# Limonene

**Other names:**

( R/ S)-limonene
(+)-(4R)-limonene
(+)-limonene
(-)-.beta.-pinene
(.+/-.)-Dipentene
(.+/-.)-Limonene
(.+/-.)-«alpha»-Limonene
(1S)-(-)-.beta.-pinene
(1S,5S)-6,6-dimethyl-2-methylenebicyclo[3.1.1]heptane
(R)-(+)-Limonene
(R)-Limonene
(±)-limonene
1,8(9)-p-Menthadiene
1,8-p-Menthadiene
1-Methyl-4-(1-methylethenyl)cyclohexene
1-Methyl-4-isopropenyl-1-cyclohexene
1-Methyl-4-isopropenylcyclohexene
1-methyl-4-(prop-1-en-2-yl)cyclohex-1-ene
1-methyl-4-isopropenylcyclohex-1-ene
1-methyl-4-isopropenylcyclohex-1-ene (limonene)
4-Isopropenyl-1-methyl-1-cyclohexene
4-Isopropenyl-1-methylcyclohexene
Achilles dipentene
Acintene DP
Acintene DP dipentene
Cajeputen
Cajeputene
Cinen
Cinene
Cyclohexene, 1-methyl-4-(1-methylethenyl)-
Cyclohexene, 1-methyl-4-(1-methylethenyl)-, (.+/-.)-
Cyclohexene, 1-methyl-4-(1-methylethynyl)
D-Limonene
DL-Limonene
Di-p-mentha-1,8-diene
Dipanol
Dipenten
Dipentene
Dipentene limonene
Eulimen

Flavor orange
Goldflush II
Inactive limonene
Kautschin
Limonen
Limonene [4R-(+), 4S-(-)]
Limonene+
NSC 21446
Nesol
Orange flavor
PC 560
UN 2052
Unitene
dipentene (p-Mentha-1,8-diene)
p-Mentha-1,8(9)-diene
p-Mentha-1,8-diene
p-Mentha-1,8-diene, dl-
«alpha»-Limonene
«delta»-1,8-Terpodiene

**Inchi:** InChI=1S/C10H16/c1-8(2)10-6-4-9(3)5-7-10/h4,10H,1,5-7H2,2-3H3
**InchiKey:** XMGQYMWWDOXHJM-UHFFFAOYSA-N
**Formula:** C10H16
**SMILES:** C=C(C)C1CC=C(C)CC1
**Mol. weight [g/mol]:** 136.23
**CAS:** 7705-14-8

# Physical Properties

| Property code | Value | Unit | Source |
|---|---|---|---|
| chl | -6171.00 ± 2.10 | kJ/mol | NIST Webbook |
| gf | 157.39 | kJ/mol | Joback Method |
| hf | -33.46 | kJ/mol | Joback Method |
| hfus | 11.73 | kJ/mol | Joback Method |
| hvap | 38.65 | kJ/mol | Joback Method |
| log10ws | -3.37 | | Crippen Method |
| logp | 3.309 | | Crippen Method |
| mcvol | 132.300 | ml/mol | McGowan Method |
| pc | 2755.56 | kPa | Joback Method |
| tb | 449.15 ± 1.00 | K | NIST Webbook |
| tb | 451.20 | K | NIST Webbook |
| tc | 657.16 | K | Joback Method |

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|---|---|---|---|
| tf | 207.40 | K | Joback Method |
| vc | 0.496 | m3/kmol | Joback Method |

# Temperature Dependent Properties

| Property code | Value | Unit | Temperature [K] | Source |
|---|---|---|---|---|
| cpg | 269.80 | J/mol×K | 448.45 | Joback Method |
| cpg | 287.42 | J/mol×K | 483.23 | Joback Method |
| cpg | 304.13 | J/mol×K | 518.02 | Joback Method |
| cpg | 319.94 | J/mol×K | 552.80 | Joback Method |
| cpg | 334.90 | J/mol×K | 587.59 | Joback Method |
| cpg | 349.03 | J/mol×K | 622.37 | Joback Method |
| cpg | 362.36 | J/mol×K | 657.16 | Joback Method |
| rhol | 866.84 | kg/m3 | 298.15 | Ternary and quaternary (liquid + liquid) equilibria for (water + ethanol + a-pinene, +b-pinene, or +limonene) and (water + ethanol + a-pinene + limonene) at the temperature 298.15 K |

# Sources

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|---|---|
| **McGowan Method:** | http://link.springer.com/article/10.1007/BF02311772 |
| **NIST Webbook:** | http://webbook.nist.gov/cgi/cbook.cgi?ID=C7705148&Units=SI |
| **Crippen Method:** | http://pubs.acs.org/doi/abs/10.1021/ci990307l |
| **Crippen Method:** | https://www.chemeo.com/doc/models/crippen_log10ws |
| **Ternary and quaternary (liquid + liquid) equilibria for (water + ethanol + a-pinene, +b-pinene, or +limonene) and (water + ethanol + a-pinene + limonene) at the temperature 298.15 K:** | https://www.doi.org/10.1016/j.jct.2005.10.018 |
| **Joback Method:** | https://en.wikipedia.org/wiki/Joback_method |

# Legend

**chl:** Standard liquid enthalpy of combustion

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|---|---|
| **cpg:** | Ideal gas heat capacity |
| **gf:** | Standard Gibbs free energy of formation |
| **hf:** | Enthalpy of formation at standard conditions |
| **hfus:** | Enthalpy of fusion at standard conditions |
| **hvap:** | Enthalpy of vaporization at standard conditions |
| **log10ws:** | Log10 of Water solubility in mol/l |
| **logp:** | Octanol/Water partition coefficient |
| **mcvol:** | McGowan's characteristic volume |
| **pc:** | Critical Pressure |
| **rhol:** | Liquid Density |
| **tb:** | Normal Boiling Point Temperature |
| **tc:** | Critical Temperature |
| **tf:** | Normal melting (fusion) point |
| **vc:** | Critical Volume |