

3 Tabulated Data on Density - Direct Bonding Between Rings

3.1 Saturated Alicyclic Rings

1,1'-Bicyclopentyl

[1636-39-1]

 $C_{10}H_{18}$

MW = 138.25

315

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

$\sigma_{c,w} = 1.2178 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 4.5371 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 372.94 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.07049 \cdot 10^3$
B	$-6.66377 \cdot 10^{-1}$
C	$-1.22861 \cdot 10^{-4}$

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)
293.15	864.80 ± 0.60	0.22	30-zel/sch(✕)	372.94	805.20 ± 0.70	0.32	52-ano(Δ)
293.15	864.70 ± 0.60	0.12	48-ano-3(\blacklozenge)	310.93	851.10 ± 0.80	-0.32	63-gud/cam(✕)
293.15	864.60 ± 0.30	0.02	49-boo/gre(\bigcirc)	273.15	879.30 ± 0.50	-0.00	68-ano-1(∇)
293.15	864.50 ± 0.30	-0.08	50-boo/gre(\square)	293.15	864.60 ± 0.50	0.02	68-ano-1(∇)
273.15	879.30 ± 0.50	-0.00	52-ano(Δ)	310.95	851.40 ± 0.50	-0.00	68-ano-1(∇)
293.15	864.60 ± 0.50	0.02	52-ano(Δ)	333.15	834.90 ± 0.50	0.05	68-ano-1(∇)
310.93	851.40 ± 0.50	-0.02	52-ano(Δ)	372.05	805.20 ± 0.70	-0.36	68-ano-1(∇)
333.15	834.90 ± 0.50	0.05	52-ano(Δ)				

Further references: [26-zel/tit, 38-eva-2, 49-wei, 55-lev/skv, 61-koz/sku].

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	881.61 ± 0.58	300.00	859.52 ± 0.51	350.00	822.21 ± 0.64
280.00	874.27 ± 0.52	310.00	852.11 ± 0.54	360.00	814.67 ± 0.69
290.00	866.91 ± 0.50	320.00	844.67 ± 0.56	370.00	807.11 ± 0.77
293.15	864.58 ± 0.50	330.00	837.21 ± 0.58	380.00	799.53 ± 0.89
298.15	860.89 ± 0.51	340.00	829.72 ± 0.61		

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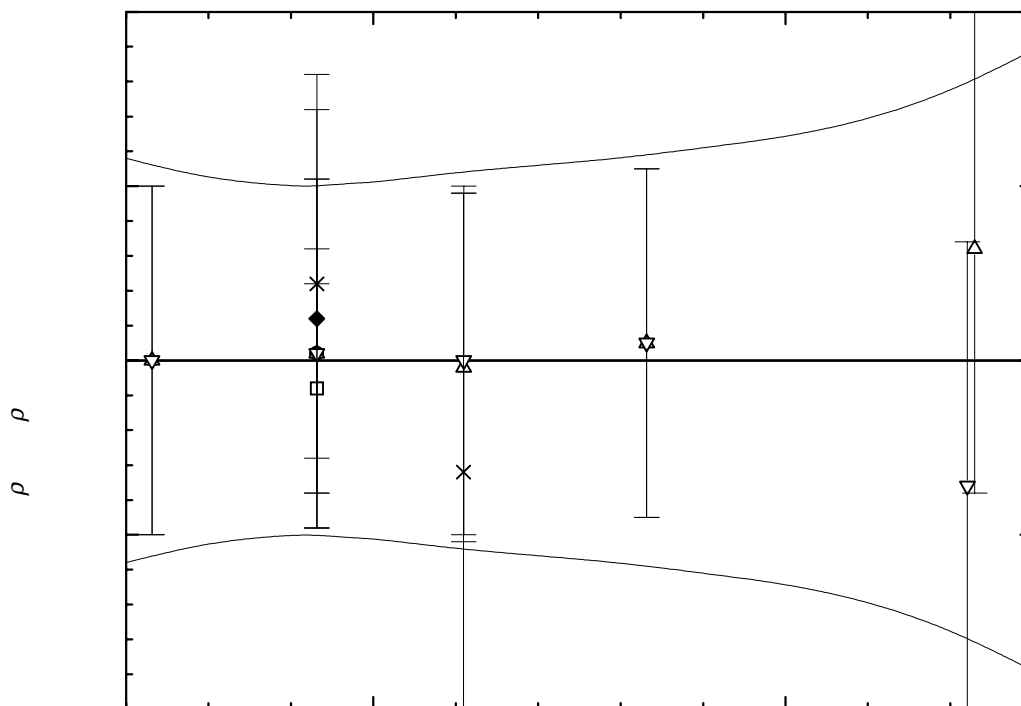
1,1'-Bicyclopentyl (cont.)

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.)

1,1'-Bicyclohexyl

[92-51-3]

 $C_{12}H_{22}$

MW = 166.31

316

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

$\sigma_{c,w} = 1.8281$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 3.9754 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 293.15 \text{ to } 372.05 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.06149 \cdot 10^3$
B	$-5.99235 \cdot 10^{-1}$

cont.

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
292.75	887.60 ± 2.00	1.54	29-huc/neu ¹⁾	333.15	858.10 ± 0.50	-3.75	58-ano(○)
293.75	886.20 ± 0.60	0.74	29-huc/neu(∇)	372.04	842.10 ± 0.70	3.55	58-ano(○)
294.95	894.70 ± 8.00	9.96	29-huc/neu ¹⁾	293.15	886.19 ± 0.60	0.37	61-jes/sta(✕)
298.15	883.30 ± 1.00	0.48	31-kag(✕)	298.15	882.49 ± 0.60	-0.33	61-jes/sta(✕)
293.15	886.50 ± 0.70	0.68	42-ju /woo(✕)	293.15	886.17 ± 0.60	0.35	63-mea/sta(✕)
293.15	886.00 ± 0.80	0.18	45-gre/vog(✕)	298.15	882.47 ± 0.60	-0.35	63-mea/sta(✕)
293.15	886.00 ± 0.60	0.18	49-foe/fen(◆)	293.15	886.50 ± 0.50	0.68	68-ano-1(□)
303.15	879.00 ± 0.60	-0.83	49-wei(✕)	310.95	873.90 ± 0.50	-1.25	68-ano-1(□)
293.15	886.00 ± 0.60	0.18	50-wis/ser(✕)	333.15	858.10 ± 0.50	-3.75	68-ano-1(□)
293.15	886.50 ± 0.50	0.68	58-ano(○)	372.05	842.10 ± 0.70	3.56	68-ano-1(□)
310.93	873.90 ± 0.50	-1.27	58-ano(○)	298.15	882.73 ± 0.60	-0.09	86-tar/dia(Δ)

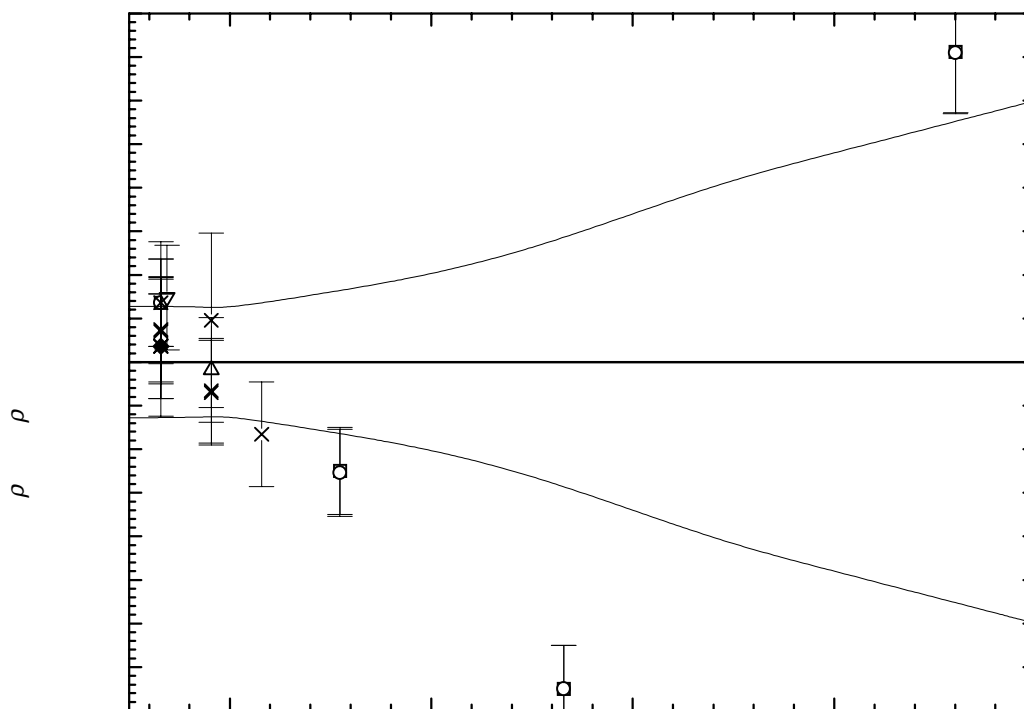
¹⁾ Not included in Fig. 1.

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.

1,1'-Bicyclohexyl (cont.)

Further references: [02-kur, 04-sab/mai, 15-sab/mur, 25-ipa/orl, 26-zel/tit, 32-zel/sch-1, 33-nam/aba, 33-sig/cra, 34-fre/cog, 36-bro/dur, 37-nam/aba, 38-eva-2, 59-wu /how, 63-gud/cam].

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

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	887.71 \pm 0.64	310.00	875.72 \pm 0.8	350.00	851.75 \pm 2.1
293.15	885.82 \pm 0.64	320.00	869.73 \pm 1.0	360.00	845.76 \pm 2.4
298.15	882.82 \pm 0.63	330.00	863.74 \pm 1.3	370.00	839.77 \pm 2.7
300.00	881.72 \pm 0.62	340.00	857.75 \pm 1.7	380.00	833.78 \pm 3.0

Cyclopentylcycloheptane**[42347-48-8]****C₁₂H₂₂****MW =166.31****317****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	891.1 \pm 0.5	61-koz/sku

3,3'-Dimethyl-1,1'-bicyclopentyl**[500037-62-7]****C₁₂H₂₂****MW =166.31****318****Table 1.** Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	878.4 \pm 3.0	12-sch/seg
291.65	875.1 \pm 3.0	26-zel/tit-1

(2-Methylcyclopentyl)cyclohexane**[5405-90-3]****C₁₂H₂₂****MW =166.31****319****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	868.0 \pm 2.0	32-zel/sch-1

(3-Methylcyclopentyl)cyclohexane**[500037-65-0]****C₁₂H₂₂****MW =166.31****320****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.
290.15	890.2 \pm 2.0	25-zel

1-Cyclopentyl-2,5-dimethylcyclohexane [500033-68-1] $C_{13}H_{24}$ MW =180.33 321

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	876.5 ± 1.5	50-pok

1-Cyclohexyl-1-methylcyclohexane [500040-31-3] $C_{13}H_{24}$ MW =180.33 322

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	889.7 ± 1.0	56-khr/kon

2-Methyl-1,1'-bicyclohexyl [66324-47-8] $C_{13}H_{24}$ MW =180.33 323

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
273.15	920.3 ± 8.0	25-gar/rei
293.15	905.8 ± 8.0	25-gar/rei
293.15	891.5 ± 2.0	57-sid
310.93	871.5 ± 2.0	63-gud/cam

2-Methyl-1,1'-bicyclohexyl (low boiling isomer) [500040-21-1] $C_{13}H_{24}$ MW =180.33 324

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	884.5 ± 0.6	51-goo/wis-1

2-Methyl-1,1'-bicyclohexyl (high boiling isomer) [500040-22-2] $C_{13}H_{24}$ MW =180.33 325

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	894.5 ± 0.6	51-goo/wis-1

1-Cyclohexyl-3-methylcyclohexane [29460-88-6] $C_{13}H_{24}$ MW =180.33 326

Table 1. Experimental values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
273.15	963.4 ± 20.0	10-mai/mur
291.15	913.8 ± 10.0	33-pet/ang
293.15	886.7 ± 10.0	33-pet/ang
293.15	893.0 ± 1.0	57-sid

1,1'-Bicycloheptyl [23183-11-1] $C_{14}H_{26}$ MW =194.36 327

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.700$.

