TABLE 1

Experimental (p,ρ,T) data for 1,1,1,2-tetrafluoroethane (R134a): T, temperature (ITS-90); p, pressure; ρ_{exp}, density; ρ_{calc} from equation of state of Tillner-Roth and Baehr (1994); Dev.=100(ρ_{exp} - ρ_{calc})/ρ_{exp}.

T (K)	p(MPa)	Density (kg·m^{-3})		Dev.
		ρ_{exp}	ρ_{calc}	
173.00	2.019	1585.92	1585.22	0.045
174.00	3.963	1585.67	1584.95	0.046
175.00	5.927	1585.44	1584.72	0.046
176.00	7.879	1585.23	1584.48	0.047
177.00	9.849	1585.02	1584.27	0.047
178.00	11.800	1584.82	1584.04	0.049
179.00	13.757	1584.62	1583.83	0.050
180.00	15.718	1584.43	1583.63	0.051
182.00	19.614	1584.06	1583.22	0.053
184.00	23.485	1583.69	1582.80	0.056
186.00	27.346	1583.34	1582.41	0.059
188.00	31.191	1582.99	1582.02	0.061
190.00	35.009	1582.65	1581.64	0.064
186.00	1.865	1551.48	1550.78	0.046
187.00	3.623	1551.25	1550.54	0.046
188.00	5.378	1551.03	1550.31	0.047
189.00	7.135	1550.83	1550.08	0.048
190.00	8.897	1550.63	1549.88	0.049
192.00	12.420	1550.25	1549.47	0.050
194.00	15.924	1549.89	1549.07	0.053
196.00	19.412	1549.55	1548.68	0.056
198.00	22.897	1549.21	1548.31	0.058
200.00	26.366	1548.87	1547.94	0.061
202.00	29.817	1548.55	1547.57	0.063
204.00	33.253	1548.22	1547.21	0.065
200.00	1.854	1514.16	1513.38	0.052
201.00	3.415	1513.95	1513.15	0.053
202.00	4.988	1513.74	1512.94	0.053
203.00	6.552	1513.55	1512.73	0.054
204.00	8.126	1513.37	1512.54	0.054
205.00	9.690	1513.19	1512.34	0.056
206.00	11.255	1513.01	1512.15	0.057
208.00	14.381	1512.67	1511.78	0.059
210.00	17.502	1512.34	1511.42	0.061
212.00	20.615	1512.02	1511.07	0.063
214.00	23.711	1511.70	1510.72	0.065
216.00	26.792	1511.39	1510.38	0.067
218.00	29.859	1511.08	1510.03	0.070
220.00	32.915	1510.78	1509.69	0.072
216.00	1.999	1471.02	1470.09	0.063
217.00	3.367	1470.82	1469.88	0.064

TABLE 1 (Continued)

Experimental (p,ρ,T) data for 1,1,1,2-tetrafluoroethane (R134a): T, temperature (ITS-90); p, pressure; ρ_{exp}, density; ρ_{calc} from equation of state of Tillner-Roth and Baehr (1994); Dev.=100(ρ_{exp} - ρ_{calc})/ρ_{exp}.

T (K)	p(MPa)	Density (kg·m^{-3})		Dev.
		ρ_{exp}	ρ_{calc}	
218.00	4.743	1470.64	1469.69	0.065
219.00	6.119	1470.46	1469.50	0.065
220.00	7.490	1470.28	1469.31	0.066
222.00	10.239	1469.95	1468.96	0.068
224.00	12.983	1469.63	1468.62	0.069
226.00	15.722	1469.32	1468.29	0.070
228.00	18.451	1469.02	1467.97	0.072
230.00	21.174	1468.72	1467.64	0.074
232.00	23.879	1468.43	1467.31	0.076
234.00	26.578	1468.14	1467.00	0.078
236.00	29.271	1467.85	1466.68	0.080
238.00	31.952	1467.56	1466.37	0.082
240.00	34.626	1467.28	1466.06	0.083
236.00	1.958	1414.91	1413.87	0.073
237.00	3.124	1414.73	1413.70	0.073
238.00	4.281	1414.56	1413.53	0.073
239.00	5.450	1414.39	1413.37	0.073
240.00	6.607	1414.24	1413.20	0.073
242.00	8.929	1413.93	1412.88	0.074
244.00	11.248	1413.63	1412.58	0.074
246.00	13.564	1413.34	1412.29	0.075
248.00	15.871	1413.06	1411.99	0.076
250.00	18.175	1412.78	1411.69	0.077
252.00	20.469	1412.51	1411.40	0.078
254.00	22.760	1412.24	1411.12	0.079
256.00	25.047	1411.97	1410.84	0.080
258.00	27.327	1411.70	1410.56	0.081
260.00	29.598	1411.44	1410.28	0.082
262.00	31.865	1411.17	1410.00	0.083
264.00	34.121	1410.91	1409.72	0.084
260.00	1.845	1343.30	1342.35	0.071
261.00	2.779	1343.15	1342.19	0.071
262.00	3.720	1342.99	1342.06	0.070
263.00	4.658	1342.85	1341.91	0.070
264.00	5.599	1342.70	1341.78	0.069
266.00	7.475	1342.42	1341.51	0.068
268.00	9.348	1342.15	1341.24	0.068
270.00	11.218	1341.89	1340.97	0.068
272.00	13.090	1341.63	1340.72	0.068
274.00	14.958	1341.37	1340.47	0.067
276.00	16.824	1341.12	1340.23	0.066

