

4. Tabulated Data on Density - Ketones

4.1 Saturated Ketones

4.1.1 Saturated Ketones, C₃ - C₆

Propanone

[67-64-1]

C₃H₆O

MW = 58.08

163

$T_c = 508.15$ K [1969-cam/cha]

$\rho_c = 269.00$ kg·m⁻³ [1969-cam/cha]

Table 1. Coefficients for the polynomial expansion equations. Standard deviations (see introduction): $\sigma_t = 1.0069$ (low temperature range), $\sigma_{c,w} = (9.6730 \cdot 10^{-1})$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 2.3296 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 183.15$ to 410.00 K $\rho = A + BT + CT^2 + DT^3 + \dots$	$T = 410.00$ to 508.15 K $\rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)]$ $[\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$
<i>A</i>	$1.06011 \cdot 10^3$	1.43119
<i>B</i>	$-6.68357 \cdot 10^{-1}$	$-3.11767 \cdot 10^{-2}$
<i>C</i>	$-8.60506 \cdot 10^{-4}$	$3.14123 \cdot 10^{-4}$
<i>D</i>		$-1.17125 \cdot 10^{-6}$

Table 2. Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
196.59	895.05 ± 0.50	-0.41	1907-tim(×)	234.79	855.86 ± 0.37	0.11	1926-fel/dur(×)
273.55	812.84 ± 0.25	-0.05	1907-tim ¹⁾	255.70	833.16 ± 0.35	0.21	1926-fel/dur(×)
183.45	910.92 ± 0.38	2.38	1924-arc/ure ¹⁾	264.75	822.64 ± 0.34	-0.21	1926-fel/dur(×)
193.45	899.92 ± 0.38	1.31	1924-arc/ure(◆)	266.75	820.84 ± 0.34	0.25	1926-fel/dur ¹⁾
203.45	888.41 ± 0.38	-0.10	1924-arc/ure(◆)	267.15	820.65 ± 0.34	0.51	1926-fel/dur ¹⁾
213.45	877.58 ± 0.38	-0.66	1924-arc/ure(◆)	273.15	813.90 ± 0.33	0.56	1926-fel/dur ¹⁾
223.25	867.86 ± 0.37	-0.15	1924-arc/ure(◆)	291.95	793.04 ± 0.31	1.40	1926-fel/dur ¹⁾
233.15	857.46 ± 0.37	-0.04	1924-arc/ure(◆)	295.40	789.82 ± 0.31	2.23	1926-fel/dur ¹⁾
243.05	847.39 ± 0.37	0.56	1924-arc/ure(◆)	305.99	777.60 ± 0.31	2.57	1926-fel/dur ¹⁾
252.75	837.08 ± 0.37	0.87	1924-arc/ure(◆)	309.03	773.88 ± 0.33	2.49	1926-fel/dur ¹⁾
262.55	826.16 ± 0.37	0.85	1924-arc/ure(◆)	324.80	755.91 ± 0.35	3.66	1926-fel/dur ¹⁾
273.15	813.98 ± 0.36	0.64	1924-arc/ure ¹⁾	293.15	789.94 ± 0.20	-0.29	1959-how/pik ¹⁾
183.15	910.63 ± 0.42	1.80	1926-fel/dur(×)	298.15	784.25 ± 0.20	-0.09	1959-how/pik ¹⁾
198.15	894.78 ± 0.41	0.89	1926-fel/dur(×)	310.95	769.44 ± 0.20	0.36	1959-how/pik ¹⁾
216.97	874.78 ± 0.39	0.19	1926-fel/dur(×)	323.20	754.82 ± 0.30	0.61	1959-how/pik ¹⁾

¹⁾ Not included in Fig. 1.

cont.

Propanone (cont.)**Table 2.** (cont.)

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg · m ⁻³	Ref. (Symbol in Fig. 1)	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg · m ⁻³	Ref. (Symbol in Fig. 1)
329.35	747.30 ± 0.50	0.66	1959-how/pik(×)	480.65	495.20 ± 0.50	0.37	1968-cam/cha(×)
293.15	789.92 ± 0.15	-0.31	1959-how/pik-1 ¹⁾	484.85	480.20 ± 0.50	0.16	1968-cam/cha(×)
298.15	784.23 ± 0.15	-0.11	1959-how/pik-1 ¹⁾	489.55	460.80 ± 0.50	-0.38	1968-cam/cha(×)
323.20	754.80 ± 0.20	0.59	1959-how/pik-1(Δ)	492.95	443.60 ± 0.50	-1.98	1968-cam/cha(×)
374.65	690.40 ± 0.30	1.47	1968-cam/cha(×)	496.95	423.80 ± 0.50	-0.54	1968-cam/cha(×)
380.55	681.60 ± 0.30	0.45	1968-cam/cha(×)	498.55	413.40 ± 0.50	-1.27	1968-cam/cha(×)
388.25	671.00 ± 0.30	0.09	1968-cam/cha(×)	501.85	395.90 ± 0.50	4.33	1968-cam/cha(×)
390.65	667.80 ± 0.30	0.10	1968-cam/cha(×)	503.35	388.00 ± 1.00	9.07	1968-cam/cha ¹⁾
397.25	658.30 ± 0.30	-0.51	1968-cam/cha(×)	504.35	362.70 ± 2.00	-6.61	1968-cam/cha(×)
400.55	653.60 ± 0.30	-0.74	1968-cam/cha(×)	505.25	354.20 ± 2.50	-5.21	1968-cam/cha(×)
405.65	646.00 ± 0.30	-1.39	1968-cam/cha(×)	506.65	335.60 ± 3.00	-4.13	1968-cam/cha(×)
408.55	641.90 ± 0.30	-1.52	1968-cam/cha(×)	507.05	327.30 ± 3.50	-4.92	1968-cam/cha(×)
413.25	634.30 ± 0.30	-2.49	1968-cam/cha(×)	223.15	867.90 ± 0.30	-0.21	1973-ter/kru(∇)
418.95	625.00 ± 0.30	-2.95	1968-cam/cha(×)	233.15	856.80 ± 0.30	-0.70	1973-ter/kru(∇)
423.05	618.20 ± 0.30	-2.96	1968-cam/cha(×)	243.15	845.70 ± 0.30	-1.02	1973-ter/kru(∇)
424.35	616.80 ± 0.50	-2.15	1968-cam/cha(×)	253.15	834.60 ± 0.30	-1.17	1973-ter/kru(∇)
429.05	609.50 ± 0.50	-1.25	1968-cam/cha(×)	263.15	823.60 ± 0.30	-1.04	1973-ter/kru(∇)
433.05	603.20 ± 0.50	-0.38	1968-cam/cha(×)	273.15	812.50 ± 0.30	-0.84	1973-ter/kru ¹⁾
437.45	596.20 ± 0.50	0.71	1968-cam/cha(×)	278.15	806.77 ± 0.10	-0.86	1989-fre(○)
444.35	584.00 ± 0.50	1.58	1968-cam/cha(×)	288.15	795.71 ± 0.10	-0.36	1989-fre(○)
453.25	567.90 ± 0.50	3.23	1968-cam/cha(×)	298.15	784.37 ± 0.10	0.03	1989-fre(○)
460.35	550.80 ± 0.50	1.38	1968-cam/cha(×)	308.15	772.81 ± 0.10	0.37	1989-fre(○)
462.85	542.10 ± 0.50	-1.62	1968-cam/cha(×)	318.15	761.04 ± 0.10	0.67	1989-fre(○)
471.45	521.20 ± 0.50	-1.09	1968-cam/cha(×)	293.15	790.15 ± 0.10	-0.08	1999-tsi/mol(□)
475.75	510.80 ± 0.50	0.63	1968-cam/cha(×)				

¹⁾ Not included in Fig. 1.

