

2.1.7 Saturated Monoesters, C₁₁ - C₁₂

Butyl heptanoate

[5454-28-4]

C₁₁H₂₂O₂

MW = 186.29

179

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w}=5.2965 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw}=1.5235 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 429.45 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.07857 \cdot 10^3$
B	$-6.62733 \cdot 10^{-1}$
C	$-2.33939 \cdot 10^{-4}$

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)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	880.60 ± 0.60	0.51	1886-gar(O)	448.35	733.00 ± 1.00	-1.41	1886-gar ¹⁾
301.45	858.50 ± 0.60	0.97	1886-gar(O)	467.05	721.60 ± 1.00	3.59	1886-gar ¹⁾
338.35	827.90 ± 0.80	0.35	1886-gar(O)	273.15	880.31 ± 0.50	0.22	1935-bil/gis(Δ)
351.85	816.90 ± 0.80	0.47	1886-gar(O)	288.15	867.93 ± 0.50	-0.25	1935-bil/gis(Δ)
370.95	800.60 ± 0.80	0.06	1886-gar(O)	303.15	855.50 ± 0.50	-0.67	1935-bil/gis(Δ)
384.25	789.50 ± 1.00	0.12	1886-gar(O)	273.15	879.90 ± 0.60	-0.19	1943-hob/par(□)
403.95	772.50 ± 1.00	-0.19	1886-gar(O)	298.15	859.20 ± 0.60	-0.98	1943-hob/par(□)
429.45	750.40 ± 1.00	-0.42	1886-gar(O)				

¹⁾ Not included in Fig. 1.

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	882.58 ± 0.70	320.00	842.54 ± 0.66	390.00	784.52 ± 0.98
280.00	874.67 ± 0.66	330.00	834.39 ± 0.68	400.00	776.05 ± 1.10
290.00	866.71 ± 0.64	340.00	826.20 ± 0.70	410.00	767.53 ± 1.26
293.15	864.19 ± 0.64	350.00	817.96 ± 0.73	420.00	758.96 ± 1.46
298.15	860.18 ± 0.63	360.00	809.67 ± 0.76	430.00	750.34 ± 1.70
300.00	858.70 ± 0.64	370.00	801.33 ± 0.81	440.00	741.68 ± 1.97
310.00	850.64 ± 0.64	380.00	792.95 ± 0.88		

cont.

Butyl heptanoate (cont.).

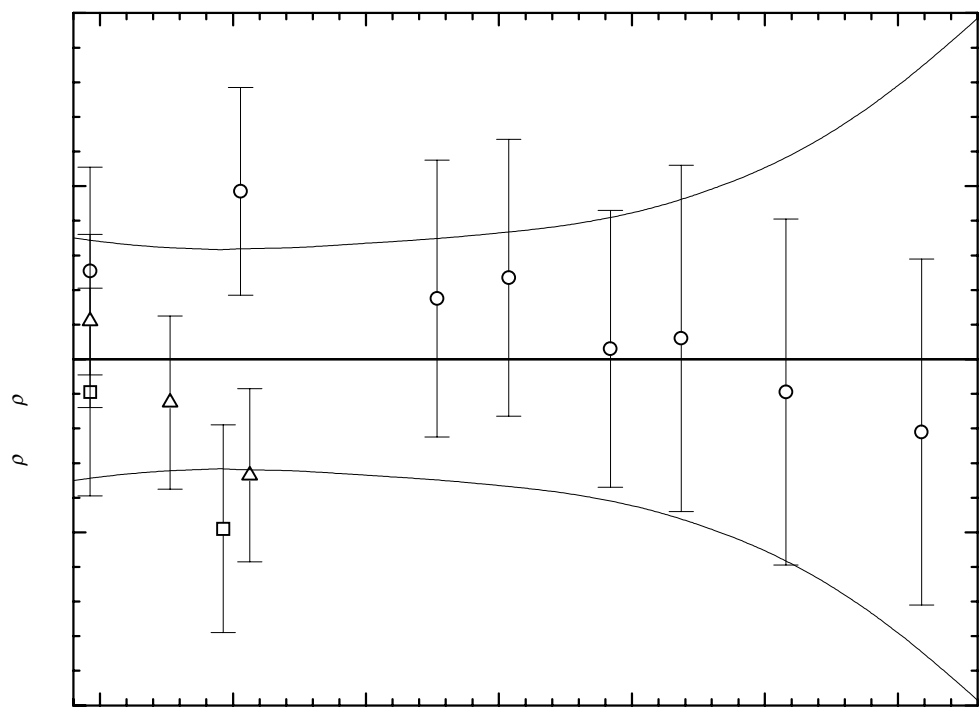


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

1-Butylpentyl ethanoate [500022-44-6] C₁₁H₂₂O₂ MW = 186.29 180

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	850.0 ± 1.0	1906-mal-1

Decyl methanoate [5451-52-5] C₁₁H₂₂O₂ MW = 186.29 181

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.
293.15	873.2 ± 0.6	1927-tal
293.15	873.2 ± 0.6	1932-kom/tal

3,5-Dimethylheptyl ethanoate [500002-46-0] C₁₁H₂₂O₂ MW = 186.29 182

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	881.5 ± 1.0	1956-sar/new

d-Ethyl 3,6-dimethylheptanoate [500002-47-1] C₁₁H₂₂O₂ MW = 186.29 183

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	862.0 ± 1.0	1932-lev/mar

l-Ethyl 2-ethylheptanoate [500002-38-0] C₁₁H₂₂O₂ MW = 186.29 184

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.
296.15	860.0 ± 1.0	1931-lev/mar-5

Ethyl 2-methyloctanoate [30982-02-6] C₁₁H₂₂O₂ MW = 186.29 185

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.
277.15	875.8 ± 2.0	1904-bou/bla-2

l-Ethyl 5-methyloctanoate [500002-37-9] C₁₁H₂₂O₂ MW = 186.29 186

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.
295.15	865.0 ± 1.0	1933-lev/mar-1

(R)-Ethyl 6-methylocatanoate [16177-02-9] C₁₁H₂₂O₂ MW = 186.29 187

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.
297.15	868.0 ± 2.0	1933-lev/mar-1

Ethyl nonanoate

[123-29-5]

C₁₁H₂₂O₂

MW = 186.29

188

Table 1. Fit with estimated *B* coefficient for 8 accepted points. Deviation $\sigma_w = 0.707$.

Coefficient	$\rho = A + BT$
<i>A</i>	1105.69
<i>B</i>	-0.820

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	860.0 ± 5.0	-5.30	1850-cah-3 ¹⁾	293.15	864.7 ± 2.0	-0.60	1931-sob/kah ¹⁾
290.65	865.5 ± 2.0	-1.85	1872-zin/fra ¹⁾	293.15	863.4 ± 2.0	-1.92	1938-alb ¹⁾
288.15	869.5 ± 1.0	0.14	1884-per	298.15	858.5 ± 2.0	-2.65	1938-alb ¹⁾
298.15	861.5 ± 1.0	0.31	1884-per	292.15	864.6 ± 1.0	-1.52	1944-sto/rou
273.15	881.5 ± 1.0	-0.17	1931-def	293.15	866.1 ± 1.0	0.80	1950-mum/phi
288.15	869.2 ± 1.0	-0.23	1931-def	298.15	862.1 ± 1.0	0.90	1950-mum/phi
303.15	856.9 ± 1.0	-0.20	1931-def				

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	884.3 ± 1.2
280.00	876.1 ± 1.0
290.00	867.9 ± 0.9
293.15	865.3 ± 0.9
298.15	861.2 ± 0.9
310.00	851.5 ± 1.2

1-Ethyl 2-propylhexanoate

[500002-51-7]

C₁₁H₂₂O₂

MW = 186.29

189

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.
298.15	861.0 ± 1.0	1932-lev/mar
295.15	865.0 ± 1.0	1933-lev/mar-1

2-Ethylhexyl propanoate

[6293-37-4]

C₁₁H₂₂O₂

MW = 186.29

190

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	863.9 ± 1.0	1932-kom/tal
293.15	863.7 ± 1.0	1959-smi/bag
293.15	863.8 ± 1.0	Recommended

1-Ethyl-2-methylbutyl butanoate [500001-95-6] C₁₁H₂₂O₂ MW = 186.29 191

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.
273.15	883.0 ± 2.0	1907-fou/tif

Heptyl butanoate [5870-93-9] C₁₁H₂₂O₂ MW = 186.29 192

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{\text{c,w}} = 1.6335$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 3.7413 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 457.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	1.06111 · 10 ³
B	-5.63787 · 10 ⁻¹
C	-3.58096 · 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	882.56 ± 1.00	2.17	1886-gar(Δ)	419.95	760.80 ± 1.00	-0.39	1886-gar(Δ)
285.45	872.90 ± 1.00	1.90	1886-gar(Δ)	457.15	726.00 ± 1.00	-2.53	1886-gar(Δ)
310.65	852.50 ± 1.00	1.09	1886-gar(Δ)	273.15	880.07 ± 0.50	-0.32	1935-bil/gis(∇)
338.55	829.70 ± 1.00	0.51	1886-gar(Δ)	288.15	867.79 ± 0.50	-1.13	1935-bil/gis(∇)
351.25	818.90 ± 1.00	0.00	1886-gar(Δ)	303.15	855.46 ± 0.50	-1.83	1935-bil/gis(∇)
369.95	803.10 ± 1.00	-0.42	1886-gar(Δ)	288.15	868.70 ± 1.00	-0.22	1937-rog/dvo(□)
383.45	791.80 ± 1.00	-0.47	1886-gar(Δ)	273.15	882.70 ± 1.00	2.31	1959-hof(○)
405.55	772.90 ± 1.00	-0.67	1886-gar(Δ)				

¹⁾ Not included in Fig. 1.

