4015.5	2.9	0.15999	0.00031	0.19	b
-35.433	0.005	103.31	0.19	4378.4	2.9	0.16082	0.00031	0.19	a

Table 30(a). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
K		mol dm^{-3}		MPa		J mol^{-1} K^{-1}			
234.1386	0.0030	10.596	0.009	3.134	0.017	101.54	0.66	0.65	b
236.3143	0.0030	10.591	0.010	5.760	0.017	101.73	0.38	0.38	a
238.2504	0.0030	10.586	0.011	8.085	0.017	102.35	0.29	0.29	b
240.4017	0.0030	10.581	0.012	10.654	0.017	102.72	0.25	0.24	a
242.3312	0.0031	10.577	0.013	12.942	0.017	103.07	0.23	0.22	b
244.4587	0.0032	10.572	0.014	15.449	0.017	103.50	0.21	0.21	a
246.3745	0.0031	10.567	0.015	17.689	0.017	104.09	0.20	0.20	b
248.4877	0.0031	10.563	0.016	20.141	0.017	104.17	0.20	0.19	a
250.3971	0.0031	10.558	0.017	22.339	0.017	105.08	0.19	0.18	b
252.4928	0.0031	10.553	0.018	24.733	0.017	104.73	0.19	0.18	a
254.3877	0.0031	10.549	0.019	26.880	0.017	105.35	0.19	0.18	b
256.4665	0.0032	10.544	0.019	29.215	0.017	105.76	0.19	0.18	a
258.3437	0.0032	10.540	0.020	31.307	0.017	105.87	0.18	0.17	b

Table 30(b). Experimental liquid heat capacity data for HCFC-123.

T	δT	ρ	$\delta\rho$	P	δP	$C_{v,exp}$	δC_v	δC_v,%	Run
°F		lb ft^{-3}		psia		Btu lb^{-1} $°F^{-1}$			
-38.221	0.005	101.16	0.09	454.5	2.5	0.15869	0.00103	0.65	b
-34.304	0.005	101.11	0.10	835.4	2.5	0.15899	0.00059	0.38	a
-30.819	0.005	101.07	0.11	1172.6	2.5	0.15996	0.00045	0.29	b
-26.947	0.005	101.02	0.11	1545.2	2.5	0.16054	0.00039	0.24	a
-23.474	0.006	100.98	0.12	1877.1	2.5	0.16108	0.00036	0.22	b
-19.644	0.006	100.93	0.13	2240.7	2.5	0.16175	0.00033	0.21	a
-16.196	0.006	100.88	0.14	2565.6	2.5	0.16268	0.00031	0.20	b
-12.392	0.006	100.85	0.15	2921.2	2.5	0.16280	0.00031	0.19	a
-8.955	0.006	100.80	0.16	3240.0	2.5	0.16422	0.00030	0.18	b
-5.183	0.006	100.75	0.17	3587.2	2.5	0.16368	0.00030	0.18	a
-1.772	0.006	100.71	0.18	3898.6	2.5	0.16465	0.00030	0.18	b
1.970	0.006	100.66	0.18	4237.3	2.5	0.16529	0.00030	0.18	a
5.349	0.006	100.63	0.19	4540.7	2.5	0.16546	0.00028	0.17	b

