

## 2 Tabulated Data on Density - Haloalkanes

### 2.1 Bromoalkanes

#### 2.1.1 Bromoalkanes, C<sub>1</sub> - C<sub>3</sub>

Tetrabromomethane

[558-13-4]

CBr<sub>4</sub>

MW = 331.63

1

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

$\sigma_{c,w} = 3.9151 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 1.7509 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 373.85 \text{ to } 436.25 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$1.69163 \cdot 10^3$
<i>B</i>	8.61292
<i>C</i>	$-1.40108 \cdot 10^{-2}$

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
		<i>crystal</i>		398.05	$2900.40 \pm 2.00$	0.33	1943-fri/har(□)
79.15	$3704.0 \pm 6.0$		1932-bil/sap	412.35	$2860.90 \pm 2.00$	0.03	1943-fri/har(□)
194.15	$3567.0 \pm 6.0$		1932-bil/sap	420.65	$2835.50 \pm 2.00$	0.02	1943-fri/har(□)
291.15	$3273.0 \pm 6.0$		1932-bil/sap	428.35	$2809.40 \pm 2.00$	-0.81	1943-fri/har(□)
		<i>liquid</i>		436.25	$2783.10 \pm 2.00$	0.55	1943-fri/har(□)
373.85	$2953.30 \pm 2.00$	-0.06	1943-fri/har(□)				

**Further references:** [1929-von/har].

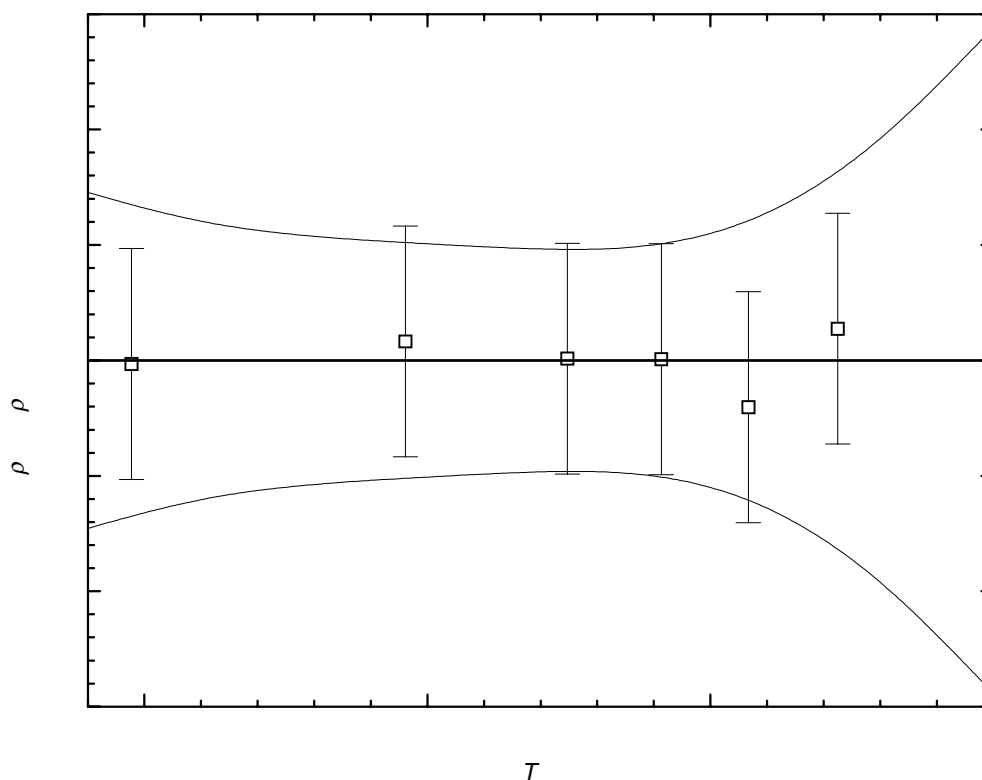
**Table 3.** Recommended values (fit to the reliable experimental values according to the equations

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
370.00	$2960.32 \pm 2.91$	400.00	$2895.06 \pm 2.02$	430.00	$2804.58 \pm 2.43$
380.00	$2941.37 \pm 2.36$	410.00	$2867.70 \pm 1.91$	440.00	$2768.81 \pm 3.72$
390.00	$2919.62 \pm 2.13$	420.00	$2837.54 \pm 1.92$	450.00	$2730.25 \pm 5.78$

cont.

## Tetrabromomethane (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.)

## Tribromomethane

[75-25-2]

CHBr<sub>3</sub>

MW = 252.73

2

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

$\sigma_{c,w} = 7.9466 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 1.9762 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 282.47 \text{ to } 323.42 \text{ K}$
	$\rho = A + BT + CT^2 + DT^3 + \dots$
$A$	$3.65657 \cdot 10^3$
$B$	-2.61420

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)
292.22	2892.40 ± 1.00	-0.25	1908-pat/tho <sup>1)</sup>	283.15	2915.90 ± 0.50	-0.46	1949-lag/mcm(○)
293.15	2889.90 ± 1.00	-0.32	1908-pat/tho <sup>1)</sup>	293.15	2890.40 ± 0.50	0.18	1949-lag/mcm(○)
294.32	2886.90 ± 1.00	-0.26	1908-pat/tho <sup>1)</sup>	303.15	2863.90 ± 0.50	-0.17	1949-lag/mcm(○)
298.90	2875.00 ± 1.00	-0.19	1908-pat/tho(×)	313.15	2837.70 ± 0.50	-0.23	1949-lag/mcm(○)
298.15	2877.90 ± 1.00	0.75	1921-dol/sch(×)	323.15	2811.80 ± 0.50	0.01	1949-lag/mcm(○)
282.47	2918.70 ± 0.60	0.56	1928-she/she(◆)	293.15	2891.60 ± 0.40	1.38	1972-bou/aim(□)
323.42	2811.70 ± 0.60	0.61	1928-she/she(◆)	298.15	2875.76 ± 0.50	-1.39	1990-sin/mal(∇)
288.15	2902.92 ± 0.50	-0.37	1928-tim/mar(Δ)	298.15	2876.00 ± 1.00	-1.15	1991-ara/ami(×)
303.15	2864.52 ± 0.50	0.45	1928-tim/mar(Δ)				

<sup>1)</sup> Not included in Fig. 1.

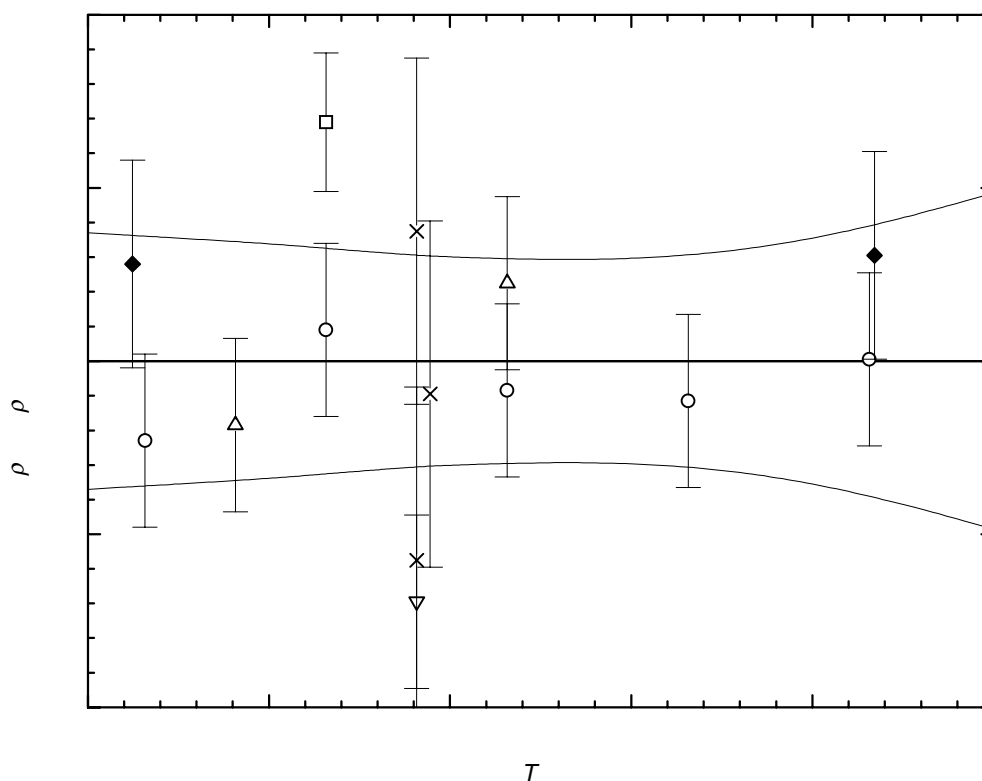
**Further references:** [1877-sch, 1880-tho, 1884-per, 1885-per-2, 1891-gla, 1898-kah, 1911-dob, 1911-dru/kas, 1912-tur, 1925-pas, 1928-buh, 1928-opp, 1929-von/har, 1930-smy/rog-1, 1931-tre/spe, 1932-bil/sap, 1932-tre-1, 1935-des-1, 1935-ear/gla, 1936-sen/abo, 1936-whi/cia, 1937-ste, 1940-mor/yag, 1941-suh/kle, 1943-fri/har, 1944-sch, 1945-fre/tre, 1947-wil, 1948-lag/eva, 1948-vog-5, 1949-tsc/ric-1, 1950-par-1, 1950-wol/sau, 1966-buc/jan, 1968-sch/cle, 1993-ami/rai].

