

3. Tabulated Data on Density - Aldehydes

3.1 Saturated Aldehydes

Methanal [50-00-0] **CH₂O** **MW = 30.03** **102**

Table 1. Experimental values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	Ref.
293.15	815.0 ± 2.0	1958-ano -3
293.15	814.0 ± 2.0	1968-ano
293.15	815.3 ± 2.0	1892-kek

Ethanal [75-07-0] **C₂H₄O** **MW = 44.05** **103**

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{\text{c,w}} = 6.1511 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.2018 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 268.15 \text{ to } 298.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$1.43477 \cdot 10^3$
<i>B</i>	-3.18247
<i>C</i>	$3.21603 \cdot 10^{-3}$

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. (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)
<i>crystal</i>				281.35	793.60 ± 0.50	-0.36	1944-fri/har-2(○)
78.15	1140.0 ± 3.0		1930-bil/fis-1	285.35	788.50 ± 0.50	-0.02	1944-fri/har-2(○)
<i>liquid</i>				289.35	782.90 ± 0.50	-0.28	1944-fri/har-2(○)
268.15	813.09 ± 1.00	0.45	1887-per-1(×)	293.45	777.30 ± 0.50	-0.52	1944-fri/har-2(○)
273.15	805.58 ± 1.00	0.15	1887-per-1(×)	273.15	805.40 ± 0.50	-0.03	1949-col/dev(□)
277.15	800.55 ± 1.00	0.77	1887-per-1(×)	298.15	772.00 ± 0.50	0.20	1949-col/dev(□)
281.15	795.17 ± 1.00	0.94	1887-per-1(×)	273.15	804.50 ± 0.60	-0.93	1951-smi/bon(Δ)
286.15	788.23 ± 1.00	0.79	1887-per-1(×)	284.15	790.10 ± 0.60	-0.04	1951-smi/bon(Δ)
273.15	805.60 ± 1.00	0.17	1922-gil(×)	288.15	784.60 ± 0.60	-0.17	1951-smi/bon(Δ)
289.15	783.90 ± 1.00	0.45	1922-gil(×)	293.15	778.00 ± 0.60	-0.21	1951-smi/bon(Δ)
273.25	804.80 ± 0.50	-0.49	1944-fri/har-2(○)	293.15	778.70 ± 0.60	0.49	1958-ano-3(◆)
277.55	799.00 ± 0.50	-0.22	1944-fri/har-2(○)	293.15	777.10 ± 0.60	-1.11	1968-ano(V)

cont.

Ethanal (cont.)

Further references: [1848-kop, 1854-kop, 1864-lan, 1881-pri/han, 1884-per, 1906-car/fer, 1906-wal-1, 1911-del, 1922-maa/boo, 1932-hat/kay, 1934-str/mac, 1938-coo/par].

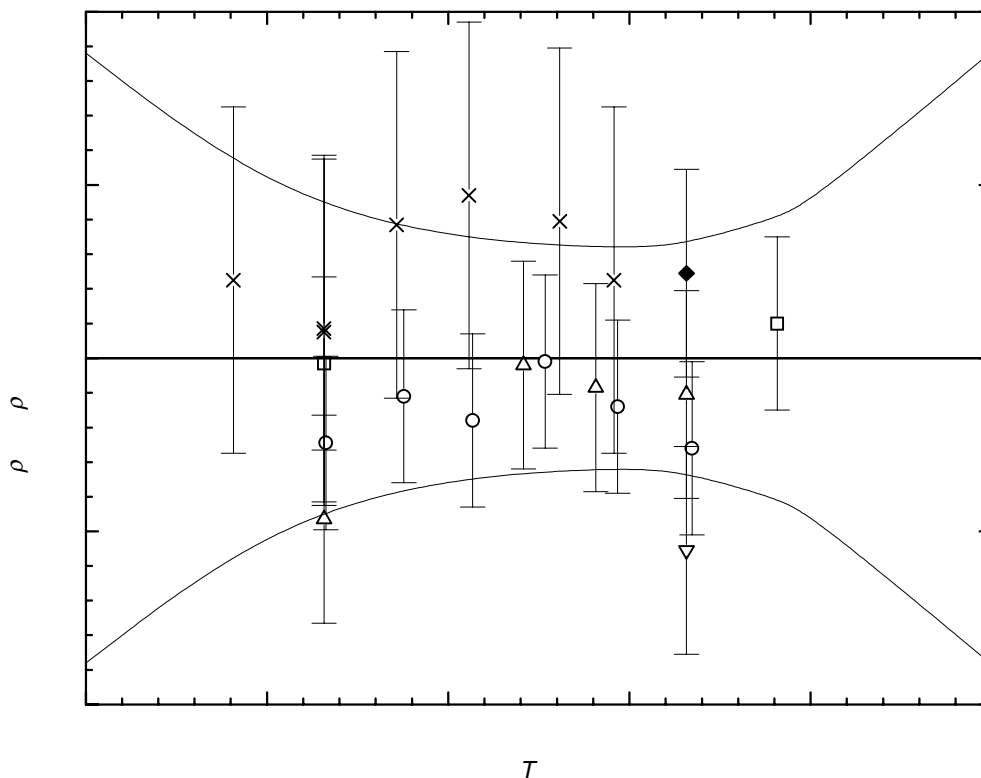


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the 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 $\rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$).