Further references: [1848-kop, 1854-kop, 1863-gla/dal, 1864-lan, 1880-pry, 1880-tho, 1881-pri/han, 1882-zan, 1883-sch-3, 1884-per, 1884-sch-6, 1890-gar, 1891-jah, 1891-sch/kos, 1893-mce/kru, 1895-squ, 1904-dun, 1906-mar, 1906-wal-1, 1907-che-1, 1908-get, 1909-hol/sag, 1910-eis, 1910-hub, 1910-tim, 1911-dor, 1911-sch, 1912-dun/hil, 1912-fau, 1912-kor, 1912-mal, 1912-sch-1, 1912-sch-2, 1912-tim, 1912-tim-1, 1912-tyr, 1913-shi/wer, 1913-ste, 1914-low, 1914-wor-1, 1915-pea, 1916-bra, 1916-ric/shi, 1917-jae, 1918-sam, 1919-pri, 1919-rei/ral, 1921-bar/bir, 1921-ken/bra, 1923-bha, 1923-her/neu, 1923-wil/smi, 1924-bus-1, 1925-eis, 1925-lew, 1925-rak, 1926-mat, 1926-sch, 1927-arc/ure, 1927-gru, 1927-krc/wil, 1927-par/cha, 1927-sui/pol, 1928-car/adk, 1928-par/kel, 1928-tim/mar, 1929-ber/reu, 1929-ham/and, 1929-kel, 1929-nic, 1929-pre, 1930-bea/mcv, 1930-rak/fro, 1930-zma, 1931-bea/mcv, 1931-pfe/adk, 1931-tre/spe, 1932-ern/lit, 1933-hug/har, 1933-tre/wat, 1933-you, 1935-ear/gla, 1936-tom, 1937-alb, 1937-oli, 1940-cow/jef, 1940-sch/ipa, 1942-owe/qua, 1943-bru/bog, 1946-kre/now, 1946-mil/per, 1946-tre/web, 1948-bha/sub, 1948-rey/kra, 1949-dre/mar, 1949-gri/buf, 1950-jac, 1950-joe/nik, 1951-kar/bow, 1952-cap/mug, 1952-coo, 1952-gri, 1952-oth/chu, 1952-thi/cra, 1953-ame/pax, 1953-ani-1, 1953-par/cha, 1954-tal/can, 1954-tha/row, 1955-qui/ami, 1956-ame/pax, 1956-bro/smi, 1956-can/hor, 1956-fai/win, 1956-moo/sty, 1957-mur/las, 1958-how/mca, 1958-lin/van, 1958-mue/kea, 1959-fre/hut, 1960-bro/smi, 1960-fro/shr, 1962-bro/smi, 1963-sha/bra, 1964-loi/mer, 1965-for/moo, 1965-kur/wik,

cont.

1966-ser/kon, 1966-sub/rao-1, 1967-fre/pik, 1967-loi/mer, 1968-ano, 1968-bek/hal, 1968-des/bha, 1968-joh, 1970-kon/lya, 1971-ben/mur, 1971-des/bha, 1972-bou/aim, 1974-pur/pol, 1976-bul/pro, 1976-haf/har, 1977-ker/dev, 1977-rad/tas, 1978-dia/cre-1, 1978-och/lu, 1979-cha/nag, 1979-sch, 1979-sch-1, 1979-sch-2, 1979-sin/siv, 1980-edu/boy, 1980-mes/doy, 1980-mes/doy-1, 1980-mes/doy-2, 1981-tas/djo, 1982-diz/mar, 1982-nod/oha, 1983-nat/tri, 1984-bau/mee, 1984-cre/com, 1984-pol/wic, 1985-cos/pat, 1986-gou/tom, 1986-hne/cib, 1986-miy/hay, 1986-sue/gei, 1987-aka/oga, 1987-tsu/ich, 1988-aww/all, 1988-bag/gur, 1988-ohg/tak, 1989-mam/pan, 1990-sin/mal, 1991-fen/doh, 1991-gro/rou, 1991-pap/zia, 1991-she/wan, 1991-yos/kat, 1992-qin/hof-1, 1992-qin/hof-2, 1993-com/fra, 1995-com/fra, 1995-com/fra-2, 1995-com/fra-4, 1995-pet/gas, 1996-nag/tam-2, 1996-res/ech, 1998-igl/org, 1998-par/aco, 1999-tre/kas].

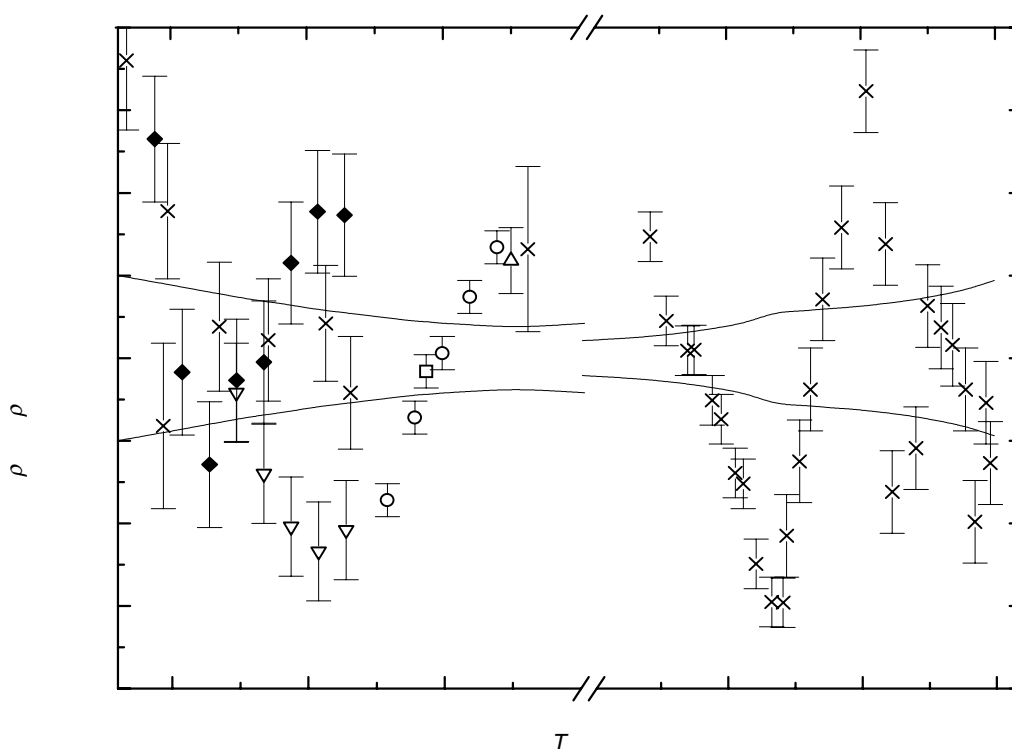


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

Table 3. Recommended values (fit to the reliable experimental values according to the equations

$$\rho = A + BT + CT^2 + DT^3 + \dots \text{ or } \rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4].$$

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
180.00	911.92 ± 0.50	230.00	860.87 ± 0.35	260.00	828.17 ± 0.28
190.00	902.06 ± 0.47	293.15	790.23 ± 0.22	270.00	816.92 ± 0.26
200.00	892.02 ± 0.44	298.15	784.34 ± 0.21	280.00	805.50 ± 0.24
210.00	881.81 ± 0.41	240.00	850.14 ± 0.33	290.00	793.92 ± 0.22
220.00	871.42 ± 0.38	250.00	839.24 ± 0.30	300.00	782.16 ± 0.21

cont.

Propanone (cont.)**Table 3.** (cont.)

