4,7-Methano-1H-indene, octahydro-

Other names:	2,3-Trimethylenenorbornane 4,7-Methanoindan, hexahydro- 4,7-methano-1H-indene, octahydro-, (3a.alpha.,4.alpha.,7.alpha.,7a.alpha.)- 4,7-methano-1H-indene, octahydro-, (3a.alpha.,4.beta.,7.beta.,7a.alpha.)- 4,7-methanoindan, hexahydro-, endo- 4,7-methanoindan, hexahydro-, exo- Bicyclo(2.2.1)heptane, 2,3-(1,3-propanediyl)- Hexadyro, 4,7-methaneindene Hexahydro-4,7-methanoindan JP-10 NSC 22464 Norbornane, 2,3-trimethylene- Octahydro-4,7-methano indene Octahydro-4,7-methano-1H-indene Tetrahydrocyclopentadiene dimer Tetrahydrodicyclopentadiene Tricyclo(5.2.1.0(2,6))decane Tricyclo[5.1.0-2.6]decane Tricyclo[5.2.1.0(sup2,6)]decane Trimethylenenorbornane endo-tetrahydrodicyclopentadiene endo-tricyclo[5.2.1.0(2,6)]decane exo-3,4,8,9-tetrahydrodicyclopentadiene exo-5,6-trimethylenenorbornane exo-octahydro-4,7-methano-1H-indene exo-tetrahydrobicyclopentadiene exo-tetrahydrodicyclopentadiene exo-tricyclo[5.2.1.02,6]decane exo-trimethylenenorbornane jp10 tricyclo[5.2.1.02,6]decane
Inchi:	InChI=1S/C10H16/c1-2-9-7-4-5-8(6-7)10(9)3-1/h7-10H,1-6H2
InchiKey:	LPSXSORODABQKT-UHFFFAOYSA-N
Formula:	C10H16
SMILES:	C1CC2C3CCC(C3)C2C1
Mol. weight [g/mol]:	136.23
CAS:	6004-38-2

Physical Properties

Property code	Value	Unit	Source
chs	-6109.00 ± 3.00	kJ/mol	NIST Webbook
chs	-6084.40	kJ/mol	NIST Webbook
gf	195.76	kJ/mol	Joback Method
hf	-60.20 ± 3.80	kJ/mol	NIST Webbook
hfs	-113.10 ± 2.50	kJ/mol	NIST Webbook
hfus	15.03	kJ/mol	Joback Method
hsub	53.00 ± 1.00	kJ/mol	NIST Webbook
hsub	52.90	kJ/mol	NIST Webbook
hsub	52.90 ± 1.30	kJ/mol	NIST Webbook
hvap	37.46	kJ/mol	Joback Method
ie	9.30	eV	NIST Webbook
log10ws	-2.73		Crippen Method
logp	2.833		Crippen Method
mcvol	119.180	ml/mol	McGowan Method
pc	3100.18	kPa	Joback Method
rinpol	1078.00		NIST Webbook
rinpol	1077.60		NIST Webbook
ripol	1243.40		NIST Webbook
ripol	1243.00		NIST Webbook
ripol	1243.40		NIST Webbook
tb	448.02	K	Joback Method
tc	661.62	K	Joback Method
tf	352.00 ± 1.00	K	NIST Webbook
vc	0.458	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	378.92	J/mol×K	661.62	Joback Method
cpg	348.41	J/mol×K	590.42	Joback Method
cpg	331.44	J/mol×K	554.82	Joback Method
cpg	313.20	J/mol×K	519.22	Joback Method
cpg	272.54	J/mol×K	448.02	Joback Method
cpg	293.60	J/mol×K	483.62	Joback Method
cpg	364.21	J/mol×K	626.02	Joback Method
cps	241.40	J/mol×K	329.00	NIST Webbook

dvisc	0.0027696	Pa×s	298.15	Densities and Viscosities of exo-Tetrahydrodicyclopentadiene + n-Butanol and exo-Tetrahydrodicyclopentadiene + n-Pentanol at Temperatures of (293.15 to 313.15) K
dvisc	0.0021120	Pa×s	313.15	Densities and Viscosities of Binary Mixtures of exo-Tetrahydrodicyclopentadiene with N-Undecane or N-Tetradecane at T = (293.15 to 313.15) K
dvisc	0.0030760	Pa×s	293.15	Densities and Viscosities of Binary Mixtures of exo-Tetrahydrodicyclopentadiene with N-Undecane or N-Tetradecane at T = (293.15 to 313.15) K
dvisc	0.0025250	Pa×s	303.15	Densities and Viscosities of Binary Mixtures of exo-Tetrahydrodicyclopentadiene with N-Undecane or N-Tetradecane at T = (293.15 to 313.15) K
dvisc	0.0027840	Pa×s	298.15	Densities and Viscosities of Binary Mixtures of exo-Tetrahydrodicyclopentadiene with N-Undecane or N-Tetradecane at T = (293.15 to 313.15) K
dvisc	0.0030770	Pa×s	293.15	Densities and Viscosities of Binary Mixtures of exo-Tetrahydrodicyclopentadiene with N-Undecane or N-Tetradecane at T = (293.15 to 313.15) K
dvisc	0.0025194	Pa×s	303.15	Densities and Viscosities of exo-Tetrahydrodicyclopentadiene + n-Butanol and exo-Tetrahydrodicyclopentadiene + n-Pentanol at Temperatures of (293.15 to 313.15) K

