

## 2.1.4 Bromoalkanes, C<sub>8</sub> - C<sub>30</sub>

**1,2-Dibromo-4,4-dimethylhexane** [35466-97-8] C<sub>8</sub>H<sub>16</sub>Br<sub>2</sub> MW = 272.02 151

**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	1468.90 ± 2.00	1946-sch

**2,3-Dibromo-4,4-dimethylhexane** [500013-29-6] C<sub>8</sub>H<sub>16</sub>Br<sub>2</sub> MW = 272.02 152

**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	1514.80 ± 1.00	1933-sch/boo

**3,4-Dibromo-2,2-dimethylhexane** [500013-30-9] C<sub>8</sub>H<sub>16</sub>Br<sub>2</sub> MW = 272.02 153

**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	1485.60 ± 1.00	1933-sch/boo

**1,2-Dibromooctane** [6269-92-7] C<sub>8</sub>H<sub>16</sub>Br<sub>2</sub> MW = 272.02 154

**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	1458.00 ± 2.00	1931-wil

**dl-4,5-Dibromooctane** [500047-60-9] C<sub>8</sub>H<sub>16</sub>Br<sub>2</sub> MW = 272.02 155

**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	1456.90 ± 2.00	1937-you/jas

**Meso-4,5-Dibromooctane** [500047-61-0] C<sub>8</sub>H<sub>16</sub>Br<sub>2</sub> MW = 272.02 156

**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	1452.50 ± 2.00	1937-you/jas

**d-1-Bromo-3-methylheptane** [500047-04-1] C<sub>8</sub>H<sub>17</sub>Br MW = 193.13 157

**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	1106.00 ± 2.00	1931-lev/mar-5

**2-Bromo-6-methylheptane** [4730-24-9] C<sub>8</sub>H<sub>17</sub>Br MW = 193.13 158

**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	1091.00 ± 1.00	1952-her/zao

**1-Bromooctane** [111-83-1] C<sub>8</sub>H<sub>17</sub>Br MW = 193.13 159

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

$\sigma_{\text{c,w}} = 5.3677 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{\text{c,uw}} = 1.5699 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

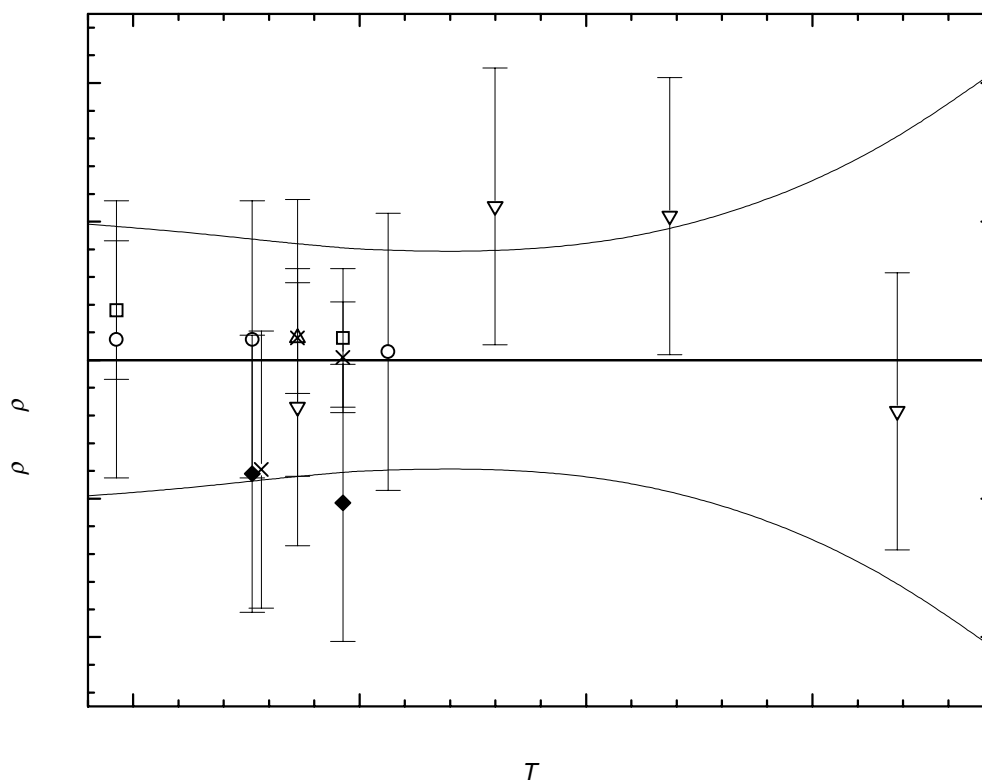
Coefficient	$T = 273.15 \text{ to } 359.35 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.40930 \cdot 10^3$
B	-1.01162

