Methyl valerate

Other names:	CH3(CH2)3COOCH3
	Methyl ester of pentanoic acid
	Methyl n-valerate
	Methyl pentanoate
	Methyl valerianate
	Pentanoic acid, methyl ester
	Propyl propanoate
	Valeric acid, methyl ester
	n-Valeric acid methyl ester
	valeric acid methyl ester
Inchi:	InChI=1S/C6H12O2/c1-3-4-5-6(7)8-2/h3-5H2,1-2H3
InchiKey:	HNBDRPTVWVGKBR-UHFFFAOYSA-N
Formula:	C6H12O2
SMILES:	CCCCC(=O)OC
Mol. weight [g/mol]:	116.16
CAS:	624-24-8

Physical Properties

Property code	Value	Unit	Source
chl	-3548.00	kJ/mol	NIST Webbook
chl	-3561.70 ± 0.60	kJ/mol	NIST Webbook
gf	-234.28	kJ/mol	Joback Method
hf	-485.00 ± 2.00	kJ/mol	NIST Webbook
hf	-472.00 ± 2.00	kJ/mol	NIST Webbook
hfl	-527.00	kJ/mol	NIST Webbook
hfl	-514.20 ± 7.10	kJ/mol	NIST Webbook
hfus	14.08	kJ/mol	Joback Method
hvap	38.11	kJ/mol	Joback Method
ie	10.40 ± 0.20	eV	NIST Webbook
log10ws	-1.34		Estimated Solubility Method
log10ws	-1.36		Aqueous Solubility Prediction Method
logp	1.350		Crippen Method
mcvol	102.840	ml/mol	McGowan Method
pc	3190.00 ± 202.65	kPa	NIST Webbook
rhoc	278.78 ± 19.75	kg/m3	NIST Webbook

rinpol	808.00	NIST Webbook
rinpol	807.00	NIST Webbook
rinpol	812.00	NIST Webbook
rinpol	814.00	NIST Webbook
rinpol	800.00	NIST Webbook
rinpol	806.00	NIST Webbook
rinpol	810.00	NIST Webbook
rinpol	807.00	NIST Webbook
rinpol	823.00	NIST Webbook
rinpol	823.00	NIST Webbook
rinpol	823.00	NIST Webbook
rinpol	825.00	NIST Webbook
rinpol	804.00	NIST Webbook
rinpol	808.80	NIST Webbook
rinpol	807.00	NIST Webbook
rinpol	852.00	NIST Webbook
rinpol	816.00	NIST Webbook
rinpol	821.00	NIST Webbook
rinpol	825.00	NIST Webbook
rinpol	808.00	NIST Webbook
rinpol	823.00	NIST Webbook
rinpol	809.00	NIST Webbook
rinpol	821.00	NIST Webbook
rinpol	829.10	NIST Webbook
rinpol	823.00	NIST Webbook
rinpol	823.00	NIST Webbook
rinpol	811.00	NIST Webbook
rinpol	806.00	NIST Webbook
rinpol	810.00	NIST Webbook
rinpol	810.00	NIST Webbook
rinpol	807.00	NIST Webbook
rinpol	806.00	NIST Webbook
rinpol	784.00	NIST Webbook
rinpol	830.00	NIST Webbook
rinpol	807.00	NIST Webbook
rinpol	806.00	NIST Webbook
rinpol	808.00	NIST Webbook
rinpol	823.00	NIST Webbook
rinpol	808.80	NIST Webbook
rinpol	821.00	NIST Webbook
rinpol	806.00	NIST Webbook
rinpol	806.00	NIST Webbook
rinpol	800.00	NIST Webbook
rinpol	830.00	NIST Webbook

