

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

3-Buten-2-one

[78-94-4]

C₄H₆O

MW = 70.09

297

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.
298.15	840.7 ± 2.0	1947-rog-2 ¹⁾
293.15	849.4 ± 1.0	1972-voj/cih
293.15	849.4 ± 1.0	Recommended

¹⁾ Not included in calculation of recommended value.

3-Methyl-3-buten-2-one

[814-78-8]

C₅H₈O

MW = 84.12

298

Table 1. Fit with estimated *B* coefficient for 4 accepted points. Deviation $\sigma_w = 0.202$.

Coefficient	$\rho = A + BT$
<i>A</i>	1139.79
<i>B</i>	-0.980

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.
298.15	847.5 ± 1.0	-0.11	1947-lan/ira
293.15	852.1 ± 0.6	-0.41	1948-mcm/rop
293.15	852.7 ± 0.4	0.17	1949-dre/mar
298.15	847.6 ± 0.4	0.02	1949-dre/mar

Table 3. Recommended values.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$
290.00	855.6 ± 0.6
293.15	852.5 ± 0.6
298.15	847.6 ± 0.6

1-Penten-3-one

[1629-58-9]

C₅H₈O

MW = 84.12

299

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	846.8 ± 0.7	1948-mcm/rop

(E)-3-Penten-2-one [3102-33-8] C₅H₈O MW = 84.12 300

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	854.9 ± 0.6	1954-ano-12

4-Hexen-3-one [2497-21-4] C₆H₁₀O MW = 98.14 301

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	843.0 ± 2.0	1939-stu/adk

4-Methyl-4-penten-2-one [3744-02-3] C₆H₁₀O MW = 98.14 302

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	841.1 ± 0.4	1947-str/mon

3-Ethyl-3-penten-2-one [1114-37-0] C₇H₁₂O MW = 112.17 303

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.
290.65	865.0 ± 2.0	1927-col

2,2-Dimethyl-4-hexen-3-one [81925-83-9] C₈H₁₄O MW = 126.2 304

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	843.0 ± 2.0	1939-stu/adk

3-Ethyl-5-hexen-2-one [51007-15-9] C₈H₁₄O MW = 126.2 305

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	846.0 ± 2.0	1949-col/lag

3-Methyl-3-hepten-2-one [39899-08-6] C₈H₁₄O MW = 126.2 306

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	Ref.
283.15	861.3 ± 1.0	1924-pow

5-Methyl-2-hepten-4-one [81925-81-7] C₈H₁₄O MW = 126.2 307

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	Ref.
298.15	848.0 ± 2.0	1939-stu/adk

5-Methyl-4-hepten-3-one [1447-26-3] C₈H₁₄O MW = 126.2 308

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

Coefficient	$\rho = A + BT$
<i>A</i>	1139.80
<i>B</i>	-0.940

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

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³	$\rho_{\text{exp}} - \rho_{\text{calc}}$ kg · m ⁻³	Ref.
273.15	869.0 ± 2.0	-14.04	1921-par/sim ¹⁾
288.15	851.1 ± 2.0	-17.84	1928-gri/flu ¹⁾
294.15	863.3 ± 1.0	0.00	1931-pow/sec
299.15	858.6 ± 1.0	0.00	1962-ber/leg

¹⁾ Not included in calculation of linear coefficients.

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ kg · m ⁻³
290.00	867.2 ± 0.8
293.15	864.2 ± 0.6
298.15	859.5 ± 0.5

6-Methyl-2-hepten-4-one [49852-35-9] $C_8H_{14}O$ MW = 126.2 309

Table 1. Experimental and recommended values with uncertainties.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
298.15	841.0 ± 2.0	1939-stu/adk
298.15	842.0 ± 1.0	1954-dub/luf
298.15	841.8 ± 1.0	Recommended

6-Methyl-5-hepten-2-one [110-93-0] $C_8H_{14}O$ MW = 126.2 310

Table 1. Fit with estimated B coefficient for 4 accepted points. Deviation $\sigma_w = 0.536$.

Coefficient	$\rho = A + BT$
A	1100.35
B	-0.850

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	850.8 ± 0.3	-0.38	1988-bag/gur
303.15	843.6 ± 0.3	0.93	1988-bag/gur
313.15	833.9 ± 0.3	-0.28	1988-bag/gur
323.15	825.4 ± 0.3	-0.28	1988-bag/gur

Table 3. Recommended values.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$
290.00	853.9 ± 1.1
293.15	851.2 ± 1.0
298.15	846.9 ± 0.8
310.00	836.9 ± 0.6
320.00	828.4 ± 0.8
330.00	819.9 ± 1.2

2-Octen-4-one [4643-27-0] $C_8H_{14}O$ MW = 126.2 311

Table 1. Experimental value with uncertainty.