Coefficient	$\rho = A + BT$
A	1111.26
B	-0.700

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.
273.15	919.4 ± 2.0	-0.70	02-mar/jak-1
293.15	906.8 ± 2.0	0.70	02-mar/jak-1

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
270.00	922.3 ± 2.3
280.00	915.3 ± 1.9
290.00	908.3 ± 2.0
293.15	906.1 ± 2.2
298.15	902.6 ± 2.4

1-Cyclopentyl-2,4,6-trimethylcyclohexane [500033-67-0] $C_{14}H_{26}$ MW =194.36 328

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	877.1 ± 1.5	50-pok

3,3'-Diethyl-1,1'-bicyclopentyl [500037-63-8] $C_{14}H_{26}$ MW =194.36 329

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
288.15	875.7 ± 3.0	37-bra/kam

1-3,3'-Dimethyl-1,1'-bicyclohexyl [500037-66-1] $C_{14}H_{26}$ MW =194.36 330

Table 1. Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 0.248$.

Coefficient	$\rho = A + BT$
A	1083.81
B	-0.700

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.
273.15	892.2 ± 2.0	-0.35	02-kur-1
293.15	878.8 ± 2.0	0.15	02-kur-1
293.15	878.8 ± 2.0	0.20	02-kur-1

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
270.00	894.8 ± 2.4
280.00	887.8 ± 1.9
290.00	880.8 ± 1.8
293.15	878.6 ± 1.9
298.15	875.1 ± 2.2

2-Ethyl-1,1'-bicyclohexyl [66826-94-6] $C_{14}H_{26}$ MW =194.36 331

Table 1. Experimental values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
273.15	924.0 ± 20.0	25-gar/rei
293.15	912.6 ± 20.0	25-gar/rei
310.93	873.1 ± 0.8	63-gud/cam

2-Ethyl-1,1'-bicyclohexyl (low boiling isomer) [500040-23-3] $C_{14}H_{26}$ MW =194.36 332

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	890.6 ± 0.6	51-goo/wis-1

2-Ethyl-1,1'-bicyclohexyl [500040-24-4] $C_{14}H_{26}$ MW = 194.36 333
(high boiling isomer)

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	896.2 ± 0.6	51-goo/wis-1

1,1':3',1''-Tercyclopentane [6051-40-7] $C_{15}H_{26}$ MW = 206.37 334

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction):
 $\sigma_{c,w} = 4.6617 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 4.2800 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 372.05 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.10297 \cdot 10^3$
B	$-6.58051 \cdot 10^{-1}$

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. (Symbol in Fig. 1)	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. (Symbol in Fig. 1)
310.93	900.50 ± 2.00	2.13	63-gud/cam(□)	310.95	897.90 ± 0.50	-0.45	68-ano-1(X)
273.15	922.90 ± 0.50	-0.33	68-ano-1(X)	333.15	883.30 ± 0.50	-0.44	68-ano-1(X)
293.15	909.70 ± 0.50	-0.37	68-ano-1(X)	372.05	857.60 ± 0.70	-0.55	68-ano-1(X)

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

T K	$\rho \pm \sigma_{\text{fit}}$ $\text{kg} \cdot \text{m}^{-3}$	T K	$\rho \pm \sigma_{\text{fit}}$ $\text{kg} \cdot \text{m}^{-3}$	T K	$\rho \pm \sigma_{\text{fit}}$ $\text{kg} \cdot \text{m}^{-3}$
270.00	925.30 ± 1.1	300.00	905.56 ± 1.00	350.00	872.66 ± 0.63
280.00	918.72 ± 1.0	310.00	898.98 ± 0.98	360.00	866.08 ± 0.65
290.00	912.14 ± 1.0	320.00	892.40 ± 0.90	370.00	859.49 ± 0.76
293.15	910.07 ± 1.0	330.00	885.82 ± 0.79	380.00	852.91 ± 1.00
298.15	906.78 ± 1.0	340.00	879.24 ± 0.68		

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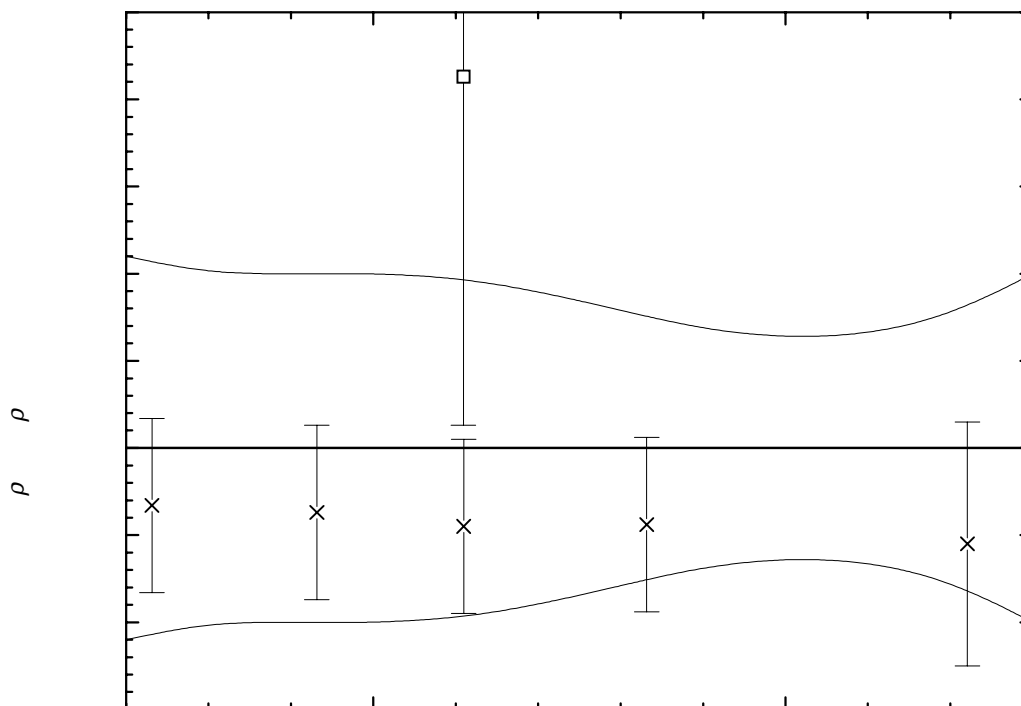


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

2-(1-Methylethyl)-1,1'-bicyclohexyl [500040-27-7] $C_{15}H_{28}$ MW =208.39 335
(low boiling isomer)

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	893.0 ± 0.6	51-goo/wis-1

2-(1-Methylethyl)-1,1'-bicyclohexyl [500040-28-8] $C_{15}H_{28}$ MW =208.39 336
(high boiling isomer)

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	903.6 ± 0.6	51-goo/wis-1

2-Propyl-1,1'-bicyclohexyl [500040-25-5] $C_{15}H_{28}$ MW =208.39 337
(low boiling isomer)

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	885.3 ± 0.6	51-goo/wis-1

2-Propyl-1,1'-bicyclohexyl [500040-26-6] $C_{15}H_{28}$ MW =208.39 338
(high boiling isomer)

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	892.0 ± 0.6	51-goo/wis-1

1,1'-Bicyclooctyl [6708-17-4] $C_{16}H_{30}$ MW =222.41 339

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.138$.

Coefficient	$\rho = A + BT$
A	1127.18
B	-0.680

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.
291.35	929.2 ± 2.0	0.14	31-ruz/boe
293.15	927.7 ± 2.0	-0.14	31-ruz/boe

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
290.00	930.0 ± 1.8
293.15	927.8 ± 1.8
298.15	924.4 ± 1.9

2-Butyl-1,1'-bicyclohexyl [500040-29-9] $C_{16}H_{30}$ MW =222.41 340
(low boiling isomer)

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	882.3 ± 0.6	51-goo/wis-1

2-Butyl-1,1'-bicyclohexyl [500040-30-2] $C_{16}H_{30}$ MW =222.41 341
(high boiling isomer)

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	888.2 ± 0.6	51-goo/wis-1

4-Butyl-1,1'-bicyclohexyl [93189-65-2] $C_{16}H_{30}$ MW =222.41 342

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	878.9 ± 2.0	60-kap/kaz

Cyclopentylbicyclohexyl [26447-22-3] $C_{17}H_{30}$ MW =234.43 343

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.
310.93	916.9 ± 1.0	63-gud/cam

1,1':2'1''-Tercyclohexyl [2456-43-1] $C_{18}H_{32}$ MW = 248.45 344

Table 1. Coefficients of the polynomial expansion equation. Standard deviations (see introduction):
 $\sigma_{c,w} = 2.4554 \cdot 10^{-2}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.4176 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 372.05 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.12588 \cdot 10^3$
B	$-6.21408 \cdot 10^{-1}$
C	$-3.81970 \cdot 10^{-5}$

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

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	953.30 ± 0.50	0.01	68-ano-1(✕)	333.15	914.60 ± 0.50	-0.02	68-ano-1(✕)
293.15	940.40 ± 0.50	-0.03	68-ano-1(✕)	372.05	889.40 ± 0.50	0.00	68-ano-1(✕)
310.95	929.00 ± 0.50	0.04	68-ano-1(✕)				

Further references: [63-gud/cam].

cont.

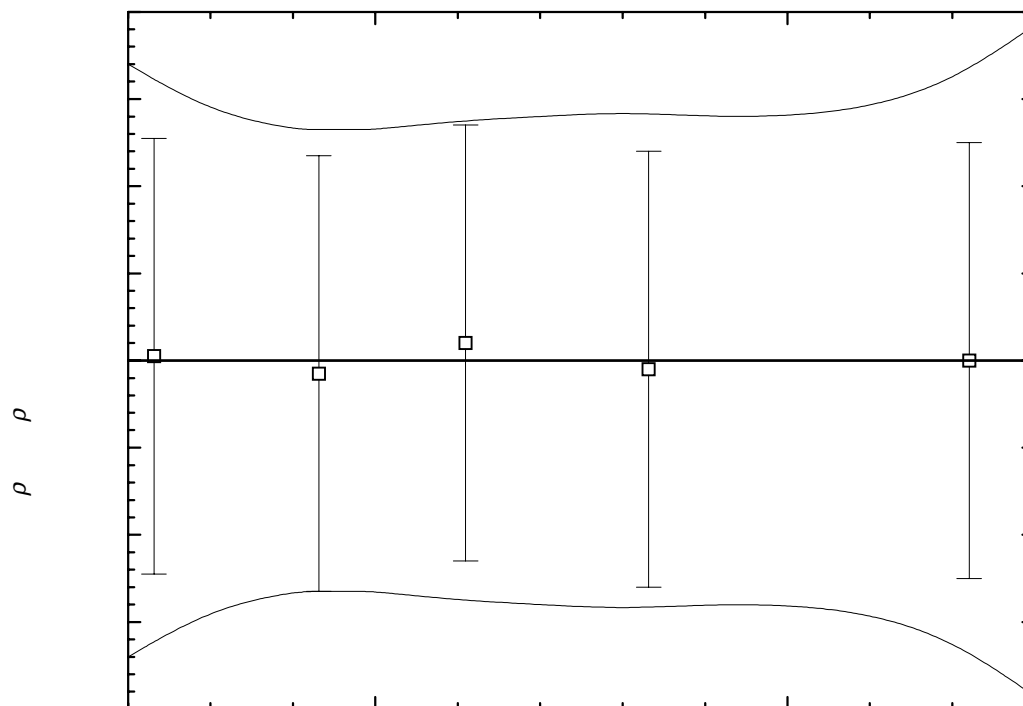
1,1':2'1''-Tercyclohexyl (cont.)