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

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	2924.59 ± 0.74	298.15	2877.15 ± 0.61	320.00	2820.03 ± 0.68
290.00	2898.45 ± 0.68	300.00	2872.31 ± 0.60	330.00	2793.88 ± 0.97
293.15	2890.22 ± 0.65	310.00	2846.17 ± 0.57		

cont.

**Tribromomethane (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.)

**Dibromomethane**

[74-95-3]

**MW = 173.83****3**

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

$\sigma_{c,w} = 7.2704 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 4.1748 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 353.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$3.16968 \cdot 10^3$
<i>B</i>	-1.98984
<i>C</i>	$-1.04256 \cdot 10^{-3}$

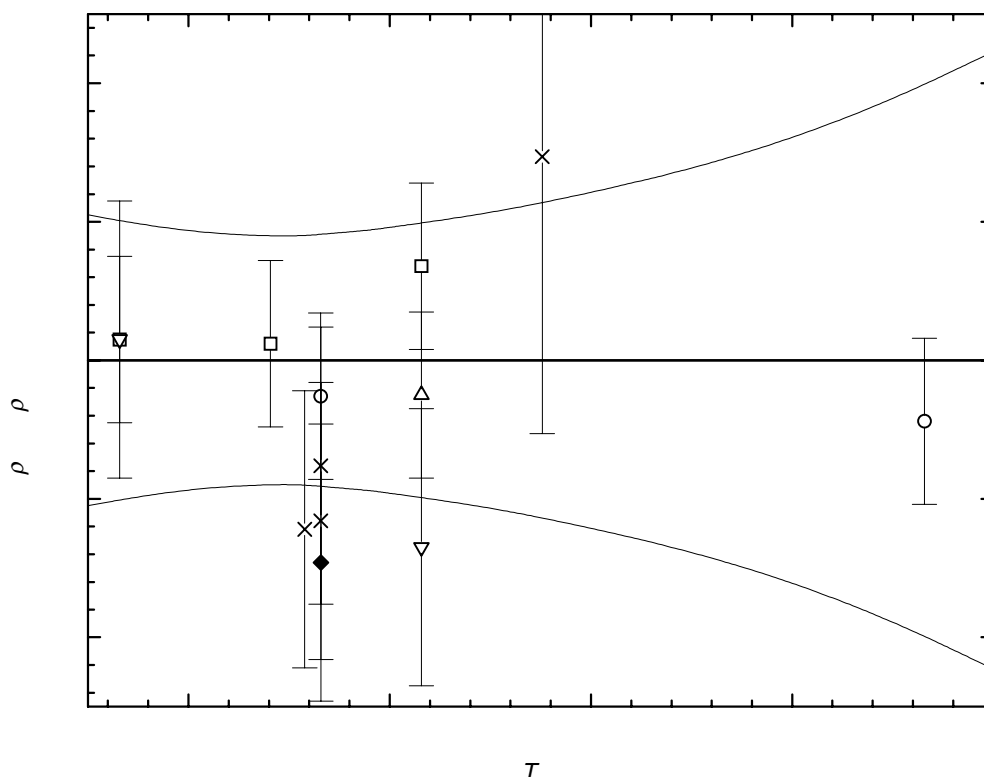
cont.

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
293.15	$2495.30 \pm 1.00$	-1.46	1928-koc(◆)	334.75	$2391.10 \pm 2.00$	4.35	1948-vog-5(×)
273.15	$2548.52 \pm 0.60$	0.15	1932-tim/hen(□)	359.25	$2326.60 \pm 2.00$	6.32	1948-vog-5 <sup>1)</sup>
288.15	$2509.86 \pm 0.60$	0.12	1932-tim/hen(□)	273.15	$2548.52 \pm 1.00$	0.15	1954-gri/car(▽)
303.15	$2471.33 \pm 0.60$	0.68	1932-tim/hen(□)	303.15	$2469.30 \pm 1.00$	-1.35	1954-gri/car(▽)
293.15	$2496.00 \pm 1.00$	-0.76	1937-ste(×)	303.15	$2470.40 \pm 0.60$	-0.25	1968-sch/cle(Δ)
291.55	$2499.70 \pm 1.00$	-1.22	1948-vog-5(×)	293.15	$2496.50 \pm 0.60$	-0.26	1981-kor/kov(○)
293.15	$2495.60 \pm 1.00$	-1.16	1948-vog-5(×)	353.15	$2336.50 \pm 0.60$	-0.44	1981-kor/kov(○)
315.15	$2440.50 \pm 2.00$	1.47	1948-vog-5(×)				

<sup>1)</sup> Not included in Fig. 1.

**Further references:** [1913-dun/hil, 1930-smy/rog-1, 1940-mor/yag, 1943-fri/har, 1948-lag/eva, 1949-lag/mcm, 1954-gri/car, 1984-sin/nig, 1985-sin/sha].



**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.

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

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	2556.42 ± 1.05	298.15	2483.73 ± 0.94	330.00	2399.50 ± 1.38
280.00	2530.79 ± 0.92	300.00	2478.90 ± 0.96	340.00	2372.61 ± 1.60
290.00	2504.95 ± 0.89	310.00	2452.64 ± 1.06	350.00	2345.52 ± 1.88
293.15	2496.76 ± 0.91	320.00	2426.17 ± 1.21	360.00	2318.22 ± 2.23

**Bromomethane****[74-83-9]****CH<sub>3</sub>Br****MW = 94.94****4****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{c,w} = 1.5507$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 2.8834 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 183.15 \text{ to } 333.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$2.38345 \cdot 10^3$
<i>B</i>	-2.58006
<i>C</i>	$2.24461 \cdot 10^{-3}$
<i>D</i>	$-5.64492 \cdot 10^{-6}$

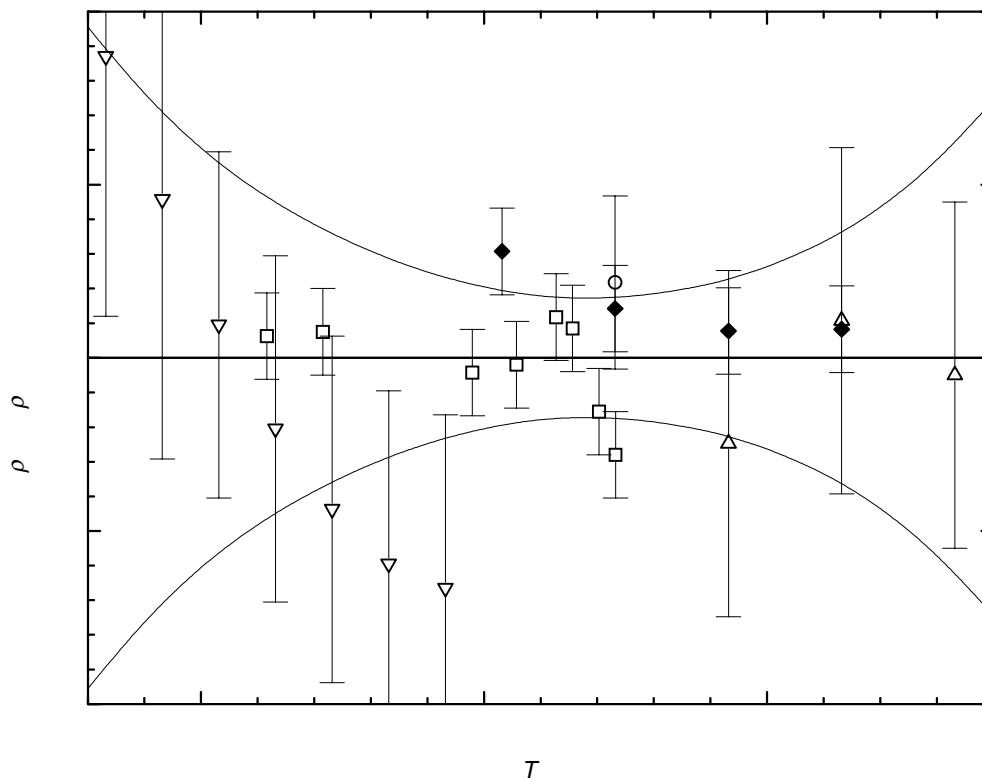
**Table 2.** Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
<i>crystal</i>				273.15	1730.00 ± 2.00	-1.13	1930-mor/low <sup>1)</sup>
153.15	2224.0 ± 8.0		1930-mor/low	211.63	1884.70 ± 0.50	0.25	1931-hsi(□)
163.15	2216.0 ± 8.0		1930-mor/low	221.52	1861.00 ± 0.50	0.30	1931-hsi(□)
173.15	2205.0 ± 8.0		1930-mor/low	247.95	1795.50 ± 0.50	-0.17	1931-hsi(□)
78.15	2346.0 ± 10.0		1932-bil/sap	255.75	1775.90 ± 0.50	-0.08	1931-hsi(□)
<i>liquid</i>				262.74	1758.60 ± 0.50	0.47	1931-hsi(□)
273.15	1732.00 ± 1.00	0.87	1878-mer(O)	265.64	1751.00 ± 0.50	0.34	1931-hsi(□)
173.15	1980.00 ± 3.00	5.30	1930-mor/low <sup>1)</sup>	270.32	1737.90 ± 0.50	-0.62	1931-hsi(□)
183.15	1955.00 ± 3.00	3.48	1930-mor/low(∇)	273.23	1729.80 ± 0.50	-1.12	1931-hsi(□)
193.15	1930.00 ± 3.00	1.83	1930-mor/low(∇)	253.15	1783.80 ± 0.50	1.23	1978-kum/iwa(◆)
203.15	1905.00 ± 2.00	0.38	1930-mor/low(∇)	273.15	1731.70 ± 0.50	0.57	1978-kum/iwa(◆)
213.15	1880.00 ± 2.00	-0.82	1930-mor/low(∇)	293.15	1678.10 ± 0.50	0.31	1978-kum/iwa(◆)
223.15	1855.00 ± 2.00	-1.75	1930-mor/low(∇)	313.15	1622.60 ± 0.50	0.33	1978-kum/iwa(◆)
233.15	1830.00 ± 2.00	-2.38	1930-mor/low(∇)	293.15	1676.80 ± 2.00	-0.99	1988-rut(Δ)
243.15	1805.00 ± 2.00	-2.66	1930-mor/low(∇)	313.15	1622.70 ± 2.00	0.43	1988-rut(Δ)
253.15	1780.00 ± 2.00	-2.57	1930-mor/low <sup>1)</sup>	333.15	1564.10 ± 2.00	-0.20	1988-rut(Δ)
263.15	1755.00 ± 2.00	-2.07	1930-mor/low <sup>1)</sup>	363.15	1467.20 ± 3.00	-4.97	1988-rut <sup>1)</sup>