T K	$\rho_{\text{exp}} \pm 2\sigma_{\text{est}}$ $\text{kg} \cdot \text{m}^{-3}$	Ref.
298.15	852.0 ± 2.0	1939-stu/adk

2,2-Dimethyl-6-hepten-3-one [52056-66-3] C₉H₁₆O MW = 140.23 312

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	836.0 ± 2.0	1949-col/lag

2,5-Dimethyl-4-hepten-3-one [62939-79-1] C₉H₁₆O MW = 140.23 313

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.
300.15	843.7 ± 2.0	1962-ber/leg

2,6-Dimethyl-4-hepten-3-one [56259-14-4] C₉H₁₆O MW = 140.23 314

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	848.0 ± 2.0	1954-col/gre

4,6-Dimethyl-4-hepten-3-one [500044-13-3] C₉H₁₆O MW = 140.23 315

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	849.9 ± 1.0	1944-pow/hag

5-Ethyl-3-hepten-2-one [71648-42-5] C₉H₁₆O MW = 140.23 316

Table 1. Experimental and recommended values with uncertainties.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	863.1 ± 5.0	1937-dra/mar ¹⁾
293.15	845.4 ± 1.0	1968-ano
293.15	845.4 ± 1.0	Recommended

¹⁾ Not included in calculation of recommended value.

2-Methyl-5-octen-4-one [500036-79-3] C₉H₁₆O MW = 140.23 317

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	839.0 ± 2.0	1954-dub/luf

3-Methyl-3-octen-5-one [81977-74-4] C₉H₁₆O MW = 140.23 318

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.
299.15	850.0 ± 2.0	1962-ber/leg

7-Methyl-5-octen-4-one [32064-78-1] C₉H₁₆O MW = 140.23 319

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	852.0 ± 1.0	1944-pow/hag

2,7-Dimethyl-5-octen-4-one [68419-46-5] C₁₀H₁₈O MW = 154.25 320

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	841.2 ± 1.0	1944-pow/hag

3,7-Dimethyl-3-octen-2-one [500023-78-9] C₁₀H₁₈O MW = 154.25 321

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	850.3 ± 1.0	1947-pri/mei

5-Ethyl-4-methyl-4-hepten-3-one [22319-28-4] C₁₀H₁₈O MW = 154.25 322**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.
296.15	856.0 ± 3.0	1943-col/jol ¹⁾
293.15	860.0 ± 2.0	1943-col/jol
293.15	860.0 ± 2.0	Recommended

¹⁾ Not included in calculation of recommended value.**2-Methyl-3-nonen-5-one** [3132-14-7] C₁₀H₁₈O MW = 154.25 323**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	848.5 ± 1.0	1944-pow/hag

2-Methyl-5-nonen-4-one [500044-16-6] C₁₀H₁₈O MW = 154.25 324**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	839.0 ± 1.0	1954-dub/luf

2,3,6-Trimethyl-3-heptene-5-one [16466-21-0] C₁₀H₁₈O MW = 154.25 325**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	855.0 ± 1.0	1935-col

5-Ethyl-3-nonen-2-one [10137-90-3] C₁₁H₂₀O MW = 168.28 326**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	905.9 ± 1.0	1937-dra/mar

2-Methyl-3-decen-5-one [32064-75-8] C₁₁H₂₀O MW = 168.28 327

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	848.7 ± 1.0	1944-pow/hag

2-Methyl-3-undecen-5-one [63859-51-8] C₁₂H₂₂O MW = 182.31 328

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	850.2 ± 1.0	1944-pow/hag

2,2,5,6,6-Pentamethyl-4-hepten-3-one [500044-21-3] C₁₂H₂₂O MW = 182.31 329

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	842.0 ± 2.0	1935-col

2,6,8-Trimethyl-5-nonen-4-one [19044-66-7] C₁₂H₂₂O MW = 182.31 330

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.
294.65	837.0 ± 2.0	1935-col

3-Ethyl-4-undecen-6-one [500044-23-5] C₁₃H₂₄O MW = 196.33 331

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	849.6 ± 1.0	1937-dra/mar

3-Ethyl-4-dodecen-6-one [500044-24-6] C₁₄H₂₆O MW = 210.36 332

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
293.15	850.0 ± 1.0	1937-dra/mar

9-Ethyl-7-tridecen-6-one [500044-25-7] C₁₅H₂₈O MW = 224.39 333

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	845.5 ± 2.0	1937-dra/mar

3,7-Diethyl-3,6,7-trimethyl-5-nonen-4-one [500044-26-8] C₁₆H₃₀O MW = 238.41 334

Table 1. Experimental value with uncertainty.

$\frac{T}{\text{K}}$	$\frac{\rho_{\text{exp}} \pm 2\sigma_{\text{est}}}{\text{kg} \cdot \text{m}^{-3}}$	Ref.
287.15	875.0 ± 2.0	1935-col

10-Ethyl-8-tetradecen-7-one [500044-27-9] C₁₆H₃₀O MW = 238.41 335

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	847.9 ± 2.0	1937-dra/mar

12-Methyl-11-heneicosen-10-one [500044-28-0] C₂₂H₄₂O MW = 322.57 336

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.
292.15	848.0 ± 2.0	1935-col