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	955.32 ± 0.68	300.00	936.02 ± 0.53	350.00	903.71 ± 0.56
280.00	948.89 ± 0.57	310.00	929.57 ± 0.55	360.00	897.22 ± 0.58
290.00	942.46 ± 0.53	320.00	923.12 ± 0.56	370.00	890.73 ± 0.64
293.15	940.43 ± 0.53	330.00	916.66 ± 0.57	380.00	884.23 ± 0.77
298.15	937.21 ± 0.53	340.00	910.19 ± 0.56		

1,1':3,1''-Tercyclohexyl [1706-50-9] $C_{18}H_{32}$ MW =248.45 345

Table 1. Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 0.401$.

Coefficient	$\rho = A + BT$
A	1123.18
B	-0.640

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	912.1 ± 20.0	-23.46	37-nam/aba ¹⁾
333.15	910.3 ± 1.0	0.34	68-ano-1
372.04	885.3 ± 1.0	0.23	68-ano-1
388.15	874.2 ± 1.0	-0.56	68-ano-1

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
330.00	912.0 ± 3.5	360.00	892.8 ± 0.9	380.00	880.0 ± 1.7
340.00	905.6 ± 2.6	370.00	886.4 ± 1.0	390.00	873.6 ± 2.7
350.00	899.2 ± 1.6				

2,2',4,4',6,6'-Hexamethyl-1,1'-bicyclohexyl [95278-29-8] $C_{18}H_{34}$ MW =250.47 346

Table 1. Experimental values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
298.15	890.6 ± 2.0	31-adk/zar
298.15	890.6 ± 2.0	33-adk/zar

4-Hexyl-1,1'-bicyclohexyl [94376-01-9] $C_{18}H_{34}$ MW =250.47 347

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	876.4 ± 2.0	60-kap/kaz

4-Heptyl-1,1'-bicyclohexyl [96667-88-8] $C_{19}H_{36}$ MW =264.49 348

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
310.93	860.1 ± 1.0	63-gud/cam

4,4'-Dibutyl-1,1'-bicyclohexyl [96624-48-5] $C_{20}H_{38}$ MW =278.52 349

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	872.1 ± 2.0	60-kap/kaz

4,4'-Dimethyl-1,1'-bis(1-methylethyl)-1,1'-bicyclohexyl [500037-67-2] $C_{20}H_{38}$ MW =278.52 350

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	891.0 ± 2.0	01-kur-1
293.15	891.0 ± 2.0	01-kur-1

4-Octyl-1,1'-bicyclohexyl [94873-86-6] $C_{20}H_{38}$ MW =278.52 351

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	871.8 ± 2.0	60-kap/kaz

4-Nonyl-1,1'-bicyclohexyl [95135-87-8] $C_{21}H_{40}$ MW =292.55 352

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.
310.93	872.7 ± 1.0	63-gud/cam

3,3'-Dicyclohexyl-1,1'-bicyclopentyl [500037-79-6] $C_{22}H_{38}$ MW =302.54 353

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	959.2 ± 2.0	37-bra/kam

4-(1-Propylheptyl)-1,1'-bicyclohexyl [53250-36-5] $C_{22}H_{42}$ MW =306.58 354

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	877.4 ± 2.0	60-kap/kaz

3,3'-Diheptyl-1,1'-bicyclopentyl [500040-19-7] $C_{24}H_{42}$ MW = 310.44 355

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.65	866.8 ± 1.5	41-von/rei

4,4'-Diheptyl-1,1'-bicyclohexyl [103043-49-8] $C_{26}H_{50}$ MW = 362.68 356

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	875.4 ± 2.0	60-kap/kaz

2-Hexadecyl-1,1'-bicyclopentyl [55334-11-7] $C_{26}H_{50}$ MW = 362.68 357

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

$\sigma_{\text{c,w}} = 1.5672 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 5.2484 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 372.05 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.04638 \cdot 10^3$
B	$-6.37888 \cdot 10^{-1}$

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. (Symbol in Fig. 1)	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. (Symbol in Fig. 1)
273.15	872.00 ± 0.50	-0.14	47-sch(□)	293.15	859.40 ± 0.60	0.02	49-foe/fen(Δ)
293.15	859.60 ± 0.50	0.22	47-sch(□)	293.15	859.60 ± 0.50	0.22	68-ano-1(O)
310.93	847.90 ± 0.50	-0.14	47-sch(□)	310.95	847.90 ± 0.50	-0.13	68-ano-1(O)
333.15	833.70 ± 0.50	-0.17	47-sch(□)	333.15	833.70 ± 0.50	-0.17	68-ano-1(O)
372.04	809.20 ± 0.70	0.14	47-sch(□)	372.05	809.20 ± 0.70	0.15	68-ano-1(O)

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

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

T K	$\rho \pm \sigma_{\text{fit}}$ $\text{kg} \cdot \text{m}^{-3}$	T K	$\rho \pm \sigma_{\text{fit}}$ $\text{kg} \cdot \text{m}^{-3}$	T K	$\rho \pm \sigma_{\text{fit}}$ $\text{kg} \cdot \text{m}^{-3}$
270.00	874.15 ± 0.57	300.00	855.01 ± 0.53	350.00	823.12 ± 0.56
280.00	867.77 ± 0.57	310.00	848.63 ± 0.51	360.00	816.74 ± 0.64
290.00	861.39 ± 0.55	320.00	842.25 ± 0.50	370.00	810.36 ± 0.74
293.15	859.38 ± 0.55	330.00	835.88 ± 0.50	380.00	803.98 ± 0.88
298.15	856.19 ± 0.54	340.00	829.50 ± 0.52		

cont.

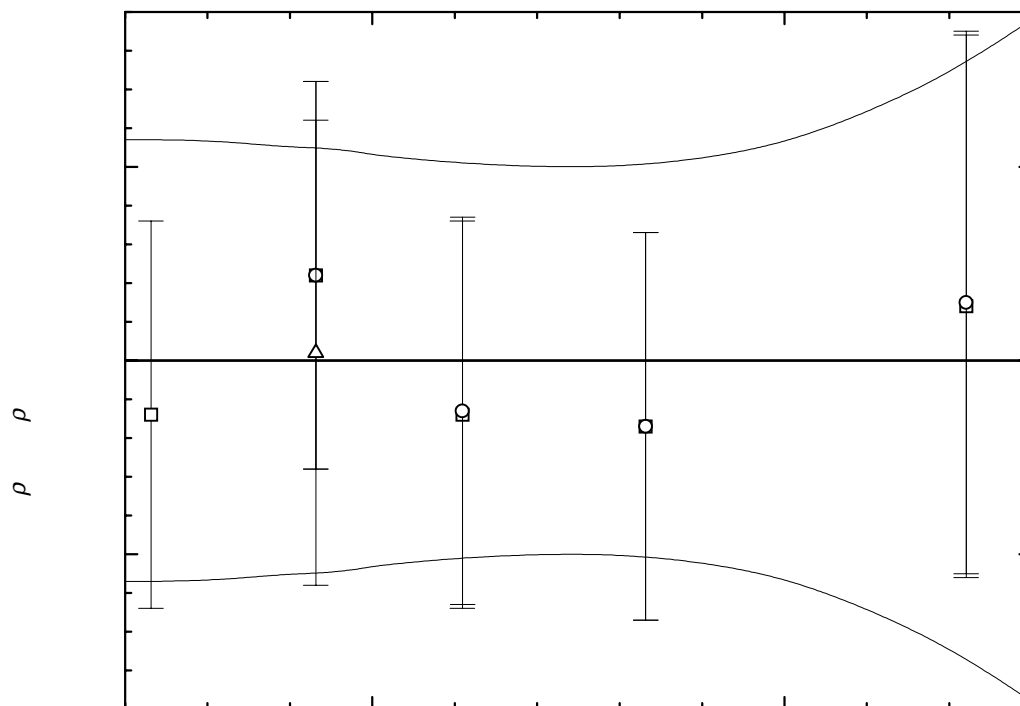
2-Hexadecyl-1,1'-bicyclopentyl (cont.)

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

2'-Dodecyl-1,1':3',1''-tercyclopentyl [55282-68-3] $C_{27}H_{50}$ MW = 374.69 358

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

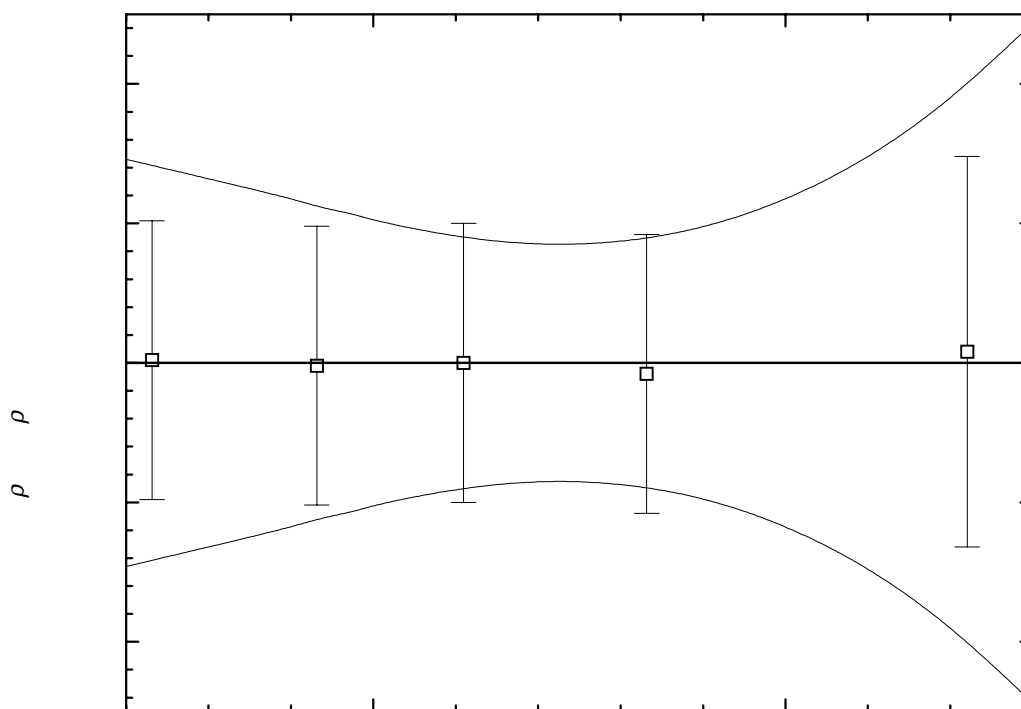
$\sigma_{c,w} = 2.3529 \cdot 10^{-2}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 1.2736 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 372.05 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.07297 \cdot 10^3$
B	$-6.24118 \cdot 10^{-1}$

cont.