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	882.78 ± 1.00	330.00	836.06 ± 0.83	410.00	769.76 ± 1.12
280.00	875.17 ± 0.92	340.00	828.02 ± 0.84	420.00	761.15 ± 1.22
290.00	867.49 ± 0.87	350.00	819.91 ± 0.86	430.00	752.47 ± 1.33
293.15	865.06 ± 0.86	360.00	811.73 ± 0.88	440.00	743.71 ± 1.46
298.15	861.18 ± 0.85	370.00	803.48 ± 0.91	450.00	734.89 ± 1.61
300.00	859.74 ± 0.84	380.00	795.16 ± 0.95	460.00	725.99 ± 1.78
310.00	851.92 ± 0.83	390.00	786.76 ± 0.99	470.00	717.02 ± 1.97
320.00	844.03 ± 0.82	400.00	778.30 ± 1.05		

cont.

Heptyl butanoate (cont.)

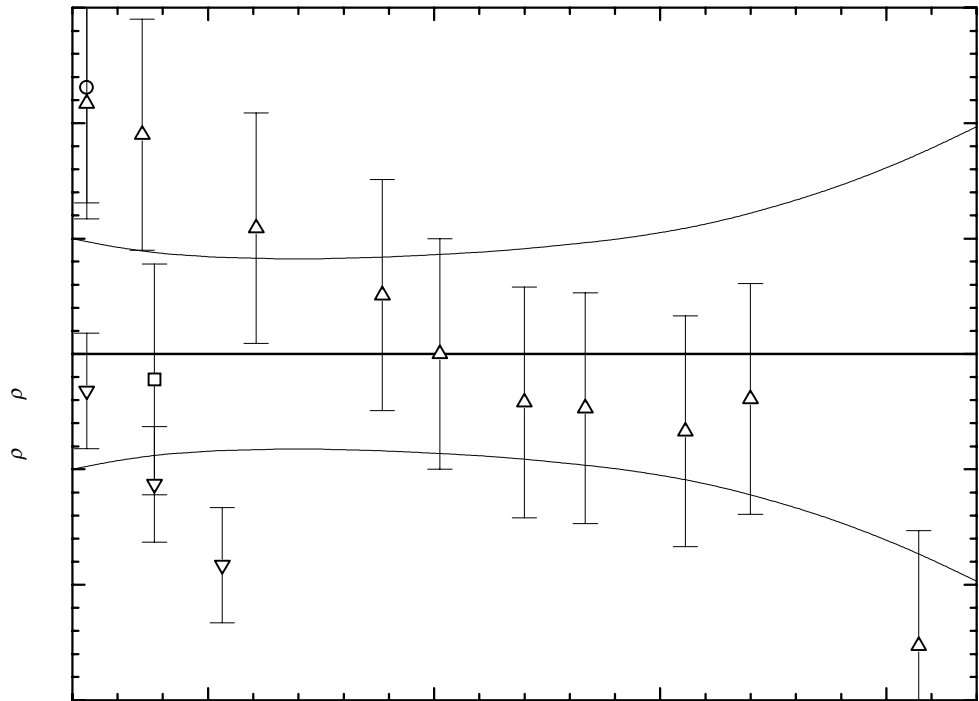


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

Heptyl 2-methylpropanoate

[2349-13-5]

C₁₁H₂₂O₂

MW = 186.29

193

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.
288.15	861.7 ± 0.8	1937-rog/dvo
293.15	871.1 ± 1.0	1976-nay/zor

Hexyl pentanoate

[1117-59-5]

C₁₁H₂₂O₂

MW = 186.29

194

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 2.3243 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 7.3783 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 457.25 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.07576 \cdot 10^3$
B	$-6.43711 \cdot 10^{-1}$
C	$-2.72983 \cdot 10^{-4}$

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)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	879.60 ± 0.60	0.04	1886-gar(□)	406.35	769.40 ± 1.00	0.29	1886-gar(□)
287.25	868.10 ± 0.60	-0.23	1886-gar(□)	429.55	748.50 ± 1.00	-0.38	1886-gar(□)
309.15	850.50 ± 0.60	-0.17	1886-gar(□)	457.25	724.20 ± 1.00	-0.15	1886-gar(□)
338.95	826.40 ± 0.80	0.19	1886-gar(□)	273.15	879.89 ± 0.50	0.33	1935-bil/gis(○)
352.05	815.70 ± 0.80	0.39	1886-gar(□)	288.15	867.52 ± 0.50	-0.09	1935-bil/gis(○)
371.35	799.00 ± 0.80	-0.07	1886-gar(□)	303.15	855.21 ± 0.50	-0.32	1935-bil/gis(○)
384.35	788.20 ± 1.00	0.18	1886-gar(□)				

¹⁾ Not included in Fig. 1.

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	882.06 ± 0.68	330.00	833.61 ± 0.72	410.00	765.95 ± 1.01
280.00	874.12 ± 0.66	340.00	825.34 ± 0.74	420.00	757.25 ± 1.11
290.00	866.13 ± 0.66	350.00	817.02 ± 0.76	430.00	748.49 ± 1.23
293.15	863.60 ± 0.66	360.00	808.64 ± 0.78	440.00	739.68 ± 1.37
298.15	859.57 ± 0.66	370.00	800.22 ± 0.80	450.00	730.81 ± 1.54
300.00	858.08 ± 0.66	380.00	791.73 ± 0.84	460.00	721.89 ± 1.75
310.00	849.98 ± 0.68	390.00	783.19 ± 0.88	470.00	712.91 ± 1.97
320.00	841.82 ± 0.70	400.00	774.60 ± 0.94		

cont.

Hexyl pentanoate (cont.)

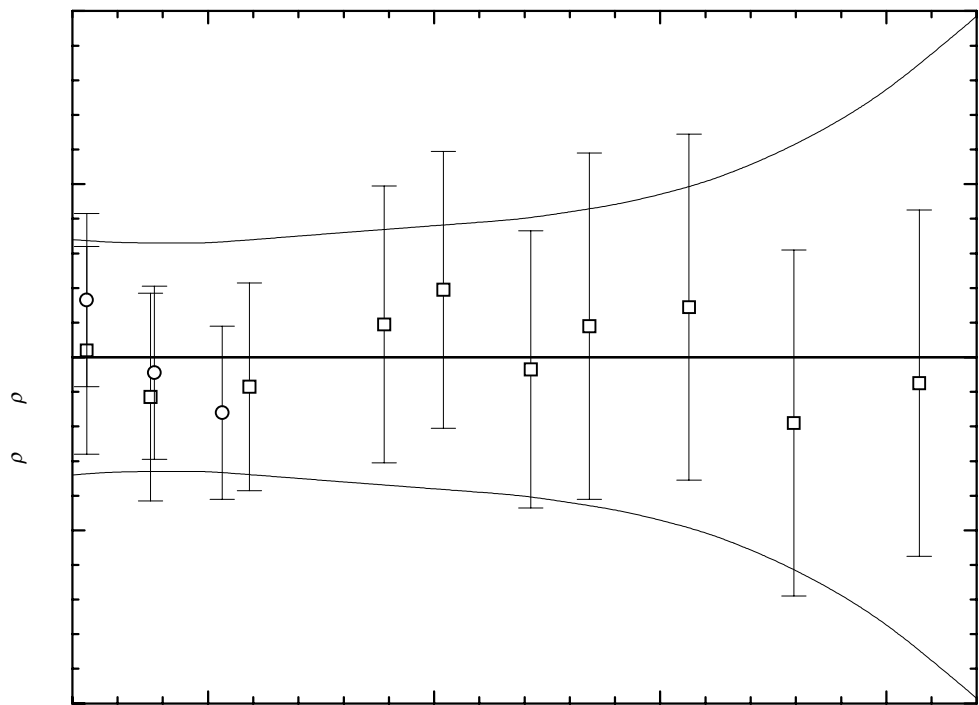


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Methyl decanoate

[110-42-9]