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
260.00	824.74 ± 1.76	290.00	782.33 ± 0.63	300.00	769.48 ± 0.90
270.00	809.96 ± 0.96	293.15	778.21 ± 0.66	310.00	757.27 ± 1.77
280.00	795.82 ± 0.68	298.15	771.80 ± 0.81		

Propanal**[123-38-6]****MW = 58.08****104**

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 8.8689 \cdot 10^{-2}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 4.1390 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 303.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.21669 \cdot 10^3$
B	-1.71390
C	$9.62158 \cdot 10^{-4}$

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)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{cal}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
<i>crystal</i>				293.15	797.00 ± 0.60	0.05	1951-smi/bon(Δ)
78.15	1089.0 ± 3.0		1930-bil/fis-1	303.15	785.60 ± 0.60	0.05	1951-smi/bon(Δ)
<i>liquid</i>				293.15	797.00 ± 0.60	0.05	1956-ano-4(\circ)
273.15	820.30 ± 0.60	-0.03	1951-smi/bon(Δ)	293.15	796.90 ± 0.60	-0.05	1958-ano-3(∇)
284.15	807.40 ± 0.60	0.03	1951-smi/bon(Δ)	293.15	796.70 ± 1.00	-0.25	1968-ano(\blacklozenge)
288.15	802.90 ± 0.60	0.18	1951-smi/bon(Δ)	293.15	796.90 ± 0.30	-0.05	1984-eng/san(\square)

Further references: [1871-ros, 1872-lin/von, 1872-pie/puc, 1880-bru-3, 1881-pri/han, 1884-per, 1901-nef, 1906-wal-1, 1923-bha, 1938-coo/par, 1944-fri/har-2, 1949-dre/mar, 1952-coo, 1952-sha/whi, 1953-mck/tar, 1962-tje].

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	824.08 ± 1.06	293.15	796.95 ± 0.60	310.00	777.85 ± 1.57
280.00	812.23 ± 0.68	298.15	791.22 ± 0.69		
290.00	800.58 ± 0.59	300.00	789.12 ± 0.77		

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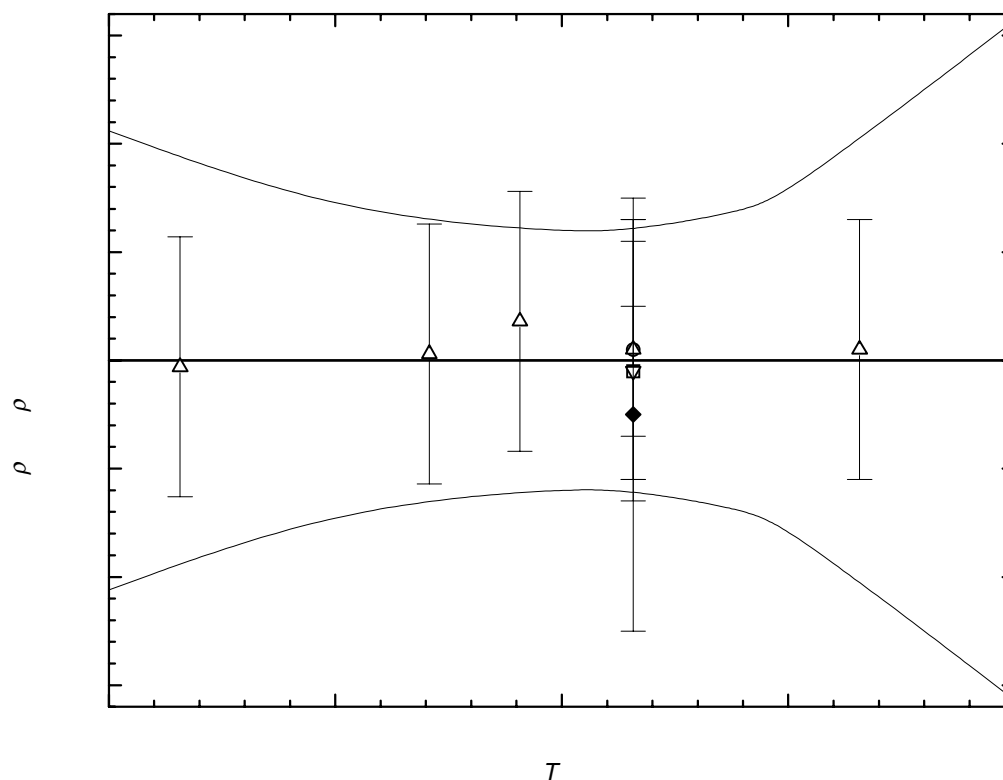
Propanal (cont.)

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.)

Butanal

[123-72-8]

 $\text{C}_4\text{H}_8\text{O}$

MW = 72.11

105

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 3.4530 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.0310 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 303.15 K
	$\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.10988 \cdot 10^3$
B	-1.05128

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)
<i>crystal</i>				303.15	791.10 ± 1.00	-0.09	1951-smi/bon(×)
78.15	1075.0 ± 3.0		1930-bil/fis-1	293.15	802.50 ± 1.00	0.80	1952-coo(×)
<i>liquid</i>				298.15	796.60 ± 0.60	0.16	1960-tje(◆)
293.15	802.20 ± 1.00	0.50	1951-bol/alb(×)	293.15	801.60 ± 0.50	-0.10	1967-dei(○)
273.15	822.30 ± 1.00	-0.43	1951-smi/bon(×)	293.15	801.20 ± 0.60	-0.50	1968-ano(▽)
284.15	811.20 ± 1.00	0.04	1951-smi/bon(×)	298.15	796.32 ± 0.30	-0.12	1985-pat/san(□)
288.15	806.90 ± 1.00	-0.06	1951-smi/bon(×)	293.15	801.60 ± 0.50	-0.10	1986-kas/kna(Δ)
293.15	801.60 ± 1.00	-0.10	1951-smi/bon(×)				

Further references: [1872-pie/puc, 1880-bru-1, 1927-har/adk, 1938-coo/par, 1938-dol/gre, 1944-fri/har-2, 1950-gor, 1958-ano-3, 1960-kyt/jef, 1961-bel/shu-1, 1963-woj, 1970-nak/shi, 1984-eng/san, 1985-hsu/laz].