Table 31(a). Experimental two-phase heat capacity data for HCFC-123.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
K		mol dm^{-3}	MPa	J mol^{-1} K^{-1}						
166.9425	0.0030	11.419	0.0001	137.83	0.11	0.08	137.82	0.11	0.08	c
171.0998	0.0030	11.368	0.0001	137.91	0.10	0.08	137.90	0.11	0.08	c
171.7387	0.0030	11.360	0.0002	138.08	0.14	0.10	138.07	0.14	0.10	a
174.8827	0.0030	11.320	0.0002	138.29	0.13	0.10	138.28	0.13	0.10	a
175.2230	0.0030	11.316	0.0002	138.32	0.11	0.08	138.31	0.11	0.08	c
178.0067	0.0033	11.281	0.0003	138.63	0.16	0.11	138.62	0.16	0.11	a
179.3247	0.0030	11.264	0.0004	138.46	0.11	0.08	138.45	0.11	0.08	c
181.5964	0.0030	11.235	0.0005	139.03	0.11	0.08	139.01	0.11	0.08	a
183.3926	0.0030	11.212	0.0006	138.84	0.11	0.08	138.82	0.11	0.08	c
185.6505	0.0030	11.183	0.0008	139.87	0.11	0.08	139.85	0.11	0.08	a
187.4343	0.0030	11.160	0.0009	139.19	0.11	0.08	139.17	0.11	0.08	c
189.6833	0.0030	11.132	0.0012	139.82	0.11	0.08	139.79	0.11	0.08	a
191.4487	0.0030	11.109	0.0014	139.84	0.12	0.08	139.81	0.12	0.08	c
193.6829	0.0031	11.080	0.0017	139.94	0.11	0.08	139.90	0.11	0.08	a
195.4422	0.0031	11.057	0.0020	140.06	0.11	0.08	140.02	0.11	0.08	c
197.6566	0.0030	11.028	0.0025	140.36	0.11	0.08	140.31	0.11	0.08	a
199.3981	0.0030	11.005	0.0029	140.49	0.12	0.08	140.43	0.12	0.08	c
201.5701	0.0031	10.977	0.0035	146.12	0.12	0.09	146.05	0.13	0.09	a
203.3431	0.0032	10.953	0.0041	140.57	0.12	0.08	140.50	0.12	0.09	c
205.4676	0.0032	10.925	0.0049	141.42	0.12	0.08	141.34	0.12	0.09	b
207.2466	0.0030	10.901	0.0057	141.46	0.12	0.08	141.37	0.12	0.09	c
209.3703	0.0031	10.873	0.0068	141.67	0.12	0.09	141.57	0.13	0.09	b
211.1434	0.0031	10.849	0.0078	142.39	0.12	0.08	142.27	0.12	0.09	c
213.2504	0.0032	10.821	0.0092	142.56	0.13	0.09	142.43	0.13	0.09	b
215.0115	0.0030	10.797	0.0106	142.20	0.12	0.08	142.07	0.13	0.09	c
217.1071	0.0031	10.769	0.0124	142.66	0.12	0.08	142.51	0.13	0.09	b
218.8554	0.0030	10.745	0.0141	142.73	0.12	0.08	142.57	0.13	0.09	c
220.9330	0.0033	10.717	0.0164	143.25	0.13	0.09	143.07	0.15	0.10	b
222.6798	0.0030	10.693	0.0186	143.31	0.12	0.08	143.12	0.14	0.09	c
224.7490	0.0033	10.665	0.0215	143.89	0.13	0.09	143.68	0.15	0.11	b
226.4838	0.0031	10.641	0.0243	143.84	0.13	0.09	143.62	0.15	0.10	c
228.5416	0.0034	10.612	0.0279	145.16	0.14	0.10	144.92	0.16	0.11	b
230.2622	0.0030	10.589	0.0313	144.44	0.12	0.09	144.19	0.16	0.11	c
232.3220	0.0031	10.560	0.0358	144.97	0.13	0.09	144.70	0.16	0.11	b
234.0181	0.0034	10.536	0.0399	145.03	0.14	0.10	144.74	0.18	0.12	d
236.0689	0.0031	10.507	0.0454	144.90	0.13	0.09	144.59	0.17	0.12	b
237.7526	0.0032	10.484	0.0504	145.33	0.13	0.09	145.01	0.18	0.13	d
239.7937	0.0031	10.455	0.0571	145.45	0.13	0.09	145.11	0.19	0.13	b
241.4666	0.0032	10.431	0.0632	145.99	0.14	0.10	145.64	0.20	0.14	d
243.5063	0.0032	10.402	0.0712	146.23	0.13	0.09	145.86	0.20	0.14	b
245.1696	0.0031	10.378	0.0785	145.91	0.13	0.09	145.53	0.21	0.14	d
247.1947	0.0031	10.349	0.0881	147.01	0.14	0.10	146.62	0.22	0.15	b
248.8370	0.0032	10.325	0.0966	147.03	0.14	0.10	146.63	0.23	0.16	d
250.8710	0.0032	10.296	0.1080	147.63	0.15	0.10	147.21	0.24	0.16	b
252.5090	0.0032	10.272	0.1181	147.37	0.14	0.09	146.95	0.24	0.16	d
254.5302	0.0032	10.243	0.1316	147.76	0.15	0.10	147.13	0.25	0.17	b
256.1441	0.0031	10.219	0.1432	147.90	0.16	0.11	147.48	0.27	0.18	d