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
310.00	770.22 ± 0.20	380.00	681.88 ± 0.28	450.00	571.30 ± 0.62
320.00	758.12 ± 0.19	390.00	668.57 ± 0.32	460.00	550.20 ± 0.66
330.00	745.84 ± 0.19	400.00	655.08 ± 0.37	470.00	526.14 ± 0.70
340.00	733.39 ± 0.20	410.00	641.43 ± 0.43	480.00	496.97 ± 0.76
350.00	720.77 ± 0.21	420.00	626.24 ± 0.56	490.00	459.22 ± 0.83
360.00	707.98 ± 0.23	430.00	609.07 ± 0.57	500.00	405.13 ± 0.94
370.00	695.01 ± 0.25	440.00	590.72 ± 0.60		

Butanone

[78-93-3]

C₄H₈O

MW = 72.11

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Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{\text{c,w}} = 9.2881 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.2065 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 195.32 to 343.05 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.05745 \cdot 10^3$
B	$-6.78098 \cdot 10^{-1}$
C	$-6.20065 \cdot 10^{-4}$

Table 2. Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	825.49 ± 0.20	-0.48	1910-tim(×)	235.20	863.15 ± 0.36	-0.51	1931-ton/ueh(×)
293.15	804.93 ± 0.30	-0.45	1919-pri ¹⁾	235.42	862.86 ± 0.36	-0.59	1931-ton/ueh(×)
303.15	794.40 ± 0.30	-0.50	1919-pri ¹⁾	235.57	862.75 ± 0.36	-0.55	1931-ton/ueh(×)
313.15	783.89 ± 0.30	-0.41	1919-pri ¹⁾	237.86	860.68 ± 0.36	-0.40	1931-ton/ueh(×)
323.15	773.13 ± 0.30	-0.44	1919-pri(×)	242.45	856.21 ± 0.36	-0.39	1931-ton/ueh(×)
273.15	825.53 ± 0.20	-0.44	1928-tim/mar ¹⁾	243.79	854.52 ± 0.35	-0.77	1931-ton/ueh(×)
288.55	809.62 ± 0.20	-0.54	1928-tim/mar(×)	247.65	850.62 ± 0.35	-0.87	1931-ton/ueh(×)
293.15	804.93 ± 0.20	-0.45	1928-tim/mar(×)	253.24	845.01 ± 0.35	-0.96	1931-ton/ueh(×)
298.15	799.78 ± 0.20	-0.38	1928-tim/mar ¹⁾	258.74	839.94 ± 0.34	-0.55	1931-ton/ueh(×)
195.32	900.61 ± 0.40	-0.74	1931-ton/ueh(×)	273.15	825.89 ± 0.33	-0.08	1931-ton/ueh(×)
208.12	889.22 ± 0.39	-0.25	1931-ton/ueh(×)	273.15	825.90 ± 0.30	-0.07	1941-col(×)
211.12	886.03 ± 0.39	-0.62	1931-ton/ueh(×)	293.15	805.00 ± 0.30	-0.38	1941-col ¹⁾
212.91	884.79 ± 0.38	-0.18	1931-ton/ueh(×)	313.15	784.20 ± 0.30	-0.10	1941-col ¹⁾
217.80	880.09 ± 0.38	-0.26	1931-ton/ueh(×)	333.15	763.50 ± 0.30	0.78	1941-col(×)
222.79	875.19 ± 0.38	-0.41	1931-ton/ueh(×)	298.25	799.40 ± 0.40	-0.65	1943-fri/har ¹⁾
227.78	870.54 ± 0.37	-0.28	1931-ton/ueh(×)	313.15	783.20 ± 0.40	-1.10	1943-fri/har ¹⁾

¹⁾ Not included in Fig. 1.

cont.

Table 2. (cont.)

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
328.05	767.30 ± 0.40	-0.97	1943-fri/har(×)	303.15	794.45 ± 0.25	-0.45	1978-sre/nai ¹⁾
343.05	751.10 ± 0.40	-0.76	1943-fri/har(×)	313.15	786.16 ± 0.25	1.86	1978-sre/nai(×)
283.15	815.70 ± 0.25	-0.04	1949-lag/mcm(×)	303.15	794.45 ± 0.20	-0.45	1982-dha/nar(○)
293.15	805.30 ± 0.25	-0.08	1949-lag/mcm ¹⁾	298.15	799.64 ± 0.30	-0.52	1984-cre/com ¹⁾
303.15	794.60 ± 0.25	-0.30	1949-lag/mcm ¹⁾	308.15	789.13 ± 0.30	-0.49	1984-cre/com ¹⁾
313.15	784.30 ± 0.25	-0.00	1949-lag/mcm(×)	323.15	773.16 ± 0.30	-0.41	1984-cre/com(×)
323.15	773.20 ± 0.25	-0.37	1949-lag/mcm(×)	298.15	799.91 ± 0.10	-0.25	1984-len/wic(□)
300.04	798.82 ± 0.20	0.65	1954-gri/jes(◆)	283.15	816.89 ± 0.37	1.15	1985-cos/pat(×)
300.04	798.83 ± 0.20	0.66	1954-gri/jes(◆)	298.15	801.72 ± 0.36	1.56	1985-cos/pat ¹⁾
303.12	795.57 ± 0.20	0.64	1954-gri/jes(◆)	313.15	785.14 ± 0.34	0.84	1985-cos/pat ¹⁾
303.12	795.55 ± 0.20	0.62	1954-gri/jes(◆)	293.15	804.82 ± 0.20	-0.56	1986-dal/las(Δ)
223.15	877.90 ± 0.30	2.64	1973-ter/kru(×)	303.15	794.39 ± 0.30	-0.51	1986-red ¹⁾
233.15	867.60 ± 0.30	1.95	1973-ter/kru(×)	313.15	784.41 ± 0.20	0.11	1986-red(∇)
243.15	857.30 ± 0.30	1.39	1973-ter/kru(×)	298.15	799.50 ± 0.30	-0.66	1988-rao/red ¹⁾
253.15	847.00 ± 0.30	0.95	1973-ter/kru(×)	308.15	789.50 ± 0.30	-0.12	1988-rao/red ¹⁾
263.15	836.60 ± 0.30	0.53	1973-ter/kru(×)	318.15	779.00 ± 0.30	0.05	1988-rao/red(×)
273.15	826.20 ± 0.30	0.23	1973-ter/kru(×)				

¹⁾ Not included in Fig. 1.

Further references: [1866-fra/dup, 1871-gri-1, 1890-gar, 1893-eyk, 1893-tho/jon, 1906-mar, 1910-eis, 1914-low, 1916-fra/coh, 1924-loc, 1926-mat, 1927-sui/pol, 1928-car/adk, 1931-pfe/adk, 1936-ceu, 1936-tom, 1940-cow/jef, 1940-gin/plo, 1940-moo/ren, 1940-sch/ipa, 1941-suh/kle, 1942-boe/han-1, 1942-owe/qua, 1947-bou/nic, 1949-dre/mar, 1951-ami/wei, 1951-ran/mck, 1951-str/boy, 1952-coo, 1952-oth/chu, 1953-par/cha, 1954-doo, 1954-jon/mcc, 1954-skr/mur, 1956-baw/hil, 1957-mur/las, 1957-rao/rao, 1963-jef, 1965-ari/mor, 1967-mur/rao, 1968-ano, 1971-tha/rao, 1972-had/edm, 1973-gei/qui, 1975-gro/ben, 1975-mus/ver, 1978-rou/per, 1979-cha/ses, 1979-sub/rao, 1980-mes/doy-3, 1981-nai/nai, 1981-oht/koy, 1984-bau/mee, 1984-gro/ben, 1986-cel/cam, 1986-gok/raj, 1986-kar/cam, 1986-nau/wag, 1986-sue/gei, 1987-man/ami, 1988-fer/lap, 1988-kai/abb, 1988-kal/abb, 1988-man/ami, 1988-rat/pal, 1989-sch/ake, 1990-kat/yam, 1991-yos/kat, 1992-lee/wei, 1992-qin/hof-1, 1992-qin/hof-2, 1992-tan/mur, 1993-com/fra, 1994-toj/ram, 1994-ven/ven, 1995-com/fra, 1995-com/fra-2, 1995-com/fra-4, 1995-pet/gas].

Table 3. Recommended values (fit to the reliable experimental values according to the equations

$$\rho = A + BT + CT^2 + DT^3 + \dots \text{ or } \rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4].$$

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
190.00	906.23 ± 0.48	260.00	839.23 ± 0.28	310.00	787.65 ± 0.25
200.00	897.03 ± 0.46	270.00	829.16 ± 0.25	320.00	776.97 ± 0.29
210.00	887.71 ± 0.44	280.00	818.97 ± 0.23	330.00	766.15 ± 0.37
220.00	878.26 ± 0.41	290.00	808.66 ± 0.22	340.00	755.22 ± 0.47
230.00	868.69 ± 0.38	293.15	805.38 ± 0.22	350.00	744.16 ± 0.60
240.00	858.99 ± 0.35	298.15	800.16 ± 0.22		
250.00	849.17 ± 0.31	300.00	798.22 ± 0.22		

cont.

