

4.3 Unsaturated Ketones of General Formula, C_nH_{2n-4}O

1,2-Pentadien-4-one [2200-53-5] C₅H₆O MW = 82.1 337

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	905.0 ± 2.0	1962-ber/leg

1,2-Hexadien-4-one [500044-41-7] C₆H₈O MW = 96.13 338

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	893.1 ± 2.0	1962-ber/leg

1,2-Heptadien-4-one [2200-55-7] C₇H₁₀O MW = 110.16 339

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
291.15	886.7 ± 2.0	1962-ber/leg

5-Methyl-1,2-hexadien-4-one [500044-43-9] C₇H₁₀O MW = 110.16 340

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	874.9 ± 2.0	1962-ber/leg

4-Nonyn-3-one [1817-61-4] C₉H₁₄O MW = 138.21 341

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	864.8 ± 2.0	1963-cas/lab

5-Decyn-4-one [13882-01-4] $C_{10}H_{16}O$ MW = 152.24 342

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	864.0 ± 2.0	1963-cas/lab

7-Dodecyn-6-one [28884-88-0] $C_{12}H_{20}O$ MW = 180.29 343

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.
293.15	860.2 ± 2.0	1963-cas/lab

5-Tetradecyn-7-one [1846-66-8] $C_{14}H_{24}O$ MW = 208.34 344

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	856.3 ± 2.0	1963-cas/lab

5-Pentadecyn-7-one [94373-06-5] $C_{15}H_{26}O$ MW = 222.37 345

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	855.4 ± 2.0	1963-cas/lab

6,10,14-Trimethyl-3,5-pentadecadien-2-one [1604-32-6] $C_{18}H_{32}O$ MW = 264.45 346

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

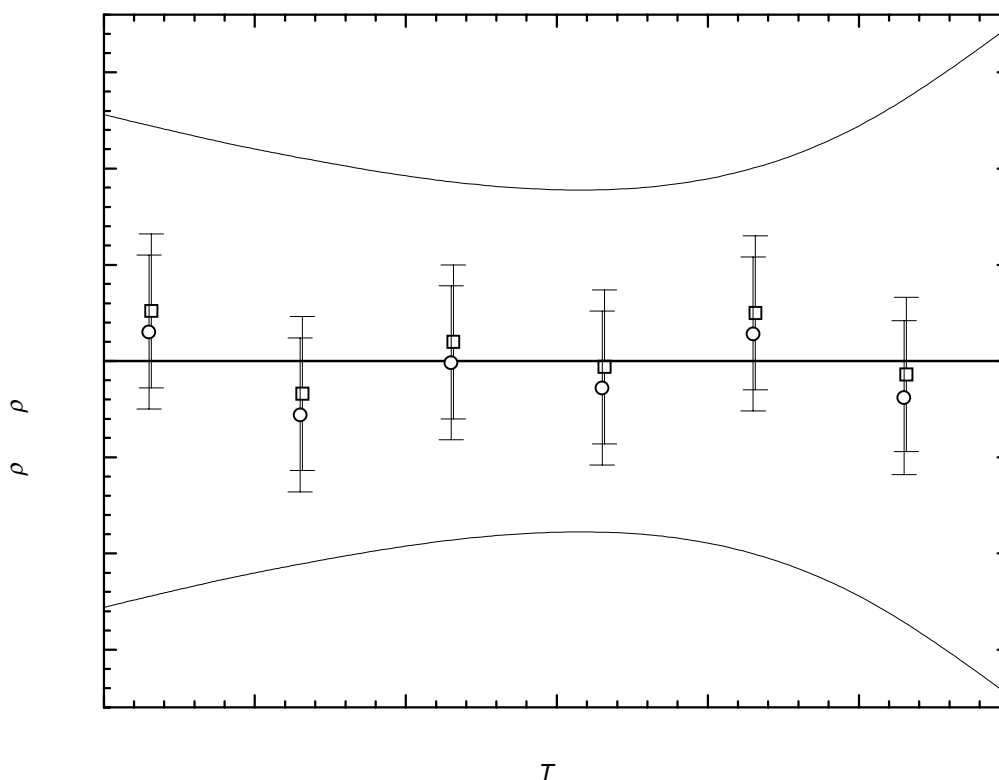
$\sigma_{c,w} = 1.6031 \cdot 10^{-1}$ (combined temperature ranges, weighted), $\sigma_{c,uw} = 5.3845 \cdot 10^{-2}$ (combined temperature ranges, unweighted).

Coefficient	$T = 293.00 \text{ to } 343.15 \text{ K}$ $\rho = A + BT + CT^2 + DT^3 + \dots$
A	$1.03176 \cdot 10^3$
B	$-4.15750 \cdot 10^{-1}$
C	$-5.05483 \cdot 10^{-4}$

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	866.70 ± 0.40	0.26	1988-bag/gur(□)	293.00	866.70 ± 0.40	0.15	1991-gur/ber(○)
303.15	859.10 ± 0.40	-0.17	1988-bag/gur(□)	303.00	859.10 ± 0.40	-0.28	1991-gur/ber(○)
313.15	852.10 ± 0.40	0.10	1988-bag/gur(□)	313.00	852.10 ± 0.40	-0.01	1991-gur/ber(○)
323.15	844.60 ± 0.40	-0.03	1988-bag/gur(□)	323.00	844.60 ± 0.40	-0.14	1991-gur/ber(○)
333.15	837.40 ± 0.40	0.25	1988-bag/gur(□)	333.00	837.40 ± 0.40	0.14	1991-gur/ber(○)
343.15	829.50 ± 0.40	-0.07	1988-bag/gur(□)	343.00	829.50 ± 0.40	-0.19	1991-gur/ber(○)

**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

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

$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$	$\frac{T}{K}$	$\frac{\rho \pm \sigma_{\text{fit}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	868.68 ± 1.28	300.00	861.54 ± 1.10	330.00	839.52 ± 0.91
293.15	866.44 ± 1.22	310.00	854.30 ± 0.95	340.00	831.97 ± 1.17
298.15	862.87 ± 1.13	320.00	846.96 ± 0.87	350.00	824.33 ± 1.74