<sup>1)</sup> Not included in Fig. 1.

cont.

**Further references:** [1885-per-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  $\rho = A + BT + CT^2 + DT^3 + \dots$  or  $\rho = [1 + 1.75(1 - T/T_c)^{1/3} + 0.75(1 - T/T_c)][\rho_c + A(T_c - T) + B(T_c - T)^2 + C(T_c - T)^3 + D(T_c - T)^4]$ ).

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
180.00	1958.84 ± 3.82	250.00	1790.52 ± 0.81	300.00	1659.03 ± 1.05
190.00	1935.55 ± 3.03	260.00	1765.15 ± 0.70	310.00	1631.17 ± 1.32
200.00	1912.06 ± 2.40	270.00	1739.35 ± 0.68	320.00	1602.70 ± 1.72
210.00	1888.34 ± 1.91	280.00	1713.09 ± 0.73	330.00	1573.60 ± 2.26
220.00	1864.37 ± 1.53	290.00	1686.33 ± 0.85	340.00	1543.83 ± 2.98
230.00	1840.09 ± 1.22	293.15	1677.79 ± 0.91		
240.00	1815.49 ± 0.98	298.15	1664.12 ± 1.01		

**1,1,1,2-Tetrabromoethane****[630-16-0]****MW = 345.65****5****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	2874.80 ± 3.00	1888-wee
293.15	2850.00 ± 6.00	1952-agr/hil

**1,1,2,2-Tetrabromoethane****[79-27-6]****MW = 345.65****6****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{\text{c,w}} = 1.0209$  (combined temperature ranges, weighted),  $\sigma_{\text{c,uw}} = 2.7726 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

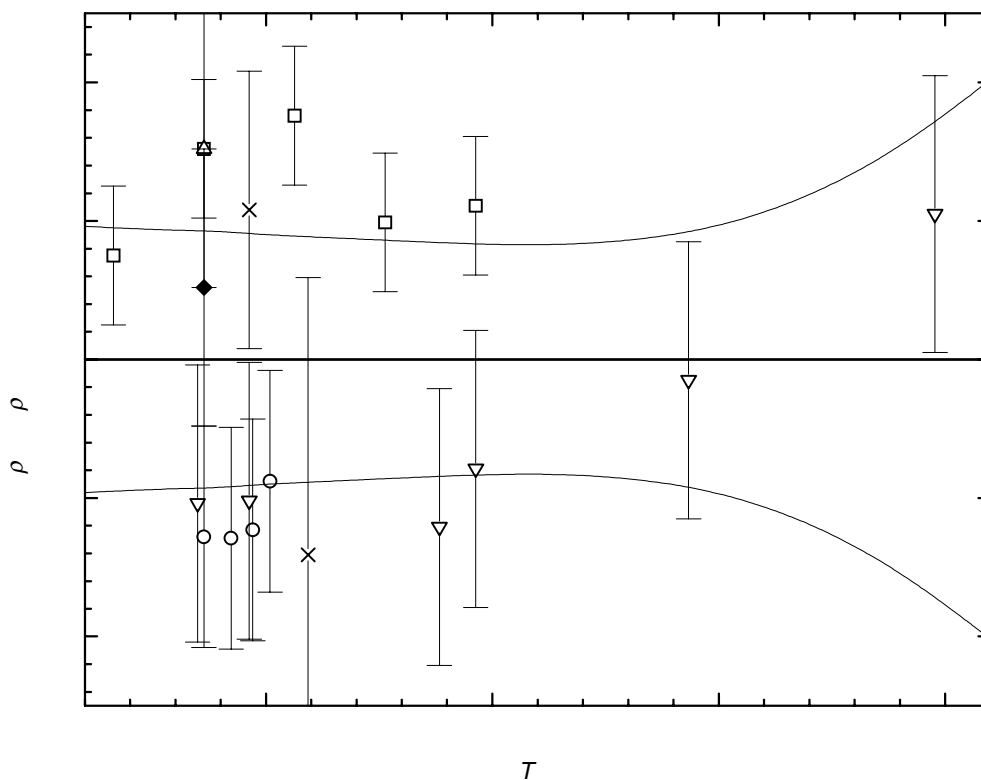
Coefficient	$T = 283.15 \text{ to } 373.85 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	0 3.58292 · 10 <sup>3</sup>
<i>B</i>	-1.98465
<i>C</i>	-4.19351 · 10 <sup>-4</sup>

**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	2965.60 ± 1.00	0.52	1897-swa(◆)	296.15	2957.10 ± 0.80	-1.29	1933-bar/woo(○)
294.02	2961.82 ± 2.00	-1.32	1908-pat/tho <sup>1)</sup>	298.55	2951.80 ± 0.80	-1.23	1933-bar/woo(○)
296.93	2955.18 ± 2.00	-1.47	1908-pat/tho <sup>1)</sup>	300.45	2947.90 ± 0.80	-0.88	1933-bar/woo(○)
304.65	2937.97 ± 2.00	-1.41	1908-pat/tho(×)	293.15	2966.60 ± 1.00	1.52	1948-lag/eva(Δ)
292.45	2965.60 ± 1.00	-1.04	1913-wal/swi(∇)	283.15	2988.10 ± 0.50	0.75	1949-lag/mcm(□)
298.15	2952.90 ± 1.00	-1.02	1913-wal/swi(∇)	293.15	2966.60 ± 0.50	1.52	1949-lag/mcm(□)
319.15	2905.60 ± 1.00	-1.21	1913-wal/swi(∇)	303.15	2944.50 ± 0.50	1.76	1949-lag/mcm(□)
323.15	2897.00 ± 1.00	-0.79	1913-wal/swi(∇)	313.15	2921.30 ± 0.50	0.99	1949-lag/mcm(□)
346.65	2844.40 ± 1.00	-0.15	1913-wal/swi(∇)	323.15	2898.90 ± 0.50	1.11	1949-lag/mcm(□)
373.85	2783.40 ± 1.00	1.05	1913-wal/swi(∇)	298.15	2955.00 ± 1.00	1.08	1950-gra(×)
293.15	2963.80 ± 0.80	-1.28	1933-bar/woo(○)				

<sup>1)</sup> Not included in Fig. 1.**Further references:** [1888-wee, 1920-har/cla, 1924-mil, 1944-sch, 1948-vog-5, 1969-cok/hol].

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	$2994.34 \pm 0.96$	310.00	$2927.38 \pm 0.87$	360.00	$2814.10 \pm 1.17$
290.00	$2972.11 \pm 0.93$	320.00	$2904.89 \pm 0.84$	370.00	$2791.19 \pm 1.52$
293.15	$2965.08 \pm 0.93$	330.00	$2882.32 \pm 0.82$	380.00	$2768.20 \pm 2.02$
298.15	$2953.92 \pm 0.91$	340.00	$2859.66 \pm 0.85$		
300.00	$2949.78 \pm 0.90$	350.00	$2836.92 \pm 0.95$		

**1,1,2-Tribromoethane****[78-74-0]****MW = 266.76****7****Table 1.** Fit with estimated B coefficient for 5 accepted points. Deviation  $\sigma_w = 0.389$ .