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
288.15	1116.98 ± 1.00	-0.82	1885-per-1(◆)	293.15	1112.90 ± 1.00	0.16	1937-oli(Δ)
298.15	1106.65 ± 1.00	-1.03	1885-per-1(◆)	293.15	1112.40 ± 1.00	-0.34	1943-vog(V)
289.15	1116.00 ± 1.00	-0.79	1869-zin(X)	314.95	1091.80 ± 1.00	1.11	1943-vog(V)
273.15	1133.12 ± 1.00	0.15	1931-def(○)	334.25	1072.20 ± 1.00	1.04	1943-vog(V)
288.15	1117.95 ± 1.00	0.15	1931-def(○)	359.35	1045.40 ± 1.00	-0.37	1943-vog(V)
303.15	1102.69 ± 1.00	0.06	1931-def(○)	293.15	1112.90 ± 0.40	0.16	1961-bje(X)
273.15	1133.33 ± 0.50	0.36	1932-ell/rei(□)	298.15	1107.70 ± 0.40	0.02	1961-bje(X)
298.15	1107.84 ± 0.50	0.16	1932-ell/rei(□)				

**Further references:** [1896-per, 1944-sch, 1946-tuo, 1947-kaz/lib].

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	$1136.16 \pm 0.98$	300.00	$1105.81 \pm 0.80$	350.00	$1055.23 \pm 1.28$
280.00	$1126.04 \pm 0.93$	310.00	$1095.70 \pm 0.78$	360.00	$1045.11 \pm 1.62$
290.00	$1115.93 \pm 0.86$	320.00	$1085.58 \pm 0.80$	370.00	$1035.00 \pm 2.08$
293.15	$1112.74 \pm 0.84$	330.00	$1075.46 \pm 0.88$		
298.15	$1107.68 \pm 0.81$	340.00	$1065.35 \pm 1.04$		

**2-Bromooctane**

[557-35-7]

**MW = 193.13****160****Table 1.** Fit with estimated B coefficient for 2 accepted points. Deviation  $\sigma_w = 0.175$ .

Coefficient	$\rho = A + BT$
A	1406.67
B	-1.040

**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.
273.15	1122.40 $\pm$ 0.60	-0.18	1932-ell/rei
298.15	1096.80 $\pm$ 0.60	0.17	1932-ell/rei
293.15	1106.00 $\pm$ 2.00	4.22	1937-zep <sup>1)</sup>
298.15	1101.00 $\pm$ 2.00	4.40	1948-let <sup>1)</sup>
299.15	1101.00 $\pm$ 2.00	5.44	1955-ber/sch <sup>1)</sup>

<sup>1)</sup> 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	1125.9 $\pm$ 1.1
280.00	1115.5 $\pm$ 0.5
290.00	1105.1 $\pm$ 0.4
293.15	1101.8 $\pm$ 0.6
298.15	1096.6 $\pm$ 0.9

**1,2-Dibromo-4,4-dimethylheptane**

[500006-37-1]

**MW = 286.05****161****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	1407.00 $\pm$ 0.70	1952-lev/tan

**1,3-Dibromo-2-ethyl-2-butylpropane**

[500000-56-6]

**MW = 286.05****162****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	1440.00 $\pm$ 2.00	1948-sho/cra

**1,2-Dibromononane** [73642-91-8] C<sub>9</sub>H<sub>18</sub>Br<sub>2</sub> MW = 286.05 163

**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	1398.00 ± 2.00	1931-wil

**1,9-Dibromononane** [4549-33-1] C<sub>9</sub>H<sub>18</sub>Br<sub>2</sub> MW = 286.05 164

**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	1428.00 ± 6.00	1950-har/for

**2,3-Dibromo-4,4,5-trimethylhexane** [500006-38-2] C<sub>9</sub>H<sub>18</sub>Br<sub>2</sub> MW = 286.05 165

**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	1432.00 ± 0.70	1952-lev/tan

**d-1-Bromo-3-methyloctane** [500047-06-3] C<sub>9</sub>H<sub>19</sub>Br MW = 207.15 166

**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	1085.00 ± 2.00	1931-lev/mar-5

**d-1-Bromo-4-methyloctane** [500047-07-4] C<sub>9</sub>H<sub>19</sub>Br MW = 207.15 167

**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.
300.65	1089.00 ± 2.00	1931-lev/mar-5

**l-1-Bromo-5-methyloctane** [500047-08-5] C<sub>9</sub>H<sub>19</sub>Br MW = 207.15 168

**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	1082.00 ± 2.00	1933-lev/mar-1

**d-1-Bromo-6-methyloctane**

[500047-09-6]

C<sub>9</sub>H<sub>19</sub>Br

MW = 207.15

169

**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	1086.00 ± 2.00	1933-lev/mar-1

**1-Bromononane**

[693-58-3]

C<sub>9</sub>H<sub>19</sub>Br

MW = 207.15

170

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

$\sigma_{\text{c,w}} = 3.9155 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{\text{c,uw}} = 1.6887 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 359.35 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.36763 \cdot 10^3$
B	$-9.47960 \cdot 10^{-1}$