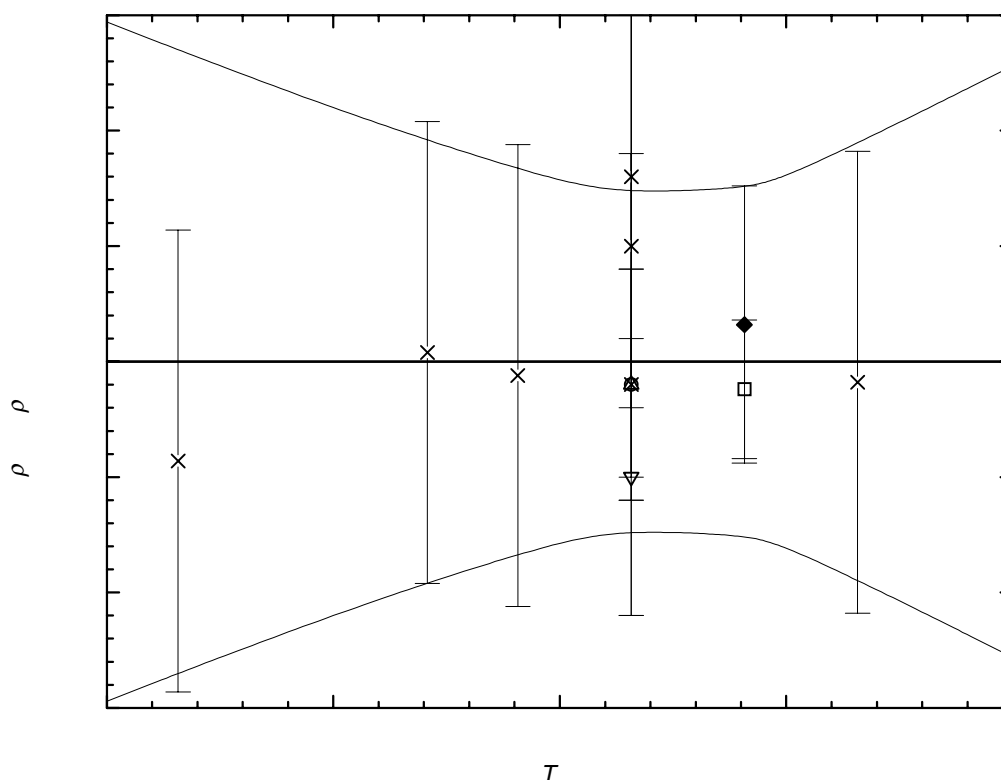


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

Butanal (cont.)**Table 3.** Recommended values (fit to the reliable experimental values according to the equations

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	826.04 \pm 1.47	293.15	801.70 \pm 0.73	310.00	783.99 \pm 1.28
280.00	815.52 \pm 1.09	298.15	796.44 \pm 0.75		
290.00	805.01 \pm 0.77	300.00	794.50 \pm 0.79		

2-Methylpropanal**[78-84-2]****C₄H₈O****MW = 72.11****106****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{c,w} = 7.3580 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 3.4566 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 293.15 to 333.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$8.54287 \cdot 10^2$
B	$6.64891 \cdot 10^{-1}$
C	$-2.87708 \cdot 10^{-3}$

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)
293.15	803.00 \pm 2.00	1.05	1872-lin/von-2(○)	303.15	790.70 \pm 1.50	-0.75	1990-gub/ger(Δ)
293.15	800.30 \pm 2.00	-1.65	1978-sac/pes(□)	313.15	780.66 \pm 1.50	0.30	1990-gub/ger(Δ)
293.15	802.87 \pm 1.50	0.92	1990-gub/ger(Δ)	323.15	769.27 \pm 1.50	0.57	1990-gub/ger(Δ)
298.15	796.62 \pm 1.50	-0.15	1990-gub/ger(Δ)	333.15	756.19 \pm 1.50	-0.28	1990-gub/ger(Δ)

Further references: [1879-ure, 1880-bru-1, 1881-pri/han, 1883-fos, 1884-per, 1938-coo/par, 1941-hea/tam, 1947-bou/nic, 1950-lad/smi, 1951-bol/alb, 1953-hag/dec, 1958-ano-3, 1962-tje, 1963-woj, 1968-ano, 1984-eng/san, 1985-pat/san].

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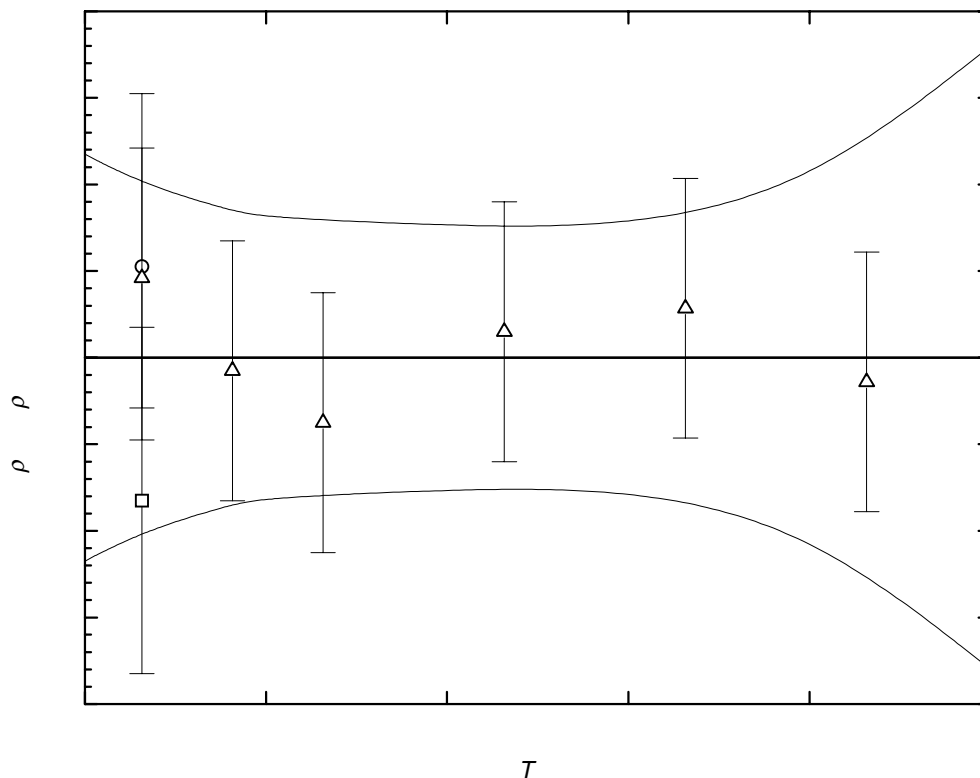