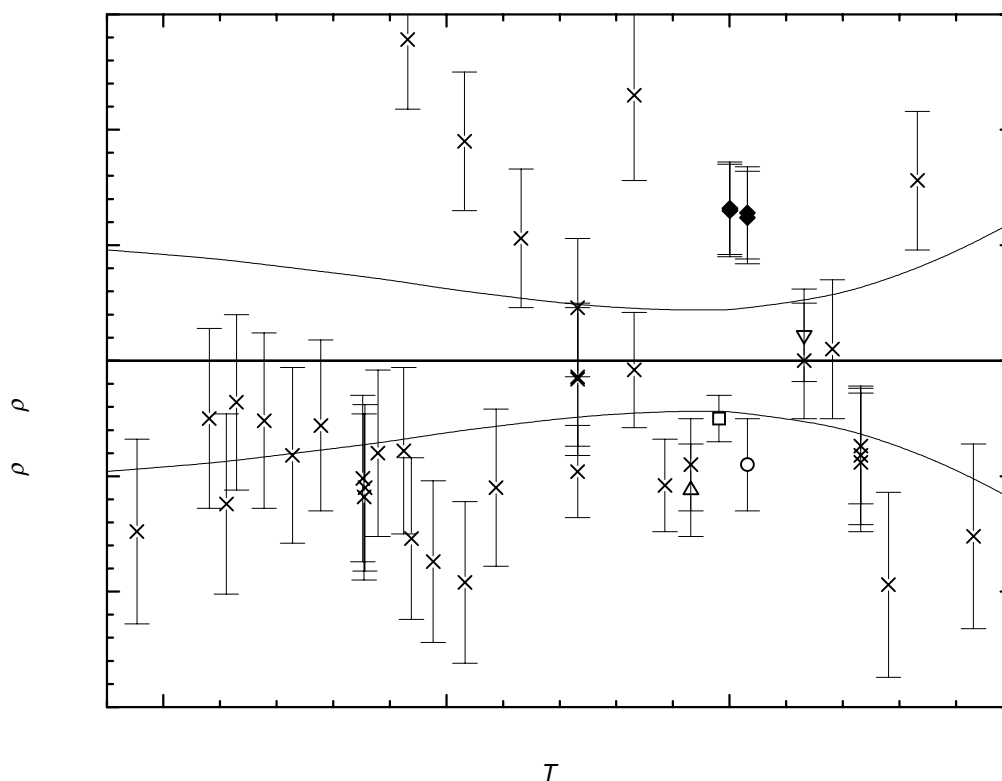
Butanone (cont.)

Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

3-Methyl-2-butanone

[563-80-4]

C₅H₁₀O

MW = 86.13

165

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 9.4619 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 9.6077 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 283.15 to 323.15 K
	$\rho = A + BT + CT^2 + DT^3 + \dots$
A	$7.67792 \cdot 10^2$
B	1.20429
C	$-3.57158 \cdot 10^{-3}$

cont.

Table 2. Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
288.15	815.00 ± 2.00	-3.26	1927-sui/pol(Δ)	323.15	784.70 ± 0.50	0.71	1937-rin/say(\circ)
283.15	823.90 ± 0.50	1.46	1937-rin/say(\circ)	303.15	805.18 ± 0.30	0.54	1996-ven/rao(\square)
303.15	805.20 ± 0.50	0.56	1937-rin/say(\circ)				

Further references: [1866-fra/dup-1, 1876-mun, 1878-win, 1878-wis, 1890-gar, 1910-eis, 1940-gin/plo, 1950-mea/foo, 1952-coo, 1990-fer/lap].

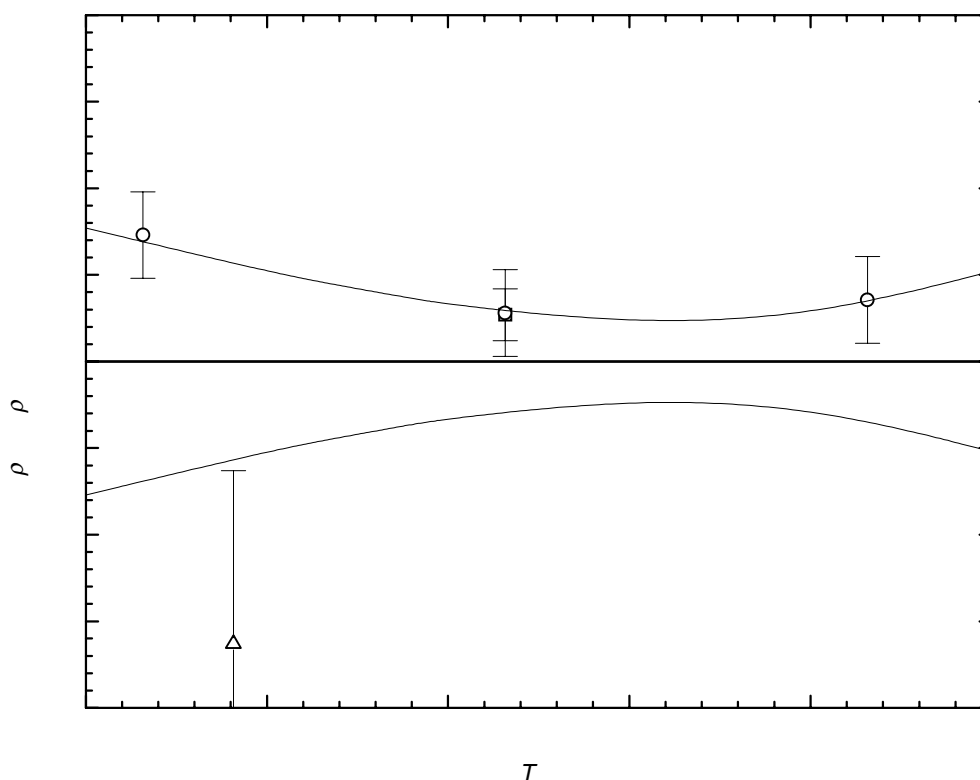


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

Table 3. Recommended values (fit to the reliable experimental values according to the equations

$$\rho = A + BT + CT^2 + DT^3 + \dots \text{ or } \rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4].$$

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	824.98 ± 1.54	298.15	809.36 ± 0.72	320.00	787.44 ± 0.51
290.00	816.67 ± 1.04	300.00	807.64 ± 0.66	330.00	776.26 ± 1.04
293.15	813.90 ± 0.91	310.00	797.89 ± 0.43		

2-Pentanone

[107-87-9]

C₅H₁₀O

MW = 86.13

166

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 8.4196 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.7158 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 233.15 to 353.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	0 1.09681 · 10 ³
B	-9.80885 · 10 ⁻¹
C	-2.75038 · 10 ⁻⁵

Table 2. Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	826.10 ± 0.60	-0.73	1913-mor/sto(×)	333.15	767.00 ± 0.40	0.03	1941-col(×)
303.15	797.70 ± 0.60	0.78	1913-mor/sto ¹⁾	353.15	746.10 ± 0.40	-0.88	1941-col(×)
326.65	774.50 ± 0.60	1.03	1913-mor/sto(×)	273.15	826.10 ± 0.40	-0.73	1960-wri(×)
288.15	811.28 ± 0.30	-0.60	1936-ceu(∇)	273.15	826.10 ± 0.50	-0.73	1961-wri(×)
303.15	796.54 ± 0.30	-0.38	1936-ceu(∇)	288.15	811.23 ± 0.20	-0.65	1972-bon/pik(□)
293.15	808.90 ± 0.50	2.00	1940-cow/jef ¹⁾	293.15	809.00 ± 0.40	2.10	1973-sch/nar(×)
313.65	787.00 ± 0.50	0.55	1940-cow/jef(×)	298.15	801.63 ± 0.30	-0.28	1975-gro/ben(Δ)
333.95	767.30 ± 0.50	1.13	1940-cow/jef(×)	303.15	796.60 ± 0.30	-0.32	1978-sre/nai(◆)
233.15	866.20 ± 0.40	-0.42	1941-col(×)	313.15	785.49 ± 0.30	-1.46	1978-sre/nai(◆)
253.15	847.00 ± 0.40	0.27	1941-col(×)	303.15	796.60 ± 0.20	-0.32	1982-dha/nar(○)
273.15	827.00 ± 0.40	0.17	1941-col(×)	298.15	801.40 ± 0.30	-0.51	1993-com/fra(×)
293.15	807.20 ± 0.40	0.30	1941-col(×)	298.15	801.76 ± 0.30	-0.15	1995-com/fra-2(×)
313.15	787.30 ± 0.40	0.35	1941-col(×)	303.15	796.53 ± 0.30	-0.39	1996-ven/rao(×)

¹⁾ Not included in Fig. 1.