Table 31(a)(continued). Experimental two-phase heat capacity data for HCFC-123.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
K		mol dm^{-3}	MPa	J mol^{-1} K^{-1}						
258.1638	0.0031	10.189	0.1590	148.03	0.14	0.10	147.61	0.27	0.18	b
259.7729	0.0034	10.165	0.1726	148.83	0.17	0.11	148.41	0.29	0.19	d
261.7865	0.0032	10.135	0.1910	139.03	5.99	4.31	138.62	5.99	4.32	b
263.3859	0.0032	10.112	0.2067	139.84	5.96	4.27	139.42	5.97	4.28	d
265.3879	0.0031	10.082	0.2279	149.60	0.14	0.09	149.19	0.29	0.20	b
266.9878	0.0031	10.057	0.2460	150.01	0.14	0.09	149.62	0.30	0.20	d
268.9728	0.0034	10.027	0.2702	151.07	0.15	0.10	150.70	0.31	0.21	b
270.5732	0.0031	10.003	0.2911	150.28	0.14	0.09	149.95	0.31	0.21	d
272.5468	0.0032	9.973	0.3187	151.61	0.15	0.10	151.31	0.32	0.21	b
274.1380	0.0032	9.949	0.3424	150.90	0.14	0.10	150.64	0.32	0.21	d
276.1054	0.0031	9.918	0.3737	151.86	0.14	0.09	151.65	0.32	0.21	b
277.6859	0.0031	9.894	0.4006	152.35	0.14	0.09	152.19	0.33	0.21	d
279.6487	0.0036	9.863	0.4361	152.03	0.16	0.11	151.94	0.34	0.22	b
281.2308	0.0032	9.839	0.4665	152.98	0.15	0.10	152.95	0.33	0.22	d
283.1806	0.0032	9.808	0.5063	152.50	0.15	0.10	152.57	0.33	0.22	b
284.7545	0.0033	9.783	0.5404	153.09	0.15	0.10	153.23	0.33	0.22	d
286.6920	0.0033	9.753	0.5850	153.25	0.15	0.10	153.51	0.33	0.22	b
288.2690	0.0032	9.728	0.6233	153.80	0.15	0.10	154.15	0.33	0.21	d
290.1942	0.0033	9.697	0.6729	154.00	0.15	0.10	154.48	0.33	0.21	b
291.7702	0.0033	9.672	0.7158	154.68	0.15	0.10	155.28	0.32	0.21	d
293.6878	0.0035	9.641	0.7709	154.09	0.16	0.11	154.86	0.32	0.21	b
295.2590	0.0032	9.615	0.8185	155.20	0.15	0.10	156.11	0.31	0.20	d
297.1620	0.0033	9.584	0.8793	154.61	0.15	0.10	155.71	0.31	0.20	b
298.7470	0.0032	9.558	0.9326	155.27	0.15	0.10	156.54	0.30	0.19	d
300.6368	0.0038	9.527	0.9994	155.04	0.17	0.11	156.52	0.31	0.20	b
302.2147	0.0035	9.501	1.0581	156.55	0.17	0.11	158.24	0.30	0.19	d
304.0893	0.0034	9.470	1.1313	155.48	0.16	0.10	157.41	0.29	0.19	b
307.5811	0.0035	9.411	1.2783	151.27	0.16	0.11	153.73	0.30	0.20	b