TABLE 1 (Continued)

Experimental (p,ρ,T) data for 1,1,1,2-tetrafluoroethane (R134a): T, temperature (ITS-90); p, pressure; ρ_{exp}, density; ρ_{calc} from equation of state of Tillner-Roth and Baehr (1994); Dev.=100(ρ_{exp} - ρ_{calc})/ρ_{exp}.

T (K)	p(MPa)	Density (kg·m^{-3})		Dev.
		ρ_{exp}	ρ_{calc}	
278.00	18.684	1340.87	1339.98	0.066
280.00	20.539	1340.62	1339.73	0.066
282.00	22.395	1340.38	1339.49	0.066
284.00	24.241	1340.13	1339.24	0.067
286.00	26.085	1339.89	1338.99	0.067
290.00	29.761	1339.40	1338.51	0.067
294.00	33.415	1338.92	1338.01	0.068
280.00	1.718	1278.26	1277.55	0.056
282.00	3.264	1277.98	1277.30	0.053
284.00	4.814	1277.72	1277.06	0.051
286.00	6.361	1277.46	1276.83	0.049
288.00	7.907	1277.21	1276.60	0.048
290.00	9.450	1276.96	1276.36	0.047
292.00	10.998	1276.72	1276.15	0.045
294.00	12.541	1276.49	1275.93	0.044
296.00	14.085	1276.25	1275.71	0.042
298.00	15.626	1276.02	1275.49	0.041
300.00	17.166	1275.79	1275.28	0.040
304.00	20.236	1275.33	1274.84	0.038
308.00	23.290	1274.87	1274.38	0.038
312.00	26.340	1274.42	1273.95	0.037
316.00	29.371	1273.97	1273.48	0.038
320.00	32.400	1273.52	1273.05	0.037
300.00	1.780	1206.76	1206.25	0.043
304.00	4.283	1206.27	1205.86	0.034
308.00	6.786	1205.81	1205.49	0.027
312.00	9.292	1205.36	1205.11	0.021
316.00	11.797	1204.93	1204.74	0.016
320.00	14.298	1204.50	1204.36	0.011
324.00	16.797	1204.07	1203.99	0.007
328.00	19.294	1203.65	1203.61	0.003
332.00	21.784	1203.23	1203.23	-0.001
336.00	24.270	1202.81	1202.86	-0.004
340.00	26.746	1202.39	1202.46	-0.006
344.00	29.217	1201.97	1202.07	-0.008
348.00	31.681	1201.56	1201.67	-0.009
320.00	1.863	1123.52	1123.03	0.044
324.00	3.807	1123.09	1122.72	0.033
328.00	5.760	1122.67	1122.43	0.022
332.00	7.717	1122.27	1122.13	0.012
336.00	9.678	1121.87	1121.83	0.003

TABLE 1 (Continued)

Experimental (p,ρ,T) data for 1,1,1,2-tetrafluoroethane (R134a): T, temperature (ITS-90); p, pressure; ρ_{exp}, density; ρ_{calc} from equation of state of Tillner-Roth and Baehr (1994); Dev.=100(ρ_{exp} - ρ_{calc})/ρ_{exp}.