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	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	902.50 ± 0.50	0.01	68-ano-1(□)	333.15	865.00 ± 0.50	-0.04	68-ano-1(□)
293.15	890.00 ± 0.50	-0.01	68-ano-1(□)	372.05	840.80 ± 0.70	0.04	68-ano-1(□)
310.95	878.90 ± 0.50	0.00	68-ano-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.)**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	904.46 ± 0.73	300.00	885.73 ± 0.51	350.00	854.53 ± 0.58
280.00	898.21 ± 0.66	310.00	879.49 ± 0.45	360.00	848.28 ± 0.73
290.00	891.97 ± 0.59	320.00	873.25 ± 0.42	370.00	842.04 ± 0.94
293.15	890.01 ± 0.56	330.00	867.01 ± 0.43	380.00	835.80 ± 1.22
298.15	886.89 ± 0.53	340.00	860.77 ± 0.48		

4,4'-Diocetyl bicyclohexyl [96374-56-0] $C_{28}H_{54}$ MW =390.74 359

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	870.9 ± 2.0	60-kap/kaz

2-Octadecyl bicyclopentyl [500040-17-5] $C_{28}H_{54}$ MW =390.74 360

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	868.4 ± 1.0	39-sui/gem

Bicyclopentadecyl [500037-71-8] $C_{30}H_{58}$ MW =418.79 361

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
361.75	872.8 ± 2.0	31-ruz/boe
373.15	866.0 ± 2.0	31-ruz/boe

3.2 Unsaturated Alicyclic Rings and Side Chains

1-Cyclopentylcyclopentene [4884-21-3] $C_{10}H_{16}$ MW =136.24 362

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	889.8 ± 2.0	32-zel/sch-1
293.15	933.2 ± 1.0	49-boo/gre

3-Cyclopentylcyclopentene [2690-17-7] $C_{10}H_{16}$ MW =136.24 363

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.
293.15	883.8 ± 1.5	37-bra/kam
293.15	883.2 ± 1.0	49-boo/gre
293.15	883.4 ± 1.0	Recommended

2-Cyclohexylcyclopentene [500037-57-0] $C_{11}H_{18}$ MW =150.26 364

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	899.5 ± 2.0	37-bra/kam

Bis(2-cyclohexen-1-yl) [1541-20-4] $C_{12}H_{18}$ MW =162.27 365

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	929.3 ± 2.0	34-fre/cog

1-Cyclohexylcyclohexene**[3282-54-0]****C₁₂H₂₀****MW = 164.29****366****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	901.0 \pm 4.0	11-wal ¹⁾
292.55	907.1 \pm 3.0	29-huc/neu ¹⁾
293.15	908.6 \pm 2.0	32-zel/sch-1
293.15	904.0 \pm 2.0	33-sig/cra
293.15	906.3 \pm 2.6	Recommended

¹⁾ Not included in calculation of recommended value.

3.3 Cycloalkyl Benzenes

Cyclopropylbenzene

[873-49-4]

 C_9H_{10}

MW =118.18

369

Table 1. Fit with estimated B coefficient for 7 accepted points. Deviation $\sigma_w = 0.771$.

Coefficient	$\rho = A + BT$
A	1181.84
B	-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	940.0 ± 2.0	-1.50	13-kiz	297.15	939.7 ± 2.0	1.53	30-les
288.15	944.8 ± 2.0	-0.81	13-kiz	298.15	937.4 ± 1.0	0.04	47-roq-2
293.15	939.7 ± 2.0	-1.75	30-les	293.15	942.0 ± 1.0	0.54	69-par/kho

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	952.2 ± 2.2
290.00	944.0 ± 1.7
293.15	941.5 ± 1.6
298.15	937.4 ± 1.6

Cyclobutylbenzene

[4392-30-7]

 $\text{C}_{10}\text{H}_{12}$

MW =132.21

370

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	937.8 ± 2.0	34-cas

Cyclopentylbenzene

[700-88-9]

 $\text{C}_{11}\text{H}_{14}$

MW = 146.23

371

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

$\sigma_{c,w} = 1.3052$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 4.2916 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 373.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.17909 \cdot 10^3$
B	$-7.90014 \cdot 10^{-1}$

cont

Cyclopentylbenzene (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)
298.15	943.19 ± 2.00	-0.36	14-bau-1(✕)	292.15	950.90 ± 2.00	2.61	36-den(▽)
292.15	950.30 ± 2.00	2.01	25-zel/tit(✕)	293.15	947.00 ± 1.00	-0.50	36-dup-3(○)
293.15	947.40 ± 1.00	-0.10	31-zel/tit(□)	273.15	961.80 ± 2.00	-1.50	38-eva-2(✕)
273.15	961.90 ± 2.00	-1.40	33-dup/cha(Δ)	293.15	946.20 ± 2.00	-1.30	38-eva-2(✕)
293.15	947.10 ± 1.00	-0.40	33-dup/cha(Δ)	323.15	922.80 ± 2.00	-1.00	38-eva-2(✕)
293.15	949.90 ± 2.00	2.40	34-cas(◆)	373.15	883.80 ± 2.00	-0.50	38-eva-2(✕)

Further references: [38-nam/pok].

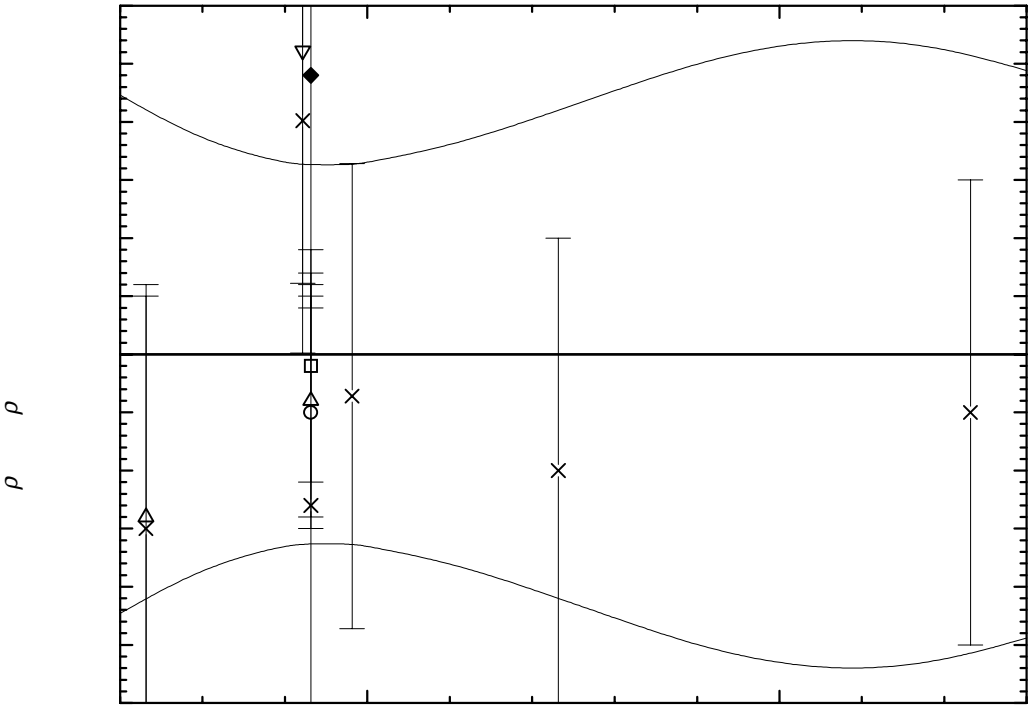


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

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

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	965.79 \pm 2.23	300.00	942.09 \pm 1.65	350.00	902.58 \pm 2.67
280.00	957.89 \pm 1.83	310.00	934.19 \pm 1.79	360.00	894.68 \pm 2.72
290.00	949.99 \pm 1.64	320.00	926.28 \pm 2.02	370.00	886.78 \pm 2.64
293.15	947.50 \pm 1.63	330.00	918.38 \pm 2.27	380.00	878.88 \pm 2.44
298.15	943.55 \pm 1.63	340.00	910.48 \pm 2.51		

1-Phenyl-1-cyclohexene

[771-98-2]

 $\text{C}_{12}\text{H}_{14}$

MW =158.24

372

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
273.15	1003.8 \pm 3.0	07-sab/mai-4	288.05	993.0 \pm 3.0	15-von/tre
287.15	994.0 \pm 3.0	07-sab/mai-4	293.15	993.1 \pm 3.0	16-von/hei
298.30	987.1 \pm 3.0	14-bau-2	293.15	984.0 \pm 3.0	33-sig/cra
287.85	993.2 \pm 3.0	15-von/tre	273.15	1008.0 \pm 3.0	35-lev/sfi

3-Phenyl-1-cyclohexene

[15232-96-9]

 $\text{C}_{12}\text{H}_{14}$

MW =158.24

373

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.
299.15	967.0 \pm 3.0	41-ber

Cyclohexylbenzene

[827-52-1]

 $\text{C}_{12}\text{H}_{16}$

MW = 160.26

374

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

$\sigma_{\text{c,w}} = 3.1610 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.2873 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 373.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.18090 \cdot 10^3$
B	$-8.11777 \cdot 10^{-1}$

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)
289.15	947.00 \pm 2.00	0.82	29-bod(X)	293.15	943.60 \pm 1.50	0.67	37-nam/pok(X)
295.15	940.50 \pm 1.50	-0.81	37-ish/mae(X)	293.15	943.80 \pm 1.50	0.87	37-tsu/sid(X)

cont.

Cyclohexylbenzene (cont.)

Table 2 (cont.)

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	959.10 ± 1.00	-0.06	38-eva-2(◆)	293.15	942.72 ± 0.50	-0.21	61-jes/sta(Δ)
293.15	942.80 ± 1.00	-0.13	38-eva-2(◆)	298.15	938.74 ± 0.50	-0.13	61-jes/sta(Δ)
323.15	918.30 ± 2.00	-0.28	38-eva-2(◆)	293.15	942.70 ± 0.50	-0.23	63-mea/sta(○)
373.15	877.50 ± 2.00	-0.49	38-eva-2(◆)	298.15	938.72 ± 0.50	-0.15	63-mea/sta(○)
288.15	947.00 ± 1.00	0.01	39-hal/caw(▽)	298.15	938.97 ± 0.40	0.10	86-tar/dia(□)

Further references: [01-kur-3, 31-kag, 34-lov/cam, 36-mat/han, 37-cor/ipa, 37-mck/sow].

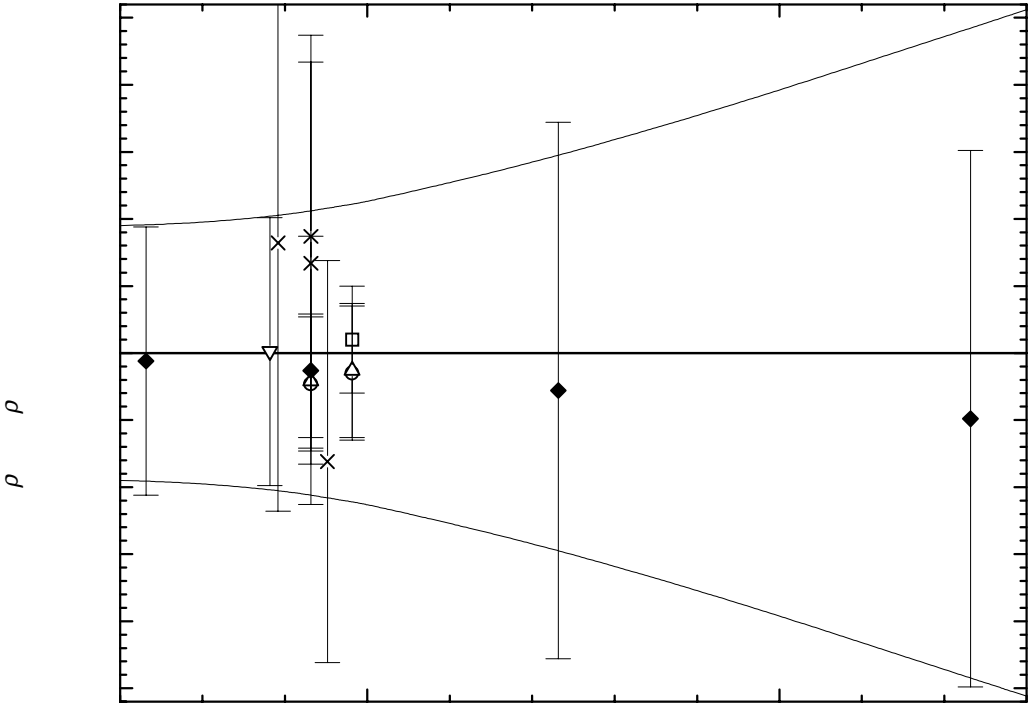


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

cont.