Coefficient	$\rho = A + BT$
A	3272.13
B	-2.220

**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.
290.65	2618.90 $\pm$ 3.00	-7.99	1883-ans <sup>1)</sup>	303.15	2599.90 $\pm$ 1.50	0.73	1949-ver/jun
294.65	2610.70 $\pm$ 3.00	-7.31	1883-ans <sup>1)</sup>	293.15	2580.00 $\pm$ 20.00	-41.34	1952-agr/hil <sup>1)</sup>
293.15	2579.00 $\pm$ 20.00	-42.38	1888-wee <sup>1)</sup>	293.15	2621.10 $\pm$ 1.00	-0.23	1953-ano-18
288.15	2628.10 $\pm$ 2.00	-4.34	1923-swa <sup>1)</sup>	298.15	2610.10 $\pm$ 1.00	-0.17	1953-ano-18
288.15	2633.10 $\pm$ 1.50	0.70	1949-ver/jun	303.15	2598.90 $\pm$ 1.00	-0.23	1953-ano-18

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

$\frac{T}{K}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	2650.5 $\pm$ 1.9
290.00	2628.3 $\pm$ 1.0
293.15	2621.3 $\pm$ 0.8
298.15	2610.2 $\pm$ 0.7
310.00	2583.9 $\pm$ 1.4

**1,1-Dibromoethane****[557-91-5]****MW = 187.86****8****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):  $\sigma_{c,w} = 2.3588 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 1.6679 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

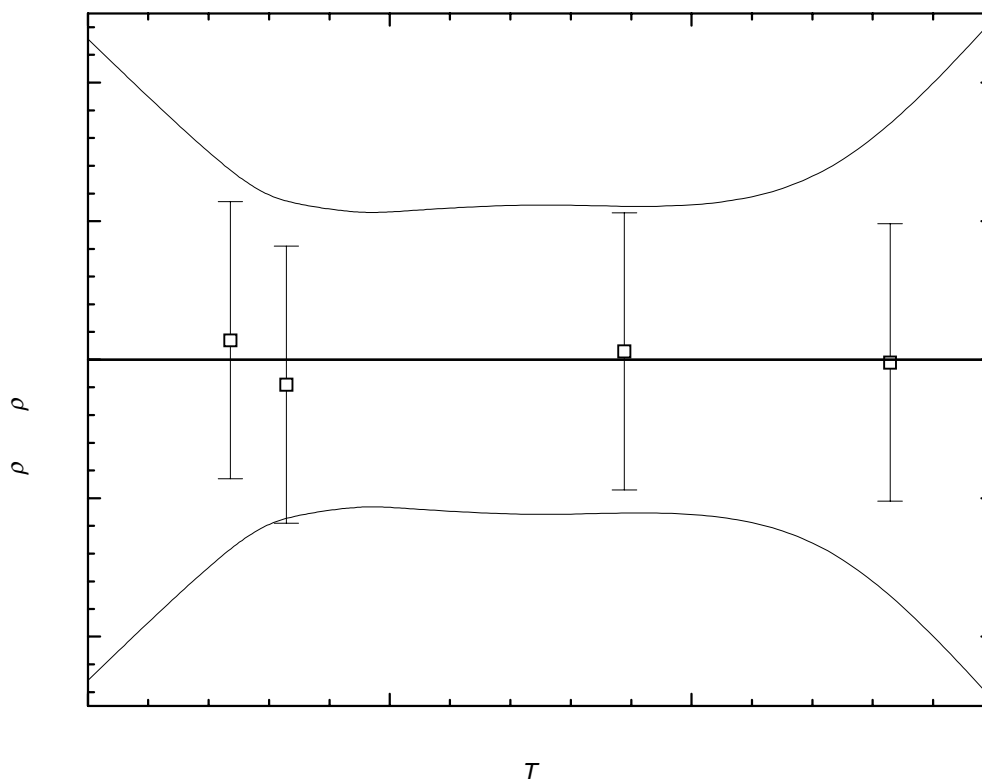
Coefficient	$T = 289.45 \text{ to } 333.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$2.33757 \cdot 10^3$
B	$4.53010 \cdot 10^{-1}$
C	$-4.28470 \cdot 10^{-3}$

cont.

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)	$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref. (Symbol in Fig. 1)
289.45	$2110.00 \pm 2.00$	0.28	1948-vog-5( $\square$ )	315.55	$2054.00 \pm 2.00$	0.12	1948-vog-5( $\square$ )
293.15	$2101.80 \pm 2.00$	-0.36	1948-vog-5( $\square$ )	333.15	$2012.90 \pm 2.00$	-0.04	1948-vog-5( $\square$ )

**Further references:** [1861-cav, 1870-reb, 1883-ans, 1888-wee, 1931-wib-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

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	$2128.49 \pm 4.63$	298.15	$2091.76 \pm 2.11$	320.00	$2043.78 \pm 2.14$
290.00	$2108.60 \pm 2.54$	300.00	$2087.85 \pm 2.13$	330.00	$2020.46 \pm 2.57$
293.15	$2102.16 \pm 2.25$	310.00	$2066.25 \pm 2.28$	340.00	$1996.28 \pm 4.92$

**1,2-Dibromoethane****[106-93-4]****C<sub>2</sub>H<sub>4</sub>Br<sub>2</sub>****MW = 187.86****9****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):
 $\sigma_{c,w} = 9.1561 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 1.6164 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 283.65 \text{ to } 358.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$2.77249 \cdot 10^3$
<i>B</i>	-2.02236

**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	$2178.50 \pm 1.00$	-1.13	1883-ans(×)	293.15	$2179.07 \pm 1.00$	-0.56	1949-dre/mar(○)
294.65	$2176.70 \pm 1.00$	0.10	1883-ans(×)	298.15	$2168.64 \pm 1.00$	-0.88	1949-dre/mar(○)
283.65	$2200.80 \pm 1.00$	1.96	1891-gla(×)	288.15	$2189.07 \pm 1.00$	-0.67	1949-ver/jun(×)
293.15	$2180.40 \pm 1.00$	0.77	1913-bir(□)	303.15	$2157.86 \pm 1.00$	-1.55	1949-ver/jun(×)
288.83	$2188.63 \pm 1.00$	0.26	1923-ege/lee(×)	293.15	$2180.20 \pm 1.00$	0.57	1950-mum/phi(×)
289.41	$2187.44 \pm 1.00$	0.24	1923-ege/lee(×)	298.15	$2170.00 \pm 1.00$	0.48	1950-mum/phi(×)
290.02	$2186.21 \pm 1.00$	0.25	1923-ege/lee(×)	288.15	$2191.10 \pm 1.00$	1.36	1950-tim(×)
290.48	$2185.21 \pm 1.00$	0.18	1923-ege/lee(×)	293.15	$2179.20 \pm 0.60$	-0.43	1952-dre(×)
290.94	$2184.33 \pm 1.00$	0.23	1923-ege/lee(×)	298.15	$2168.77 \pm 0.60$	-0.75	1952-dre(×)
291.44	$2183.24 \pm 1.00$	0.15	1923-ege/lee(×)	303.15	$2158.34 \pm 0.60$	-1.07	1952-dre(×)
292.10	$2181.85 \pm 1.00$	0.09	1923-ege/lee(×)	293.15	$2178.90 \pm 1.00$	-0.73	1960-grz/jef-1(×)
292.66	$2180.75 \pm 1.00$	0.13	1923-ege/lee(×)	313.15	$2139.10 \pm 1.00$	-0.09	1960-grz/jef-1(×)
288.15	$2191.10 \pm 1.00$	1.36	1926-tim/mar-1(Δ)	333.15	$2100.00 \pm 1.00$	1.26	1960-grz/jef-1(×)
303.15	$2159.70 \pm 1.00$	0.29	1926-tim/mar-1(Δ)	358.15	$2048.60 \pm 1.00$	0.42	1960-grz/jef-1(×)
293.15	$2180.50 \pm 1.00$	0.87	1929-hil(∇)	298.15	$2168.37 \pm 1.00$	-1.15	2000-mus/pos(×)
293.15	$2177.70 \pm 1.00$	-1.93	1948-lag/eva(◆)				

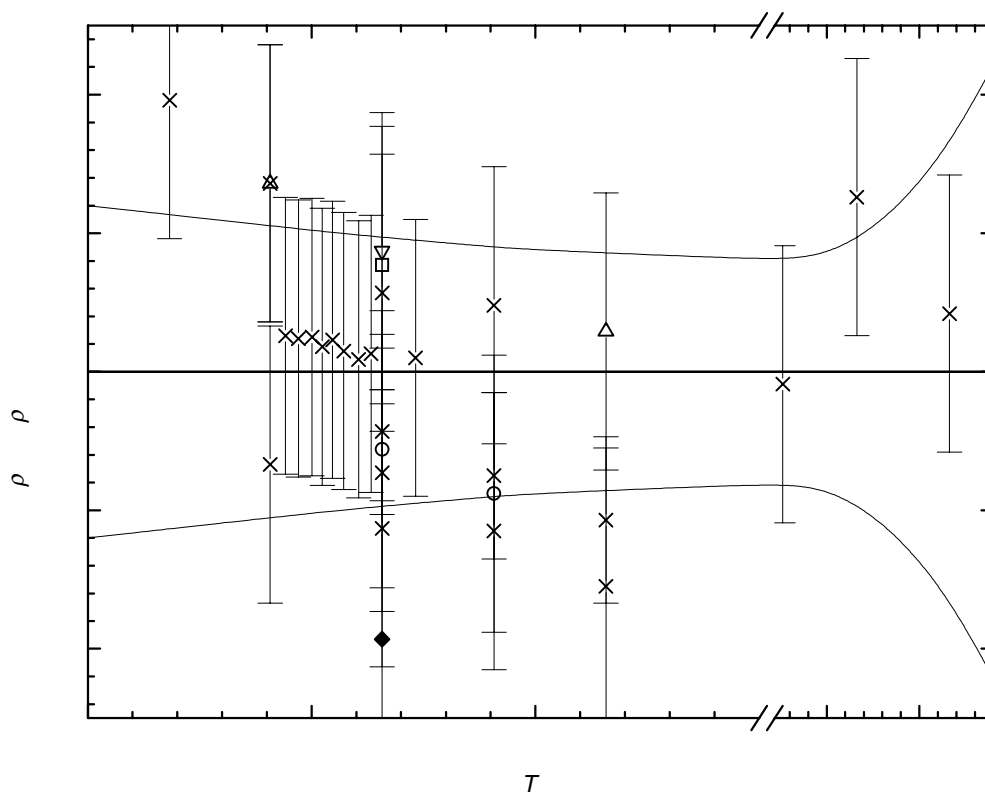
**Further references:** [1888-wee, 1908-pat/tho, 1910-sch-2, 1913-dun/hil, 1914-sch, 1926-mat, 1930-her, 1931-smy/kam, 1940-mor/yag, 1944-sch, 1948-vog, 1949-fre/nog, 1949-lag/mcm, 1950-kor/pav, 1985-ven/ram].