dvisc	0.0020936	Pa×s	313.15	Densities and Viscosities of exo-Tetrahydrodicyclopentadiene + n-Butanol and exo-Tetrahydrodicyclopentadiene + n-Pentanol at Temperatures of (293.15 to 313.15) K
dvisc	0.0030764	Pa×s	293.15	Densities and Viscosities of exo-Tetrahydrodicyclopentadiene + n-Butanol and exo-Tetrahydrodicyclopentadiene + n-Pentanol at Temperatures of (293.15 to 313.15) K
hfust	3.07	kJ/mol	345.30	NIST Webbook
hfust	2.95	kJ/mol	352.00	NIST Webbook
hfust	2.95	kJ/mol	352.00	NIST Webbook
hfust	2.95	kJ/mol	352.00	NIST Webbook
hvapt	43.50	kJ/mol	411.50	NIST Webbook
hvapt	46.00	kJ/mol	425.50	NIST Webbook
pvap	2.00	kPa	344.02	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	5.00	kPa	367.23	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	10.00	kPa	384.68	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures

pvap	15.00	kPa	396.77	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	20.00	kPa	405.51	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	25.00	kPa	412.50	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	30.00	kPa	418.51	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	35.00	kPa	423.84	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	40.00	kPa	428.42	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures

pvap	45.00	kPa	432.64	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	50.00	kPa	436.48	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	3.50	kPa	358.17	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	60.00	kPa	443.43	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	65.00	kPa	446.40	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	75.00	kPa	451.93	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures

pvap	80.00	kPa	454.45	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	85.00	kPa	456.82	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	90.00	kPa	458.86	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	95.00	kPa	460.90	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	100.00	kPa	462.76	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
pvap	101.60	kPa	463.60	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures

pvap	55.00	kPa	440.06	Vapor liquid equilibrium, densities and viscosities for the binary system exo- and endo-tetrahydrodicyclopentadiene and pure component vapor pressures
rhol	896.61	kg/m3	343.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	900.56	kg/m3	338.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	904.52	kg/m3	333.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	935.88	kg/m3	293.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane
rhol	932.00	kg/m3	298.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane

rhol	928.08	kg/m3	303.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane
rhol	924.16	kg/m3	308.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane
rhol	920.24	kg/m3	313.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane
rhol	916.31	kg/m3	318.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane
rhol	912.38	kg/m3	323.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane
rhol	908.44	kg/m3	328.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane
rhol	904.50	kg/m3	333.15	Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane

rhol	935.85	kg/m3	293.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	931.95	kg/m3	298.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	928.06	kg/m3	303.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	924.17	kg/m3	308.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	920.26	kg/m3	313.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries

rhol	916.33	kg/m3	318.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	912.40	kg/m3	323.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
rhol	908.46	kg/m3	328.15	Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries
sfust	8.40	J/mol×K	352.00	NIST Webbook
srf	0.03	N/m	293.15	Density, Refractive Index, Viscosity, and Surface Tension of Binary Mixtures of exo-Tetrahydrodicyclopentadiene with Some n-Alkanes from (293.15 to 313.15) K
srf	0.03	N/m	303.15	Density, Refractive Index, Viscosity, and Surface Tension of Binary Mixtures of exo-Tetrahydrodicyclopentadiene with Some n-Alkanes from (293.15 to 313.15) K

Datasets

Molar heat capacity at constant pressure, J/K/mol

Temperature, K - Liquid	Pressure, kPa - Liquid	Molar heat capacity at constant pressure, J/K/mol - Liquid
323.34	100.00	219.49
323.37	1030.00	219.39
323.37	2050.00	218.99
323.35	3070.00	218.80
323.34	4000.00	218.30
323.34	5020.00	218.14
323.35	6080.00	217.34
333.20	100.00	224.40
333.20	1070.00	224.39
333.21	2020.00	224.41
333.20	3000.00	223.84
333.16	3990.00	223.29
333.17	5040.00	223.42
333.17	5990.00	223.32
343.01	100.00	230.29
343.03	1090.00	230.02
343.06	2070.00	229.60
343.06	3060.00	229.00
343.09	4000.00	229.50
343.09	5030.00	228.72
343.09	6000.00	229.08
353.59	100.00	234.98
353.61	1080.00	234.61
353.61	2010.00	234.35
353.62	3070.00	234.12
353.59	4080.00	234.11
353.59	5070.00	234.17
353.60	6090.00	233.83
363.48	100.00	240.37
363.53	1070.00	240.28
363.53	2030.00	240.09
363.53	2990.00	239.97
363.54	4080.00	239.88
363.54	5000.00	239.76