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

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	961.72 \pm 0.95	300.00	937.37 \pm 1.13	350.00	896.78 \pm 1.96
280.00	953.60 \pm 0.97	310.00	929.25 \pm 1.27	360.00	888.66 \pm 2.16
290.00	945.49 \pm 1.03	320.00	921.13 \pm 1.42	370.00	880.54 \pm 2.36
293.15	942.93 \pm 1.06	330.00	913.01 \pm 1.59	380.00	872.43 \pm 2.56
298.15	938.87 \pm 1.11	340.00	904.90 \pm 1.77		

1-(1-Methylethyl)-2-phenylcyclopropane [500060-03-7] $\text{C}_{12}\text{H}_{16}$ MW =160.26 375

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	899.0 \pm 5.0	44-dav/fel

1-Methyl-1-phenylcyclopentane [500022-32-2] $\text{C}_{12}\text{H}_{16}$ MW =160.26 376

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	944.6 \pm 0.5	48-lut/bea

1-Methyl-1-phenyl-1,3-cyclohexadiene [500036-70-4] $\text{C}_{13}\text{H}_{14}$ MW =170.25 377

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	995.0 \pm 2.0	55-col/keh

4-(Methylphenyl)-1-cyclohexene [1821-23-4] $\text{C}_{13}\text{H}_{16}$ MW =172.27 378

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.320$.

Coefficient	$\rho = A + BT$
A	1193.74
B	-0.780

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.
285.15	971.0 \pm 3.0	-0.32	07-sab/mai-4
273.15	981.0 \pm 3.0	0.32	07-sab/mai-4

cont.

1-(1-Cyclohexen-1-yl)-4-methylbenzene (cont.)**Table 3.** Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	983.1 \pm 2.9
280.00	975.3 \pm 2.7
290.00	967.5 \pm 2.9

1,4-Dimethyl-2-(2-cyclopentenyl)-benzene [500039-31-6] $\text{C}_{13}\text{H}_{16}$ MW =172.27 379

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	961.3 \pm 2.0	27-von/kuh

(4-Methyl-1-cyclohexen-1-yl)benzene [16776-31-1] $\text{C}_{13}\text{H}_{16}$ MW =172.27 380

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	961.0 \pm 2.0	60-col/dre

(5-Methyl-1-cyclohexenyl)benzene [500040-03-9] $\text{C}_{13}\text{H}_{16}$ MW =172.27 381

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	970.2 \pm 3.0	10-mai/mur
273.15	985.9 \pm 3.0	10-mai/mur

4-Methyl-1-phenyl-1-cyclohexene [500029-36-7] $\text{C}_{13}\text{H}_{16}$ MW =172.27 382

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 1.040$.

Coefficient	$\rho = A + BT$
A	1196.62
B	-0.780

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	984.6 \pm 2.0	1.04	07-sab/mai-4
287.15	971.6 \pm 2.0	-1.04	07-sab/mai-4

cont.

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
270.00	986.0 ± 2.3
280.00	978.2 ± 2.1
290.00	970.4 ± 2.3

1-Cyclohexyl-3-methylbenzene [4575-46-6] $\text{C}_{13}\text{H}_{18}$ MW =174.29 383

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	936.5 ± 2.0	06-kur

1-Cyclohexyl-4-methylbenzene [4501-36-4] $\text{C}_{13}\text{H}_{18}$ MW =174.29 384

Table 1. Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 0.241$.

Coefficient	$\rho = A + BT$
A	1151.77
B	-0.740

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	935.0 ± 2.0	0.16	06-kur
291.15	936.5 ± 2.0	0.18	06-kur
273.15	949.3 ± 2.0	-0.34	06-kur

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
270.00	952.0 ± 2.4
280.00	944.6 ± 1.9
290.00	937.2 ± 1.9
293.15	934.8 ± 1.9
298.15	931.1 ± 2.2

1-Cyclopentyl-2,5-dimethylbenzene [500033-65-8] $\text{C}_{13}\text{H}_{18}$ MW =174.29 385

Table 1. Experimental values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	941.4 ± 2.0	43-pok
293.15	941.4 ± 2.0	50-pok
293.15	938.8 ± 2.0	58-gal/kus
293.15	940.5 ± 2.2	Recommended

1-Methyl-1-phenylcyclohexane [500017-63-0] $C_{13}H_{18}$ MW =174.29 386

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	947.8 ± 1.0	50-ipa/mei

1-Methyl-2-phenylcyclohexane [500029-37-8] $C_{13}H_{18}$ MW =174.29 387

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
291.65	956.9 ± 3.0	41-sid/tsu
293.15	946.5 ± 2.0	57-sid

1-Methyl-3-phenylcyclohexane [500029-38-9] $C_{13}H_{18}$ MW =174.29 388

Table 1. Fit with estimated B coefficient for 4 accepted points. Deviation $\sigma_w = 2.662$.

Coefficient	$\rho = A + BT$
A	1154.39
B	-0.720

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.
296.15	930.4 ± 4.0	-10.77	29-von/ant ¹⁾
293.15	946.4 ± 2.0	3.07	57-sid
273.15	955.4 ± 3.0	-2.33	06-kur
291.15	942.5 ± 3.0	-2.27	06-kur
293.15	941.0 ± 3.0	-2.33	06-kur

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	960.0 ± 3.8
280.00	952.8 ± 3.4
290.00	945.6 ± 3.3
293.15	943.3 ± 3.3
298.15	939.7 ± 3.4

1,5-Dimethyl-3-phenyl-1,3-cyclohexadiene**[500039-34-9]****C₁₄H₁₆****MW =184.28****389****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	973.0 \pm 2.0	07-fri
290.15	977.2 \pm 2.0	15-von/tre

2-Phenyl-1,3-cyclooctadiene**[500050-08-8]****C₁₄H₁₆****MW =184.28****390****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	1028.0 \pm 2.0	52-cop/smi

4-Ethenyl-5-phenyl-1-cyclohexene**[500036-96-4]****C₁₄H₁₆****MW =184.28****391****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	971.4 \pm 1.5	58-sop/kov

1,5-Dimethyl-3-phenyl-1-cyclohexene**[500039-50-9]****C₁₄H₁₈****MW =186.30****392****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	942.0 \pm 2.0	15-von/tre
288.65	946.0 \pm 2.0	15-von/tre
288.45	946.2 \pm 2.0	15-von/tre

4,5-Dimethyl-1-phenyl-1-cyclohexene**[500039-51-0]****C₁₄H₁₈****MW =186.30****393****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	954.0 \pm 2.0	60-col/dre

(4-Ethylphenyl)cyclohexane**[500011-18-7]****C₁₄H₁₈****MW =186.30****394****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	950.0 \pm 2.0	46-mar/all

1-Methyl-2-(2-methylphenyl)-2-cyclohexene [500039-44-1] $C_{14}H_{18}$ MW =186.30 395

Table 1. Experimental values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
293.15	961.0 ± 3.0	09-mur
273.15	985.0 ± 3.0	09-mur

1-Cyclohexyl-2,4-dimethylbenzene [4501-51-3] $C_{14}H_{20}$ MW =188.31 396

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	931.2 ± 2.0	58-gal/kus

2-Cyclohexyl-1,4-dimethylbenzene [500029-05-0] $C_{14}H_{20}$ MW =188.31 397

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.070$.

Coefficient	$\rho = A + BT$
A	1145.70
B	-0.720

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.
291.15	936.0 ± 2.0	-0.07	29-bod
293.15	934.7 ± 2.0	0.07	58-gal/kus

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
290.00	936.9 ± 1.8
293.15	934.6 ± 1.8
298.15	931.0 ± 1.9

5-Cyclohexyl-1,3-dimethylbenzene [500029-06-1] $C_{14}H_{20}$ MW =188.31 398

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	931.0 ± 2.0	29-bod

1-Cyclopentyl-2,3,5-trimethylbenzene [62379-94-6] $C_{14}H_{20}$ MW =188.31 399

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	942.4 ± 2.0	58-gal/kus

1-Cyclopentyl-2,4,6-trimethylbenzene [500033-66-9] $C_{14}H_{20}$ MW =188.31 400

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	943.5 ± 2.0	43-pok
293.15	943.5 ± 2.0	50-pok

(4-Ethylcyclohexyl)benzene [103203-57-2] $C_{14}H_{20}$ MW =188.31 401

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	932.8 ± 2.0	35-nen/gav

1,2-Diphenylcyclopropane [29881-14-9] $C_{15}H_{14}$ MW =194.28 402

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	1031.7 ± 1.0	15-kis
294.15	1031.6 ± 1.0	32-les/wak

4-Ethenyl-1-methyl-5-phenyl-1-cyclohexene [500036-98-6] $C_{15}H_{18}$ MW =198.31 403

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	965.4 ± 1.5	58-sop/kov

4-Ethenyl-3-methyl-5-phenyl-1-cyclohexene [500036-97-5] $C_{15}H_{18}$ MW =198.31 404

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	963.8 ± 1.5	58-sop/kov

1,1-Dimethyl-2-phenyl-3-methylene-cyclohexane [500039-59-8] $C_{15}H_{20}$ MW =200.32 405

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.
284.15	940.3 ± 2.0	26-esc-1

1-Cyclohexyl-2,3,5-trimethylbenzene [32406-18-1] $C_{15}H_{22}$ MW =202.34 406

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	938.4 ± 2.0	58-gal/kus

1-(1-Methylethenyl)-2-phenyl-3-methyl-1,3-cyclohexadiene [500039-69-0] $C_{16}H_{18}$ MW =210.32 407

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	971.4 ± 2.0	14-rup/tom

4-Ethenyl-1,2-dimethyl-5-phenyl-1-cyclohexene [500036-99-7] $C_{16}H_{20}$ MW =212.33 408

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	964.0 ± 1.5	58-sop/kov

1-(1-Methylethyl)-2-phenyl-4-methyl-1,3-cyclohexadiene [500039-70-3] $C_{16}H_{20}$ MW =212.33 409

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.
298.15	955.2 ± 2.0	29-rea/wat

1,3-Dicyclopentylbenzene [74869-90-2] $C_{16}H_{22}$ MW =214.35 410

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	979.0 ± 2.0	56-tur/dav

1,4-Di(1-methylcyclobutyl)benzene [500021-09-0] $C_{16}H_{22}$ MW =214.35 411

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.100$.