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the 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 $\rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$).

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	805.14 ± 2.35	300.00	794.82 ± 1.62	330.00	760.39 ± 1.96
293.15	801.95 ± 2.01	310.00	783.92 ± 1.52	340.00	747.76 ± 3.60
298.15	796.77 ± 1.69	320.00	772.44 ± 1.50		

2,2-Dimethylpropanal

[630-19-3]

 $\text{C}_5\text{H}_{10}\text{O}$

MW = 86.13

107

Table 1. Fit with estimated B coefficient for 4 accepted points. Deviation $\sigma_w = 1.000$.

Coefficient	$\rho = A + BT$
A	1081.15
B	-1.000

cont.

2,2-Dimethylpropanal (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.	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
290.15	792.7 ± 2.0	1.70	1893-tis ¹⁾	293.15	787.0 ± 1.0	-1.00	1965-kri/man
293.15	780.1 ± 3.0	-7.90	1957-ano-10 ¹⁾	313.15	767.0 ± 1.0	-1.00	1965-kri/man
280.15	802.0 ± 1.0	1.00	1965-kri/man	333.15	749.0 ± 1.0	1.00	1965-kri/man

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	801.2 ± 2.7
290.00	791.2 ± 1.9
293.15	788.0 ± 1.7
298.15	783.0 ± 1.3
310.00	771.2 ± 1.3
320.00	761.2 ± 1.9
330.00	751.2 ± 2.8
340.00	741.2 ± 3.7

2-Methylbutanal

[96-17-3]

 $\text{C}_5\text{H}_{10}\text{O}$

MW = 86.13

108

Table 1. Experimental and recommended values with uncertainties.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	804.7 ± 2.0	1952-coo
293.15	796.4 ± 3.0	1957-ano ¹⁾
293.15	801.0 ± 2.0	1963-iva/dol
293.15	802.9 ± 2.4	Recommended

¹⁾ Not included in calculation of recommended value.**(S)-2-Methylbutanal**

[1730-97-8]

 $\text{C}_5\text{H}_{10}\text{O}$

MW = 86.13

109

Table 1. Experimental and recommended values with uncertainties.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	818.6 ± 3.0	1945-bad/pac ¹⁾
293.15	806.8 ± 0.8	1971-sch/gad
293.15	806.8 ± 0.8	Recommended

¹⁾ Not included in calculation of recommended value.

3-Methylbutanal**[590-86-3]****C₅H₁₀O****MW = 86.13****110**

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 3.3986 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.3422 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 290.15 to 358.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.08958 \cdot 10^3$
B	$-9.90690 \cdot 10^{-1}$

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)
290.15	803.00 ± 1.00	0.87	1901-nef(○)	328.55	764.10 ± 0.60	0.01	1944-fri/har-2(□)
294.25	797.60 ± 0.60	-0.47	1944-fri/har-2(□)	338.15	754.50 ± 0.60	-0.08	1944-fri/har-2(□)
308.15	784.20 ± 0.60	-0.10	1944-fri/har-2(□)	347.85	744.90 ± 0.60	-0.07	1944-fri/har-2(□)
318.45	774.00 ± 0.60	-0.10	1944-fri/har-2(□)	358.15	734.70 ± 0.60	-0.07	1944-fri/har-2(□)

Further references: [1881-pri/han, 1909-sem-1, 1923-bha, 1938-coo/par, 1957-ano].

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	802.28 ± 0.98	310.00	782.47 ± 0.62	350.00	742.84 ± 0.73
293.15	799.16 ± 0.91	320.00	772.56 ± 0.52	360.00	732.93 ± 0.98
298.15	794.21 ± 0.81	330.00	762.65 ± 0.50	370.00	723.03 ± 1.33
300.00	792.37 ± 0.78	340.00	752.75 ± 0.57		