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

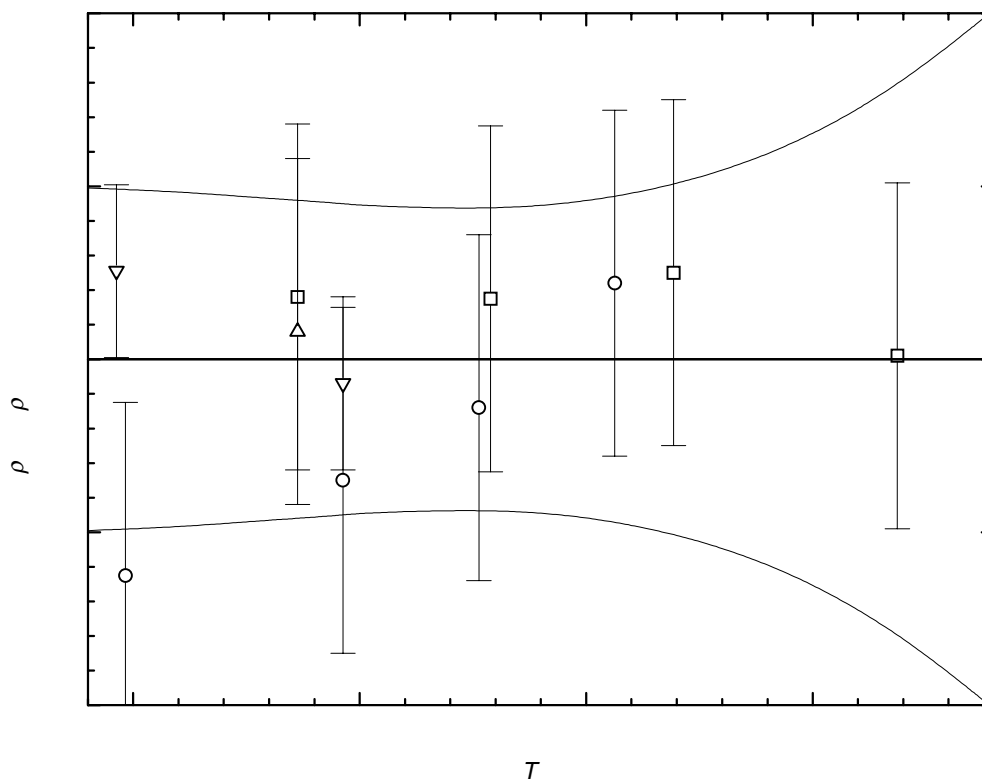
$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
273.15	1109.21 ± 0.50	0.51	1932-ell/rei(∇)	359.35	1027.00 ± 1.00	0.02	1943-vog(□)
298.15	1084.86 ± 0.50	-0.14	1932-ell/rei(∇)	274.15	1106.50 ± 1.00	-1.25	1950-hes/hen(○)
293.15	1089.90 ± 1.00	0.16	1937-oli(Δ)	298.15	1084.30 ± 1.00	-0.70	1950-hes/hen(○)
293.15	1090.10 ± 1.00	0.36	1943-vog(□)	313.15	1070.50 ± 1.00	-0.28	1950-hes/hen(○)
314.45	1069.90 ± 1.00	0.35	1943-vog(□)	328.15	1057.00 ± 1.00	0.44	1950-hes/hen(○)
334.65	1050.90 ± 1.00	0.50	1943-vog(□)				

**Further references:** [1945-sch, 1946-tuo].**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	1111.68 ± 0.99	300.00	1083.24 ± 0.89	350.00	1035.85 ± 1.29
280.00	1102.20 ± 0.97	310.00	1073.76 ± 0.87	360.00	1026.37 ± 1.60
290.00	1092.72 ± 0.93	320.00	1064.28 ± 0.88	370.00	1016.89 ± 2.02
293.15	1089.74 ± 0.92	330.00	1054.80 ± 0.95		
298.15	1085.00 ± 0.90	340.00	1045.32 ± 1.08		

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-Bromononane**

[2216-35-5]

**C<sub>9</sub>H<sub>19</sub>Br****MW = 207.15****171**

**Table 1.** Fit with estimated B coefficient for 2 accepted points. Deviation  $\sigma_w = 0.013$ .

Coefficient	$\rho = A + BT$
<i>A</i>	1393.54
<i>B</i>	-1.065

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

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m <sup>-3</sup>	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg·m <sup>-3</sup>	Ref.
273.15	1102.60 ± 0.60	-0.01	1932-ell/rei
298.15	1076.00 ± 0.60	0.01	1932-ell/rei

cont.