Coefficient	$\rho = A + BT$
A	1145.37
B	-0.720

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	934.4 ± 1.0	0.10	39-ipa/pin
313.15	919.8 ± 1.0	-0.10	39-ipa/pin

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
290.00	936.6 ± 1.1
293.15	934.3 ± 1.0
298.15	930.7 ± 0.9
310.00	922.2 ± 1.0
320.00	915.0 ± 1.2

1-(1-Methylethenyl)-2-phenyl-4-methylcyclohexane [500039-76-9] $C_{16}H_{22}$ MW =214.35 412

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
288.85	946.2 ± 2.0	06-kla/sau

1-(1-Methylethyl)-2-phenyl-3-methylcyclohexane [500039-78-1] $C_{16}H_{24}$ MW =216.37 413

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
296.15	934.0 ± 2.0	37-ish/mae

1,2-Diphenyl-2-cyclopentene [500016-76-2] $C_{17}H_{16}$ MW =220.31 414

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	1036.0 ± 2.0	15-kis-1

1,3-Diphenylcyclopentane [24813-94-3] $C_{17}H_{18}$ MW =222.33 415

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.
298.15	1019.6 ± 1.0	39-dra/ada

1-Methyl-3-(4-methylphenyl)-4-(1-methylethyl)-3-cyclohexene [500019-98-7] $C_{17}H_{24}$ 228.38 416

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.
298.15	926.9 ± 0.6	40-rit/bog

cis-1,2-Dimethyl-1,2-diphenylcyclobutane [84434-91-3] $C_{18}H_{20}$ MW =236.36 417

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	996.1 ± 2.0	47-tuo/guy

1,3-Dimethyl-1,3-diphenylcyclobutane [597-28-4] $C_{18}H_{20}$ MW =236.36 418

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	1003.8 ± 2.0	29-sta/bre

p-Dicyclohexylbenzene [1087-02-1] $C_{18}H_{26}$ MW =242.40 419

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.
273.15	1049.0 ± 2.0	39-ipa/pin

1-Cyclohexyl-3-(4-methylcyclohexyl)-benzene [500039-95-2] $C_{19}H_{28}$ MW =256.43 420

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	955.2 ± 2.0	33-pet/ang

2,4-Dicyclopentyl-1,3,5-trimethyl-benzene [94440-26-3] C₁₉H₂₈ MW =256.43 421

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	987.0 ± 2.0	43-pok

1,2-Diphenyl-1,2-dipropylcyclobutane [500037-40-1] C₂₂H₂₈ MW =292.46 422

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	960.1 ± 2.0	1883-daf-3

1,3,5-Trimethyl-1,3,5-triphenyl-cyclohexane [500037-48-9] C₂₇H₃₀ MW =354.54 423

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	1045.5 ± 2.0	29-sta/bre

3.4 Polyphenyls

1,1'-Biphenyl

[92-52-4]

 $C_{12}H_{10}$

MW = 154.21

424

 $T_c = 773.00 \text{ K}$ [95- tso/amb] $\rho_c = 310.00 \text{ kg} \cdot \text{m}^{-3}$ [95- tso/amb]**Table 1.** Coefficients for the polynomial expansion equations. Standard deviations (see introduction): $\sigma_l = 3.9585$ (low temperature range), $\sigma_{c,w} = (3.1372 \text{ combined temperature ranges, weighted})$, $\sigma_{c,uw} = 8.7207 \cdot 10^{-1}$ (combined temperature ranges, unweighted).

Coefficient	$T = 293.15 \text{ to } 618.50 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$	$T = 618.50 \text{ to } 773.00 \text{ K}$ $\rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)]$ $[\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3$ $+ D(T_c - T)^4]$
<i>A</i>	$1.23316 \cdot 10^3$	3.44743
<i>B</i>	$-1.43033 \cdot 10^{-5}$	$-6.97558 \cdot 10^{-2}$
<i>C</i>	$-4.16894 \cdot 10^{-3}$	$5.10464 \cdot 10^{-4}$
<i>D</i>	$8.20920 \cdot 10^{-6}$	$-1.25126 \cdot 10^{-6}$
<i>E</i>	$-5.64637 \cdot 10^{-9}$	

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. (Symbol in Fig. 1)	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. (Symbol in Fig. 1)
<i>crystal</i>				391.15	959.30 ± 4.00	4.88	00-dut/fri ¹⁾
293.15	1165.0 ± 2.0		1881-sch-1	452.55	905.30 ± 2.00	1.93	00-dut/fri(✕)
282.17	1163.2 ± 2.0		12-blo	355.15	984.50 ± 0.50	-0.73	05-bol/guy(○)
292.17	1154.5 ± 2.0		12-blo	381.75	962.60 ± 0.50	0.21	05-bol/guy(○)
303.68	1145.3 ± 2.0		12-blo	425.15	927.20 ± 0.60	1.22	05-bol/guy(○)
290.15	1120.0 ± 2.0		28-est	331.68	1008.20 ± 0.60	2.47	12-blo(Δ)
273.15	1180.0 ± 2.0		29-zie/dit	334.27	1005.60 ± 0.60	2.15	12-blo(Δ)
297.25	1175.2 ± 2.0		33-hen/jef	335.76	1004.20 ± 0.60	2.06	12-blo(Δ)
297.35	1175.6 ± 2.0		33-hen/jef	340.18	1001.20 ± 0.60	2.93	12-blo(Δ)
297.55	1175.4 ± 2.0		33-hen/jef	343.67	998.00 ± 0.60	2.78	12-blo(Δ)
297.55	1174.5 ± 2.0		33-hen/jef	345.16	995.60 ± 0.60	1.69	12-blo(Δ)
297.95	1174.7 ± 2.0		33-hen/jef	348.18	992.50 ± 0.60	1.22	12-blo(Δ)
297.95	1175.0 ± 2.0		33-hen/jef	350.17	991.20 ± 0.60	1.65	12-blo(Δ)
298.05	1174.6 ± 2.0		33-hen/jef	352.68	988.80 ± 0.60	1.43	12-blo(Δ)
298.15	1154.0 ± 5.0		33-muk	355.48	986.20 ± 0.60	1.26	12-blo(Δ)
293.15	1142.0 ± 2.0		49-foe/fen	293.15	1041.00 ± 4.00	1.00	23-kro-1(✕)
<i>liquid</i>				333.15	1003.10 ± 1.00	-1.34	24-kal ¹⁾
368.15	974.99 ± 0.60	0.98	1896-per(◆)	346.15	991.90 ± 0.70	-1.15	24-kal(✕)
372.15	971.65 ± 3.00	1.07	1896-per ¹⁾	353.25	985.70 ± 0.70	-1.17	24-kal(✕)
373.15	970.72 ± 0.60	0.99	1896-per(◆)	382.81	961.10 ± 0.70	-0.39	24-kal(✕)
356.55	985.50 ± 2.00	1.49	00-dut/fri ¹⁾	411.95	937.20 ± 0.70	0.24	24-kal(✕)

cont.

1,1'-Biphenyl (cont.)**Table 2** (cont.)

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
366.45	974.72 ± 0.96	-0.75	31-mon/roh(✕)	427.65	924.40 ± 0.60	0.49	44-fri/har(✕)
394.25	952.46 ± 0.96	0.65	31-mon/roh(✕)	443.15	911.10 ± 0.60	-0.01	44-fri/har(✕)
421.85	930.35 ± 0.96	1.63	31-mon/roh(✕)	455.15	900.50 ± 0.70	-0.73	44-fri/har(✕)
449.85	907.45 ± 0.96	1.86	31-mon/roh(✕)	466.45	890.50 ± 0.70	-1.44	44-fri/har(✕)
477.55	884.86 ± 0.96	2.07	31-mon/roh(✕)	483.15	876.20 ± 0.75	-1.96	44-fri/har(✕)
505.35	861.95 ± 0.96	2.26	31-mon/roh(✕)	293.15	1041.00 ± 1.50	1.00	50-wis/ser(✕)
528.45	842.41 ± 0.96	2.34	31-mon/roh(✕)	333.15	986.10 ± 0.30	-18.34	55-bel/col ¹⁾
533.15	838.09 ± 0.96	2.09	31-mon/roh(✕)	343.15	993.90 ± 0.30	-1.77	55-bel/col(□)
560.95	838.09 ± 0.96	26.81	31-mon/roh ¹⁾	353.15	986.10 ± 0.30	-0.86	55-bel/col(□)
588.75	785.55 ± 0.96	0.57	31-mon/roh(✕)	293.15	1034.00 ± 2.00	-6.00	63-dav/got(✕)
616.45	757.67 ± 0.96	1.08	31-mon/roh(✕)	574.15	788.00 ± 5.00	-11.02	96-grz/ram(✕)
644.25	726.92 ± 1.04	10.46	31-mon/roh(✕)	584.15	777.00 ± 5.00	-12.46	96-grz/ram(✕)
672.05	693.28 ± 1.12	13.45	31-mon/roh(✕)	594.15	767.00 ± 5.00	-12.64	96-grz/ram ¹⁾
699.85	654.99 ± 1.12	-4.39	31-mon/roh(✕)	604.15	748.00 ± 5.00	-21.51	96-grz/ram ¹⁾
727.55	610.30 ± 1.20	-19.48	31-mon/roh(✕)	614.15	737.00 ± 5.00	-22.05	96-grz/ram ¹⁾
755.35	553.92 ± 1.20	21.43	31-mon/roh(✕)	624.15	726.00 ± 5.00	-21.48	96-grz/ram(✕)
348.15	989.30 ± 0.60	-2.01	38-eva-2(∇)	634.15	719.00 ± 5.00	-13.61	96-grz/ram(✕)
378.15	964.90 ± 0.60	-0.56	38-eva-2(∇)	644.15	710.00 ± 5.00	-6.62	96-grz/ram(✕)
353.15	986.10 ± 0.70	-0.86	42-ju /woo(✕)	654.15	701.00 ± 5.00	-0.47	96-grz/ram(✕)
383.65	961.20 ± 0.60	0.42	44-fri/har(✕)	673.15	672.00 ± 5.00	-6.77	96-grz/ram(✕)
412.65	937.60 ± 0.60	1.22	44-fri/har(✕)				

¹⁾ Not included in Fig. 1.**Further references:** [1884-sch-5, 1893-eyk, 21-von/fru, 21-von/fru-1, 22-von, 33-hen/jef].**Table 3.** Recommended values (fit to the reliable experimental values according to the equations

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	1042.83 ± 2.92	390.00	955.39 ± 0.36	510.00	855.78 ± 1.84
293.15	1040.00 ± 2.74	400.00	946.97 ± 0.37	520.00	847.31 ± 2.00
298.15	1035.52 ± 2.47	410.00	938.59 ± 0.42	530.00	838.73 ± 2.14
300.00	1033.86 ± 2.38	420.00	930.26 ± 0.49	540.00	830.03 ± 2.27
310.00	1024.93 ± 1.90	430.00	921.97 ± 0.59	550.00	821.17 ± 2.37
320.00	1016.05 ± 1.50	440.00	913.71 ± 0.71	560.00	812.15 ± 2.45
330.00	1007.21 ± 1.17	450.00	905.47 ± 0.84	570.00	802.92 ± 2.50
340.00	998.43 ± 0.90	460.00	897.24 ± 1.00	580.00	793.46 ± 2.52
350.00	989.70 ± 0.69	470.00	889.01 ± 1.16	590.00	783.75 ± 2.51
360.00	981.03 ± 0.53	480.00	880.77 ± 1.33	600.00	773.75 ± 2.47
370.00	972.42 ± 0.43	490.00	872.49 ± 1.51	610.00	763.43 ± 2.40
380.00	963.88 ± 0.37	500.00	864.17 ± 1.68	620.00	752.71 ± 3.39

cont.

Table 3 (cont.)