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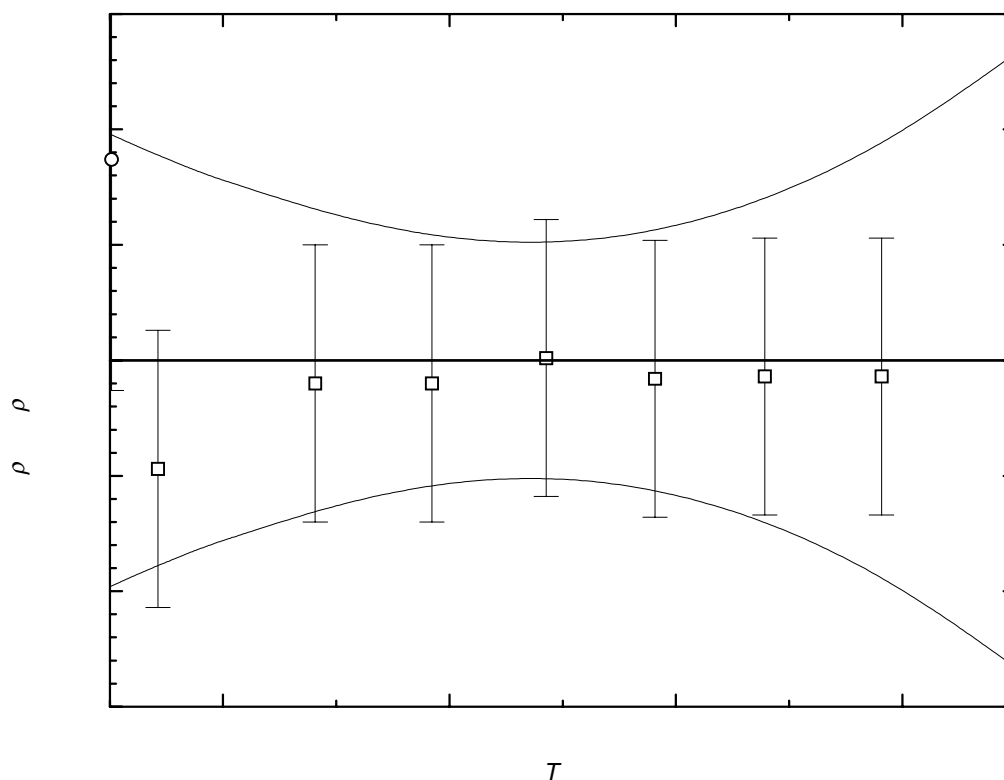
3-Methylbutanal (cont.)

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.)

Pentanal**[110-62-3]****C₅H₁₀O****MW = 86.13****111**

Table 1. Fit with estimated B coefficient for 11 accepted points. Deviation $\sigma_w = 0.882$.

Coefficient	$\rho = A + BT$
A	1026.86
B	-0.740

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.	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
298.15	806.1 ± 1.0	-0.12	1883-gla	293.15	810.5 ± 1.0	0.58	1938-coo/par
298.15	806.1 ± 1.0	-0.12	1884-gla	290.15	818.6 ± 3.0	6.46	1944-pre ¹⁾
284.97	818.5 ± 2.0	2.52	1884-zan	298.15	816.7 ± 4.0	10.48	1945-sch/gel ¹⁾
293.15	809.5 ± 1.0	-0.43	1931-bru/ern-1	293.15	810.9 ± 0.6	0.98	1956-ano-14

¹⁾ Not included in calculation of linear coefficients.

cont.

Table 2. (cont.)

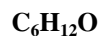
T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	810.9 ± 1.0	0.98	1958-ano-13	293.15	809.2 ± 0.6	-0.72	1968-ano
293.15	811.2 ± 1.0	1.28	1960-kyt/jef	293.15	808.9 ± 0.6	-1.02	1979-tar/sch
313.15	794.5 ± 1.0	-0.62	1960-kyt/jef				

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
280.00	819.7 ± 1.9
290.00	812.3 ± 1.3
293.15	809.9 ± 1.2
298.15	806.2 ± 1.2
310.00	797.5 ± 1.9
320.00	790.1 ± 2.8

2,2-Dimethylbutanal

[2094-75-9]



MW = 100.16

112

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
295.15	804.0 ± 1.0	1929-con/web

2,3-Dimethylbutanal

[2109-98-0]



MW = 100.16

113

Table 1. Experimental and recommended values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
298.15	809.7 ± 1.0	1946-bar/bud
298.15	830.0 ± 3.0	1959-tsu/hay ¹⁾
298.15	830.0 ± 3.0	1960-tsu/kis ¹⁾
298.15	809.7 ± 1.0	Recommended

¹⁾ Not included in calculation of recommended value.

2-Ethylbutanal

[97-96-1]



MW = 100.16

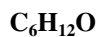
114

Table 1. Experimental values with uncertainties.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
273.15	830.6 ± 3.0	1904-beh/som ¹⁾	293.15	811.0 ± 3.0	1937-dra/mar ¹⁾
290.15	808.5 ± 3.0	1904-beh/som ¹⁾	293.15	815.0 ± 2.0	1968-ano
290.15	808.5 ± 3.0	1906-som ¹⁾	293.15	815.0 ± 2.0	Recommended

¹⁾ Not included in calculation of recommended value.**Hexanal**

[66-25-1]



MW = 100.16

115

Table 1. Fit with estimated B coefficient for 4 accepted points. Deviation $\sigma_w = 1.167$.

Coefficient	$\rho = A + BT$
A	1049.83
B	-0.800

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

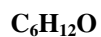
$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	831.9 ± 5.0	16.58	1932-bru-1 ¹⁾	293.15	816.2 ± 1.0	0.89	1960-kyt/jef
293.15	817.6 ± 3.0	2.29	1933-bac ¹⁾	313.15	801.2 ± 1.0	1.89	1960-kyt/jef
293.15	814.2 ± 0.6	-1.11	1953-ano-15	333.15	783.6 ± 1.0	0.29	1960-kyt/jef

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	817.8 ± 1.9
293.15	815.3 ± 1.7
298.15	811.3 ± 1.4
310.00	801.8 ± 1.4
320.00	793.8 ± 2.1
330.00	785.8 ± 2.9
340.00	777.8 ± 3.9

2-Methylpentanal

[123-15-9]



MW = 100.16

116

Table 1. Experimental and recommended values with uncertainties.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
295.15	808.0 ± 2.0	1951-hau ¹⁾
293.15	808.0 ± 0.6	1955-ano-13
293.15	808.6 ± 0.6	1968-ano
293.15	808.3 ± 0.6	Recommended