Table 31(b). Experimental two-phase heat capacity data for HCFC-123.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
°F		lb ft^{-3}	psia	Btu lb^{-1} °F^{-1}						
-159.174	0.005	109.02	0.0	0.21541	0.00017	0.08	0.21539	0.00017	0.08	c
-151.690	0.005	108.53	0.0	0.21553	0.00016	0.08	0.21552	0.00017	0.08	c
-150.540	0.005	108.46	0.0	0.21580	0.00022	0.10	0.21578	0.00022	0.10	a
-144.881	0.005	108.07	0.0	0.21613	0.00020	0.10	0.21611	0.00020	0.10	a
-144.269	0.005	108.03	0.0	0.21617	0.00017	0.08	0.21616	0.00017	0.08	c
-139.258	0.006	107.70	0.0	0.21666	0.00025	0.11	0.21664	0.00025	0.11	a
-136.886	0.005	107.54	0.1	0.21639	0.00017	0.08	0.21638	0.00017	0.08	c
-132.797	0.005	107.26	0.1	0.21728	0.00017	0.08	0.21725	0.00017	0.08	a
-129.563	0.005	107.04	0.1	0.21698	0.00017	0.08	0.21695	0.00017	0.08	c
-125.499	0.005	106.77	0.1	0.21859	0.00017	0.08	0.21856	0.00017	0.08	a
-122.288	0.005	106.55	0.1	0.21753	0.00017	0.08	0.21750	0.00017	0.08	c
-118.240	0.005	106.28	0.2	0.21852	0.00017	0.08	0.21847	0.00017	0.08	a
-115.062	0.005	106.06	0.2	0.21855	0.00019	0.08	0.21850	0.00019	0.08	c
-111.041	0.006	105.78	0.2	0.21870	0.00017	0.08	0.21864	0.00017	0.08	a
-107.874	0.006	105.56	0.3	0.21889	0.00017	0.08	0.21883	0.00017	0.08	c
-103.888	0.005	105.29	0.4	0.21936	0.00017	0.08	0.21928	0.00017	0.08	a
-100.753	0.005	105.07	0.4	0.21956	0.00019	0.08	0.21947	0.00019	0.08	c
-96.844	0.006	104.80	0.5	0.22836	0.00019	0.09	0.22825	0.00020	0.09	a
-93.652	0.006	104.57	0.6	0.21969	0.00019	0.08	0.21958	0.00019	0.09	c
-89.828	0.006	104.30	0.7	0.22102	0.00019	0.08	0.22089	0.00019	0.09	b
-86.626	0.005	104.07	0.8	0.22108	0.00019	0.08	0.22094	0.00019	0.09	c
-82.803	0.006	103.81	1.0	0.22141	0.00019	0.09	0.22125	0.00020	0.09	b
-79.612	0.006	103.58	1.1	0.22253	0.00019	0.08	0.22235	0.00019	0.09	c
-75.819	0.006	103.31	1.3	0.22280	0.00020	0.09	0.22260	0.00020	0.09	b
-72.649	0.005	103.08	1.5	0.22224	0.00019	0.08	0.22203	0.00020	0.09	c
-68.877	0.006	102.81	1.8	0.22296	0.00019	0.08	0.22272	0.00020	0.09	b
-65.730	0.005	102.58	2.0	0.22306	0.00019	0.08	0.22281	0.00020	0.09	c
-61.991	0.006	102.32	2.4	0.22388	0.00020	0.09	0.22360	0.00023	0.10	b
-58.846	0.005	102.09	2.7	0.22397	0.00019	0.08	0.22367	0.00022	0.09	c
-55.122	0.006	101.82	3.1	0.22488	0.00020	0.09	0.22455	0.00023	0.11	b
-51.999	0.006	101.59	3.5	0.22480	0.00020	0.09	0.22446	0.00023	0.10	c
-48.295	0.006	101.31	4.0	0.22686	0.00022	0.10	0.22649	0.00025	0.11	b
-45.198	0.005	101.09	4.5	0.22574	0.00019	0.09	0.22535	0.00025	0.11	c
-41.490	0.006	100.82	5.2	0.22657	0.00020	0.09	0.22614	0.00025	0.11	b
-38.437	0.006	100.59	5.8	0.22666	0.00022	0.10	0.22621	0.00028	0.12	d
-34.746	0.006	100 31	6.6	0.22646	0.00020	0.09	0.22597	0.00027	0.12	b
-31.715	0.006	100.09	7.3	0.22713	0.00020	0.09	0.22663	0.00028	0.13	d
-28.041	0.006	99.81	8.3	0.22732	0.00020	0.09	0.22678	0.00030	0.13	b
-25.030	0.006	99.59	9.2	0.22816	0.00022	0.10	0.22761	0.00031	0.14	d
-21.359	0.006	99.31	10.3	0.22853	0.00020	0.09	0.22796	0.00031	0.14	b
-18.365	0.006	99.08	11.4	0.22803	0.00020	0.09	0.22744	0.00033	0.14	d
-14.720	0.006	98.80	12.8	0.22975	0.00022	0.10	0.22914	0.00034	0.15	b
-11.763	0.006	98.57	14.0	0.22978	0.00022	0.10	0.22916	0.00036	0.16	d
-8.102	0.006	98.30	15.7	0.23072	0.00023	0.10	0.23007	0.00038	0.16	b
-5.154	0.006	98.07	17.1	0.23032	0.00022	0.09	0.22966	0.00038	0.16	d
-1.516	0.006	97.79	19.1	0.23061	0.00023	0.10	0.22994	0.00039	0.17	b
1.389	0.006	97.56	20.8	0.23114	0.00025	0.11	0.23049	0.00042	0.18	d