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
630.00	739.05 ± 3.33	680.00	672.79 ± 3.09	730.00	625.03 ± 2.92
640.00	723.24 ± 3.27	690.00	665.64 ± 3.05	740.00	599.37 ± 2.90
650.00	707.56 ± 3.22	700.00	659.28 ± 3.01	750.00	560.52 ± 2.87
660.00	693.52 ± 3.17	710.00	651.98 ± 2.98	760.00	502.74 ± 2.85
670.00	681.89 ± 3.13	720.00	641.48 ± 2.95	770.00	408.59 ± 2.83

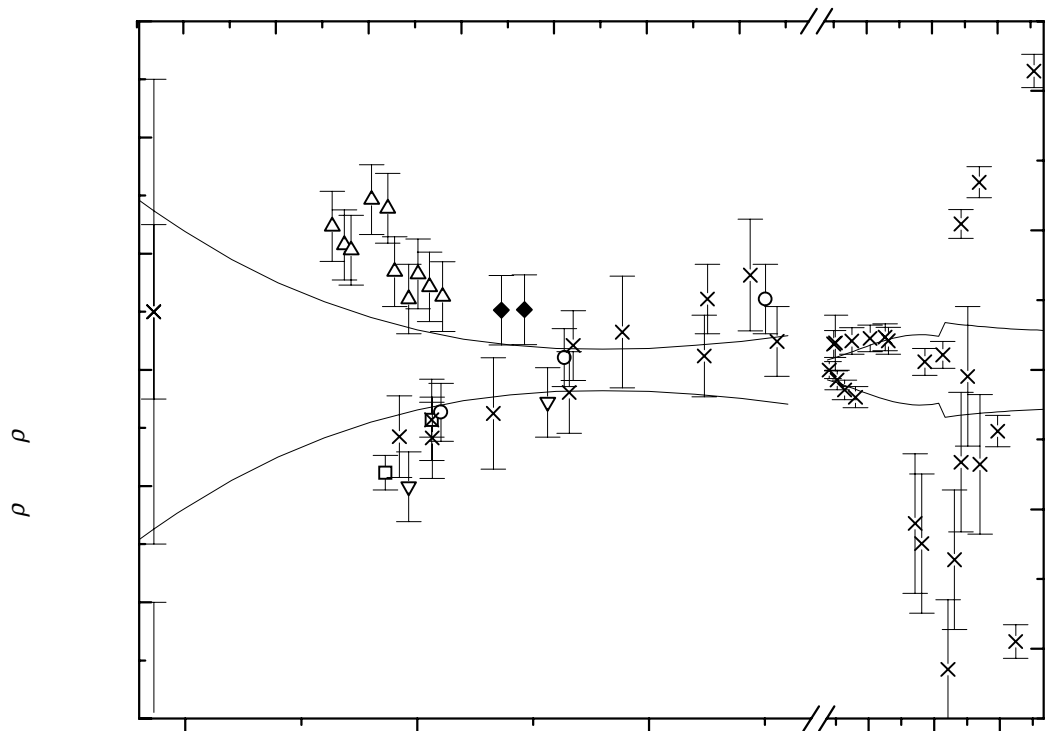


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

2-Methyl-1,1'-biphenyl

[643-58-3]

C₁₃H₁₂

MW =168.24

425

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	1010.0 ± 1.0	1895-jac
293.15	1011.3 ± 0.6	50-goo/wis
293.15	1011.3 ± 0.6	51-goo/wis-1
293.15	1011.1 ± 0.6	Recommended

3-Methyl-1,1'-biphenyl**[643-93-6]****C₁₃H₁₂****MW =168.24****426****Table 1.** Fit with estimated *B* coefficient for 7 accepted points. Deviation $\sigma_w = 0.847$.

Coefficient	$\rho = A + BT$
<i>A</i>	1254.23
<i>B</i>	-0.820

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.
273.15	1031.0 \pm 2.0	0.75	1888-ada	295.15	1010.0 \pm 2.0	-2.21	32-she/sho
290.15	1012.0 \pm 4.0	-4.31	1895-jac ¹⁾	293.15	1013.9 \pm 0.6	0.09	51-goo/wis-1
289.85	1018.2 \pm 2.0	1.65	22-von/jul	293.15	1013.5 \pm 1.5	-0.35	57-sid
293.15	1015.0 \pm 2.0	1.15	22-von/jul	293.15	1010.4 \pm 4.0	-3.45	62-skv/lin ¹⁾
293.15	1012.1 \pm 2.0	-1.75	32-kru-1				

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

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	1032.8 \pm 2.6
280.00	1024.6 \pm 1.9
290.00	1016.4 \pm 1.5
293.15	1013.8 \pm 1.5
298.15	1009.7 \pm 1.6

2,2'-Dimethyl-1,1'-biphenyl**[605-39-0]****C₁₄H₁₄****MW =182.27****427****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	990.6 \pm 1.0	57-joh

2,3'-Dimethyl-1,1'-biphenyl**[611-43-8]****C₁₄H₁₄****MW =182.27****428****Table 1.** Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
295.15	998.4 \pm 4.0	21-may/fre
293.15	993.3 \pm 1.0	57-joh

2,4-Dimethyl-1,1'-biphenyl**[4433-10-7]****C₁₄H₁₄****MW =182.27****429****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	995.7 \pm 1.0	57-joh

2,4'-Dimethyl-1,1'-biphenyl [611-61-0] $C_{14}H_{14}$ MW =182.27 430

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	992.4 ± 1.0	57-joh

2,5-Dimethyl-1,1'-biphenyl [7372-85-2] $C_{14}H_{14}$ MW =182.27 431

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	993.1 ± 2.0	57-joh
300.15	981.4 ± 2.0	58-wei/wei

2,6-Dimethyl-1,1'-biphenyl [3976-34-9] $C_{14}H_{14}$ MW =182.27 432

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	990.7 ± 1.0	57-joh

3,3'-Dimethyl-1,1'-biphenyl [612-75-9] $C_{14}H_{14}$ MW =182.27 433

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
289.15	999.3 ± 3.0	1888-sto
293.15	999.3 ± 1.0	57-joh

3,4-Dimethyl-1,1'-biphenyl [4433-11-8] $C_{14}H_{14}$ MW =182.27 434

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	1008.7 ± 1.0	57-joh

3,4'-Dimethyl-1,1'-biphenyl [7383-90-6] $C_{14}H_{14}$ MW =182.27 435

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.
293.15	998.0 ± 1.0	32-kru-1
293.15	997.8 ± 1.0	57-joh
293.15	998.5 ± 1.0	62-skv/lin
293.15	998.1 ± 1.0	Recommended

3,5-Dimethyl-1,1'-biphenyl [17057-88-4] $C_{14}H_{14}$ MW =182.27 436

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	999.0 ± 1.0	57-joh

4,4'-Dimethyl-1,1'-biphenyl [613-33-2] $C_{14}H_{14}$ MW =182.27 437

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
<i>crystal</i>		
293.15	1102.0 ± 3.0	15-mie
293.15	1102.0 ± 3.0	20-mie
<i>liquid</i>		
394.15	917.2 ± 1.0	1884-sch-5
295.15	999.1 ± 1.0	15-sab/mur

2-Ethyl-1,1'-biphenyl [1812-51-7] $C_{14}H_{14}$ MW =182.27 438

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.
293.15	996.6 ± 0.6	51-goo/wis-1
293.15	996.5 ± 1.0	56-lev/gir-2
293.15	996.6 ± 0.6	Recommended

3-Ethyl-1,1'-biphenyl [5668-93-9] $C_{14}H_{14}$ MW =182.27 439

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
273.15	1043.0 ± 20.0	1888-ada
293.15	999.3 ± 0.6	51-goo/wis-1

2-Ethyl-5-methyl-1,1'-biphenyl [91363-50-7] $C_{15}H_{16}$ MW =196.29 440

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	988.6 ± 1.5	58-sop/kov

4-Ethyl-3'-methyl-1,1'-biphenyl [500037-15-0] $C_{15}H_{16}$ MW =196.29 441

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	991.6 ± 1.0	62-skv/lin

2-(1-Methylethyl)-1,1'-biphenyl [19486-60-3] $C_{15}H_{16}$ MW =196.29 442

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	982.2 ± 0.6	50-goo/wis
293.15	982.2 ± 0.6	51-goo/wis-1

4-(1-Methylethyl)-1,1'-biphenyl [7116-95-2] $C_{15}H_{16}$ MW =196.29 443

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	969.0 ± 2.0	63-var/kop

2-Propyl-1,1'-biphenyl [20282-28-4] $C_{15}H_{16}$ MW =196.29 444

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	980.2 ± 0.6	50-goo/wis
293.15	980.2 ± 0.6	51-goo/wis
293.15	980.2 ± 0.6	51-goo/wis-1

4-Propyl-1,1'-biphenyl [10289-45-9] $C_{15}H_{16}$ MW =196.29 445

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	979.8 ± 1.0	58-rom/ber

2,4,6-Trimethyl-1,1'-biphenyl [3976-35-0] $C_{15}H_{16}$ MW =196.29 446

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	978.2 ± 1.0	62-skv/lin

2-Butyl-1,1'-biphenyl [54532-97-7] $C_{16}H_{18}$ MW =210.32 447

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	967.6 ± 0.6	50-goo/wis
293.15	967.6 ± 0.6	51-goo/wis-1

4-Butyl-1,1'-biphenyl [37909-95-8] $C_{16}H_{18}$ MW =210.32 448

Table 1. Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.150$.

Coefficient	$\rho = A + BT$
A	1230.53
B	-0.820

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.
293.15	968.4 ± 8.0	-21.75	58-rom/ber ¹⁾
293.15	990.3 ± 2.0	0.15	59-koe/kla
308.15	977.7 ± 2.0	-0.15	59-koe/kla
343.15	941.7 ± 5.0	-7.45	59-koe/kla ¹⁾

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	992.7 ± 1.4
293.15	990.1 ± 1.2
298.15	986.0 ± 0.9
310.00	976.3 ± 1.3

2-Methyl-5-(1-methylethyl)-1,1'-biphenyl [2086-50-2] $C_{16}H_{18}$ MW =210.32 449

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	978.0 ± 2.0	59-gue/jun
286.95	982.2 ± 2.0	06-kla
288.15	977.6 ± 3.0	07-kla
293.15	967.6 ± 6.0	14-rup/tom

3-Methyl-4'-(1-methylethyl)-1,1'-biphenyl [500040-10-8] $C_{16}H_{18}$ MW =210.32 450

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	966.3 ± 2.0	62-skv/lin

3-Methyl-4'-propylbiphenyl [93313-05-4] $C_{16}H_{18}$ MW =210.32 451

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	974.0 ± 1.0	62-skv/lin

2-(1-Methylpropyl)-1,1'-biphenyl [700002-68-2] $C_{16}H_{18}$ MW =210.32 452

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	971.4 ± 0.6	51-goo/wis-1

2-(2-Methylpropyl)-1,1'-biphenyl [700002-65-9] $C_{16}H_{18}$ MW =210.32 453

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	963.2 ± 0.6	51-goo/wis-1

4-(1-Methylpropyl)-1,1'-biphenyl [16236-40-1] $C_{16}H_{18}$ MW =210.32 454

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	976.2 ± 1.5	58-zav/sid

3,4'-Dimethyl-2-(1-methylethyl)-1,1'-biphenyl [500019-96-5] $C_{17}H_{20}$ MW =224.35 455

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.
298.15	961.9 ± 1.0	40-rit/bog

4-(1,1-Dimethylpropyl)-1,1'-biphenyl [500019-91-0] $C_{17}H_{20}$ MW =224.35 456

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	996.4 ± 20.0	55-rom/ber
293.15	967.1 ± 2.0	58-rom/ber

Terphenyl [26140-60-3] $C_{18}H_{14}$ MW =230.31 457

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.
<i>crystal</i>		
293.15	1234.0 ± 4.0	29-zie/dit

1,1':2',1''-Terphenyl [84-15-1] $C_{18}H_{14}$ MW = 230.31 458

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

$\sigma_{\text{c,w}} = 1.9809$ (combined temperature ranges, weighted), $\sigma_{\text{c,uw}} = 1.3668$ (combined temperature ranges, unweighted).