¹⁾ Not included in calculation of recommended value.**3-Methylpentanal**

[15877-57-3]

 $\text{C}_6\text{H}_{12}\text{O}$

MW = 100.16

117

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
298.15	801.0 ± 1.0	1935-lev/rot

3,4-Dimethylpentanal

[19353-21-0]

 $\text{C}_7\text{H}_{14}\text{O}$

MW = 114.19

118

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{\text{c,w}} = 6.4111 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 2.6870 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 298.15 \text{ to } 373.20 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$9.32294 \cdot 10^2$
B	$4.18434 \cdot 10^{-2}$
C	$-1.36867 \cdot 10^{-3}$

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)
298.15	822.60 ± 1.00	-0.50	1952-adk/wil(□)	323.20	802.00 ± 1.00	-0.85	1987-mil/fen-1(○)
298.15	824.00 ± 1.00	0.90	1987-mil/fen-1(○)	348.20	781.00 ± 1.00	0.08	1987-mil/fen-1(○)
303.15	820.00 ± 1.00	0.80	1987-mil/fen-1(○)	373.20	757.00 ± 1.00	-0.28	1987-mil/fen-1(○)
313.20	811.00 ± 1.00	-0.14	1987-mil/fen-1(○)				

cont.

3,4-Dimethylpentanal (cont.)

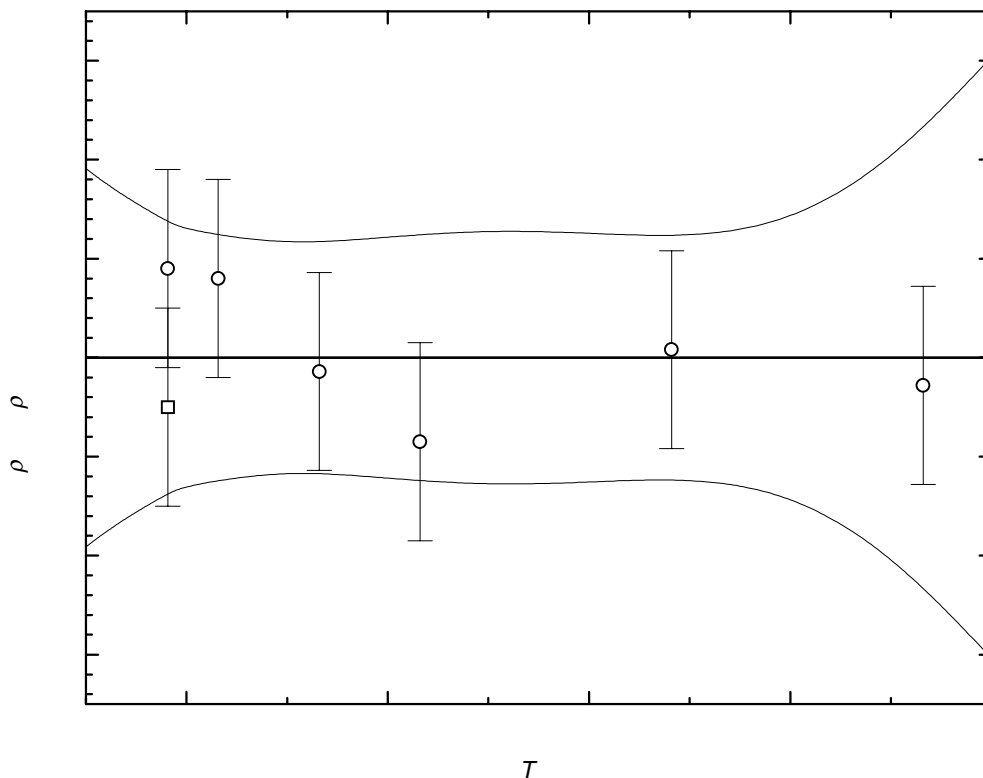


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	829.32 ± 1.91	310.00	813.74 ± 1.13	350.00	779.28 ± 1.21
293.15	826.94 ± 1.67	320.00	805.53 ± 1.22	360.00	769.98 ± 1.36
298.15	823.10 ± 1.37	330.00	797.05 ± 1.29	370.00	760.40 ± 1.97
300.00	821.67 ± 1.29	340.00	788.30 ± 1.26	380.00	750.56 ± 3.04

2-Ethyl-3-methylbutanal**[26254-92-2]****C₇H₁₄O****MW = 114.19****119****Table 1.** Experimental and recommended values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	Ref.
298.15	822.4 ± 2.0	1946-bar/bud
298.15	829.5 ± 4.0	1960-tsu/kis ¹⁾
298.15	822.4 ± 2.0	Recommended

¹⁾ Not included in calculation of recommended value.**Heptanal****[111-71-7]****C₇H₁₄O****MW = 114.19****120****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{\text{c,w}} = 3.0687 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.0358 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 358.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$9.33034 \cdot 10^2$
<i>B</i>	$4.83695 \cdot 10^{-2}$
<i>C</i>	$-1.50932 \cdot 10^{-3}$

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. (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)
288.15	821.89 ± 1.00	0.24	1884-per(◆)	293.15	817.00 ± 1.00	-0.51	1933-ano(Δ)
298.15	813.36 ± 1.00	0.07	1884-per(◆)	293.15	817.40 ± 0.60	-0.11	1960-kyt/jef(□)
293.05	817.05 ± 1.00	-0.54	1910-eis(○)	313.15	800.50 ± 0.60	0.33	1960-kyt/jef(□)
273.15	834.20 ± 1.00	0.57	1931-def(▽)	333.15	781.70 ± 0.60	0.07	1960-kyt/jef(□)
288.15	821.59 ± 1.00	-0.06	1931-def(▽)	358.15	756.70 ± 0.60	-0.06	1960-kyt/jef(□)
303.15	808.99 ± 1.00	-0.00	1931-def(▽)				

Further references: [1877-cro, 1880-bru-1, 1898-kah, 1909-sem, 1919-eyk, 1927-har/adk, 1930-err/she, 1930-she].

cont.