C₁₁H₂₂O₂

MW = 186.29

195

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 4.6869 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.3562 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 293.15 to 361.25 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.10478 \cdot 10^3$
B	$-7.92113 \cdot 10^{-1}$

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)
293.15	873.00 ± 1.00	0.43	1948-bon/alt(×)	372.05	806.80 ± 0.00	-3.27	1948-bon/alt ¹⁾
310.95	858.10 ± 1.00	-0.37	1948-bon/alt(×)	293.15	873.30 ± 0.60	0.73	1948-vog-9(◆)

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)
295.15	871.70 ± 0.60	0.72	1948-vog-9(◆)	293.15	872.50 ± 0.50	-0.07	1964-adr/dek(▽)
314.55	856.00 ± 0.60	0.38	1948-vog-9(◆)	293.15	872.40 ± 0.50	-0.17	1964-gou/vlu(Δ)
314.65	855.90 ± 0.60	0.36	1948-vog-9(◆)	313.15	855.80 ± 0.50	-0.93	1964-gou/vlu(Δ)
334.65	840.20 ± 0.80	0.50	1948-vog-9(◆)	298.15	868.19 ± 0.40	-0.42	1990-ort(O)
335.45	839.60 ± 0.80	0.54	1948-vog-9(◆)	298.15	868.28 ± 0.40	-0.33	1995-pos/gar(□)
360.05	819.40 ± 0.80	-0.18	1948-vog-9(◆)				

¹⁾ Not included in Fig. 1.

Further references: [1935-dra/spi].

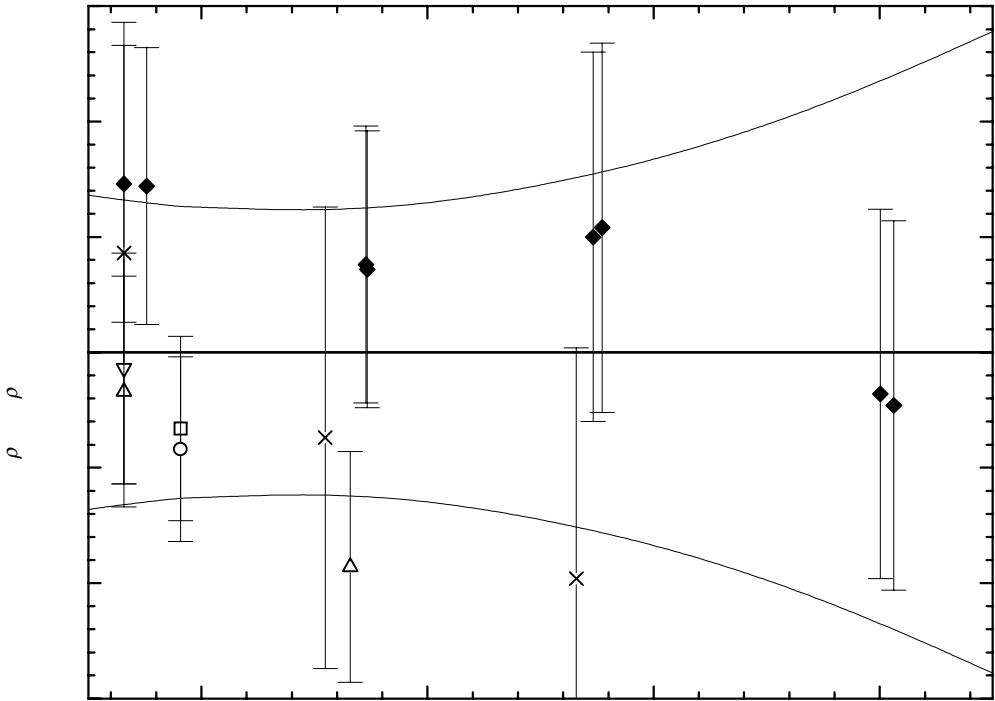


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

Methyl decanoate (cont.)

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	875.06 ± 0.68	310.00	859.22 ± 0.61	350.00	827.54 ± 0.98
293.15	872.57 ± 0.66	320.00	851.30 ± 0.64	360.00	819.62 ± 1.17
298.15	868.61 ± 0.63	330.00	843.38 ± 0.72	370.00	811.69 ± 1.39
300.00	867.14 ± 0.63	340.00	835.46 ± 0.83		

1-Methylethyl octanoate [5458-59-3] C₁₁H₂₂O₂ MW = 186.29 196

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation $\sigma_w = 0.141$.

Coefficient	$\rho = A + BT$
<i>A</i>	1110.67
<i>B</i>	-0.870

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.
293.15	855.5 ± 1.0	-0.13	1948-bon/alt
310.95	840.0 ± 1.0	-0.15	1948-bon/alt
333.15	821.0 ± 1.0	0.17	1948-bon/alt
372.05	787.1 ± 1.0	0.11	1948-bon/alt

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	858.4 ± 1.2	320.00	832.3 ± 0.9	360.00	797.5 ± 1.1
293.15	855.6 ± 1.1	330.00	823.6 ± 0.9	370.00	788.8 ± 1.2
298.15	851.3 ± 1.1	340.00	814.9 ± 0.9	380.00	780.1 ± 1.4
310.00	841.0 ± 1.0	350.00	806.2 ± 1.0		

1-Methylheptyl propanoate [500003-21-6] C₁₁H₂₂O₂ MW = 186.29 197

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation $\sigma_w = 1.165$.

Coefficient	$\rho = A + BT$
<i>A</i>	1133.42
<i>B</i>	-0.910

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.
293.65	865.0 ± 1.0	-1.20	1914-pic/ken-1
329.15	835.0 ± 1.0	1.11	1914-pic/ken-1
360.15	806.9 ± 1.0	1.22	1914-pic/ken-1
405.15	763.6 ± 1.0	-1.13	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	869.5 ± 1.9	330.00	833.1 ± 1.5	380.00	787.6 ± 1.6
293.15	866.7 ± 1.8	340.00	824.0 ± 1.5	390.00	778.5 ± 1.7
298.15	862.1 ± 1.8	350.00	814.9 ± 1.5	400.00	769.4 ± 1.8
310.00	851.3 ± 1.6	360.00	805.8 ± 1.5	410.00	760.3 ± 1.9
320.00	842.2 ± 1.6	370.00	796.7 ± 1.5		

1-Methylhexyl butanoate [39026-94-3] C₁₁H₂₂O₂ MW = 186.29 198

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation σ_w = 0.890.

Coefficient	$\rho = A + BT$
<i>A</i>	1119.16
<i>B</i>	-0.890

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.
290.15	860.0 ± 1.0	-0.93	1914-pic/ken-1
329.15	827.1 ± 1.0	0.88	1914-pic/ken-1
358.15	801.3 ± 1.0	0.89	1914-pic/ken-1
413.15	750.6 ± 1.0	-0.86	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	861.1 ± 1.7	330.00	825.5 ± 1.3	380.00	781.0 ± 1.4
293.15	858.3 ± 1.7	340.00	816.6 ± 1.3	390.00	772.1 ± 1.5
298.15	853.8 ± 1.6	350.00	807.7 ± 1.3	400.00	763.2 ± 1.6
310.00	843.3 ± 1.5	360.00	798.8 ± 1.3	410.00	754.3 ± 1.8
320.00	834.4 ± 1.4	370.00	789.9 ± 1.3	420.00	745.4 ± 1.9

1-Methyloctyl ethanoate

[500022-41-3]

C₁₁H₂₂O₂

MW = 186.29

199

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	832.10 ± 1.0	1906-ger

1-Methylpentyl pentanoate

[7150-92-7]

C₁₁H₂₂O₂

MW = 186.29

200

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation σ_w = 0.814

Coefficient	$\rho = A + BT$
<i>A</i>	1116.58
<i>B</i>	-0.880

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.
287.15	863.2 ± 1.0	-0.68	1914-pic/ken-1
329.15	828.3 ± 1.0	1.37	1914-pic/ken-1
363.15	796.5 ± 1.0	-0.50	1914-pic/ken-1
397.15	766.9 ± 1.0	-0.19	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	870.2 ± 1.8	320.00	835.0 ± 1.3	370.00	791.0 ± 1.3
290.00	861.4 ± 1.6	330.00	826.2 ± 1.2	380.00	782.2 ± 1.4
293.15	858.6 ± 1.6	340.00	817.4 ± 1.2	390.00	773.4 ± 1.5
298.15	854.2 ± 1.5	350.00	808.6 ± 1.2	400.00	764.6 ± 1.6
310.00	843.8 ± 1.4	360.00	799.8 ± 1.3		

1-Methylpropyl heptanoate

[119245-03-3]

C₁₁H₂₂O₂

MW = 186.29

201

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation σ_w = 0.676.