Further references: [1866-fra/dup, 1884-cha, 1884-per, 1890-gar, 1893-ram/shi-3, 1893-tho/jon, 1910-eis, 1917-jae, 1927-sui/pol, 1934-fav/chi, 1936-tom, 1940-gin/plo, 1940-sch/ipa, 1942-owe/qua, 1947-bre/kee, 1952-coo, 1954-doo, 1954-pom/foo-1, 1956-war/bar, 1965-shu/kar, 1966-mey/wag, 1968-ano, 1988-gar/cob, 1990-lu /ish, 1995-com/fra-4].

Table 3. Recommended values (fit to the reliable experimental values according to the equations

$$\rho = A + BT + CT^2 + DT^3 + \dots \text{ or } \rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$$

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
230.00	869.75 ± 0.62	290.00	810.04 ± 0.36	330.00	770.12 ± 0.44
240.00	859.81 ± 0.56	293.15	806.90 ± 0.35	340.00	760.13 ± 0.54
250.00	849.87 ± 0.51	298.15	801.91 ± 0.35	350.00	750.13 ± 0.67
260.00	839.92 ± 0.47	300.00	800.07 ± 0.35	360.00	740.12 ± 0.86
270.00	829.96 ± 0.42	310.00	790.09 ± 0.35		
280.00	820.00 ± 0.39	320.00	780.11 ± 0.38		

cont.

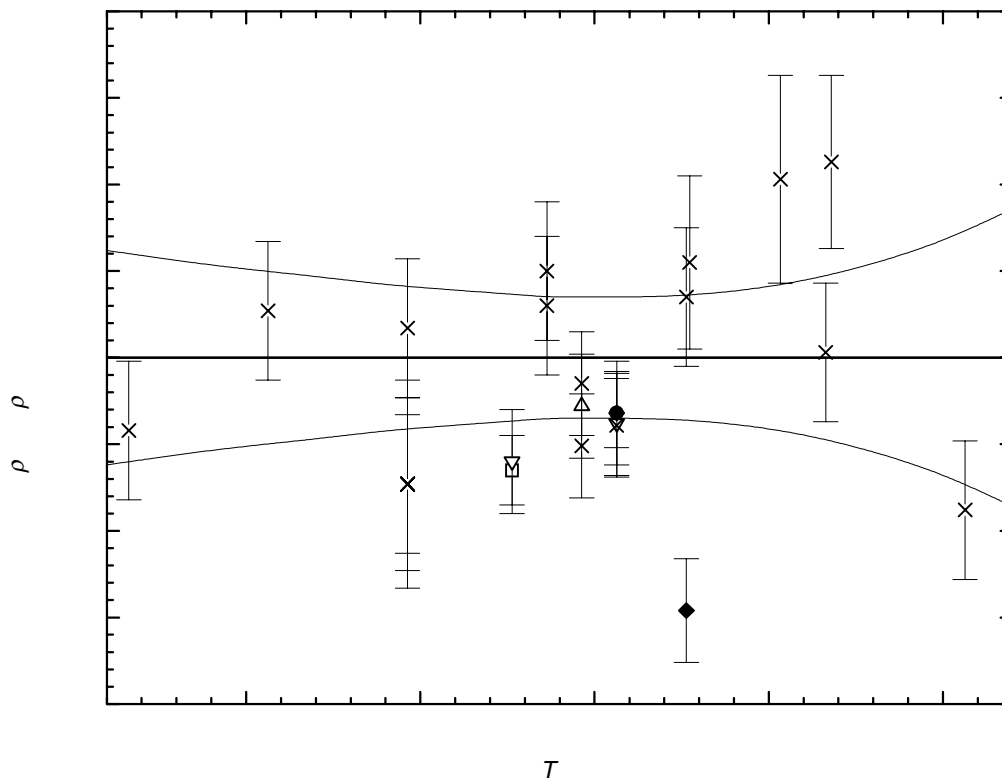


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

3-Pentanone

[96-22-0]

C₅H₁₀O

MW = 86.13

167

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{c,w} = 3.4598 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 6.8100 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	T = 253.15 to 353.15 K
	$\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.09875 \cdot 10^3$
B	$-9.45548 \cdot 10^{-1}$
C	$-8.21619 \cdot 10^{-5}$

cont.

3-Pentanone (cont.)**Table 2.** Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
292.25	815.90 ± 0.40	0.50	1894-bru-1(×)	293.15	814.38 ± 0.20	-0.12	1949-dre/mar(□)
289.75	817.48 ± 0.40	-0.40	1910-eis(×)	298.15	809.51 ± 0.20	-0.02	1949-dre/mar(□)
285.55	823.06 ± 0.60	1.01	1911-sch ¹⁾	293.15	814.50 ± 0.30	-0.00	1952-coo(×)
307.15	801.74 ± 0.60	1.16	1911-sch ¹⁾	303.15	804.55 ± 0.30	-0.01	1978-sre/nai(×)
307.35	801.74 ± 0.60	1.36	1911-sch ¹⁾	313.15	794.79 ± 0.30	0.19	1978-sre/nai(×)
347.45	760.28 ± 0.60	-0.02	1911-sch(×)	303.15	804.55 ± 0.20	-0.01	1982-dha/nar(○)
273.15	833.51 ± 0.30	-0.84	1932-tim/hen(×)	293.15	814.20 ± 0.30	-0.30	1988-bag/gur(Δ)
288.15	819.05 ± 0.30	-0.42	1932-tim/hen(×)	303.15	804.50 ± 0.30	-0.06	1988-bag/gur(Δ)
303.15	804.59 ± 0.30	0.03	1932-tim/hen(×)	313.15	794.60 ± 0.30	0.00	1988-bag/gur(Δ)
253.15	854.80 ± 0.40	0.68	1941-col(×)	323.15	784.50 ± 0.30	-0.12	1988-bag/gur(Δ)
273.15	835.00 ± 0.40	0.65	1941-col(×)	333.15	772.00 ± 0.30	-2.62	1988-bag/gur ¹⁾
293.15	814.90 ± 0.40	0.40	1941-col ¹⁾	343.15	761.40 ± 0.30	-3.21	1988-bag/gur ¹⁾
313.15	794.90 ± 0.40	0.30	1941-col(×)	298.15	809.50 ± 0.40	-0.03	1988-gar/cob ¹⁾
333.15	774.30 ± 0.40	-0.32	1941-col(×)	298.15	809.60 ± 0.30	0.07	1988-rao/red(◆)
353.15	754.10 ± 0.40	-0.48	1941-col(×)	308.15	799.72 ± 0.30	0.14	1988-rao/red(◆)
297.95	809.70 ± 0.50	-0.03	1942-owe/qua ¹⁾	318.15	790.03 ± 0.30	0.42	1988-rao/red(◆)
308.00	800.00 ± 0.50	0.27	1942-owe/qua ¹⁾	298.15	809.32 ± 0.30	-0.21	1990-fer/lap(×)
323.30	784.80 ± 0.50	0.33	1942-owe/qua(×)	303.15	804.58 ± 0.30	0.02	1996-ven/rao(V)

¹⁾ Not included in Fig. 1.

Further references: [1884-cha, 1890-gar, 1893-eyk, 1893-tho/jon, 1916-ric/shi, 1919-eyk, 1928-car/adk, 1934-car/jon, 1936-tom, 1940-cow/jef, 1940-gin/plo, 1941-suh/kle, 1956-shu/bel, 1957-wid/phi, 1996-res/ech].