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

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
280.00	$2206.23 \pm 1.20$	300.00	$2165.78 \pm 0.88$	340.00	$2084.88 \pm 1.09$
290.00	$2186.00 \pm 1.02$	310.00	$2145.56 \pm 0.81$	350.00	$2064.66 \pm 1.36$
293.15	$2179.63 \pm 0.97$	320.00	$2125.33 \pm 0.82$	360.00	$2044.44 \pm 1.73$
298.15	$2169.52 \pm 0.90$	330.00	$2105.11 \pm 0.91$	370.00	$2024.21 \pm 2.22$

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.)

**Bromoethane**

[74-96-4]

C2H5Br

MW = 108.97

10

**Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):  $\sigma_{c,w} = 1.5149$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 2.0390 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 173.15 \text{ to } 363.15 \text{ K}$
	$\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$2.06337 \cdot 10^3$
<i>B</i>	$-2.50140$
<i>C</i>	$2.96714 \cdot 10^{-3}$
<i>D</i>	$-4.95235 \cdot 10^{-6}$

cont.

**Bromoethane** (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)
291.47	1463.69 ± 1.00	-0.04	1908-pat/tho(×)	303.15	1438.00 ± 1.50	-1.78	1930-mor/low <sup>1)</sup>
292.77	1461.07 ± 1.00	-0.01	1908-pat/tho(×)	313.15	1416.40 ± 1.50	-2.54	1930-mor/low(×)
295.65	1455.23 ± 1.00	0.03	1908-pat/tho(×)	298.15	1451.20 ± 1.00	1.12	1935-ska/mcc(×)
273.15	1501.35 ± 0.50	0.79	1910-tim(□)	288.85	1467.60 ± 1.00	-1.45	1943-vog(×)
273.15	1501.14 ± 1.00	0.58	1923-tim(×)	293.15	1460.40 ± 1.00	0.09	1943-vog(×)
273.15	1501.36 ± 1.00	0.80	1926-tim/mar(×)	293.15	1460.60 ± 1.00	0.29	1948-lag/eva(×)
288.15	1470.80 ± 1.00	0.34	1926-tim/mar(×)	283.15	1480.30 ± 0.50	-0.26	1949-lag/mcm(○)
303.15	1440.30 ± 1.00	0.52	1926-tim/mar(×)	293.15	1460.60 ± 0.50	0.29	1949-lag/mcm(○)
173.15	1695.00 ± 1.50	1.50	1930-mor/low(×)	303.15	1439.80 ± 0.50	0.02	1949-lag/mcm(○)
183.15	1675.20 ± 1.50	0.86	1930-mor/low(×)	288.25	1470.40 ± 0.60	0.14	1955-fle/sau(Δ)
193.15	1655.50 ± 1.50	0.27	1930-mor/low(×)	298.15	1449.00 ± 0.60	-1.08	1955-fle/sau(Δ)
203.15	1635.80 ± 1.50	-0.34	1930-mor/low(×)	253.15	1542.10 ± 0.60	2.16	1978-kum/iwa(∇)
213.15	1616.20 ± 1.50	-0.84	1930-mor/low(×)	273.15	1500.50 ± 0.60	-0.06	1978-kum/iwa(∇)
223.15	1596.60 ± 1.50	-1.30	1930-mor/low(×)	293.15	1459.40 ± 0.60	-0.91	1978-kum/iwa(∇)
233.15	1577.60 ± 1.50	-1.09	1930-mor/low(×)	313.15	1417.60 ± 0.60	-1.34	1978-kum/iwa(∇)
243.15	1558.00 ± 1.50	-1.38	1930-mor/low(×)	293.15	1462.30 ± 0.80	1.99	1988-rut(◆)
253.15	1538.40 ± 1.50	-1.54	1930-mor/low(×)	313.15	1421.00 ± 0.80	2.06	1988-rut(◆)
263.15	1518.50 ± 1.50	-1.85	1930-mor/low(×)	333.15	1378.70 ± 0.80	2.47	1988-rut(◆)
273.15	1499.30 ± 1.50	-1.26	1930-mor/low <sup>1)</sup>	363.15	1308.80 ± 0.80	-0.31	1988-rut(◆)
283.15	1479.00 ± 1.50	-1.56	1930-mor/low <sup>1)</sup>	393.15	1232.70 ± 0.80	-4.92	1988-rut <sup>1)</sup>
293.15	1458.60 ± 1.50	-1.71	1930-mor/low <sup>1)</sup>				

<sup>1)</sup> Not included in Fig. 1.

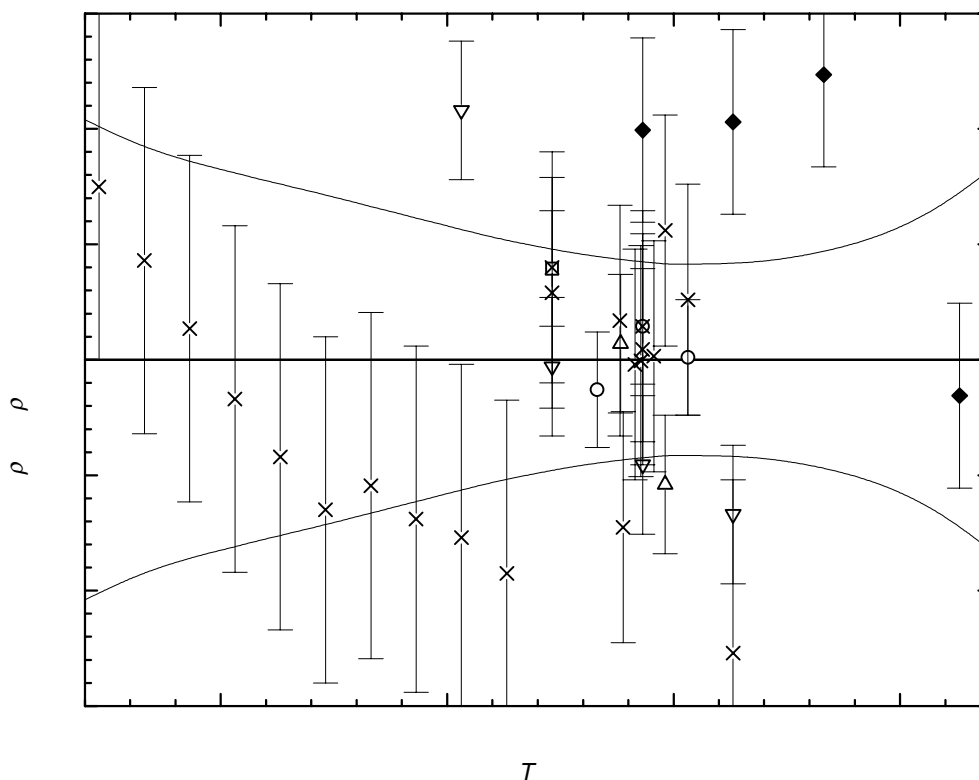
**Further references:** [1885-per-1, 1886-sch, 1888-wee, 1891-gla, 1898-kah, 1907-ric/mat, 1907-tim, 1908-ric/mat, 1920-har/cla, 1923-her/neu, 1928-smy/mor, 1929-smy/eng-1, 1945-fre/tre]

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

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
170.00	1699.55 ± 2.08	250.00	1546.08 ± 1.16	310.00	1425.54 ± 0.83
180.00	1680.37 ± 1.89	260.00	1526.54 ± 1.06	320.00	1404.48 ± 0.85
190.00	1661.25 ± 1.75	270.00	1506.82 ± 0.98	330.00	1383.05 ± 0.91
200.00	1642.15 ± 1.65	280.00	1486.88 ± 0.91	340.00	1361.24 ± 1.00
210.00	1623.06 ± 1.55	290.00	1466.71 ± 0.86	350.00	1339.02 ± 1.14
220.00	1603.94 ± 1.46	293.15	1460.31 ± 0.85	360.00	1316.35 ± 1.35
230.00	1584.75 ± 1.36	298.15	1450.08 ± 0.83	370.00	1293.20 ± 1.65
240.00	1565.48 ± 1.26	300.00	1446.28 ± 0.83		

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.)

**1,1,1,2-Tetrabromopropane** [62127-49-5] **C<sub>3</sub>H<sub>4</sub>Br<sub>4</sub>** MW = 359.68 11

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

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>	Ref.
293.15	2679.00 ± 2.00	1935-bac

**1,1,2,2-Tetrabromopropane** [34570-59-7] **C<sub>3</sub>H<sub>4</sub>Br<sub>4</sub>** MW = 359.68 12

**Table 1.** Fit with estimated B coefficient for 4 accepted points. Deviation  $\sigma_w = 1.268$ .

Coefficient	$\rho = A + BT$
A	3307.40
B	-2.140

cont.