Coefficient	$\rho = A + BT$
<i>A</i>	1113.46
<i>B</i>	-0.870

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.
287.15	862.7 ± 1.0	-0.94	1914-pic/ken-1
324.15	832.0 ± 1.0	0.55	1914-pic/ken-1
354.15	805.0 ± 1.0	-0.35	1914-pic/ken-1
395.15	770.4 ± 1.0	0.72	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	869.9 ± 1.6	320.00	835.1 ± 1.2	370.00	791.6 ± 1.3
290.00	861.2 ± 1.5	330.00	826.4 ± 1.1	380.00	782.9 ± 1.4
293.15	858.4 ± 1.5	340.00	817.7 ± 1.1	390.00	774.2 ± 1.5
298.15	854.1 ± 1.4	350.00	809.0 ± 1.1	400.00	765.5 ± 1.6
310.00	843.8 ± 1.3	360.00	800.3 ± 1.2		

1-(2-Methylpropyl)pentyl ethanoate [500002-19-7] C₁₁H₂₂O₂ MW = 186.29 202

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	859.0 ± 2.0	1906-mal-1

Nonyl ethanoate [143-13-5] C₁₁H₂₂O₂ MW = 186.29 203

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.
293.15	865.5 ± 0.6	1964-bre/ulu
293.15	890.0 ± 15.0	1967-bar/fro

Octyl propanoate [142-60-9] C₁₁H₂₂O₂ MW = 186.29 204

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{\text{c,w}} = 3.0435 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 8.4502 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 466.95 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.06650 \cdot 10^3$
B	$-5.72291 \cdot 10^{-1}$
C	$-3.68331 \cdot 10^{-4}$

cont.

Octyl propanoate (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)
273.15	883.20 ± 0.60	0.51	1886-gar(□)	429.45	752.90 ± 1.00	0.11	1886-gar(□)
304.75	858.10 ± 0.60	0.22	1886-gar(□)	448.85	735.60 ± 1.00	0.18	1886-gar(□)
338.65	830.50 ± 0.80	0.05	1886-gar(□)	466.95	718.60 ± 1.00	-0.35	1886-gar(□)
351.85	819.60 ± 0.80	0.06	1886-gar(□)	273.15	882.68 ± 0.50	-0.01	1935-bil/gis(○)
371.05	803.30 ± 0.80	-0.14	1886-gar(□)	288.15	870.41 ± 0.50	-0.60	1935-bil/gis(○)
384.25	792.20 ± 1.00	-0.01	1886-gar(□)	303.15	858.09 ± 0.50	-1.07	1935-bil/gis ¹⁾
404.05	775.10 ± 1.00	-0.03	1886-gar(□)				

¹⁾ Not included in Fig. 1.

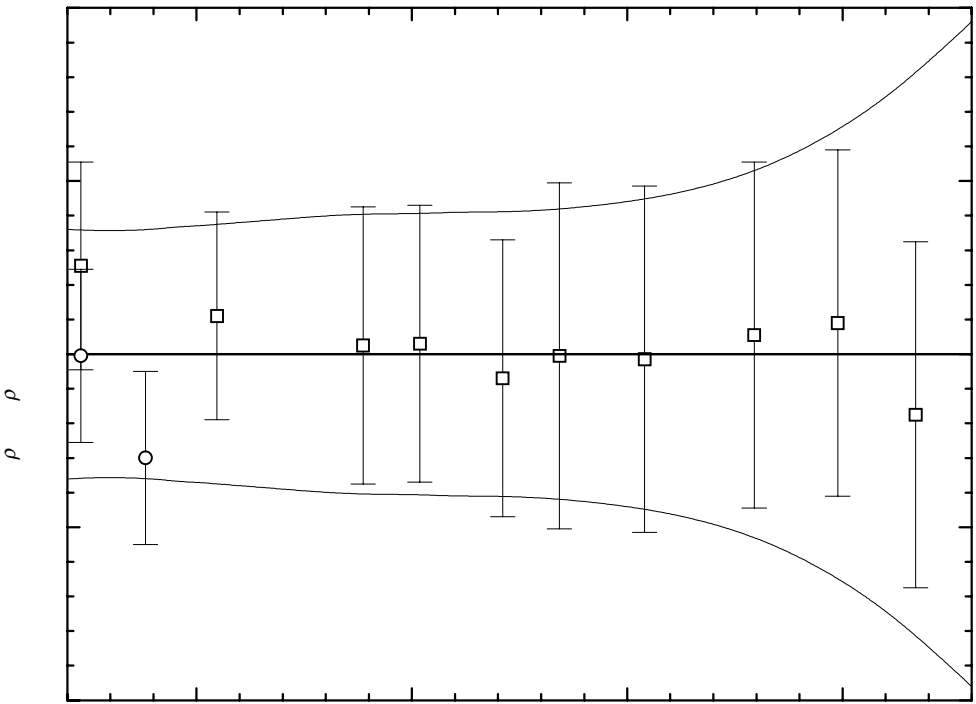


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

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	885.13 ± 0.72	340.00	829.34 ± 0.81	410.00	769.94 ± 0.92
280.00	877.38 ± 0.71	350.00	821.07 ± 0.81	420.00	761.16 ± 0.98
290.00	869.55 ± 0.72	360.00	812.73 ± 0.82	430.00	752.31 ± 1.06
293.15	867.07 ± 0.73	370.00	804.32 ± 0.82	440.00	743.38 ± 1.17
298.15	863.12 ± 0.74	380.00	795.84 ± 0.83	450.00	734.38 ± 1.31
300.00	861.66 ± 0.74	390.00	787.28 ± 0.85	460.00	725.30 ± 1.48
310.00	853.69 ± 0.76	400.00	778.65 ± 0.88	470.00	716.15 ± 1.69
320.00	845.64 ± 0.78	330.00	837.53 ± 0.80	480.00	706.93 ± 1.92

Pentyl hexanoate [540-07-8] C₁₁H₂₂O₂ MW = 186.29 205

Table 1. Fit with estimated *B* coefficient for 5 accepted points. Deviation σ_w = 0.612.

Coefficient	$\rho = A + BT$
<i>A</i>	1105.57
<i>B</i>	-0.825

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.
273.15	880.0 ± 0.5	-0.24	1935-bil/gis	273.15	880.1 ± 0.7	-0.12	1943-hob/par
288.15	867.6 ± 0.5	-0.27	1935-bil/gis	298.15	861.2 ± 0.7	1.60	1943-hob/par
303.15	855.2 ± 0.5	-0.24	1935-bil/gis	293.15	880.0 ± 2.0	16.28	1974-raj/mur-1 ¹⁾

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	882.8 ± 1.0
280.00	874.6 ± 0.8
290.00	866.3 ± 0.8
293.15	863.7 ± 0.8
298.15	859.6 ± 0.9
310.00	849.8 ± 1.2

Propyl octanoate

[624-13-5]

C₁₁H₂₂O₂

MW = 186.29

206

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 7.8577 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 2.6089 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 449.85 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.09333 \cdot 10^3$
B	$-7.41231 \cdot 10^{-1}$
C	$-1.26116 \cdot 10^{-4}$

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)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	880.40 ± 0.60	-1.06	1886-gar(○)	273.15	882.27 ± 0.50	0.81	1935-bil/gis(▽)
290.95	866.50 ± 0.60	-0.50	1886-gar(○)	288.15	869.97 ± 0.50	0.69	1935-bil/gis(▽)
314.55	848.10 ± 0.60	0.40	1886-gar(○)	303.15	857.70 ± 0.50	0.66	1935-bil/gis(▽)
338.55	828.10 ± 0.80	0.17	1886-gar(○)	273.15	882.00 ± 0.80	0.54	1943-hob/par(□)
351.65	818.20 ± 0.80	1.12	1886-gar(○)	298.15	861.60 ± 0.80	0.48	1943-hob/par(□)
370.55	802.50 ± 0.80	1.15	1886-gar(○)	293.15	863.80 ± 1.00	-1.40	1948-bon/alt(Δ)
384.05	791.40 ± 1.00	1.34	1886-gar(○)	310.95	849.00 ± 1.00	-1.65	1948-bon/alt(Δ)
404.65	773.80 ± 1.00	1.06	1886-gar(○)	333.15	830.50 ± 1.00	-1.89	1948-bon/alt(Δ)
429.35	752.20 ± 1.00	0.36	1886-gar(○)	372.05	798.00 ± 1.00	-2.10	1948-bon/alt(Δ)
449.85	734.20 ± 1.00	-0.17	1886-gar(○)				

¹⁾ Not included in Fig. 1.

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	884.01 ± 0.79	330.00	834.99 ± 0.83	410.00	768.23 ± 1.04
280.00	875.90 ± 0.78	340.00	826.74 ± 0.84	420.00	759.77 ± 1.15
290.00	867.77 ± 0.77	350.00	818.45 ± 0.84	430.00	751.28 ± 1.28
293.15	865.20 ± 0.77	360.00	810.15 ± 0.85	440.00	742.78 ± 1.46
298.15	861.12 ± 0.78	370.00	801.81 ± 0.86	450.00	734.24 ± 1.66
300.00	859.61 ± 0.79	380.00	793.45 ± 0.88	460.00	725.68 ± 1.91
310.00	851.43 ± 0.81	390.00	785.07 ± 0.91		
320.00	843.22 ± 0.82	400.00	776.66 ± 0.96		

cont.