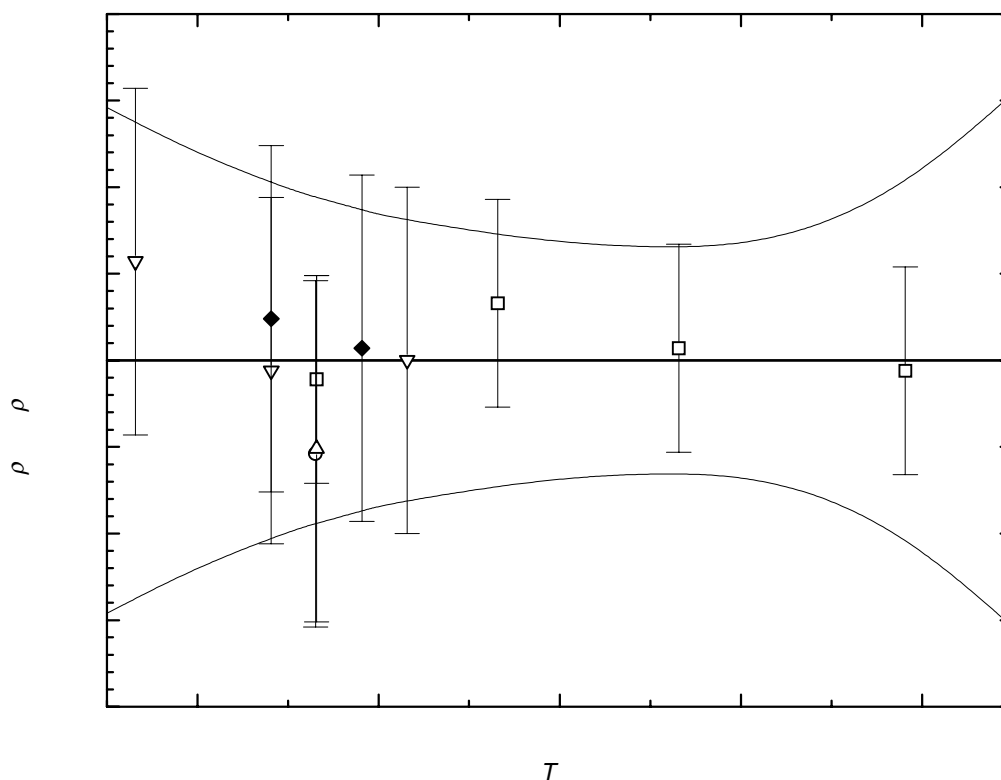
Heptanal (cont.)

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.)

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	836.06 ± 1.46	300.00	811.71 ± 0.84	350.00	765.07 ± 0.79
280.00	828.25 ± 1.19	310.00	802.98 ± 0.75	360.00	754.84 ± 1.08
290.00	820.13 ± 0.99	320.00	793.96 ± 0.68	370.00	744.31 ± 1.54
293.15	817.51 ± 0.94	330.00	784.63 ± 0.65		
298.15	813.29 ± 0.87	340.00	775.00 ± 0.66		

3-Methylhexanal

[19269-28-4]

 $\text{C}_7\text{H}_{14}\text{O}$

MW = 114.19

121

Table 1. Fit with estimated B coefficient for 7 accepted points. Deviation $\sigma_w = 1.254$.

Coefficient	$\rho = A + BT$
A	1082.66
B	-0.900

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

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	820.3 ± 1.0	1.48	1924-dew/wec	323.20	791.0 ± 2.0	-0.78	1987-mil/fen-1
298.15	813.0 ± 2.0	-1.32	1987-mil/fen-1	348.10	769.0 ± 2.0	-0.37	1987-mil/fen-1
303.20	808.0 ± 2.0	-1.78	1987-mil/fen-1	373.10	746.0 ± 2.0	-0.87	1987-mil/fen-1
313.20	800.0 ± 2.0	-0.78	1987-mil/fen-1				

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
290.00	821.7 ± 2.4
293.15	818.8 ± 2.3
298.15	814.3 ± 2.2
310.00	803.7 ± 2.1
320.00	794.7 ± 2.1
330.00	785.7 ± 2.2
340.00	776.7 ± 2.5
350.00	767.7 ± 2.8
360.00	758.7 ± 3.1
370.00	749.7 ± 3.5
380.00	740.7 ± 3.9

4-Methylhexanal

[41065-97-8]

 $\text{C}_7\text{H}_{14}\text{O}$

MW = 114.19

122

Table 1. Experimental and recommended values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
298.15	824.0 ± 2.0	1953-sut ¹⁾
293.15	827.5 ± 1.0	1954-fre/lwo
293.15	827.5 ± 1.0	Recommended

¹⁾ Not included in calculation of recommended value.

5-Methylhexanal [1860-39-5] $\text{C}_7\text{H}_{14}\text{O}$ MW = 114.19 123

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	820.6 ± 0.7	1943-hen/hil

2,4-Dimethylhexanal [20514-48-1] $\text{C}_8\text{H}_{16}\text{O}$ MW = 128.21 124

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	847.6 ± 1.0	1958-hag/hud

2-Ethylhexanal [123-05-7] $\text{C}_8\text{H}_{16}\text{O}$ MW = 128.21 125

Table 1. Fit with estimated B coefficient for 5 accepted points. Deviation $\sigma_w = 0.748$.