Table 31(b)(continued). Experimental two-phase heat capacity data for HCFC-123.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
°F		lb ft^{-3}	psia	Btu lb^{-1} °F^{-1}						
5.025	0.006	97.28	23.1	0.23135	0.00022	0.10	0.23069	0.00042	0.18	b
7.921	0.006	97.05	25.0	0.23260	0.00027	0.11	0.23194	0.00045	0.19	d
11.546	0.006	96.76	27.7	0.21728	0.00936	4.31	0.21664	0.00936	4.32	b
14.425	0.006	96.54	30.0	0.21855	0.00931	4.27	0.21789	0.00933	4.28	d
18.028	0.006	96.25	33.1	0.23380	0.00022	0.09	0.23316	0.00045	0.20	b
20.908	0.006	96.02	35.7	0.23444	0.00022	0.09	0.23383	0.00047	0.20	d
24.481	0.006	95.73	39.2	0.23610	0.00023	0.10	0.23552	0.00048	0.21	b
27.362	0.006	95.50	42.2	0.23486	0.00022	0.09	0.23435	0.00048	0.21	d
30.914	0.006	95.21	46.2	0.23694	0.00023	0.10	0.23647	0.00050	0.21	b
33.778	0.006	94.98	49.7	0.23583	0.00022	0.10	0.23543	0.00050	0.21	d
37.320	0.006	94.69	54.2	0.23733	0.00022	0.09	0.23700	0.00050	0.21	b
40.165	0.006	94.46	58.1	0.23810	0.00022	0.09	0.23785	0.00052	0.21	d
43.698	0.006	94.16	63.3	0.23760	0.00025	0.11	0.23746	0.00053	0.22	b
46.545	0.006	93.93	67.7	0.23908	0.00023	0.10	0.23904	0.00052	0.22	d
50.055	0.006	93.64	73.4	0.23833	0.00023	0.10	0.23844	0.00052	0.22	b
52.888	0.006	93.40	78.4	0.23926	0.00023	0.10	0.23947	0.00052	0.22	d
56.376	0.006	93.11	84.8	0.23951	0.00023	0.10	0.23991	0.00052	0.22	b
59.214	0.006	92.87	90.4	0.24037	0.00023	0.10	0.24091	0.00052	0.21	d
62.680	0.006	92.58	97.6	0.24068	0.00023	0.10	0.24143	0.00052	0.21	b
65.516	0.006	92.34	103.8	0.24174	0.00023	0.10	0.24268	0.00050	0.21	d
68.968	0.006	92.04	111.8	0.24082	0.00025	0.11	0.24202	0.00050	0.21	b
71.796	0.006	91.80	118.7	0.24255	0.00023	0.10	0.24398	0.00048	0.20	d
75.222	0.006	91.50	127.5	0.24163	0.00023	0.10	0.24335	0.00048	0.20	b
78.075	0.006	91.25	135.3	0.24266	0.00023	0.10	0.24465	0.00047	0.19	d
81.476	0.007	90.96	145.0	0.24230	0.00027	0.11	0.24462	0.00048	0.20	b
84.316	0.006	90.71	153.5	0.24466	0.00027	0.11	0.24730	0.00047	0.19	d
87.691	0.006	90.41	164.1	0.24299	0.00025	0.10	0.24601	0.00045	0.19	b
93.976	0.006	89.85	185.4	0.23641	0.00025	0.11	0.24026	0.00047	0.20	b