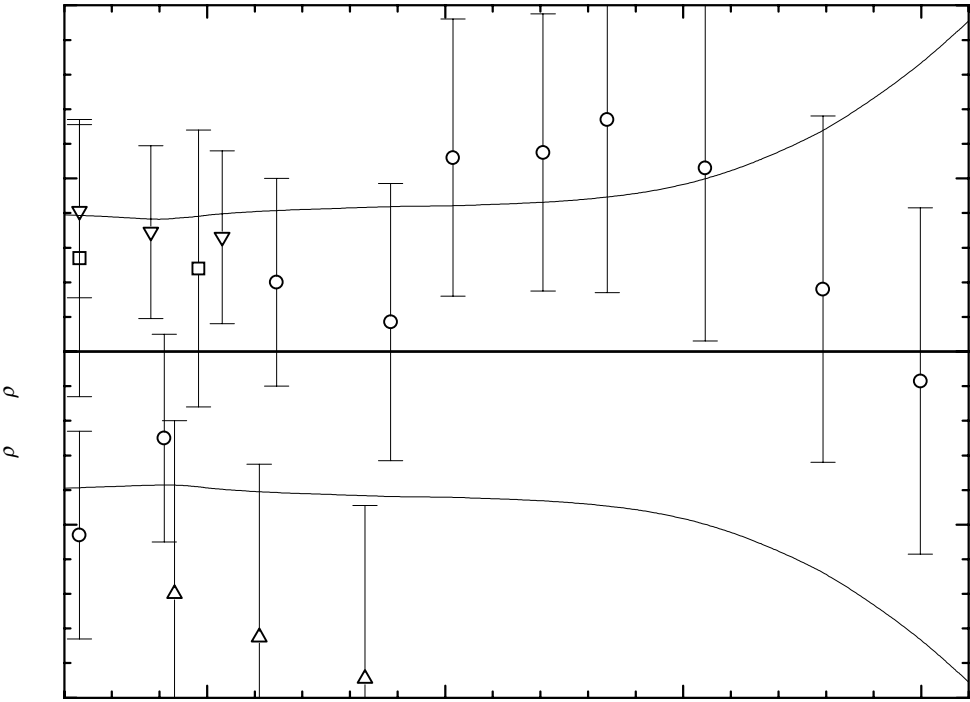


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

Butyl octanoate [589-75-3] C₁₂H₂₄O₂ MW = 200.32 207

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 4.6146 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.3834 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 458.05 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.06982 \cdot 10^3$
B	$-6.29947 \cdot 10^{-1}$
C	$-2.55053 \cdot 10^{-4}$

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)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	879.60 ± 0.60	0.88	1886-gar(□)	338.45	827.70 ± 0.80	0.30	1886-gar(□)
303.05	855.80 ± 0.60	0.31	1886-gar(□)	351.65	816.60 ± 0.80	-0.16	1886-gar(□)

cont.

Butyl octanoate (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)
370.55	801.50 ± 0.80	0.13	1886-gar(□)	288.15	866.74 ± 0.50	-0.38	1935-bil/gis(Δ)
384.15	790.50 ± 1.00	0.31	1886-gar(□)	303.15	854.76 ± 0.50	-0.65	1935-bil/gis(Δ)
406.05	772.50 ± 1.00	0.52	1886-gar(□)	273.15	878.60 ± 0.80	-0.12	1943-hob/par(O)
458.05	727.20 ± 1.00	-0.56	1886-gar(□)	298.15	858.40 ± 0.80	-0.93	1943-hob/par(O)

¹⁾ Not included in Fig. 1.

Further references: [59-smi/bag].

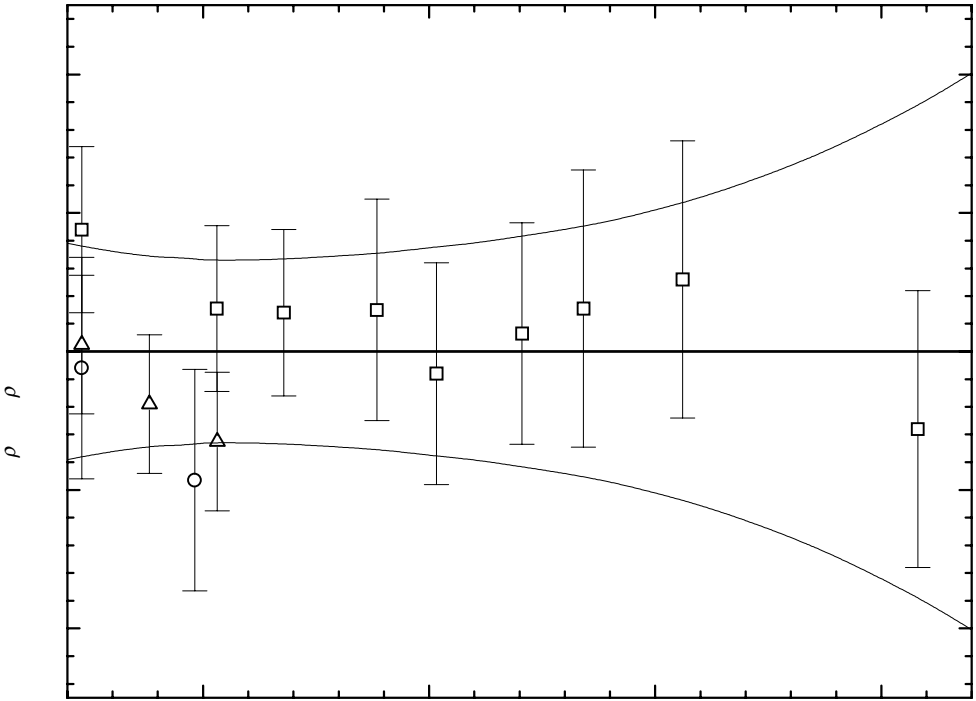


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

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	881.14 ± 0.78	330.00	834.16 ± 0.69	410.00	768.67 ± 1.11
280.00	873.44 ± 0.72	340.00	826.15 ± 0.71	420.00	760.25 ± 1.22
290.00	865.68 ± 0.68	350.00	818.09 ± 0.75	430.00	751.78 ± 1.34
293.15	863.23 ± 0.68	360.00	809.98 ± 0.78	440.00	743.26 ± 1.48
298.15	859.33 ± 0.67	370.00	801.82 ± 0.83	450.00	734.69 ± 1.64
300.00	857.88 ± 0.66	380.00	793.61 ± 0.88	460.00	726.07 ± 1.81
310.00	850.02 ± 0.66	390.00	785.35 ± 0.94	470.00	717.40 ± 2.01
320.00	842.12 ± 0.67	400.00	777.03 ± 1.02		

Decyl ethanoate [112-17-4] C₁₂H₂₄O₂ MW = 200.32 208

Table 1. Fit with estimated *B* coefficient for 8 accepted points. Deviation $\sigma_w = 0.838$.

Coefficient	$\rho = A + BT$
<i>A</i>	1119.99
<i>B</i>	-0.860

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	867.1 ± 1.0	-0.78	1927-tal	298.15	866.8 ± 2.0	3.22	1980-mey/awe ¹⁾
293.15	867.1 ± 1.0	-0.78	1932-kom/tal	308.15	854.5 ± 1.0	-0.48	1955-shi/bon
293.15	865.4 ± 2.0	-2.48	1959-smi/bag ¹⁾	323.15	841.5 ± 1.0	-0.58	1955-shi/bon
293.15	872.0 ± 2.0	4.12	1963-kug/kov ¹⁾	338.15	829.3 ± 1.0	0.12	1955-shi/bon
293.15	864.5 ± 2.0	-3.38	1964-bre/ulo ¹⁾	353.15	817.2 ± 1.0	0.92	1955-shi/bon
298.15	863.4 ± 1.0	-0.14	1976-dus/pie	368.15	805.1 ± 1.0	1.72	1955-shi/bon

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	870.6 ± 1.4	320.00	844.8 ± 1.0	350.00	819.0 ± 1.3
293.15	867.9 ± 1.3	330.00	836.2 ± 1.1	360.00	810.4 ± 1.5
298.15	863.6 ± 1.3	340.00	827.6 ± 1.2	370.00	801.8 ± 1.8
310.00	853.4 ± 1.1				

1-(1,1-Dimethylethyl)-2-ethylbutyl
ethanoate

[500000-37-3]

C₁₂H₂₄O₂

MW = 200.32

209

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	871.8 ± 1.0	1941-whi/whi

1,5-Dimethyl-1-ethylhexyl ethanoate

[500002-29-9]

C₁₂H₂₄O₂

MW = 200.32

210

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.
285.15	861.0 ± 2.0	1928-esc

3,7-Dimethyloctyl ethanoate

[500002-75-5]

C₁₂H₂₄O₂

MW = 200.32

211

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.
290.15	876.0 ± 2.0	1923-von/kai

Ethyl 2-butylhexanoate

[2985-48-0]

C₁₂H₂₄O₂

MW = 200.32

212

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	863.6 ± 2.0	1925-hes/bap

l-Ethyl 2-butylhexanoate

[500002-57-3]

C₁₂H₂₄O₂

MW = 200.32

213

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.
297.15	862.0 ± 1.0	1933-lev/mar-1

Ethyl decanoate

[110-38-3]

C₁₂H₂₄O₂

MW = 200.32

214

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{\text{c,w}} = 4.0587 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.0223 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 359.75 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.09384 \cdot 10^3$
B	$-7.81542 \cdot 10^{-1}$

cont.