Table 3. Recommended values (fit to the reliable experimental values according to the equations

$$\rho = A + BT + CT^2 + DT^3 + \dots \text{ or } \rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$$

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
250.00	857.23 ± 0.56	293.15	814.50 ± 0.31	330.00	777.77 ± 0.39
260.00	847.36 ± 0.48	298.15	809.53 ± 0.30	340.00	767.77 ± 0.51
270.00	837.46 ± 0.41	300.00	807.69 ± 0.29	350.00	757.75 ± 0.68
280.00	827.56 ± 0.36	310.00	797.74 ± 0.30	360.00	747.71 ± 0.90
290.00	817.63 ± 0.32	320.00	787.76 ± 0.33		

cont.

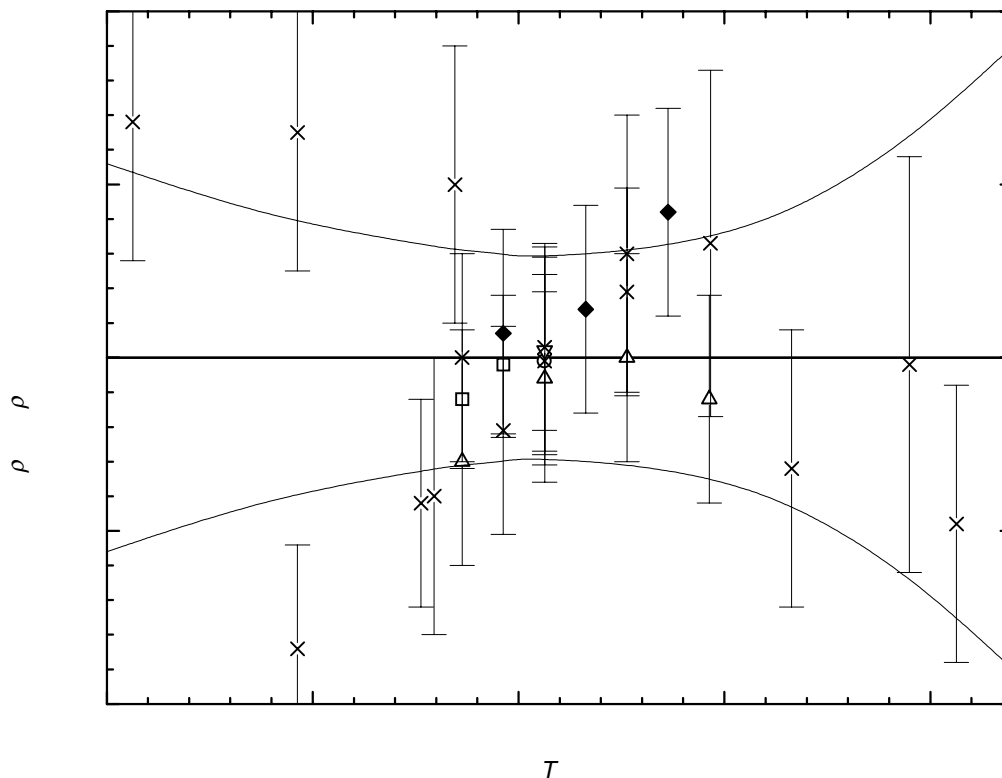


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

3,3-Dimethyl-2-butanone

[75-97-8]

C₆H₁₂O

MW = 100.16

168

Table 1. Fit with estimated B coefficient for 7 accepted points. Deviation $\sigma_w = 0.694$.

Coefficient	$\rho = A + BT$
A	1080.90
B	-0.940

Table 2. Experimental values with uncertainties and deviation from calculated values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg·m ⁻³	Ref.	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg·m ⁻³	Ref.
289.15	799.1 ± 3.0	-10.00	1860-fit ¹⁾	293.15	805.7 ± 0.5	0.36	1952-coo
323.15	782.0 ± 3.0	4.86	1874-but-1 ¹⁾	298.15	801.0 ± 0.5	0.36	1952-coo
378.65	721.7 ± 3.0	-3.27	1886-sch ¹⁾	293.15	805.7 ± 0.5	0.36	1960-pet/sok
293.15	811.4 ± 3.0	6.06	1914-low ¹⁾	273.15	826.2 ± 2.0	2.06	1960-wri
298.15	804.3 ± 3.0	3.68	1931-pfe/adk ¹⁾	273.15	826.2 ± 2.0	2.06	1961-wri
298.15	801.2 ± 1.0	0.56	1940-gin/plo	293.15	804.4 ± 0.4	-0.94	1973-gei/qui

¹⁾ Not included in calculation of linear coefficients.

cont.

3,3-Dimethyl-2-butanone (cont.)**Table 3.** Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	827.1 \pm 1.5
280.00	817.7 \pm 1.1
290.00	808.3 \pm 0.9
293.15	805.3 \pm 0.9
298.15	800.6 \pm 0.9

2-Hexanone

[591-78-6]

C₆H₁₂O

MW = 100.16

169

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{\text{c,w}} = 7.9222 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.3635 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 358.75 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.07588 \cdot 10^3$
B	$-9.01812 \cdot 10^{-1}$

Table 2. Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	829.70 \pm 1.00	0.15	1865-erl/wan(×)	298.15	807.20 \pm 0.50	0.19	1940-gin/plo(×)
288.15	817.40 \pm 0.60	1.38	1927-sui/pol(×)	293.15	811.80 \pm 0.50	0.29	1943-hen/hil(×)
288.15	815.79 \pm 0.30	-0.23	1936-ceu(○)	293.15	811.80 \pm 0.40	0.29	1952-coo(×)
303.15	802.18 \pm 0.30	-0.32	1936-ceu(○)	293.15	811.10 \pm 0.60	-0.41	1954-doo(×)
283.15	819.80 \pm 0.60	-0.73	1937-rin/say(×)	298.15	807.25 \pm 0.15	0.24	1985-ort/paz(×)
303.15	802.50 \pm 0.60	0.00	1937-rin/say(×)	298.15	807.14 \pm 0.35	0.13	1988-fer/lap(◆)
323.15	784.50 \pm 0.60	0.04	1937-rin/say(×)	298.15	807.14 \pm 0.30	0.13	1990-fer/lap(Δ)
298.15	807.70 \pm 0.50	0.69	1938-tho/cam(×)	298.15	806.74 \pm 0.30	-0.27	1995-com/fra(∇)
293.15	809.50 \pm 0.50	-2.01	1940-cow/jef(×)	298.15	807.26 \pm 0.30	0.25	1995-com/fra-2(□)
333.65	775.00 \pm 0.50	0.01	1940-cow/jef(×)	298.15	807.23 \pm 0.40	0.22	1995-com/fra-4(×)
358.75	752.30 \pm 0.50	-0.06	1940-cow/jef(×)				

Further references: [1890-gar, 1903-mou/del, 1940-sch/ipa, 1942-owe/qua, 1954-jon/mcc, 1963-kup/pet, 1965-shu/kar].

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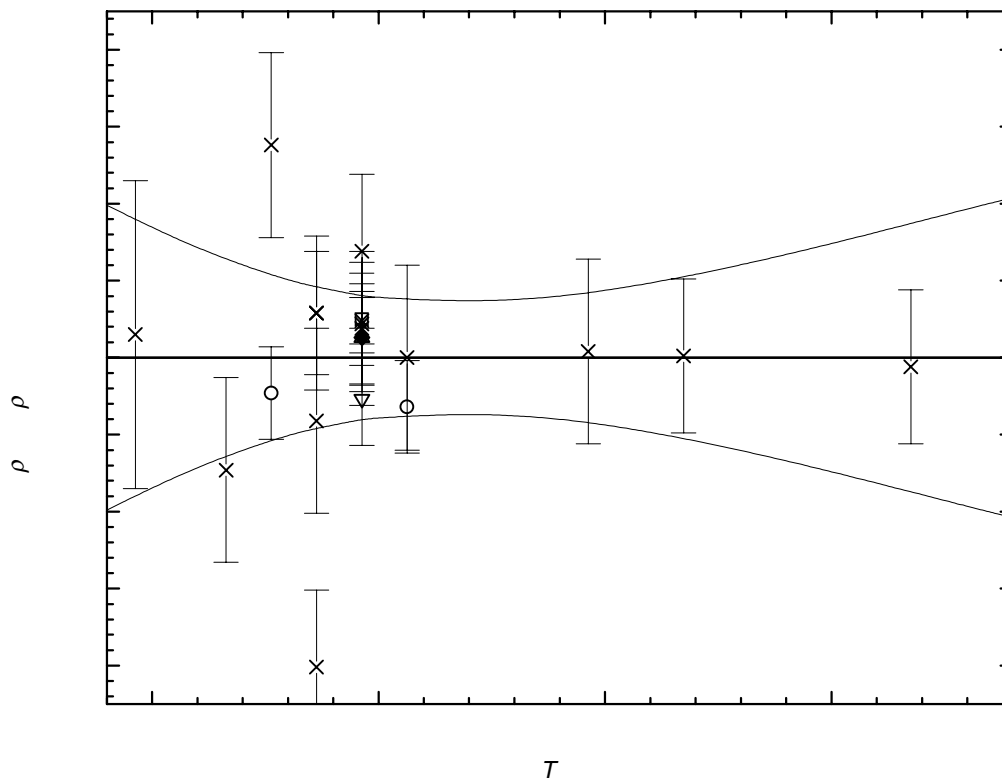