T (K)	p(MPa)	Density (kg·m^{-3})		Dev.
		ρ_{exp}	ρ_{calc}	
340.00	11.641	1121.47	1121.54	-0.006
344.00	13.606	1121.09	1121.24	-0.014
348.00	15.571	1120.70	1120.93	-0.021
352.00	17.536	1120.31	1120.62	-0.027
356.00	19.498	1119.93	1120.30	-0.034
360.00	21.459	1119.54	1119.98	-0.039
364.00	23.417	1119.16	1119.64	-0.043
368.00	25.372	1118.77	1119.31	-0.048
372.00	27.323	1118.39	1118.96	-0.051
376.00	29.271	1118.00	1118.62	-0.055
380.00	31.213	1117.62	1118.25	-0.057
384.00	33.152	1117.23	1117.89	-0.059
388.00	35.085	1116.85	1117.52	-0.060
339.99	2.250	1020.91	1020.23	0.066
340.00	2.254	1020.91	1020.24	0.066
343.15	3.369	1020.62	1020.00	0.060
344.00	3.671	1020.54	1019.95	0.057
348.00	5.099	1020.18	1019.70	0.047
352.00	6.537	1019.82	1019.48	0.034
353.15	6.952	1019.72	1019.41	0.031
354.00	7.259	1019.65	1019.37	0.027
358.00	8.707	1019.30	1019.15	0.015
362.00	10.161	1018.95	1018.92	0.002
363.15	10.579	1018.85	1018.85	0.000
364.00	10.889	1018.78	1018.81	-0.003
368.00	12.348	1018.43	1018.58	-0.014
372.00	13.810	1018.09	1018.35	-0.026
373.15	14.231	1017.99	1018.28	-0.029
376.00	15.275	1017.74	1018.11	-0.036
380.00	16.739	1017.40	1017.86	-0.046
384.00	18.206	1017.05	1017.61	-0.054
388.00	19.672	1016.71	1017.35	-0.063
392.00	21.138	1016.36	1017.07	-0.070
396.00	22.605	1016.02	1016.80	-0.077
400.00	24.069	1015.67	1016.51	-0.083
360.00	3.230	881.27	880.76	0.058
363.15	3.947	881.04	880.37	0.076
364.00	4.144	880.97	880.31	0.076
368.00	5.073	880.68	879.94	0.084
372.00	6.014	880.39	879.66	0.082
373.15	6.286	880.31	879.58	0.083

TABLE 1 (Continued)

Experimental (p,ρ,T) data for 1,1,1,2-tetrafluoroethane (R134a): T, temperature (ITS-90); p, pressure; ρ_{exp}, density; ρ_{calc} from equation of state of Tillner-Roth and Baehr (1994); Dev.=100(ρ_{exp} - ρ_{calc})/ρ_{exp}.

T (K)	p(MPa)	Density (kg·m^{-3})		Dev.
		ρ_{exp}	ρ_{calc}	
376.00	6.966	880.10	879.45	0.074
380.00	7.925	879.81	879.23	0.066
383.15	8.684	879.58	879.07	0.058
384.00	8.891	879.52	879.04	0.054
388.00	9.861	879.23	878.88	0.040
392.00	10.838	878.94	878.70	0.027
396.00	11.817	878.65	878.53	0.013
400.00	12.800	878.36	878.36	-0.001
376.00	4.458	712.69	710.65	0.287
380.00	5.017	712.46	710.85	0.227
383.15	5.465	712.29	710.98	0.184
384.00	5.588	712.24	711.06	0.166
388.00	6.168	712.02	711.15	0.122
392.00	6.756	711.79	711.15	0.091
393.15	6.925	711.73	711.13	0.084
396.00	7.349	711.57	711.10	0.066
400.00	7.947	711.34	711.00	0.047
376.00	4.203	527.26	490.51	7.492
378.00	4.376	527.18	509.47	3.477
380.00	4.550	527.11	515.41	2.269
382.00	4.726	527.03	518.91	1.566
383.15	4.827	526.99	520.17	1.311
384.00	4.902	526.96	520.99	1.145
386.00	5.079	526.88	522.31	0.875
388.00	5.257	526.80	523.32	0.665
390.00	5.436	526.72	524.00	0.518
392.00	5.615	526.64	524.49	0.411
393.15	5.717	526.60	524.64	0.373
396.00	5.973	526.48	525.11	0.261
400.00	6.334	526.32	525.51	0.155
373.15	3.937	334.73	328.49	1.899
374.00	3.983	334.70	329.70	1.518
376.00	4.093	334.65	331.43	0.972
378.00	4.201	334.60	332.28	0.698
380.00	4.307	334.56	332.72	0.553
382.00	4.413	334.51	332.91	0.482
383.15	4.473	334.48	332.99	0.447
384.00	4.518	334.46	333.05	0.424
386.00	4.622	334.41	333.12	0.388
388.00	4.726	334.37	333.14	0.367
390.00	4.828	334.32	333.18	0.342