Coefficient	$T = 333.15 \text{ to } 673.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$1.33745 \cdot 10^3$
<i>B</i>	$-8.60961 \cdot 10^{-1}$

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)
333.15	1049.60 ± 0.50	-1.02	68-ano-1(□)	614.15	814.00 ± 1.38	5.31	96-grz/ram(○)
372.05	1018.50 ± 0.50	1.37	68-ano-1(□)	634.15	796.00 ± 1.42	4.53	96-grz/ram(○)
574.15	838.00 ± 1.30	-5.13	96-grz/ram(○)	654.15	776.00 ± 1.46	1.75	96-grz/ram(○)
594.15	823.00 ± 1.34	-2.91	96-grz/ram(○)	673.15	754.00 ± 1.50	-3.89	96-grz/ram(○)

cont.

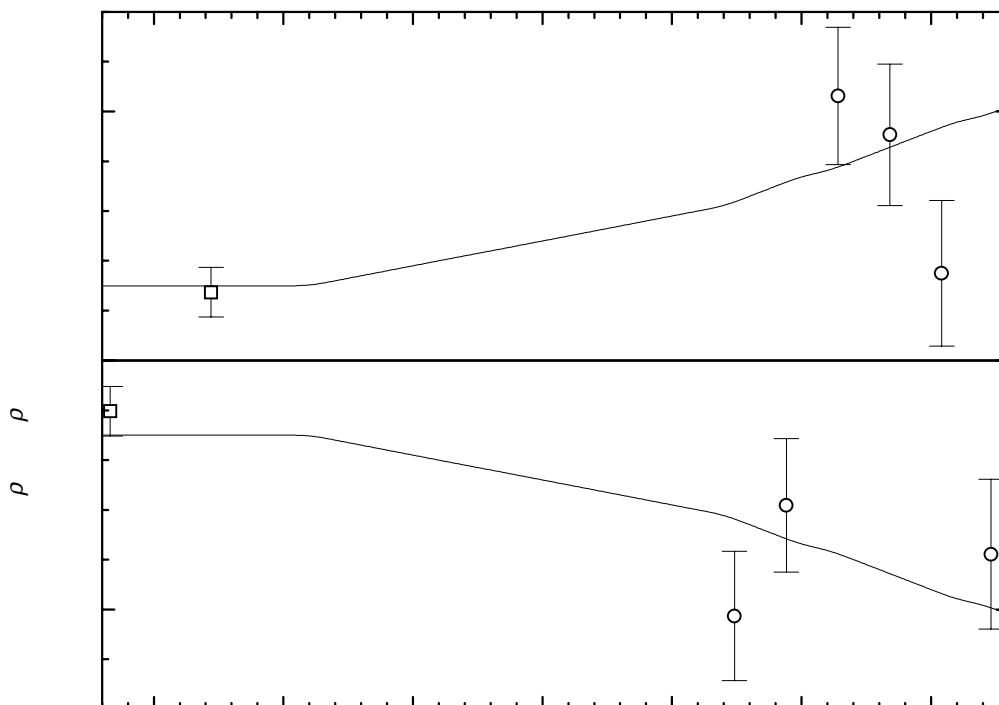


Fig. 1. The symbols show the deviation of the calculated from the experimental values from Table 2. The curves above and below the zero line indicate the calculated error region of the recommended values given in Table 3. The error bars represent the experimental errors. (Error bars smaller than the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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
330.00	1053.33 ± 1.5	450.00	950.02 ± 1.9	570.00	846.70 ± 3.1
340.00	1044.72 ± 1.5	460.00	941.41 ± 2.0	580.00	838.09 ± 3.3
350.00	1036.11 ± 1.5	470.00	932.80 ± 2.1	590.00	829.48 ± 3.5
360.00	1027.50 ± 1.5	480.00	924.19 ± 2.2	600.00	820.87 ± 3.7
370.00	1018.89 ± 1.5	490.00	915.58 ± 2.3	610.00	812.26 ± 3.8
380.00	1010.28 ± 1.5	500.00	906.97 ± 2.4	620.00	803.65 ± 4.0
390.00	1001.68 ± 1.5	510.00	898.36 ± 2.5	630.00	795.04 ± 4.2
400.00	993.07 ± 1.5	520.00	889.75 ± 2.6	640.00	786.44 ± 4.4
410.00	984.46 ± 1.5	530.00	881.14 ± 2.7	650.00	777.83 ± 4.6
420.00	975.85 ± 1.6	540.00	872.53 ± 2.8	660.00	769.22 ± 4.8
430.00	967.24 ± 1.7	550.00	863.92 ± 2.9	670.00	760.61 ± 4.9
440.00	958.63 ± 1.8	560.00	855.31 ± 3.0	680.00	752.00 ± 5.1

1,1':3',1''-Biphenyl**[92-06-8]****C₁₈H₁₄****MW =230.31****459****Table 1.** Fit with estimated B coefficient for 2 accepted points. Deviation $\sigma_w = 0.264$.

Coefficient	$\rho = A + BT$
A	1326.47
B	-0.780

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.
333.15	1066.8 ± 0.5	0.19	68-ano-1
372.05	1035.9 ± 0.7	-0.37	68-ano-1

Table 3. Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
330.00	1069.1 ± 1.0	350.00	1053.5 ± 0.6	370.00	1037.9 ± 1.3
340.00	1061.3 ± 0.7	360.00	1045.7 ± 0.9	380.00	1030.1 ± 1.8

4-Hexyl-1,1'-biphenyl**[59662-31-6]****C₁₈H₂₂****MW =238.37****460****Table 1.** Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 10.195$.

Coefficient	$\rho = A + BT$
A	1217.22
B	-0.820

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.
293.15	987.5 ± 8.0	10.67	59-koe/kla
308.15	967.6 ± 8.0	3.07	59-koe/kla
343.15	922.1 ± 8.0	-13.73	59-koe/kla

Table 3. Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	979.4 ± 12.7	310.00	963.0 ± 12.5	340.00	938.4 ± 12.7
293.15	976.8 ± 12.6	320.00	954.8 ± 12.5	350.00	930.2 ± 12.9
298.15	972.7 ± 12.6	330.00	946.6 ± 12.5		

4,4'-Dipropyl-1,1'-biphenyl [14584-23-7] $C_{18}H_{22}$ MW =238.37 461

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	999.7 ± 2.0	58-rom/ber

4,4'-Di(1-methylpropyl)-1,1'-biphenyl [500020-11-1] $C_{20}H_{26}$ MW =266.43 462

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.
288.15	953.0 ± 2.0	29-boe

4,4'-Dibutyl-1,1'-biphenyl [7641-81-8] $C_{20}H_{26}$ MW =266.43 463

Table 1. Experimental values with uncertainties.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
288.15	959.9 ± 3.0	29-boe
293.15	962.2 ± 2.0	58-rom/ber

4-Octyl-1,1'-biphenyl [500020-09-7] $C_{20}H_{26}$ MW =266.43 464

Table 1. Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 11.512$.

Coefficient	$\rho = A + BT$
A	1212.56
B	-0.830

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.
293.15	981.2 ± 8.0	11.95	59-koe/kla
308.15	960.4 ± 8.0	3.60	59-koe/kla
343.15	912.2 ± 8.0	-15.55	59-koe/kla

Table 3. Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	971.9 ± 13.8	310.00	955.3 ± 13.6	340.00	930.4 ± 13.8
293.15	969.3 ± 13.7	320.00	947.0 ± 13.6	350.00	922.1 ± 14.0
298.15	965.1 ± 13.7	330.00	938.7 ± 13.6		

**4,4'-bis(1,1'-Dimethylpropyl)-
1,1'-biphenyl****[500037-02-5]****C₂₂H₃₀****MW =294.48****465****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	947.9 \pm 1.5	58-rom/ber

4-Decyl-1,1'-diphenyl**[500020-13-3]****C₂₂H₃₀****MW =294.48****466****Table 1.** Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 13.661$.

Coefficient	$\rho = A + BT$
A	1208.15
B	-0.840

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	976.2 \pm 8.0	14.30	59-koe/kla
308.15	953.4 \pm 8.0	4.10	59-koe/kla
343.15	901.5 \pm 8.0	-18.40	59-koe/kla

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	964.5 \pm 15.6	310.00	947.7 \pm 15.4	340.00	922.5 \pm 15.6
293.15	961.9 \pm 15.6	320.00	939.3 \pm 15.4	350.00	914.1 \pm 15.8
298.15	957.7 \pm 15.5	330.00	930.9 \pm 15.5		

1,3,5-Triphenylbenzene**[612-71-5]****C₂₄H₁₈****MW =306.41****467****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.
<i>crystal</i>		
293.15	1206.0 \pm 4.0	1881-sch-1
273.15	1205.0 \pm 4.0	29-zie/dit
293.15	1206.0 \pm 4.0	33-herroe
293.15	1200.0 \pm 4.0	35-kri/ban
303.45	1199.0 \pm 4.0	36-bax/hal

4-Dodecyl-1,1'-biphenyl**[500020-14-4]****C₂₄H₃₄****MW =322.53****468****Table 1.** Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 14.545$.

Coefficient	$\rho = A + BT$
A	1207.89
B	-0.850

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.
293.15	974.1 ± 8.0	15.38	59-koe/kla
308.15	950.1 ± 8.0	4.13	59-koe/kla
343.15	896.7 ± 8.0	-19.52	59-koe/kla

Table 3. Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	961.4 ± 16.4	310.00	944.4 ± 16.2	340.00	918.9 ± 16.4
293.15	958.7 ± 16.4	320.00	935.9 ± 16.2	350.00	910.4 ± 16.6
298.15	954.5 ± 16.3	330.00	927.4 ± 16.3		

4-Tetradecyl-1,1'-biphenyl**[103049-65-6]****C₂₆H₃₈****MW =350.59****469****Table 1.** Fit with estimated B coefficient for 3 accepted points. Deviation $\sigma_w = 15.033$.

Coefficient	$\rho = A + BT$
A	1206.79
B	-0.850

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.
293.15	973.2 ± 8.0	15.58	59-koe/kla
308.15	949.6 ± 8.0	4.73	59-koe/kla
343.15	894.8 ± 8.0	-20.32	59-koe/kla

Table 3. Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	960.3 ± 16.8	310.00	943.3 ± 16.7	340.00	917.8 ± 16.8
293.15	957.6 ± 16.8	320.00	934.8 ± 16.7	350.00	909.3 ± 17.0
298.15	953.4 ± 16.7	330.00	926.3 ± 16.7		

4-Octadecyl-1,1'-biphenyl [500020-17-7] $\text{C}_{30}\text{H}_{46}$ MW =406.70 470

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	913.8 ± 2.0	36-mik

4-(1-Butyloctadecyl)-1,1'-biphenyl [500020-21-3] $\text{C}_{34}\text{H}_{54}$ MW =462.80 471

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	899.0 ± 2.0	36-mik

4-(1-Butylheneicosyl)-1,1'-biphenyl [500020-22-4] $\text{C}_{38}\text{H}_{62}$ MW =518.91 472

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	926.9 ± 2.0	36-mik