**2-Bromononane** (cont.)**Table 3.** Recommended values.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>
270.00	1106.0 ± 0.9
280.00	1095.3 ± 0.6
290.00	1084.7 ± 0.6
293.15	1081.3 ± 0.7
298.15	1076.0 ± 0.8

**4,7-Dibromodecane**

[500047-63-2]

C<sub>10</sub>H<sub>20</sub>Br<sub>2</sub>

MW = 300.08

172

**Table 1.** Experimental value with uncertainty.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>	Ref.
293.15	1335.40 ± 2.00	1939-mar/wil

**1,2-Dibromo-4,4-dimethyloctane**

[500006-39-3]

C<sub>10</sub>H<sub>20</sub>Br<sub>2</sub>

MW = 300.08

173

**Table 1.** Experimental value with uncertainty.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>	Ref.
293.15	1359.00 ± 0.70	1952-lev/tan

**1-Bromodecane**

[112-29-8]

C<sub>10</sub>H<sub>21</sub>Br

MW = 221.18

174

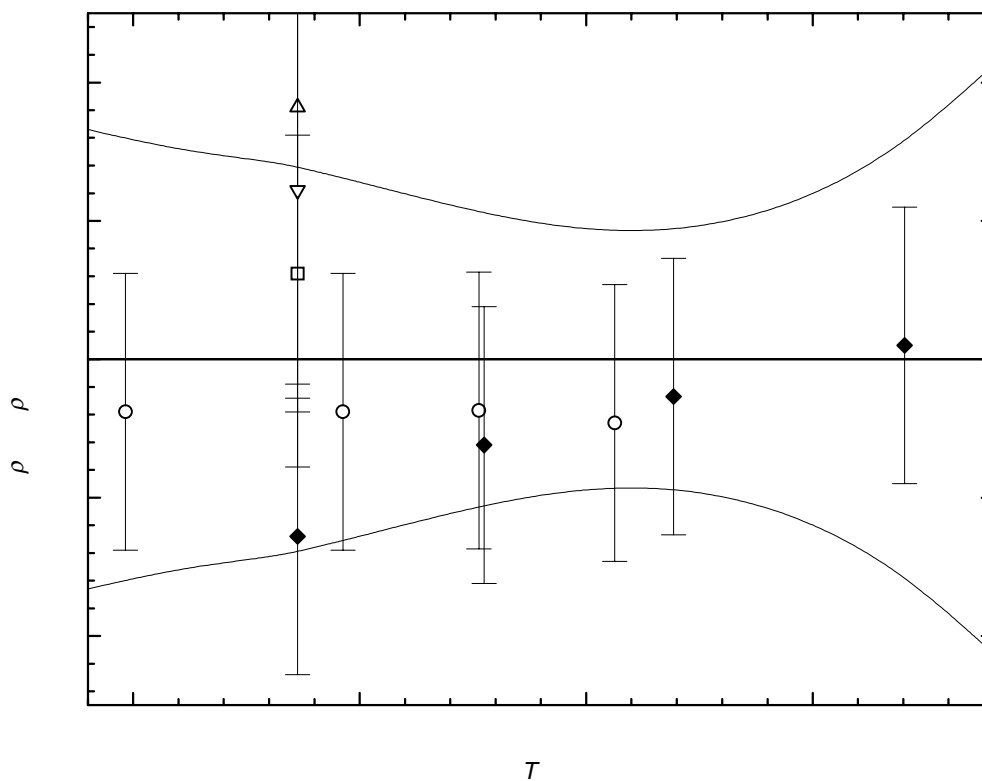
**Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):  $\sigma_{\text{c,w}} = 6.5724 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{\text{c,uw}} = 2.6810 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 274.15 \text{ to } 360.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.33699 \cdot 10^3$
B	$-9.20711 \cdot 10^{-1}$

cont.

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

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	$\rho_{\text{exp}} - \rho_{\text{calc}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref. (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)
293.15	$1068.30 \pm 2.00$	1.22	1927-tal(▽)	274.15	$1084.20 \pm 1.00$	-0.38	1950-hes/hen(○)
293.15	$1065.80 \pm 1.00$	-1.28	1943-vog(◆)	298.15	$1062.10 \pm 1.00$	-0.38	1950-hes/hen(○)
313.75	$1047.50 \pm 1.00$	-0.62	1943-vog(◆)	313.15	$1048.30 \pm 1.00$	-0.37	1950-hes/hen(○)
334.65	$1028.60 \pm 1.00$	-0.27	1943-vog(◆)	328.15	$1034.40 \pm 1.00$	-0.46	1950-hes/hen(○)
360.15	$1005.50 \pm 1.00$	0.10	1943-vog(◆)	293.15	$1068.90 \pm 2.00$	1.82	1951-tit/lev(Δ)
293.15	$1067.70 \pm 1.00$	0.62	1946-tuo(□)				

**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-Bromodecane (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	1088.40 ± 1.66	300.00	1060.78 ± 1.28	350.00	1014.74 ± 1.17
280.00	1079.19 ± 1.51	310.00	1051.57 ± 1.11	360.00	1005.53 ± 1.54
290.00	1069.98 ± 1.43	320.00	1042.36 ± 0.97	370.00	996.33 ± 2.13
293.15	1067.08 ± 1.39	330.00	1033.15 ± 0.91		
298.15	1062.48 ± 1.31	340.00	1023.95 ± 0.97		

**2-Bromodecane**

[39563-53-6]