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

Table 3. Recommended values (fit to the reliable experimental values according to the equations $\rho = A + BT + CT^2 + DT^3 + \dots$ or $\rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$).

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	832.39 ± 0.99	300.00	805.34 ± 0.39	350.00	760.25 ± 0.74
280.00	823.37 ± 0.70	310.00	796.32 ± 0.36	360.00	751.23 ± 0.89
290.00	814.36 ± 0.50	320.00	787.30 ± 0.39	370.00	742.21 ± 1.04
293.15	811.51 ± 0.46	330.00	778.28 ± 0.48		
298.15	807.01 ± 0.40	340.00	769.26 ± 0.60		

3-Hexanone**[589-38-8]****MW = 100.16****170****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{c,w} = 1.6861$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 3.3384 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 359.45 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.08553 \cdot 10^3$
B	$-9.22306 \cdot 10^{-1}$

Table 2. Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	833.00 ± 1.00	-0.61	1876-dec(Δ)	298.15	811.10 ± 0.50	0.55	1940-gin/plo(\times)
294.95	813.03 ± 1.00	-0.47	1876-dec(Δ)	297.95	811.30 ± 0.50	0.57	1942-owe/qua(\square)
295.15	814.89 ± 1.00	1.58	1910-eis(∇)	308.00	802.10 ± 0.50	0.64	1942-owe/qua(\square)
293.15	811.80 ± 0.50	-3.36	1940-cow/jef(\times)	323.30	787.70 ± 0.50	0.35	1942-owe/qua(\square)
314.65	794.50 ± 0.50	-0.83	1940-cow/jef(\times)	293.15	814.80 ± 2.00	-0.36	1956-shu/bel(\times)
335.25	776.10 ± 0.50	-0.23	1940-cow/jef(\times)	293.15	816.00 ± 2.00	0.84	1956-shu/bel(\times)
359.45	753.60 ± 0.50	-0.41	1940-cow/jef(\times)	293.15	816.90 ± 1.00	1.74	1965-shu/kar(\blacklozenge)

Further references: [1919-eyk, 1927-sui/pol].**Table 3.** Recommended values (fit to the reliable experimental values according to the equations

$$\rho = A + BT + CT^2 + DT^3 + \dots \text{ or } \rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$$

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	836.51 ± 1.25	300.00	808.84 ± 0.92	350.00	762.73 ± 0.47
280.00	827.29 ± 1.20	310.00	799.62 ± 0.70	360.00	753.50 ± 0.73
290.00	818.06 ± 1.08	320.00	790.40 ± 0.50	370.00	744.28 ± 1.21
293.15	815.16 ± 1.04	330.00	781.17 ± 0.37		
298.15	810.55 ± 0.95	340.00	771.95 ± 0.36		

cont.

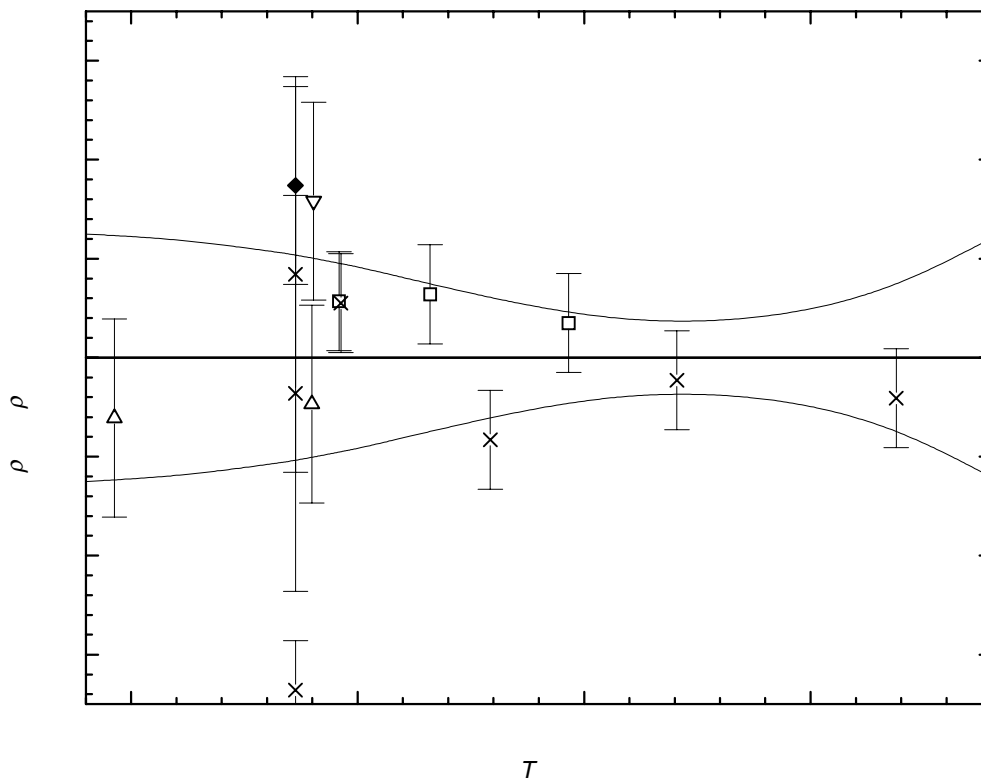


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

2-Methyl-3-pentanone

[565-69-5]

C₆H₁₂O

MW = 100.16

171

Table 1. Fit with estimated B coefficient for 5 accepted points. Deviation $\sigma_w = 0.332$.

Coefficient	$\rho = A + BT$
A	1074.84
B	-0.900

Table 2. Experimental values with uncertainties and deviation from calculated values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg · m ⁻³	Ref.
273.15	830.0 ± 2.0	0.99	1891-wag
291.15	814.0 ± 2.0	1.19	1891-wag
298.15	805.9 ± 0.6	-0.61	1940-gin/plo
293.15	811.1 ± 0.4	0.09	1970-sel
298.15	806.6 ± 0.4	0.09	1970-sel

cont.

2-Methyl-3-pentanone (cont.)**Table 3.** Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³
270.00	831.8 ± 1.6
280.00	822.8 ± 1.3
290.00	813.8 ± 1.1
293.15	811.0 ± 1.0
298.15	806.5 ± 1.0

3-Methyl-2-pentanone

[565-61-7]

C₆H₁₂O

MW = 100.16

172

Table 1. Fit with estimated B coefficient for 6 accepted points. Deviation $\sigma_w = 0.299$.