TABLE 1 (Continued)

Experimental (p,ρ,T) data for 1,1,1,2-tetrafluoroethane (R134a): T, temperature (ITS-90); p, pressure; ρ_{exp}, density; ρ_{calc} from equation of state of Tillner-Roth and Baehr (1994); Dev.=100(ρ_{exp} - ρ_{calc})/ρ_{exp}.

T (K)	p(MPa)	Density (kg·m^{-3})		Dev.
		ρ_{exp}	ρ_{calc}	
392.00	4.931	334.27	333.22	0.316
393.15	4.990	334.25	333.24	0.303
396.00	5.134	334.18	333.26	0.277
400.00	5.336	334.08	333.27	0.244
372.00	3.512	214.75	214.12	0.294
373.15	3.548	214.73	214.13	0.282
376.00	3.635	214.69	214.19	0.234
380.00	3.757	214.64	214.28	0.171
383.15	3.851	214.60	214.27	0.153
384.00	3.876	214.59	214.28	0.145
388.00	3.994	214.54	214.26	0.127
392.00	4.110	214.45	214.11	0.155
393.15	4.143	214.43	214.13	0.140
396.00	4.225	214.40	214.13	0.125
400.00	4.340	214.35	214.13	0.103
372.00	2.850	139.97	139.53	0.319
373.15	2.870	139.97	139.55	0.298
376.00	2.920	139.95	139.58	0.266
380.00	2.990	139.93	139.64	0.206
383.15	3.044	139.90	139.62	0.200
384.00	3.059	139.89	139.62	0.193
392.00	3.196	140.10	139.78	0.227
393.15	3.215	140.08	139.77	0.226
396.00	3.263	140.05	139.75	0.220
400.00	3.329	140.01	139.72	0.211
372.00	2.077	87.78	87.42	0.412
373.15	2.088	87.77	87.42	0.405
376.00	2.115	87.75	87.40	0.397
380.00	2.153	87.73	87.39	0.384
383.15	2.183	87.70	87.38	0.377
384.00	2.191	87.70	87.37	0.374
388.00	2.228	87.67	87.36	0.362
392.00	2.265	87.65	87.34	0.357
393.15	2.276	87.64	87.33	0.352
396.00	2.302	87.62	87.32	0.349
400.00	2.339	87.59	87.31	0.332

TABLE 2

Second virial coefficients derived from the measurements in Table 1 for 1,1,1,2-tetrafluoroethane (R134a): T , ITS-90.

T (K)	B ($cm^3 \cdot mol^{-1}$)	T (K)	B ($cm^3 \cdot mol^{-1}$)
373.15	-275.4	388.00	-248.6
376.00	-269.9	392.00	-241.6
380.00	-262.3	393.15	-239.8
383.15	-256.7	396.00	-235.2
384.00	-255.2	400.00	-228.9

TABLE 3

Saturated liquid density values for 1,1,1,2-tetrafluoroethane (R134a) obtained from extrapolation of isochoric (p,ρ,T) data to vapor pressure: T, temperature (ITS-90); $\rho_{sat,exp}$, saturated liquid density; $\rho_{sat,calc}$, calculated saturated liquid density from Tillner-Roth and Baehr (1994); Dev.=100(ρ_{exp} - ρ_{calc})/ρ_{exp}.

T (K)	$\rho_{sat,exp}$	$\rho_{sat,calc}$	Dev.
	(kg/m^3)		
171.97	1586.18	1585.48	0.044
184.94	1551.73	1551.03	0.045
198.83	1514.40	1513.63	0.051
214.56	1471.29	1470.38	0.062
234.37	1415.19	1414.15	0.073
258.22	1343.57	1342.60	0.072
278.24	1278.50	1277.76	0.058
298.23	1206.98	1206.39	0.049
318.59	1123.67	1123.09	0.051
339.09	1020.99	1020.25	0.073
358.87	881.35	880.63	0.081