C<sub>10</sub>H<sub>21</sub>Br

MW = 221.18

175

**Table 1.** Fit with estimated B coefficient for 4 accepted points. Deviation  $\sigma_w = 0.554$ .

Coefficient	$\rho = A + BT$
A	1345.22
B	-1.000

**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	1051.20 ± 1.50	-0.87	1948-pro/cas
298.15	1047.00 ± 1.50	-0.07	1948-pro/cas
303.15	1042.60 ± 1.50	0.52	1948-pro/cas
308.15	1037.50 ± 1.50	0.43	1948-pro/cas

**Table 3.** Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	1055.2 ± 1.7
293.15	1052.1 ± 1.6
298.15	1047.1 ± 1.5
310.00	1035.2 ± 1.6

**(+)-1-Bromo-3-methylnonane**

[500021-23-8]

C<sub>10</sub>H<sub>21</sub>Br

MW = 221.18

176

**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	1070.00 ± 2.00	1950-let/tra

***l*-1-Bromo-3-methylnonane** [500047-10-9] C<sub>10</sub>H<sub>21</sub>Br MW = 221.18 177

**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	1063.00 ± 2.00	1931-lev/mar-5

***d*-1-Bromo-4-methylnonane** [500047-11-0] C<sub>10</sub>H<sub>21</sub>Br MW = 221.18 178

**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.
300.65	1081.00 ± 2.00	1931-lev/mar-5

***l*-1-Bromo-5-methylnonane** [500047-12-1] C<sub>10</sub>H<sub>21</sub>Br MW = 221.18 179

**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	1082.00 ± 2.00	1933-lev/mar-1

**(-)-5-Bromo-3-methylnonane** [500021-30-7] C<sub>10</sub>H<sub>21</sub>Br MW = 221.18 180

**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.
298.15	1068.00 ± 2.00	1950-let/tra

**1-Bromo-2-propylheptane** [500025-27-4] C<sub>10</sub>H<sub>21</sub>Br MW = 221.18 181

**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	1077.50 ± 7.00	1928-kar

**1,7-Dibromo-4,4-diethylheptane** [72936-16-4] C<sub>11</sub>H<sub>22</sub>Br<sub>2</sub> MW = 314.10 182

**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.
293.15	1368.00 ± 2.50	1979-zel/hub

***l*-1-Bromo-5-methyldecane****[500047-13-2]****C<sub>11</sub>H<sub>23</sub>Br****MW = 235.21****183****Table 1.** Experimental value with uncertainty.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m <sup>-3</sup>	Ref.
298.15	1062.00 ± 2.00	1933-lev/mar-1

**1-Bromoundecane****[693-67-4]****C<sub>11</sub>H<sub>23</sub>Br****MW = 235.21****184****Table 1.** Fit with estimated B coefficient for 4 accepted points. Deviation  $\sigma_w = 0.517$ .

Coefficient	$\rho = A + BT$
<i>A</i>	1306.95
<i>B</i>	-0.860

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

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m <sup>-3</sup>	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg·m <sup>-3</sup>	Ref.
293.15	1052.10 ± 2.00	-2.74	1928-yoh/ada <sup>1)</sup>
293.15	1054.10 ± 1.00	-0.74	1943-vog
314.15	1036.70 ± 1.00	-0.08	1943-vog
334.95	1019.60 ± 1.00	0.71	1943-vog
359.85	997.60 ± 1.00	0.12	1943-vog

<sup>1)</sup> Not included in calculation of linear coefficients.**Table 3.** Recommended values.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m <sup>-3</sup>
290.00	1057.6 ± 2.0
293.15	1054.8 ± 1.8
298.15	1050.5 ± 1.6
310.00	1040.4 ± 1.2
320.00	1031.8 ± 0.9
330.00	1023.2 ± 0.9
340.00	1014.6 ± 1.1
350.00	1006.0 ± 1.5
360.00	997.4 ± 1.9

**1-Bromododecane****[143-15-7]****C<sub>12</sub>H<sub>25</sub>Br****MW = 249.23****185**

**Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):  $\sigma_{c,w} = 1.1036$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 3.1320 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 293.15 \text{ to } 358.05 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$1.29606 \cdot 10^3$
<i>B</i>	$-8.73401 \cdot 10^{-1}$

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
293.15	$1038.20 \pm 1.00$	-1.82	1943-vog( $\Delta$ )	298.08	$1036.60 \pm 0.60$	0.89	1969-cok/hol( $\nabla$ )
314.15	$1020.80 \pm 1.00$	-0.88	1943-vog( $\Delta$ )	303.10	$1032.20 \pm 0.60$	0.87	1969-cok/hol( $\nabla$ )
332.85	$1005.50 \pm 1.00$	0.15	1943-vog( $\Delta$ )	308.11	$1027.70 \pm 0.60$	0.75	1969-cok/hol( $\nabla$ )
358.05	$983.90 \pm 1.00$	0.56	1943-vog( $\Delta$ )	313.11	$1023.40 \pm 0.60$	0.81	1969-cok/hol( $\nabla$ )
303.15	$1029.00 \pm 1.00$	-2.29	1950-hof/smy( $\square$ )	293.15	$1040.50 \pm 1.00$	0.48	1976-str-2( $\circ$ )
333.15	$1005.00 \pm 1.00$	-0.08	1950-hof/smy( $\square$ )	298.15	$1036.20 \pm 1.00$	0.55	1976-str-2( $\circ$ )