Coefficient	$\rho = A + BT$
A	1091.74
B	-0.950

Table 2. Experimental values with uncertainties and deviation from calculated values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg · m ⁻³	Ref.	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg · m ⁻³	Ref.
287.65	818.1 ± 2.0	-0.37	1883-wis	298.15	808.3 ± 0.5	-0.20	1940-gin/plo
293.15	813.2 ± 1.0	-0.05	1890-gar	293.15	813.1 ± 0.5	-0.15	1952-coo
291.15	814.5 ± 1.0	-0.65	1901-zel/zet	293.15	813.6 ± 0.4	0.35	1973-gei/qui
298.15	812.0 ± 3.0	3.50	1935-dra/vei ¹⁾				

¹⁾ Not included in calculation of linear coefficients.**Table 3.** Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³
280.00	825.7 ± 1.6
290.00	816.2 ± 0.9
293.15	813.2 ± 0.8
298.15	808.5 ± 0.9

4-Methyl-2-pentanone**[108-10-1]****C₆H₁₂O****MW = 100.16****173****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):
 $\sigma_{c,w} = 7.3255 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.3101 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 253.15 to 373.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.07407 \cdot 10^3$
B	$-9.25461 \cdot 10^{-1}$
C	$-1.97675 \cdot 10^{-5}$

Table 2. Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	819.40 ± 0.70	-0.41	1891-wag(×)	373.15	725.10 ± 0.40	-0.89	1952-fug/bow(∇)
292.15	803.30 ± 0.70	1.29	1891-wag ¹⁾	303.15	791.90 ± 0.50	0.20	1973-dak/rao ¹⁾
283.15	809.40 ± 0.60	-1.05	1937-rin/say(×)	313.15	782.70 ± 0.50	0.37	1973-dak/rao ¹⁾
303.15	792.20 ± 0.60	0.50	1937-rin/say ¹⁾	323.15	773.90 ± 0.50	0.95	1973-dak/rao(×)
323.15	773.60 ± 0.60	0.65	1937-rin/say(×)	333.15	764.50 ± 0.50	0.94	1973-dak/rao(×)
293.15	797.80 ± 0.50	-3.28	1940-cow/jef ¹⁾	293.15	799.70 ± 0.40	-1.38	1973-gei/qui(◆)
334.65	763.10 ± 0.50	0.94	1940-cow/jef(×)	293.15	800.90 ± 0.40	-0.18	1976-bul/pro(×)
359.75	740.20 ± 0.50	1.62	1940-cow/jef(×)	293.15	799.50 ± 0.40	-1.58	1976-haf/har(×)
253.15	840.20 ± 0.50	1.67	1941-col(×)	298.15	795.90 ± 0.40	-0.49	1976-haf/har ¹⁾
273.15	821.40 ± 0.50	1.59	1941-col(×)	308.15	787.30 ± 0.40	0.28	1976-haf/har(×)
293.15	802.10 ± 0.50	1.02	1941-col ¹⁾	318.15	778.00 ± 0.40	0.36	1976-haf/har(×)
313.15	783.10 ± 0.50	0.77	1941-col ¹⁾	293.15	801.00 ± 0.40	-0.08	1980-rig/upe(×)
333.15	763.80 ± 0.50	0.24	1941-col(×)	298.15	796.30 ± 0.40	-0.09	1980-rig/upe ¹⁾
353.15	744.40 ± 0.50	-0.38	1941-col(×)	303.15	792.00 ± 0.40	0.30	1980-rig/upe(×)
373.15	725.00 ± 0.50	-0.99	1941-col(×)	308.15	786.80 ± 0.40	-0.22	1980-rig/upe(×)
273.15	818.80 ± 0.50	-1.01	1946-sch/eva(×)	298.15	796.30 ± 0.30	-0.09	1986-rig/mar(×)
288.15	805.20 ± 0.50	-0.56	1946-sch/eva(×)	303.15	792.00 ± 0.30	0.30	1986-rig/mar(×)
293.15	800.60 ± 0.50	-0.48	1946-sch/eva ¹⁾	308.15	786.60 ± 0.30	-0.42	1986-rig/mar(×)
298.15	796.10 ± 0.50	-0.29	1946-sch/eva ¹⁾	313.15	782.60 ± 0.30	0.27	1986-rig/mar(×)
303.15	791.40 ± 0.50	-0.30	1946-sch/eva ¹⁾	298.15	796.53 ± 0.30	0.14	1988-rao/red(□)
293.15	800.80 ± 0.30	-0.28	1952-fug/bow(∇)	308.15	787.02 ± 0.30	0.00	1988-rao/red(□)
313.15	782.30 ± 0.30	-0.03	1952-fug/bow(∇)	318.15	777.57 ± 0.30	-0.07	1988-rao/red(□)
333.15	763.60 ± 0.30	0.04	1952-fug/bow(∇)	298.15	796.30 ± 0.30	-0.09	1989-sol/mar(Δ)
353.15	744.50 ± 0.40	-0.28	1952-fug/bow(∇)	298.15	796.07 ± 0.30	-0.32	1996-ven/rao(○)

¹⁾ Not included in Fig. 1.

Further references: [1910-eis, 1910-ski/rit, 1914-vav, 1940-gin/plo, 1951-kar/bow, 1952-coo, 1954-doo, 1958-bra, 1962-nar/red, 1968-ana/rao, 1968-ano, 1972-dak/chi, 1979-sub/rao, 1985-chi/lin, 1986-ash/sri, 1986-raj/fin].

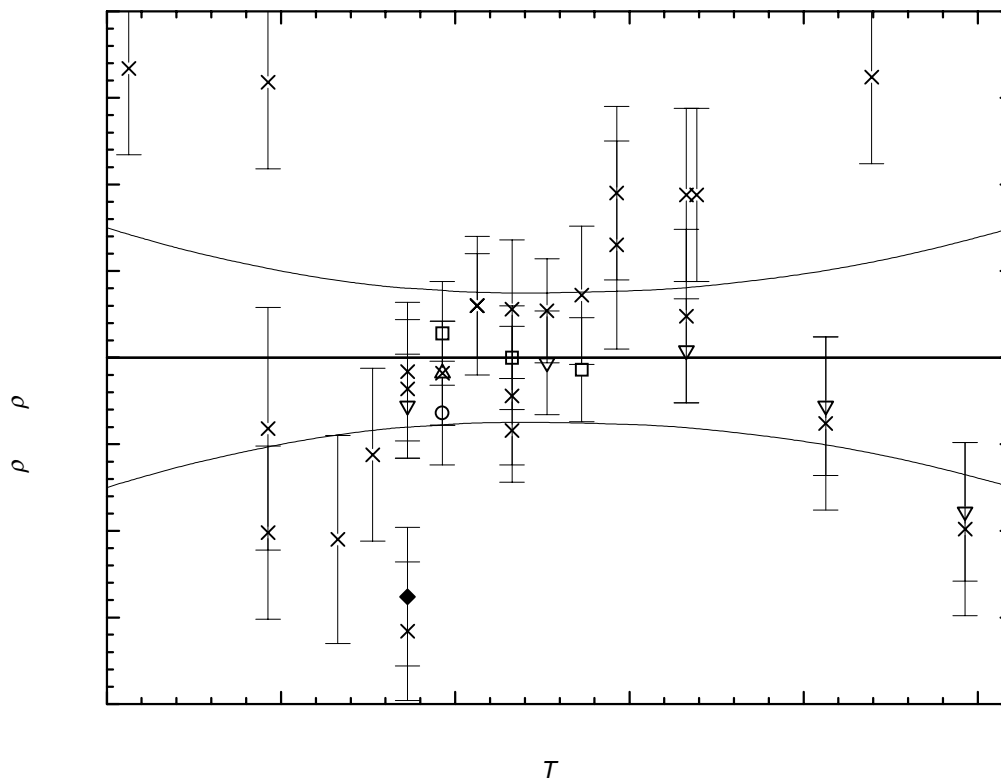


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the symbols are omitted for clarity of the figure.)

Table 3. Recommended values (fit to the reliable experimental values according to the equations $\rho = A + BT + CT^2 + DT^3 + \dots$ or $\rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$).

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
250.00	841.47 ± 0.75	298.15	796.39 ± 0.39	350.00	747.74 ± 0.48
260.00	832.12 ± 0.63	300.00	794.66 ± 0.38	360.00	738.35 ± 0.55
270.00	822.76 ± 0.54	310.00	785.28 ± 0.37	370.00	728.95 ± 0.64
280.00	813.40 ± 0.46	320.00	775.90 ± 0.38	380.00	719.55 ± 0.75
290.00	804.03 ± 0.41	330.00	766.52 ± 0.39		
293.15	801.08 ± 0.40	340.00	757.13 ± 0.43		