Table 32(a). Experimental two-phase heat capacity data for HCFC-123.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
K		mol dm^{-3}	MPa	J mol^{-1} K^{-1}						
168.7184	0.0031	11.397	0.0001	137.80	0.11	0.08	137.80	0.11	0.08	c
172.5740	0.0031	11.349	0.0002	138.26	0.11	0.08	138.25	0.11	0.08	c
176.4120	0.0030	11.301	0.0003	138.61	0.12	0.08	138.61	0.12	0.08	c
180.2215	0.0031	11.253	0.0004	139.11	0.12	0.08	139.11	0.12	0.08	c
184.0196	0.0030	11.204	0.0006	139.40	0.11	0.08	139.40	0.11	0.08	c
187.7881	0.0030	11.156	0.0010	139.64	0.11	0.08	139.63	0.11	0.08	c
191.5341	0.0030	11.108	0.0014	139.74	0.12	0.09	139.74	0.12	0.09	c
195.2573	0.0030	11.059	0.0020	140.40	0.12	0.08	140.39	0.12	0.08	c
198.9580	0.0031	11.011	0.0028	141.09	0.12	0.09	141.08	0.12	0.09	c
202.6360	0.0031	10.963	0.0039	141.41	0.12	0.09	141.40	0.12	0.09	c
206.2941	0.0031	10.914	0.0053	141.68	0.13	0.09	141.68	0.13	0.09	c
209.9295	0.0030	10.866	0.0071	141.76	0.12	0.09	141.76	0.12	0.09	c
213.5374	0.0030	10.817	0.0094	142.03	0.12	0.09	142.03	0.12	0.09	c
217.1351	0.0030	10.769	0.0124	142.54	0.12	0.09	142.55	0.12	0.09	c
220.7050	0.0032	10.720	0.0162	143.23	0.14	0.09	143.25	0.14	0.09	c
224.2648	0.0030	10.671	0.0208	143.69	0.13	0.09	143.72	0.13	0.09	c
227.8030	0.0031	10.623	0.0265	144.10	0.13	0.09	144.15	0.13	0.09	c

Table 32(b). Experimental two-phase heat capacity data for HCFC-123.

T	δT	ρ_σ	P_σ	$C_v^{(2)}$	$\delta C_v^{(2)}$	$\delta C_v^{(2)}$,%	C_σ	δC_σ	δC_σ,%	Run
°F		lb ft^{-3}	psia	Btu lb^{-1} °F^{-1}						
-155.977	0.006	108.81	0.0	0.21536	0.00017	0.08	0.21536	0.00017	0.08	c
-149.037	0.006	108.35	0.0	0.21608	0.00017	0.08	0.21606	0.00017	0.08	c
-142.128	0.005	107.89	0.0	0.21663	0.00019	0.08	0.21663	0.00019	0.08	c
-135.271	0.006	107.43	0.1	0.21741	0.00019	0.08	0.21741	0.00019	0.08	c
-128.435	0.005	106.97	0.1	0.21786	0.00017	0.08	0.21786	0.00017	0.08	c
-121.651	0.005	106.51	0.1	0.21824	0.00017	0.08	0.21822	0.00017	0.08	c
-114.909	0.005	106.05	0.2	0.21839	0.00019	0.09	0.21839	0.00019	0.09	c
-108.207	0.005	105.58	0.3	0.21942	0.00019	0.08	0.21941	0.00019	0.08	c
-101.546	0.006	105.12	0.4	0.22050	0.00019	0.09	0.22049	0.00019	0.09	c
-94.925	0.006	104.66	0.6	0.22100	0.00019	0.09	0.22099	0.00019	0.09	c
-88.341	0.006	104.20	0.8	0.22142	0.00020	0.09	0.22142	0.00020	0.09	c
-81.797	0.005	103.74	1.0	0.22155	0.00019	0.09	0.22155	0.00019	0.09	c
-75.303	0.005	103.27	1.4	0.22197	0.00019	0.09	0.22197	0.00019	0.09	c
-68.827	0.005	102.81	1.8	0.22277	0.00019	0.09	0.22278	0.00019	0.09	c
-62.401	0.006	102.34	2.3	0.22385	0.00022	0.09	0.22388	0.00022	0.09	c
-55.993	0.005	101.88	3.0	0.22456	0.00020	0.09	0.22461	0.00020	0.09	c
-49.625	0.006	101.42	3.8	0.22521	0.00020	0.09	0.22528	0.00020	0.09	c

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