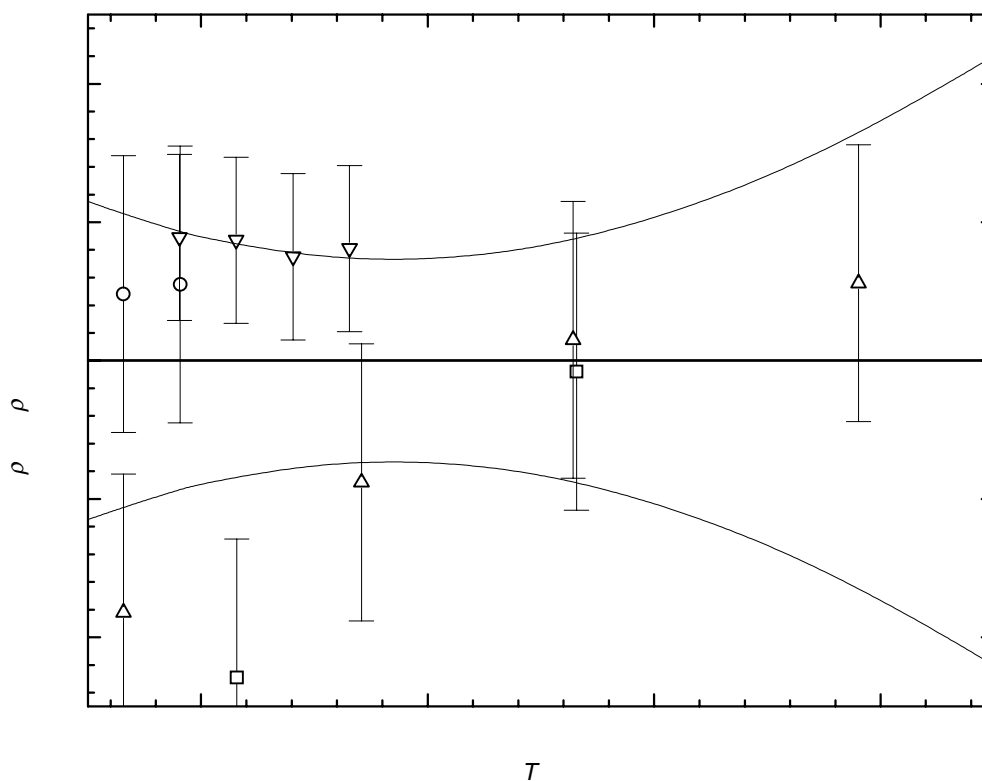
**Further references:** [1950-hes/hen].

**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	$1042.77 \pm 1.15$	310.00	$1025.30 \pm 0.74$	350.00	$990.37 \pm 1.32$
293.15	$1040.02 \pm 1.06$	320.00	$1016.57 \pm 0.72$	360.00	$981.63 \pm 1.72$
298.15	$1035.65 \pm 0.93$	330.00	$1007.83 \pm 0.81$	370.00	$972.90 \pm 2.20$
300.00	$1034.04 \pm 0.89$	340.00	$999.10 \pm 1.02$		

cont.

**1-Bromododecane (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-Bromo-3-methylundecane**

[500024-09-9]

C<sub>12</sub>H<sub>25</sub>Br

MW = 249.23

186

**Table 1.** Fit with estimated B coefficient for 4 accepted points. Deviation  $\sigma_w = 0.150$ .

Coefficient	$\rho = A + BT$
A	1306.19
B	-0.900

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

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg · m <sup>-3</sup>	Ref.
293.15	1042.10 ± 0.80	-0.25	1948-pro/cas
298.15	1037.90 ± 0.80	0.05	1948-pro/cas
303.15	1033.40 ± 0.80	0.05	1948-pro/cas
308.15	1029.00 ± 0.80	0.15	1948-pro/cas

cont.

**Table 3.** Recommended values.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m <sup>-3</sup>
290.00	1045.2 ± 0.9
293.15	1042.4 ± 0.8
298.15	1037.9 ± 0.7
310.00	1027.2 ± 0.9

**1-Bromotetradecane**

[112-71-0]

C<sub>14</sub>H<sub>29</sub>Br

MW = 277.29

187

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

$\sigma_{\text{c,w}} = 1.3530$  (combined temperature ranges, weighted),  $\sigma_{\text{c,uw}} = 4.5502 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 274.15 \text{ to } 359.35 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.26077 \cdot 10^3$
B	$-8.31772 \cdot 10^{-1}$