363.55	6020.00	239.67
383.60	100.00	249.31
383.60	1000.00	248.82
383.61	2020.00	248.80
383.58	3060.00	248.68
383.58	4010.00	248.49
383.59	5070.00	248.39
383.60	5990.00	248.35
403.36	100.00	260.34
403.36	1020.00	259.74
403.37	2060.00	259.23
403.38	3040.00	258.89
403.38	4010.00	257.41
403.39	5000.00	256.93
403.40	6070.00	256.62
423.21	100.00	271.95
423.20	1020.00	271.44
423.20	2050.00	270.28
423.20	3010.00	268.73
423.25	4020.00	267.73
423.26	4980.00	267.54
423.27	6000.00	266.96
443.15	240.00	284.80
443.14	1030.00	284.05
443.13	2050.00	283.43
443.11	3110.00	282.78
443.17	4060.00	282.05
443.19	5030.00	281.38
443.18	6050.00	280.75
463.17	230.00	301.77
463.18	1060.00	300.31
463.16	2040.00	298.88
463.20	3000.00	299.41
463.19	4070.00	297.53
463.21	5010.00	297.44
463.22	6020.00	296.56
483.42	470.00	321.27
483.39	1020.00	319.24
483.31	2050.00	316.76
483.32	3040.00	315.54
483.37	4030.00	315.19
483.38	5080.00	314.31
483.37	6060.00	314.11
503.30	480.00	338.70

503.28	1020.00	336.59
503.28	2040.00	334.35
503.28	3050.00	333.03
503.29	4090.00	330.60
503.29	5070.00	331.61
503.30	6000.00	331.50
523.47	500.00	355.43
523.45	1030.00	352.98
523.45	2060.00	350.70
523.44	3010.00	348.07
523.50	4000.00	346.42
523.49	5040.00	345.42
523.49	6180.00	344.08

Reference *https://www.doi.org/10.1016/j.fluid.2016.11.031*

Sources

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McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Vapor–liquid equilibrium, densities and viscosities for the binary system exo-tetrahydrodicyclopentadiene + 1,3-dimethyladamantane:	https://www.doi.org/10.1016/j.fluid.2006.09.024
Densities and Viscosities of Binary Mixture of exo-Tetrahydrodicyclopentadiene with 1-Dodecanol, 1-Tetradecane at T = (293.15 to 313.15) K:	https://www.doi.org/10.1021/je100313a
Mixture component vapor pressures:	https://www.doi.org/10.1021/acs.jced.9b00074
Density and Viscosity of Ternary Mixture of Cyclopentanol + exo-Tetrahydrodicyclopentadiene + 1,3-Dimethyladamantane:	https://www.doi.org/10.1021/acs.jced.9b00397
Densities and Viscosities for the Ternary Mixtures of exo-Tetrahydrodicyclopentadiene (1) + Isopropylcyclohexane (2) + Methyl Laurate (3) and Corresponding Binaries at (293.15 to 313.15) K:	https://www.doi.org/10.1021/je200757a
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Prediction of Refractive Index, Viscosity, and Surface Tension of Binary Mixtures with Some n-Alkanes from (293.15 to 313.15) K:	https://www.doi.org/10.1021/je990307l
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Isobaric heat capacities of exo-tetrahydrodicyclopentadiene at temperatures from 323 K to 523 K and pressures up to 6 MPa:	https://www.doi.org/10.1016/j.fluid.2016.11.031

Legend

chs:	Standard solid enthalpy of combustion
cpg:	Ideal gas heat capacity
cpl:	Liquid phase heat capacity
cps:	Solid phase heat capacity
dvisc:	Dynamic viscosity
gf:	Standard Gibbs free energy of formation

hf:	Enthalpy of formation at standard conditions
hfs:	Solid phase enthalpy of formation at standard conditions
hfus:	Enthalpy of fusion at standard conditions
hfust:	Enthalpy of fusion at a given temperature
hsub:	Enthalpy of sublimation at standard conditions
hvap:	Enthalpy of vaporization at standard conditions
hvapt:	Enthalpy of vaporization at a given temperature
ie:	Ionization energy
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure
pvap:	Vapor pressure
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
sfust:	Entropy of fusion at a given temperature
srf:	Surface Tension
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
vc:	Critical Volume