**1,1,2,2-Tetrabromopropane** (cont.)**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.
290.55	2666.10 ± 4.00	-19.52	1919-van-2 <sup>1)</sup>
273.15	2722.50 ± 3.00	-0.36	1923-dem/doj
283.15	2701.10 ± 3.00	-0.36	1923-dem/doj
294.15	2680.00 ± 3.00	2.08	1923-dem/doj
298.15	2668.00 ± 3.00	-1.36	1941-sch-1

<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>
270.00	2729.6 ± 3.0
280.00	2708.2 ± 2.6
290.00	2686.8 ± 2.5
293.15	2680.1 ± 2.6
298.15	2669.4 ± 2.7

**1,1,3,3-Tetrabromopropane**

[51525-97-4]

C<sub>3</sub>H<sub>4</sub>Br<sub>4</sub>

MW = 359.68

13

**Table 1.** Fit with estimated B coefficient for 2 accepted points. Deviation  $\sigma_w = 0.454$ .

Coefficient	$\rho = A + BT$
A	3292.22
B	-2.020

**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	2740.00 ± 3.00	-0.45	1923-dem/doj
293.55	2699.70 ± 3.00	0.45	1923-dem/doj
298.15	2683.00 ± 4.00	-6.95	1941-sch-1 <sup>1)</sup>

<sup>1)</sup> Not included in calculation of linear coefficients.

cont.

**Table 3.** Recommended values.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>
270.00	2746.8 ± 2.3
280.00	2726.6 ± 1.9
290.00	2706.4 ± 2.0
293.15	2700.1 ± 2.1
298.15	2690.0 ± 2.4

**1,1,2,3-Tetrabromopropane**

[54268-02-9]



MW = 359.68

14

**Table 1.** Experimental values with uncertainties.

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>	Ref.
273.15	2729.00 ± 3.00	1923-dem/doj
293.15	2703.00 ± 2.00	1930-hur/mei

**1,1,1-Tribromopropane**

[62127-61-1]



MW = 280.78

15

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

$T$ K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m <sup>-3</sup>	Ref.
298.15	2350.00 ± 10.00	1953-con

**1,1,2-Tribromopropane**

[14602-62-1]



MW = 280.78

16

**Table 1.** Fit with estimated B coefficient for 2 accepted points. Deviation  $\sigma_w = 0.000$ .

Coefficient	$\rho = A + BT$
A	2926.48
B	-1.950

**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.
291.15	2356.00 ± 2.00	-2.74	1898-mou <sup>1)</sup>
273.15	2393.80 ± 1.00	0.00	1923-mer-1
293.15	2354.80 ± 1.00	0.00	1923-mer-1

<sup>1)</sup> Not included in calculation of linear coefficients.

cont.

**1,1,2-Tribromopropane** (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	2400.0 $\pm$ 0.9
280.00	2380.5 $\pm$ 0.6
290.00	2361.0 $\pm$ 0.7
293.15	2354.8 $\pm$ 0.8
298.15	2345.1 $\pm$ 1.0

**1,1,3-Tribromopropane** [23511-78-6] C<sub>3</sub>H<sub>5</sub>Br<sub>3</sub> MW = 280.78 17

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

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
290.15	2350.00 $\pm$ 2.00	1936-kir/ren

**1,2,2-Tribromopropane** [14476-30-3] C<sub>3</sub>H<sub>5</sub>Br<sub>3</sub> MW = 280.78 18

**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.
281.15	2349.00 $\pm$ 5.00	1878-reb
285.15	2330.00 $\pm$ 5.00	1878-reb
293.15	2298.54 $\pm$ 1.00	1923-mer

**1,2,3-Tribromopropane** [96-11-7] C<sub>3</sub>H<sub>5</sub>Br<sub>3</sub> MW = 280.78 19

**Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):  $\sigma_{\text{c,w}} = 2.2022$  (combined temperature ranges, weighted),  $\sigma_{\text{c,uw}} = 9.8908 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

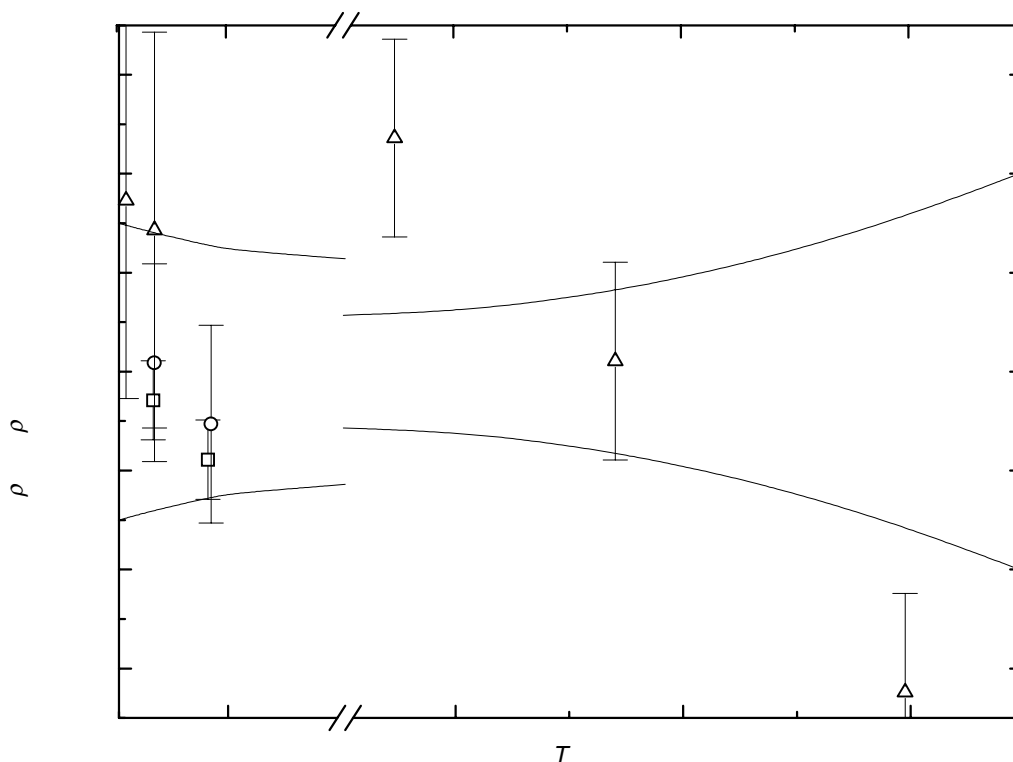
Coefficient	$T = 290.65 \text{ to } 359.65 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$2.96031 \cdot 10^3$
B	-1.84049

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)
290.65	$2427.10 \pm 2.00$	1.73	1948-vog-5( $\Delta$ )	293.15	$2420.48 \pm 0.40$	-0.29	1949-dre/mar( $\square$ )
293.15	$2422.20 \pm 2.00$	1.43	1948-vog-5( $\Delta$ )	298.15	$2410.68 \pm 0.40$	-0.89	1949-dre/mar( $\square$ )
314.55	$2386.10 \pm 2.00$	4.72	1948-vog-5( $\Delta$ )	293.15	$2420.86 \pm 1.00$	0.09	1953-ano-9( $\circ$ )
334.05	$2345.70 \pm 2.00$	0.21	1948-vog-5( $\Delta$ )	298.15	$2411.04 \pm 1.00$	-0.53	1953-ano-9( $\circ$ )
359.65	$2291.90 \pm 2.00$	-6.48	1948-vog-5( $\Delta$ )				

**Further references:** [1891-gla, 1905-per/sim, 1911-dob-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.

**1,2,3-Tribromopropane (cont.)****Table 3.** Recommended values (fit to the reliable experimental values according to the equations

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	2426.57 ± 1.50	310.00	2389.76 ± 1.14	350.00	2316.14 ± 2.45
293.15	2420.77 ± 1.40	320.00	2371.35 ± 1.22	360.00	2297.73 ± 3.16
298.15	2411.57 ± 1.27	330.00	2352.95 ± 1.48	370.00	2279.33 ± 4.02
300.00	2408.16 ± 1.23	340.00	2334.54 ± 1.89		

**1,1-Dibromopropane****[598-17-4]****C<sub>3</sub>H<sub>6</sub>Br<sub>2</sub>****MW = 201.89****20****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.
282.15	1895.00 ± 20.00	1870-reb
293.15	1982.00 ± 2.00	1944-vog
298.15	1960.00 ± 5.00	1953-con
293.15	1880.00 ± 20.00	1956-ste/muk

**1,2-Dibromopropane****[78-75-1]****C<sub>3</sub>H<sub>6</sub>Br<sub>2</sub>****MW = 201.89****21****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):

$\sigma_{c,w} = 1.3857$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 4.1791 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