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{cal}}}{\text{kg} \cdot \text{m}^{-3}}$	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)
301.15	859.00 ± 1.00	0.52	1924-lan/gob(×)	293.15	864.80 ± 0.60	0.07	1948-vog-9(Δ)
273.15	880.30 ± 1.00	-0.06	1931-def(∇)	298.15	860.80 ± 0.60	-0.02	1948-vog-9(Δ)
288.15	868.10 ± 1.00	-0.54	1931-def(∇)	314.15	848.40 ± 0.60	0.08	1948-vog-9(Δ)
303.15	856.00 ± 1.00	-0.91	1931-def(∇)	315.15	847.60 ± 0.60	0.07	1948-vog-9(Δ)
293.15	863.70 ± 1.00	-1.03	1931-sob/kah(◆)	334.15	833.10 ± 0.80	0.41	1948-vog-9(Δ)
288.15	869.10 ± 0.60	0.46	1932-kao/ma -1(O)	335.05	832.40 ± 0.80	0.42	1948-vog-9(Δ)
293.15	865.00 ± 0.60	0.27	1932-kao/ma -1(O)	359.15	813.10 ± 0.80	-0.05	1948-vog-9(Δ)
298.15	860.90 ± 0.60	0.08	1932-kao/ma -1(O)	359.75	812.60 ± 0.80	-0.08	1948-vog-9(Δ)
289.25	867.80 ± 0.60	0.02	1948-vog-9(Δ)	293.15	865.00 ± 0.50	0.27	1970-ere(□)

¹⁾ Not included in Fig. 1.

Further references: [1861-fis, 1952-gro/feu, 1955-shi/bon, 1959-smi/bag].

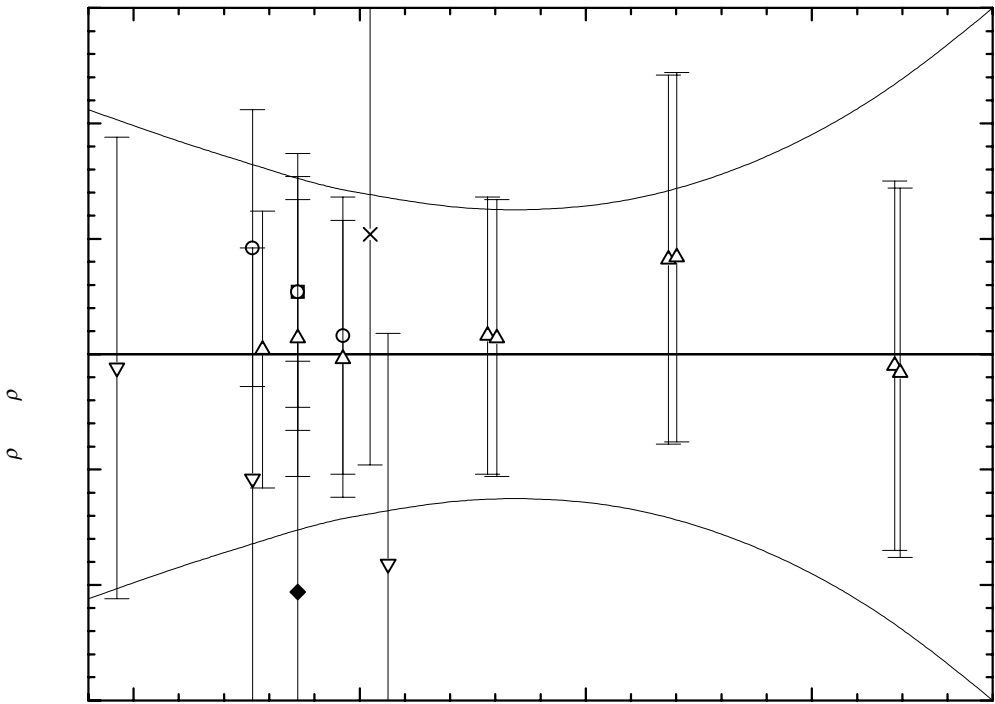


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

Ethyl decanoate (cont.)

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	882.82 ± 1.06	300.00	859.38 ± 0.70	350.00	820.30 ± 0.94
280.00	875.01 ± 0.92	310.00	851.56 ± 0.63	360.00	812.48 ± 1.18
290.00	867.19 ± 0.80	320.00	843.74 ± 0.62	370.00	804.67 ± 1.50
293.15	864.73 ± 0.76	330.00	835.93 ± 0.66		
298.15	860.82 ± 0.71	340.00	828.11 ± 0.77		

D-Ethyl 2-ethyloctanoate

[500002-55-1]

C₁₂H₂₄O₂

MW = 200.32

215

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	862.0 ± 1.0	1931-lev/mar-5

Ethyl 2-methylnonanoate

[2458-99-3]

C₁₂H₂₄O₂

MW = 200.32

216

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	856.0 ± 2.0	1929-lev/mik

Ethyl 3-methylnonanoate

[86051-37-8]

C₁₂H₂₄O₂

MW = 200.32

217

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	865.3 ± 2.0	1922-lev/tay-1

l-Ethyl 2-propylheptanoate

[500002-56-2]

C₁₂H₂₄O₂

MW = 200.32

218

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	862.0 ± 1.0	1932-lev/mar

2-Ethylbutyl 2-ethylbutanoate

[55145-34-1]

C₁₂H₂₄O₂

MW = 200.32

219

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	866.1 ± 1.0	1968-ano

2-Ethylbutyl hexanoate

[91933-26-5]

C₁₂H₂₄O₂

MW = 200.32

220

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	869.0 ± 1.0	1968-ano

1-Ethyl-2-methylbutyl 3-methylbutanoate

[500002-32-4]

C₁₂H₂₄O₂

MW = 200.32

221

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.
273.15	837.0 ± 2.0	1907-fou/tif

Heptyl 3-methylbutanoate

[56423-43-9]

C₁₂H₂₄O₂

MW = 200.32

222

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.
288.15	864.1 ± 0.7	1937-rog/dvo

Heptyl pentanoate

[5451-80-9]

C₁₂H₂₄O₂

MW = 200.32

223

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{\text{c,w}} = 4.7223 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.3462 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 484.35 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	1.05558 · 10 ³
B	-5.55480 · 10 ⁻¹
C	-3.47025 · 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	878.50 ± 0.60	0.55	1886-gar(□)	457.35	728.90 ± 1.00	-0.04	1886-gar(□)
304.15	855.00 ± 0.60	0.48	1886-gar(□)	466.15	721.10 ± 1.00	-0.13	1886-gar(□)
337.85	828.50 ± 0.80	0.20	1886-gar(□)	484.35	704.50 ± 1.00	-0.62	1886-gar(□)
370.15	802.70 ± 0.80	0.28	1886-gar(□)	273.15	878.27 ± 0.50	0.32	1935-bil/gis(○)
383.55	791.60 ± 1.00	0.13	1886-gar(□)	288.15	866.22 ± 0.50	-0.48	1935-bil/gis(○)
402.75	775.80 ± 1.00	0.23	1886-gar(□)	303.15	854.23 ± 0.50	-1.06	1935-bil/gis(○)
428.35	754.10 ± 1.00	0.14	1886-gar(□)				

¹⁾ Not included in Fig. 1.

Further references: [1959-smi/bag].

cont.

Heptyl pentanoate (cont.)