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

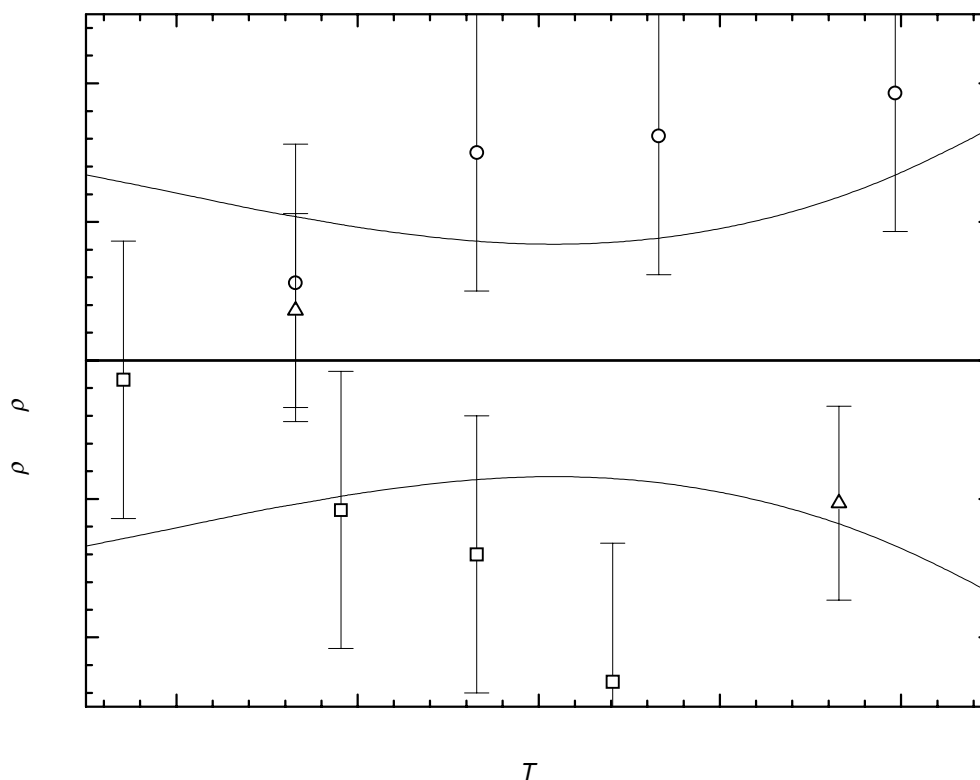
$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m <sup>-3</sup>	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg·m <sup>-3</sup>	Ref. (Symbol in Fig. 1)	$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg·m <sup>-3</sup>	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg·m <sup>-3</sup>	Ref. (Symbol in Fig. 1)
293.15	1017.50 ± 1.00	0.56	1948-vog(○)	298.15	1011.70 ± 1.00	-1.08	1950-hes/hen(□)
313.15	1001.80 ± 1.00	1.50	1948-vog(○)	313.15	998.90 ± 1.00	-1.40	1950-hes/hen(□)
333.25	985.20 ± 1.00	1.62	1948-vog(○)	328.15	985.50 ± 1.00	-2.32	1950-hes/hen(□)
359.35	963.80 ± 1.00	1.93	1948-vog(○)	293.15	1017.30 ± 0.70	0.36	1981-kor/kov(Δ)
274.15	1032.60 ± 1.00	-0.14	1950-hes/hen(□)	353.15	966.00 ± 0.70	-1.03	1981-kor/kov(Δ)

**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	$\rho \pm \sigma_{\text{fit}}$ kg·m <sup>-3</sup>	$T$ K	$\rho \pm \sigma_{\text{fit}}$ kg·m <sup>-3</sup>	$T$ K	$\rho \pm \sigma_{\text{fit}}$ kg·m <sup>-3</sup>
270.00	1036.19 ± 1.34	300.00	1011.24 ± 0.96	350.00	969.65 ± 1.10
280.00	1027.87 ± 1.21	310.00	1002.92 ± 0.87	360.00	961.33 ± 1.34
290.00	1019.56 ± 1.07	320.00	994.60 ± 0.83	370.00	953.01 ± 1.68
293.15	1016.94 ± 1.04	330.00	986.29 ± 0.85		
298.15	1012.78 ± 0.98	340.00	977.97 ± 0.94		

cont.

**1-Bromotetradecane (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-Bromohexadecane**

[112-82-3]

**C<sub>16</sub>H<sub>33</sub>Br****MW = 305.34****188**

**Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):  $\sigma_{c,w} = 9.2548 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 3.0362 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