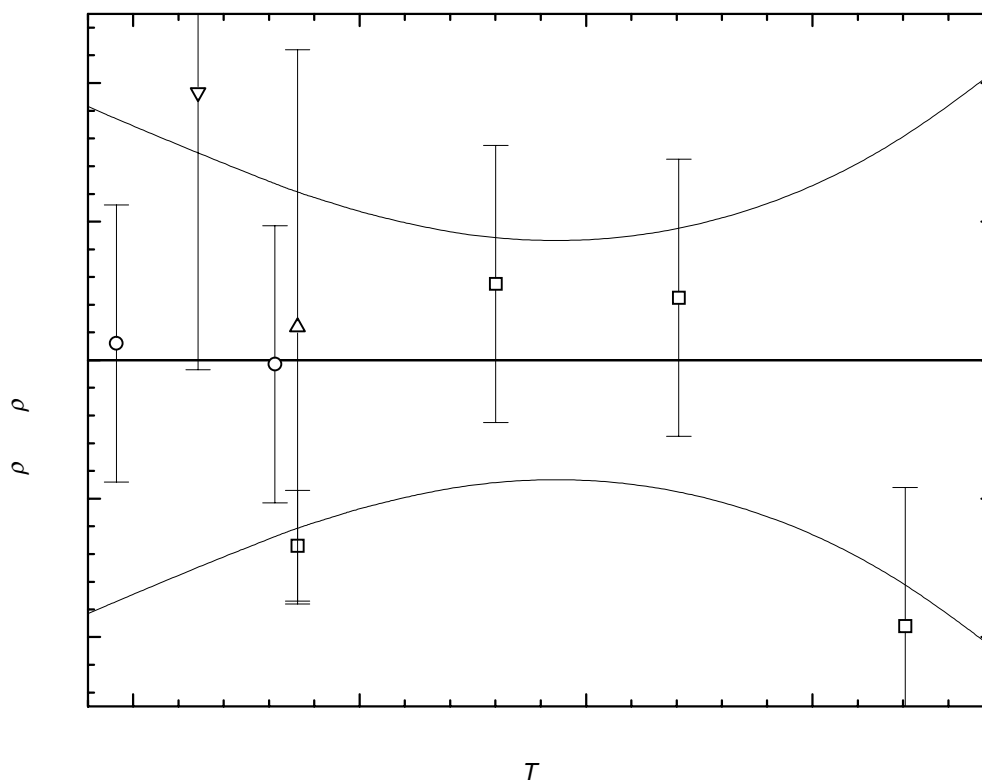
Coefficient	$T = 273.15 \text{ to } 360.25 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$2.44890 \cdot 10^3$
<i>B</i>	-1.75734

**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)
282.15	1955.00 ± 2.00	1.93	1870-reb(V)	293.15	1932.40 ± 0.40	-1.34	1948-vog(□)
293.15	1933.98 ± 2.00	0.24	1898-kah(Δ)	315.05	1895.80 ± 1.00	0.55	1948-vog(□)
273.15	1969.00 ± 1.00	0.12	1907-fav/sok-1(O)	335.25	1860.20 ± 1.00	0.45	1948-vog(□)
290.65	1938.10 ± 1.00	-0.03	1907-fav/sok-1(O)	360.25	1813.90 ± 1.00	-1.92	1948-vog(□)

**Further references:** [1850-rey, 1872-lin-1, 1884-gla, 1948-kre, 1948-lag/eva, 1949-fre/nog, 1949-lag/mcm, 1953-hin/pol].

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

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	1974.42 ± 1.83	300.00	1921.70 ± 1.07	350.00	1833.83 ± 1.24
280.00	1956.85 ± 1.55	310.00	1904.13 ± 0.91	360.00	1816.26 ± 1.59
290.00	1939.27 ± 1.29	320.00	1886.55 ± 0.85	370.00	1798.69 ± 2.08
293.15	1933.74 ± 1.21	330.00	1868.98 ± 0.88		
298.15	1924.95 ± 1.11	340.00	1851.41 ± 1.01		

**1,3-Dibromopropane****[109-64-8]****C<sub>3</sub>H<sub>6</sub>Br<sub>2</sub>****MW = 201.89****22****Table 1.** Coefficients of the polynomial expansion equation. Standard deviations (see introduction):
 $\sigma_{c,w} = 9.0119 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 2.6148 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	$T = 273.15 \text{ to } 359.85 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$2.48355 \cdot 10^3$
<i>B</i>	-1.71432

**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	$2016.18 \pm 1.00$	0.90	1933-ser(∇)	298.15	$1972.70 \pm 1.00$	0.28	1950-mum/phi(○)
288.15	$1989.27 \pm 1.00$	-0.29	1933-ser(∇)	293.15	$1980.09 \pm 1.00$	-0.90	1952-dre(Δ)
303.15	$1962.38 \pm 1.00$	-1.47	1933-ser(∇)	298.15	$1971.19 \pm 1.00$	-1.23	1952-dre(Δ)
293.15	$1982.20 \pm 1.50$	1.21	1948-vog(◆)	303.15	$1962.29 \pm 1.00$	-1.56	1952-dre(Δ)
315.45	$1944.40 \pm 1.50$	1.64	1948-vog(◆)	293.15	$1981.00 \pm 1.00$	0.01	1960-grz/jef-1(□)
333.65	$1912.80 \pm 1.50$	1.24	1948-vog(◆)	313.15	$1947.40 \pm 1.00$	0.69	1960-grz/jef-1(□)
359.85	$1866.20 \pm 1.50$	-0.45	1948-vog(◆)	333.15	$1920.40 \pm 1.00$	7.98	1960-grz/jef-1 <sup>1)</sup>
293.15	$1981.20 \pm 1.00$	0.21	1950-mum/phi(○)	358.15	$1869.30 \pm 1.00$	-0.26	1960-grz/jef-1(□)

<sup>1)</sup> Not included in Fig. 1.

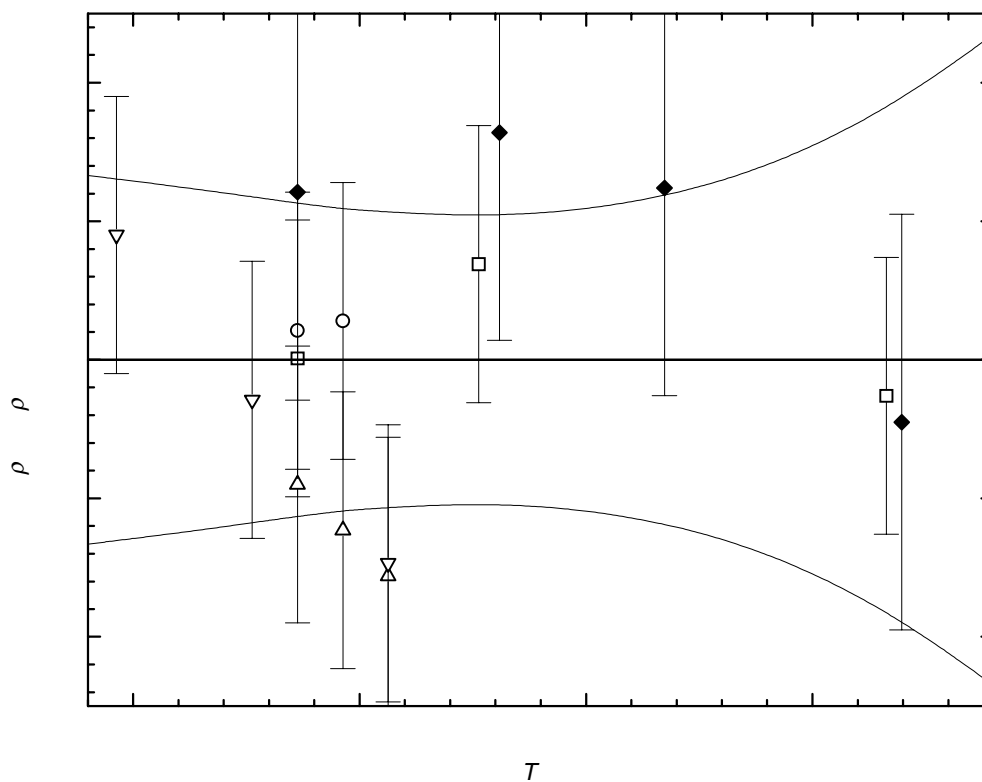
**Further references:** [1871-ger, 1893-eyk-1, 1898-kah, 1907-fav/sok-1, 1931-smy/kam, 1932-smy/wal, 1950-har/for, 1952-rab/coh].