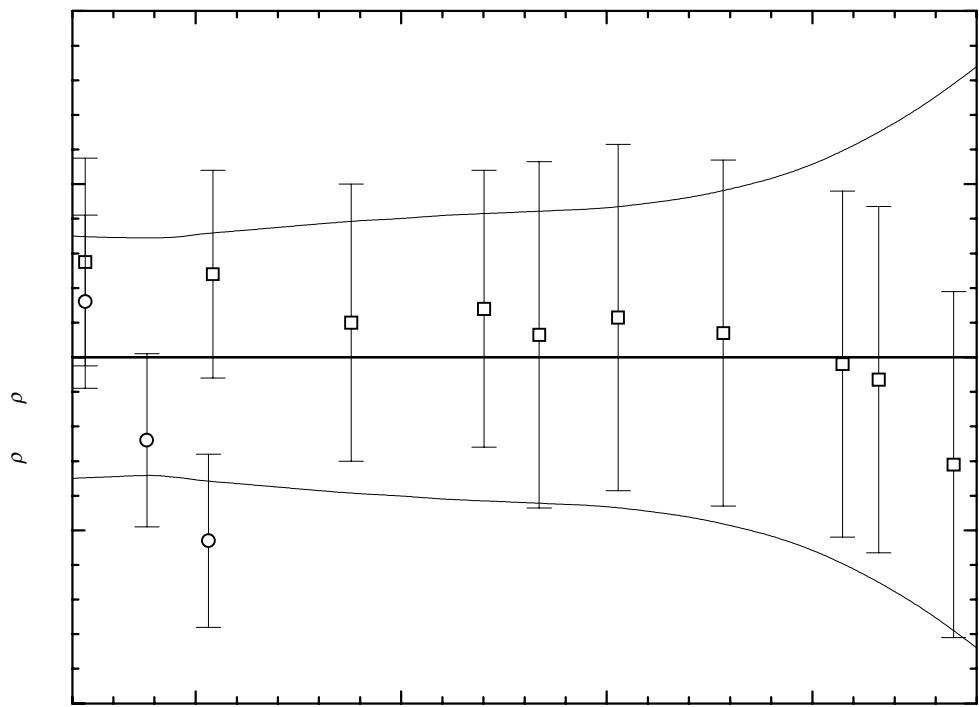


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	880.30 ± 0.70	340.00	826.60 ± 0.79	430.00	752.55 ± 0.97
280.00	872.83 ± 0.69	350.00	818.65 ± 0.80	440.00	743.98 ± 1.03
290.00	865.30 ± 0.68	360.00	810.63 ± 0.82	450.00	735.34 ± 1.11
293.15	862.91 ± 0.69	370.00	802.54 ± 0.83	460.00	726.62 ± 1.22
298.15	859.11 ± 0.70	380.00	794.38 ± 0.84	470.00	717.84 ± 1.35
300.00	857.70 ± 0.71	390.00	786.16 ± 0.85	480.00	708.99 ± 1.50
310.00	850.03 ± 0.73	400.00	777.86 ± 0.86	490.00	700.07 ± 1.68
320.00	842.29 ± 0.75	410.00	769.49 ± 0.89		
330.00	834.48 ± 0.77	420.00	761.06 ± 0.92		

Hexyl hexanoate

[6378-65-0]

C₁₂H₂₄O₂

MW = 200.32

224

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation $\sigma_w = 0.323$.

Coefficient	$\rho = A + BT$
<i>A</i>	1102.51
<i>B</i>	-0.820

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.
273.15	878.2 ± 0.5	-0.32	1935-bil/gis
288.15	866.1 ± 0.5	-0.08	1935-bil/gis
303.15	854.1 ± 0.5	0.19	1935-bil/gis
293.15	863.0 ± 1.0	0.88	1959-smi/bag

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	881.1 ± 1.0
280.00	872.9 ± 0.7
290.00	864.7 ± 0.6
293.15	862.1 ± 0.7
298.15	858.0 ± 0.8
310.00	848.3 ± 1.1

Methyl undecanoate

[1731-86-8]

C₁₂H₂₄O₂

MW = 200.32

225

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation $\sigma_w = 0.231$.

Coefficient	$\rho = A + BT$
<i>A</i>	1111.22
<i>B</i>	-0.820

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.
293.15	870.0 ± 1.0	-0.84	1964-adr/dek
293.15	870.8 ± 0.5	-0.04	1964-gou/vlu
313.15	854.5 ± 0.5	0.06	1964-gou/vlu
298.15	866.9 ± 0.4	0.12	1990-ort

cont.

Methyl undecanoate (cont.)

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	873.4 ± 0.7
293.15	870.8 ± 0.7
298.15	866.7 ± 0.6
310.00	857.0 ± 0.7
320.00	848.8 ± 1.0

1-Methylheptyl butanoate [20286-44-6] C₁₂H₂₄O₂ MW = 200.32 226

Table 1. Fit with estimated *B* coefficient for 5 accepted points. Deviation σ_w = 0.957.

Coefficient	$\rho = A + BT$
<i>A</i>	1105.07
<i>B</i>	-0.847

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.
290.15	858.7 ± 1.0	-0.62	1914-pic/ken-1
325.15	831.4 ± 1.0	1.73	1914-pic/ken-1
364.15	797.0 ± 1.0	0.36	1914-pic/ken-1
399.15	766.3 ± 1.0	-0.69	1914-pic/ken-1
293.15	856.0 ± 1.0	-0.78	1967-mus/mek

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	859.4 ± 1.6	330.00	825.6 ± 1.3	370.00	791.7 ± 1.5
293.15	856.8 ± 1.5	340.00	817.1 ± 1.3	380.00	783.2 ± 1.6
298.15	852.5 ± 1.5	350.00	808.6 ± 1.3	390.00	774.7 ± 1.7
310.00	842.5 ± 1.4	360.00	800.2 ± 1.4	400.00	766.3 ± 1.9
320.00	834.0 ± 1.3				

1-Methylhexyl pentanoate [7155-20-6] C₁₂H₂₄O₂ MW = 200.32 227

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation σ_w = 1.008.

Coefficient	$\rho = A + BT$
<i>A</i>	1109.03
<i>B</i>	-0.865

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.
289.15	857.9 ± 1.0	-1.01	1914-pic/ken-1
320.15	833.0 ± 1.0	0.90	1914-pic/ken-1
354.15	803.8 ± 1.0	1.11	1914-pic/ken-1
397.15	764.5 ± 1.0	-0.99	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	866.8 ± 1.8	320.00	832.2 ± 1.4	370.00	789.0 ± 1.5
290.00	858.2 ± 1.7	330.00	823.6 ± 1.4	380.00	780.3 ± 1.6
293.15	855.5 ± 1.6	340.00	814.9 ± 1.3	390.00	771.7 ± 1.7
298.15	851.1 ± 1.6	350.00	806.3 ± 1.4	400.00	763.0 ± 1.8
310.00	840.9 ± 1.5	360.00	797.6 ± 1.4		

1-Methylnonyl ethanoate [500003-32-7] C₁₂H₂₄O₂ MW = 200.32 228

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation σ_w = 1.021.

Coefficient	$\rho = A + BT$
<i>A</i>	1108.63
<i>B</i>	-0.850

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.
293.15	859.7 ± 1.0	0.25	1914-pic/ken-1
325.15	833.4 ± 1.0	1.15	1914-pic/ken-1
355.15	807.0 ± 1.0	0.25	1914-pic/ken-1
395.15	771.1 ± 1.0	-1.65	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	862.1 ± 1.7	330.00	828.1 ± 1.4	370.00	794.1 ± 1.5
293.15	859.5 ± 1.7	340.00	819.6 ± 1.4	380.00	785.6 ± 1.6
298.15	855.2 ± 1.6	350.00	811.1 ± 1.4	390.00	777.1 ± 1.7
310.00	845.1 ± 1.5	360.00	802.6 ± 1.4	400.00	768.6 ± 1.8
320.00	836.6 ± 1.4				

2-Methylnonyl ethanoate

[500002-10-8]

C₁₂H₂₄O₂

MW = 200.32

229

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.
273.15	881.2 ± 2.0	1902-gue
288.15	870.5 ± 2.0	1902-gue

1-Methylpentyl hexanoate

[55195-15-2]

C₁₂H₂₄O₂

MW = 200.32

230

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation σ_w = 1.065.

Coefficient	$\rho = A + BT$
<i>A</i>	1098.93
<i>B</i>	-0.830

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.
287.15	860.6 ± 1.0	0.01	1914-pic/ken-1
324.15	831.3 ± 1.0	1.42	1914-pic/ken-1
362.15	798.5 ± 1.0	0.16	1914-pic/ken-1
394.15	770.2 ± 1.0	-1.58	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	866.5 ± 1.9	320.00	833.3 ± 1.5	370.00	791.8 ± 1.5
290.00	858.2 ± 1.7	330.00	825.0 ± 1.4	380.00	783.5 ± 1.6
293.15	855.6 ± 1.7	340.00	816.7 ± 1.4	390.00	775.2 ± 1.7
298.15	851.5 ± 1.6	350.00	808.4 ± 1.4	400.00	766.9 ± 1.8
310.00	841.6 ± 1.5	360.00	800.1 ± 1.4		

3-Methylpentyl 3-methylpentanoate

[52450-70-1]

C₁₂H₂₄O₂

MW = 200.32

231

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.
288.15	867.0 ± 2.0	1886-van
291.15	862.9 ± 1.0	1941-boh

1-Methylpropyl octanoate

[5458-61-7]

C₁₂H₂₄O₂

MW = 200.32

232

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation $\sigma_w = 0.913$.