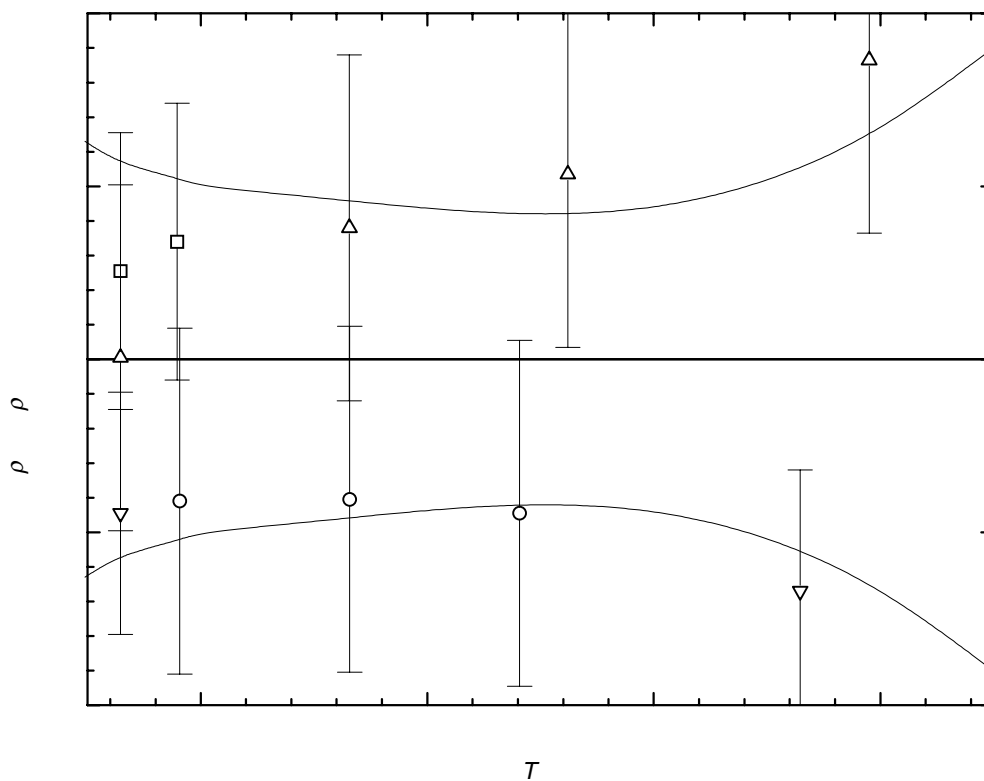
Coefficient	$T = 293.15 \text{ to } 359.25 \text{ K}$
	$\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$1.23850 \cdot 10^3$
<i>B</i>	$-8.14295 \cdot 10^{-1}$

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)
293.15	$999.80 \pm 1.00$	0.01	1948-vog( $\Delta$ )	328.15	$970.40 \pm 1.00$	-0.89	1950-hes/hen( $\circ$ )
313.35	$984.10 \pm 1.00$	0.76	1948-vog( $\Delta$ )	293.15	$1000.30 \pm 0.80$	0.51	1976-str-2( $\square$ )
332.65	$968.70 \pm 1.00$	1.07	1948-vog( $\Delta$ )	298.15	$996.40 \pm 0.80$	0.68	1976-str-2( $\square$ )
359.25	$947.70 \pm 1.00$	1.73	1948-vog( $\Delta$ )	293.15	$998.90 \pm 0.70$	-0.89	1981-kor/kov( $\nabla$ )
298.15	$994.90 \pm 1.00$	-0.82	1950-hes/hen( $\circ$ )	353.15	$949.60 \pm 0.70$	-1.34	1981-kor/kov( $\nabla$ )
313.15	$982.70 \pm 1.00$	-0.81	1950-hes/hen( $\circ$ )				

**Further references:** [1950-hof/smy].



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

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	1002.36 ± 1.26	310.00	986.07 ± 0.94	350.00	953.50 ± 1.01
293.15	999.79 ± 1.13	320.00	977.93 ± 0.87	360.00	945.36 ± 1.30
298.15	995.72 ± 1.05	330.00	969.79 ± 0.83	370.00	937.21 ± 1.79
300.00	994.22 ± 1.00	340.00	961.64 ± 0.86		

**1-Bromooctadecane**

[112-89-0]

C<sub>18</sub>H<sub>37</sub>Br

MW = 333.40

189

**Table 1.** Fit with estimated B coefficient for 4 accepted points. Deviation  $\sigma_w = 0.553$ .

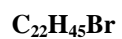
Coefficient	$\rho = A + BT$
A	1216.11
B	-0.790

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

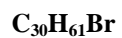
$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
303.15	976.00 ± 1.00	-0.62	1950-hof/smy
333.15	952.00 ± 1.00	-0.92	1950-hof/smy
293.15	985.00 ± 0.70	0.48	1981-kor/kov
353.15	937.40 ± 0.70	0.28	1981-kor/kov

**Table 3.** Recommended values.

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	987.0 ± 1.3
293.15	984.5 ± 1.3
298.15	980.6 ± 1.2
310.00	971.2 ± 1.0
320.00	963.3 ± 0.9
330.00	955.4 ± 1.0
340.00	947.5 ± 1.1
350.00	939.6 ± 1.3
360.00	931.7 ± 1.5

**1-Bromodocosane****[6938-66-5]****MW = 389.50****190****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.
<i>crysta</i>		
308.15	1150.0 ± 10.0	1952-hof-1
<i>liquid</i>		
313.15	1000.00 ± 10.00	1952-hof
313.15	1000.00 ± 10.00	1952-hof-1

**1-Bromotriacontane****[4209-22-7]****MW = 501.72****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.
340.15	920.00 ± 6.00	1952-hof