**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	$2020.68 \pm 1.33$	300.00	$1969.25 \pm 1.08$	350.00	$1883.53 \pm 1.53$
280.00	$2003.54 \pm 1.25$	310.00	$1952.11 \pm 1.04$	360.00	$1866.39 \pm 1.88$
290.00	$1986.39 \pm 1.16$	320.00	$1934.96 \pm 1.05$	370.00	$1849.25 \pm 2.35$
293.15	$1980.99 \pm 1.13$	330.00	$1917.82 \pm 1.13$		
298.15	$1972.42 \pm 1.09$	340.00	$1900.68 \pm 1.28$		

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-Bromopropane

[106-94-5]

C<sub>3</sub>H<sub>7</sub>Br

MW = 122.99

23

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

$\sigma_{c,w} = 1.0634$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 3.3605 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

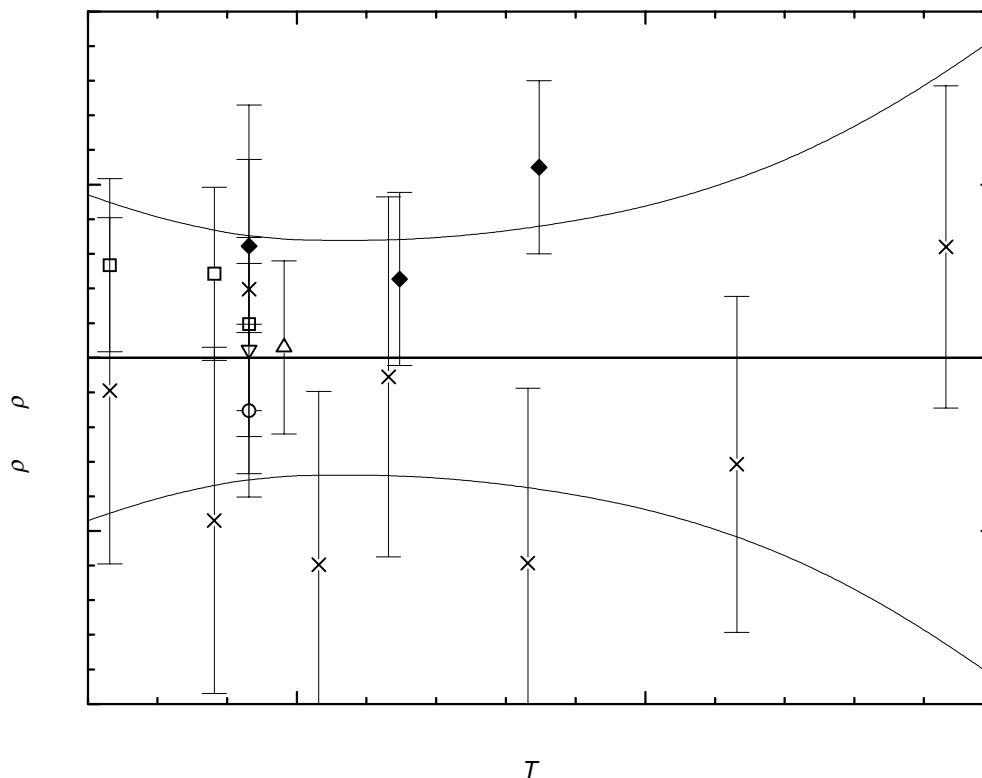
Coefficient	$T = 273.15 \text{ to } 393.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
<i>A</i>	$1.63732 \cdot 10^3$
<i>B</i>	$-3.21117 \cdot 10^{-1}$
<i>C</i>	$-2.20716 \cdot 10^{-3}$

cont.

**1-Bromopropane (cont.)****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	1352.90 $\pm$ 1.00	-0.61	1880-bru-1(O)	293.15	1354.80 $\pm$ 1.00	1.29	1943-vog(◆)
273.15	1386.00 $\pm$ 1.00	1.07	1912-kar(□)	314.75	1318.50 $\pm$ 1.00	0.91	1943-vog(◆)
288.15	1362.50 $\pm$ 1.00	0.97	1912-kar(□)	334.75	1284.70 $\pm$ 1.00	2.20	1943-vog(◆)
293.15	1353.90 $\pm$ 1.00	0.39	1912-kar(□)	293.15	1354.30 $\pm$ 2.13	0.79	1988-rut(X)
273.15	1384.55 $\pm$ 2.00	-0.38	1926-tim/mar(X)	313.15	1320.10 $\pm$ 2.08	-0.22	1988-rut(X)
288.15	1359.65 $\pm$ 2.00	-1.88	1926-tim/mar(X)	333.15	1283.00 $\pm$ 2.02	-2.37	1988-rut(X)
303.15	1334.75 $\pm$ 2.00	-2.39	1926-tim/mar(X)	363.15	1228.40 $\pm$ 1.94	-1.23	1988-rut(X)
298.15	1345.50 $\pm$ 1.00	0.12	1935-ska/mcc(Δ)	393.15	1171.20 $\pm$ 1.86	1.28	1988-rut(X)
293.15	1353.60 $\pm$ 1.00	0.09	1938-cow/par(∇)				

**Further references:** [1872-lin-1, 1882-zan, 1885-per-1, 1890-gar, 1896-per, 1933-bri, 1939-cup/rog].



**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

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

$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{\text{K}}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
270.00	1389.72 ± 1.88	310.00	1325.67 ± 1.35	370.00	1216.35 ± 2.27
280.00	1374.37 ± 1.61	320.00	1308.55 ± 1.38	380.00	1196.58 ± 2.66
290.00	1358.58 ± 1.44	330.00	1290.99 ± 1.46	390.00	1176.38 ± 3.13
293.15	1353.51 ± 1.41	340.00	1273.00 ± 1.58	400.00	1155.73 ± 3.68
298.15	1345.38 ± 1.37	350.00	1254.56 ± 1.74		
300.00	1342.34 ± 1.36	360.00	1235.67 ± 1.97		

**2-Bromopropane**

[75-26-3]

C<sub>3</sub>H<sub>7</sub>Br

MW = 122.99

24

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

$\sigma_{c,w} = 4.3007 \cdot 10^{-1}$  (combined temperature ranges, weighted),  $\sigma_{c,uw} = 1.3727 \cdot 10^{-1}$  (combined temperature ranges, unweighted).

Coefficient	T = 273.15 to 328.15 K $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.81632 \cdot 10^3$
B	-1.72773

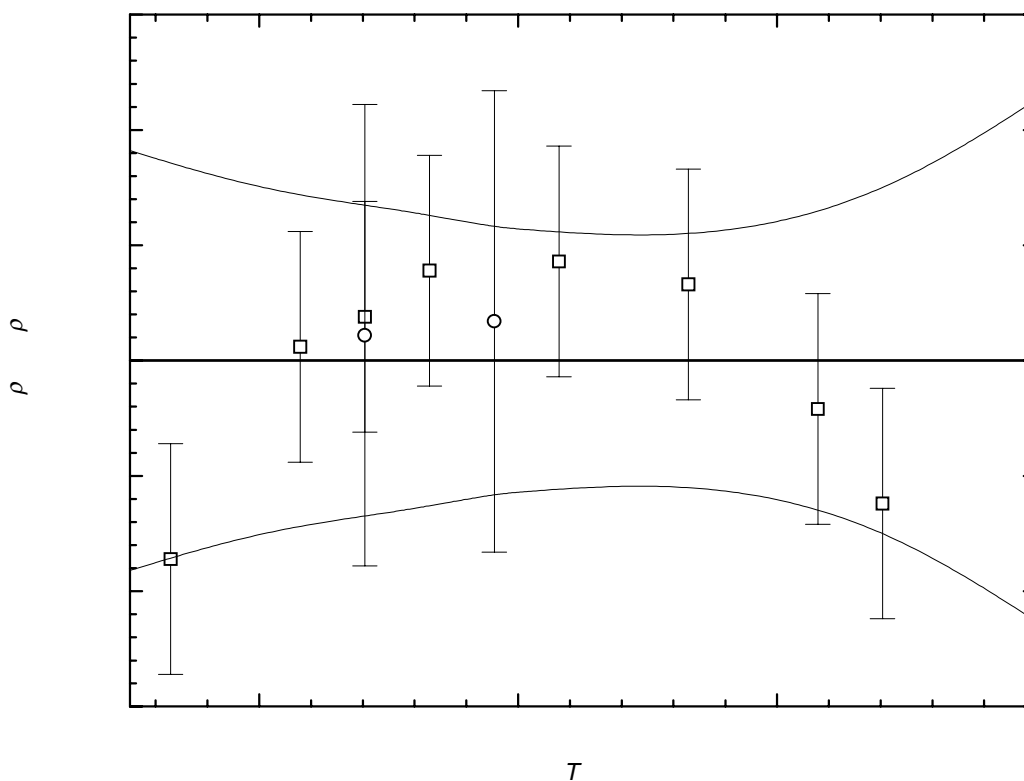
**Table 2.** Experimental values with uncertainties and deviation from calculated values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{\rho_{\text{exp}} - \rho_{\text{calc}}}{\text{kg} \cdot \text{m}^{-3}}$	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	1318.59 ± 1.00	0.11	1885-per-1(○)	293.15	1310.23 ± 0.50	0.39	1958-afe(□)
298.15	1301.37 ± 1.00	0.17	1885-per-1(○)	303.15	1292.99 ± 0.50	0.43	1958-afe(□)
273.15	1343.53 ± 0.50	-0.86	1958-afe(□)	313.15	1275.61 ± 0.50	0.33	1958-afe(□)
283.15	1327.18 ± 0.50	0.06	1958-afe(□)	323.15	1257.80 ± 0.50	-0.21	1958-afe(□)
288.15	1318.67 ± 0.50	0.19	1958-afe(□)	328.15	1248.75 ± 0.50	-0.62	1958-afe(□)

<sup>1)</sup> Not included in Fig. 1.

**Further references:** [1880-bru-1, 1882-zan, 1928-tim/mar, 1935-ska/mcc, 1938-cow/par, 1939-cup/rog, 1943-vog].

cont.

**2-Bromopropane (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	$1349.84 \pm 0.91$	298.15	$1301.20 \pm 0.58$	330.00	$1246.17 \pm 0.77$
280.00	$1332.56 \pm 0.74$	300.00	$1298.00 \pm 0.57$	340.00	$1228.89 \pm 1.13$
290.00	$1315.28 \pm 0.66$	310.00	$1280.73 \pm 0.53$		
293.15	$1309.84 \pm 0.63$	320.00	$1263.45 \pm 0.58$		