Coefficient	$\rho = A + BT$
<i>A</i>	1098.22
<i>B</i>	-0.820

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.
288.15	861.3 ± 1.0	-0.63	1914-pic/ken-1
328.15	829.0 ± 1.0	-0.13	1914-pic/ken-1
361.65	800.9 ± 1.0	-0.76	1914-pic/ken-1
416.15	758.5 ± 1.0	1.53	1914-pic/ken-1

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	868.6 ± 1.9	330.00	827.6 ± 1.3	380.00	786.6 ± 1.4
290.00	860.4 ± 1.7	340.00	819.4 ± 1.3	390.00	778.4 ± 1.5
293.15	857.8 ± 1.7	350.00	811.2 ± 1.3	400.00	770.2 ± 1.6
298.15	853.7 ± 1.6	360.00	803.0 ± 1.3	410.00	762.0 ± 1.8
310.00	844.0 ± 1.5	370.00	794.8 ± 1.3	420.00	753.8 ± 1.9
320.00	835.8 ± 1.4				

Nonyl propanoate

[53184-67-1]

C₁₂H₂₄O₂

MW = 200.32

233

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	863.7 ± 1.0	1959-smi/bag

Octyl butanoate

[110-39-4]

C₁₂H₂₄O₂

MW = 200.32

234

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction): $\sigma_{c,w} = 3.6048 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.0419 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 457.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	1.06631 · 10 ³
<i>B</i>	-6.12394 · 10 ⁻¹
<i>C</i>	-2.71949 · 10 ⁻⁴

cont.

Nonyl propanoate (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)
273.15	879.26 ± 0.60	0.52	1886-gar(O)	405.55	773.30 ± 1.00	0.08	1886-gar(O)
289.75	866.40 ± 0.60	0.37	1886-gar(O)	420.45	760.70 ± 1.00	-0.05	1886-gar(O)
305.45	854.20 ± 0.60	0.32	1886-gar(O)	457.15	729.10 ± 1.00	-0.42	1886-gar(O)
337.95	828.40 ± 0.80	0.11	1886-gar(O)	273.15	878.72 ± 0.50	-0.02	1935-bil/gis(□)
351.25	817.70 ± 0.80	0.05	1886-gar(O)	288.15	866.83 ± 0.50	-0.43	1935-bil/gis(□)
370.15	802.60 ± 0.80	0.23	1886-gar(O)	303.15	854.89 ± 0.50	-0.78	1935-bil/gis(□)
383.35	791.60 ± 1.00	0.02	1886-gar(O)				

¹⁾ Not included in Fig. 1.

Further references: [1873-van-1, 13-sen/abo, 1959-smi/bag, 1967-mus/mek].

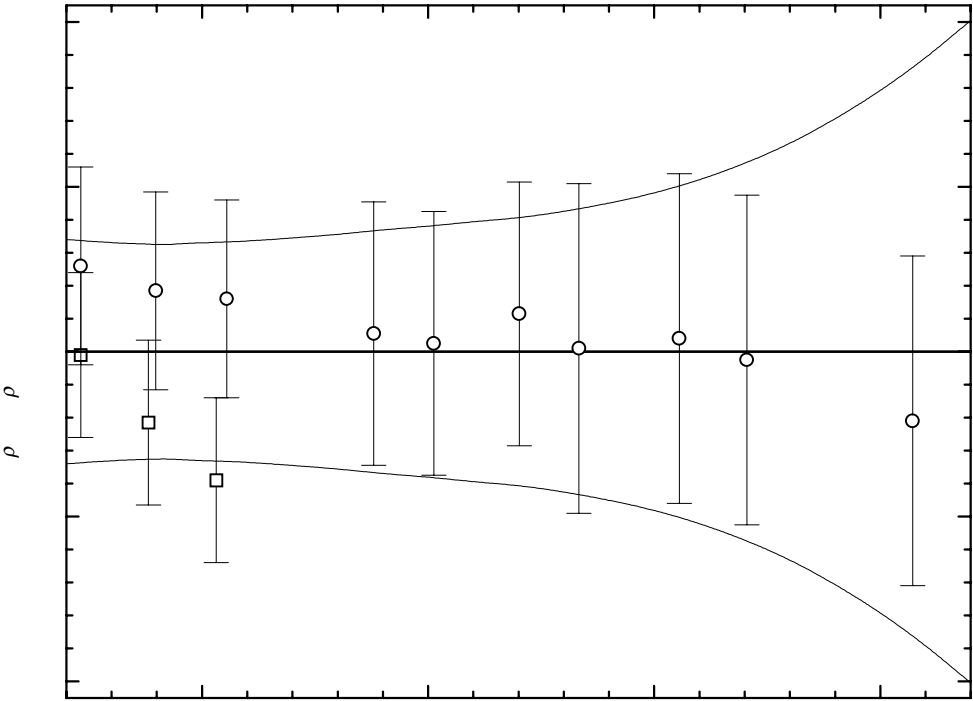


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

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	881.13 ± 0.68	330.00	834.60 ± 0.71	410.00	769.51 ± 1.04
280.00	873.52 ± 0.66	340.00	826.65 ± 0.74	420.00	761.13 ± 1.14
290.00	865.84 ± 0.65	350.00	818.65 ± 0.76	430.00	752.69 ± 1.26
293.15	863.41 ± 0.65	360.00	810.60 ± 0.79	440.00	744.20 ± 1.41
298.15	859.55 ± 0.66	370.00	802.49 ± 0.81	450.00	735.66 ± 1.58
300.00	858.11 ± 0.66	380.00	794.33 ± 0.85	460.00	727.06 ± 1.78
310.00	850.33 ± 0.67	390.00	786.11 ± 0.90	470.00	718.41 ± 2.01
320.00	842.49 ± 0.69	400.00	777.84 ± 0.96		

Octyl 2-methylpropanoate [109-15-9] C₁₂H₂₄O₂ MW = 200.32 235

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.
287.15	855.4 ± 2.0	1913-sen/abo

Pentyl heptanoate [7493-82-5] C₁₂H₂₄O₂ MW = 200.32 236

Table 1. Fit with estimated *B* coefficient for 6 accepted points. Deviation $\sigma_w = 0.340$.

Coefficient	$\rho = A + BT$
<i>A</i>	1102.61
<i>B</i>	-0.820

Pentyl heptanoate (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.
273.15	878.5 ± 0.5	-0.15	1935-bil/gis	273.15	878.0 ± 0.8	-0.62	1943-hob/par
288.15	866.3 ± 0.5	-0.01	1935-bil/gis	298.15	858.0 ± 0.8	-0.12	1943-hob/par
303.15	854.2 ± 0.5	0.22	1935-bil/gis	293.15	863.2 ± 1.0	0.98	1959-smi/bag

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	881.2 ± 1.0
280.00	873.0 ± 0.8
290.00	864.8 ± 0.7
293.15	862.2 ± 0.7
298.15	858.1 ± 0.8
310.00	848.4 ± 1.1

Propyl nonanoate

[6513-03-7]

C₁₂H₂₄O₂

MW = 200.32

237

Table 1. Fit with estimated *B* coefficient for 5 accepted points. Deviation $\sigma_w = 0.630$.

Coefficient	$\rho = A + BT$
<i>A</i>	1105.56
<i>B</i>	-0.825

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	864.0 ± 1.0	0.34	1938-alb	273.15	874.4 ± 2.0	-5.81	1943-hob/par ¹⁾
298.15	860.1 ± 1.0	0.50	1938-alb	298.15	854.0 ± 2.0	-5.59	1943-hob/par ¹⁾
373.15	798.1 ± 1.0	0.39	1938-alb	293.15	863.7 ± 1.0	-0.01	1959-smi/bag
453.15	730.5 ± 1.0	-1.21	1938-alb				

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	866.3 ± 1.4	350.00	816.8 ± 0.9	410.00	767.3 ± 1.6
293.15	863.7 ± 1.3	360.00	808.6 ± 1.0	420.00	759.1 ± 1.8
298.15	859.6 ± 1.3	370.00	800.3 ± 1.1	430.00	750.8 ± 2.0
310.00	849.8 ± 1.1	380.00	792.1 ± 1.2	440.00	742.6 ± 2.2
320.00	841.6 ± 1.0	390.00	783.8 ± 1.3	450.00	734.3 ± 2.3
330.00	833.3 ± 0.9	400.00	775.6 ± 1.5	460.00	726.1 ± 2.5
340.00	825.1 ± 0.9				

2,2,4-Trimethylpentyl 2-methylpropanoate

[36679-74-0]

C₁₂H₂₄O₂

MW = 200.32

238

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	854.5 ± 1.0	1925-ter