Coefficient	$\rho = A + BT$
A	1083.50
B	-0.900

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

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	820.5 ± 1.0	0.84	1937-dra/mar
291.15	823.1 ± 2.0	1.64	1951-hau
293.15	820.1 ± 1.0	0.44	1960-tje
298.15	815.6 ± 1.0	0.44	1960-tje
293.15	818.9 ± 0.6	-0.76	1968-ano

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
290.00	822.5 ± 1.3
293.15	819.7 ± 1.3
298.15	815.2 ± 1.3

2-Ethyl-4-methylpentanal [10349-95-8] $\text{C}_8\text{H}_{16}\text{O}$ MW = 128.21 126

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	847.6 ± 1.0	1958-hag/hud

Octanal [124-13-0] $\text{C}_8\text{H}_{16}\text{O}$ MW = 128.21 127

Table 1. Fit with estimated B coefficient for 5 accepted points. Deviation $\sigma_w = 0.983$.

Coefficient	$\rho = A + BT$
A	1085.21
B	-0.900

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

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	819.6 ± 2.0	-1.78	1909-sem
292.15	823.9 ± 2.0	1.62	1910-har
293.15	821.0 ± 1.0	-0.38	1933-ano
293.15	822.1 ± 2.0	0.72	1935-uhl
288.15	826.8 ± 2.0	0.92	1946-ben/igo

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
280.00	833.2 ± 2.3
290.00	824.2 ± 1.9
293.15	821.4 ± 1.9
298.15	816.9 ± 2.0

2-Ethyl-2,4-dimethylpentanal [91526-57-7] $\text{C}_9\text{H}_{18}\text{O}$ MW = 142.24 128

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
298.15	827.0 ± 1.5	1952-doe/far

2-Ethyl-4-methylhexanal [91526-46-4] $\text{C}_9\text{H}_{18}\text{O}$ MW = 142.24 129

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	848.3 ± 1.0	1958-hag/hud

4-Methyl-2-propylpentanal [91526-42-0] $\text{C}_9\text{H}_{18}\text{O}$ MW = 142.24 130

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	842.3 ± 1.0	1958-hag/hud

Nonanal [124-19-6] $\text{C}_9\text{H}_{18}\text{O}$ MW = 142.24 131

Table 1. Experimental and recommended values with uncertainties.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
288.15	827.7 ± 3.0	1900-wal/ste ¹⁾	293.15	825.0 ± 1.0	1933-ano
290.65	839.0 ± 6.0	1923-hol/zad ¹⁾	293.15	828.2 ± 3.0	1935-uhl ¹⁾
295.75	826.4 ± 3.0	1944-sto/rou ¹⁾	293.15	825.0 ± 1.0	Recommended

¹⁾ Not included in calculation of recommended value.

2,4,5-Trimethylhexanal [90676-47-4] $\text{C}_9\text{H}_{18}\text{O}$ MW = 142.24 132

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
291.15	884.3 ± 2.0	1962-yas/mat

Decanal [112-31-2] $\text{C}_{10}\text{H}_{20}\text{O}$ MW = 156.27 133

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.250$.

Coefficient	$\rho = A + BT$
A	1089.59
B	-0.900

cont.

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

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
288.15	828.0 ± 3.0	-2.25	1900-ste ¹⁾	298.15	824.9 ± 3.0	3.65	1943-foo/gel ¹⁾
293.15	826.0 ± 2.0	0.25	1933-ano	288.15	830.0 ± 2.0	-0.25	1943-gue/lan
293.15	848.7 ± 6.0	22.95	1935-uhl ¹⁾	296.65	840.0 ± 6.0	17.40	1947-haa/red ¹⁾

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

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
280.00	837.6 ± 1.2
290.00	828.6 ± 0.6
293.15	825.7 ± 0.7
298.15	821.2 ± 1.0

3,7-Dimethyloctanal

[5988-91-0]

 $\text{C}_{10}\text{H}_{20}\text{O}$

MW = 156.27

134

Table 1. Experimental and recommended values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
295.15	823.0 ± 5.0	1923-von/kai ¹⁾
292.15	824.0 ± 5.0	1923-von/kai ¹⁾
298.15	813.4 ± 0.6	1988-cac/cos
298.15	813.4 ± 0.6	Recommended

¹⁾ Not included in calculation of recommended value.**4-Methyl-2-propylhexanal**

[85153-29-3]

 $\text{C}_{10}\text{H}_{20}\text{O}$

MW = 156.27

135

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	843.0 ± 1.0	1958-hag/hud

4,8-Dimethylnonanal

[77331-37-4]

 $\text{C}_{11}\text{H}_{22}\text{O}$

MW = 170.3

136

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
291.15	830.0 ± 2.0	1923-von/kai

2-Methyldecenal [19009-56-4] $C_{11}H_{22}O$ MW = 170.3 137

Table 1. Experimental value with uncertainty.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	894.8 ± 1.0	1955-hil/sim

Undecanal [112-44-7] $C_{11}H_{22}O$ MW = 170.3 138

Table 1. Experimental and recommended values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
296.15	825.1 ± 3.0	1903-bla/gue ¹⁾
293.15	832.0 ± 2.0	1933-ano
293.15	832.0 ± 2.0	Recommended

¹⁾ Not included in calculation of recommended value.

Dodecanal [112-54-9] $C_{12}H_{24}O$ MW = 184.32 139

Table 1. Experimental and recommended values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
288.15	835.2 ± 1.0	1931-laa
288.15	838.0 ± 2.0	1943-gue/lan
288.15	835.8 ± 1.4	Recommended

Tridecanal [10486-19-8] $C_{13}H_{26}O$ MW = 198.35 140

Table 1. Experimental value with uncertainty.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
291.15	835.6 ± 1.0	1947-sto