rinpol	802.00		NIST Webbook
rinpol	794.00		NIST Webbook
rinpol	821.20		NIST Webbook
rinpol	822.80		NIST Webbook
rinpol	822.80		NIST Webbook
rinpol	821.90		NIST Webbook
ripol	1086.00		NIST Webbook
ripol	1096.00		NIST Webbook
ripol	1090.00		NIST Webbook
ripol	1084.00		NIST Webbook
ripol	1090.00		NIST Webbook
ripol	1095.00		NIST Webbook
ripol	1082.00		NIST Webbook
ripol	1087.00		NIST Webbook
ripol	1086.00		NIST Webbook
ripol	1081.00		NIST Webbook
ripol	1085.00		NIST Webbook
ripol	1076.00		NIST Webbook
ripol	1082.00		NIST Webbook
ripol	1083.00		NIST Webbook
ripol	1081.00		NIST Webbook
ripol	1109.00		NIST Webbook
ripol	1075.00		NIST Webbook
ripol	1089.00		NIST Webbook
ripol	1085.00		NIST Webbook
ripol	1083.00		NIST Webbook
ripol	1076.00		NIST Webbook
ripol	1123.00		NIST Webbook
ripol	1083.00		NIST Webbook
tb	400.48	K	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
tc	566.90 ± 20.00	K	NIST Webbook
tc	556.70 ± 20.00	K	NIST Webbook
tf	182.50 ± 0.05	K	NIST Webbook
vc	0.396	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	237.38	J/mol×K	531.36	Joback Method

cpg	209.71	J/mol×K	442.57	Joback Method
cpg	254.27	J/mol×K	590.55	Joback Method
cpg	245.98	J/mol×K	560.96	Joback Method
cpg	219.25	J/mol×K	472.16	Joback Method
cpg	228.47	J/mol×K	501.76	Joback Method
cpg	199.87	J/mol×K	412.97	Joback Method
cpl	226.11	J/mol×K	298.15	NIST Webbook
cpl	229.30	J/mol×K	298.15	NIST Webbook
dvisc	0.0007120	Pa×s	293.15	A Study on Properties Derived from Densities and Viscosities for the Ternary Systems (Methyl Pentanoate or Methyl Heptanoate) + n-Octane + 1-Hexanol and their Binary Subsystems at Various Temperatures.
dvisc	0.0006610	Pa×s	298.15	A Study on Properties Derived from Densities and Viscosities for the Ternary Systems (Methyl Pentanoate or Methyl Heptanoate) + n-Octane + 1-Hexanol and their Binary Subsystems at Various Temperatures.
dvisc	0.0006230	Pa×s	303.15	A Study on Properties Derived from Densities and Viscosities for the Ternary Systems (Methyl Pentanoate or Methyl Heptanoate) + n-Octane + 1-Hexanol and their Binary Subsystems at Various Temperatures.

dvisc	0.0005510	Pa×s	313.15	A Study on Properties Derived from Densities and Viscosities for the Ternary Systems (Methyl Pentanoate or Methyl Heptanoate) + n-Octane + 1-Hexanol and their Binary Subsystems at Various Temperatures.
dvisc	0.0008160	Pa×s	283.15	A Study on Properties Derived from Densities and Viscosities for the Ternary Systems (Methyl Pentanoate or Methyl Heptanoate) + n-Octane + 1-Hexanol and their Binary Subsystems at Various Temperatures.
hvapt	44.40	kJ/mol	414.00	NIST Webbook
hvapt	42.50	kJ/mol	354.00	NIST Webbook
hvapt	44.10 ± 0.10	kJ/mol	382.50	NIST Webbook
hvapt	41.30	kJ/mol	350.00	NIST Webbook
hvapt	39.20	kJ/mol	390.50	NIST Webbook
pvap	1.58	kPa	299.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.87	kPa	289.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.93	kPa	290.30	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters

pvap	1.03	kPa	292.40	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.09	kPa	293.30	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.13	kPa	293.40	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.23	kPa	294.50	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.33	kPa	296.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.51	kPa	297.50	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.52	kPa	298.30	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.61	kPa	299.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.83	kPa	288.70	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters

pvap	1.97	kPa	302.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	1.94	kPa	302.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	2.27	kPa	305.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	2.65	kPa	308.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	3.11	kPa	311.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	101.30	kPa	400.48	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	100.40	kPa	400.07	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	95.08	kPa	398.03	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	88.17	kPa	395.42	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane

pvap	77.71	kPa	391.14	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	0.82	kPa	288.50	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	59.35	kPa	382.55	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	52.83	kPa	378.84	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	45.81	kPa	374.53	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	40.47	kPa	370.86	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	35.06	kPa	366.70	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	29.41	kPa	361.82	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	60.00	kPa	383.29	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	0.78	kPa	288.40	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters

pvap	0.79	kPa	288.40	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.75	kPa	287.40	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.69	kPa	285.50	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.62	kPa	284.50	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.60	kPa	284.30	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.64	kPa	284.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.52	kPa	281.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.46	kPa	279.40	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.34	kPa	275.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters

pvap	0.34	kPa	274.90	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	0.42	kPa	278.20	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
pvap	69.02	kPa	387.18	Vapor Liquid Equilibria Measurements for the Five Linear C6 Esters with n-Octane
pvap	0.56	kPa	282.60	Transpiration method: Vapor pressures and enthalpies of vaporization of some low-boiling esters
rfi	1.39500		298.15	Thermodynamic study of (alkyl esters + alpha,omega-alkyl dihalides) IV: Hex and Vex for 25 binary mixtures {xC(u-1)H(2u-1)CO2CH3 + (1-x)alpha,omega-BrCH2(CH2)(v-2)CH2Br}, where u = 1 to 5, alpha = 1 and v = omega = 2 to 6
rfi	1.39520		298.15	Mixing thermodynamic properties of ester-containing solutions: A study on the ternary (methyl alkanoate (pentanoate and methanoate) + methanol) and the corresponding binaries. New contributions to the (ester + ester) interactions

rfi	1.39680		298.15	A Study on Alkane + Ester + Ester Systems. Physicochemical Behavior of Binaries and Ternaries of Octane or Iso-octane with Methyl Esters (Ethanoate, Butanoate, Pentanoate)	
rfi	1.39470		298.15	Isobaric Vapor-Liquid Equilibria and Excess Properties for the Binary Systems of Methyl Esters + Heptane	
rfi	1.39710		298.15	Vapor-Liquid Equilibrium Data for the Binary Methyl Esters (Butyrate, Pentanoate, and Hexanoate) (1) + Acetonitrile (2) Systems at 93.32 kPa	
rfi	1.39710		298.15	Vapor-Liquid Equilibrium Data for the Binary Methyl Esters (Butyrate, Pentanoate, and Hexanoate) (1) + Propanenitrile (2) Systems at 93.32 kPa	
rhol	885.66	kg/m3	298.15	Densities and interfacial tensions for fatty acid methyl esters (from methyl formate to methyl heptanoate) + water demixed mixtures at atmospheric pressure conditions	
tcondl	0.14	W/m×K	295.51	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	

tcondl	0.14	W/m×K	298.99	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	
tcondl	0.14	W/m×K	305.50	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	
tcondl	0.14	W/m×K	290.39	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	
tcondl	0.14	W/m×K	285.55	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	
tcondl	0.13	W/m×K	312.35	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	
tcondl	0.12	W/m×K	362.16	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	
tcondl	0.12	W/m×K	355.39	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel	

tcondl	0.12	W/m×K	348.36	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel
tcondl	0.12	W/m×K	340.41	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel
tcondl	0.13	W/m×K	333.50	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel
tcondl	0.13	W/m×K	327.35	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel
tcondl	0.13	W/m×K	320.42	Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.40423e+01
Coeff. B	-3.36903e+03
Coeff. C	-5.25030e+01
Temperature range (K), min.	297.44

Temperature range (K), max.	438.38

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/T + C*ln(T) + D*T^2
Coeff. A	1.06981e+02
Coeff. B	-8.88364e+03
Coeff. C	-1.35161e+01
Coeff. D	6.94116e-06
Temperature range (K), min.	318.15
Temperature range (K), max.	575.15

Datasets

Mass density, kg/m3

Temperature, K - Liquid	Pressure, kPa - Liquid	Mass density, kg/m3 - Liquid
293.15	100.00	890.18
293.15	1000.00	890.39
293.15	3000.00	892.23
293.15	5000.00	893.59
293.15	10000.00	897.77
293.15	15000.00	901.59
293.15	20000.00	905.28
293.15	25000.00	908.91
293.15	30000.00	912.4
293.15	35000.00	915.63
293.15	40000.00	918.78
293.15	50000.00	925.12
293.15	60000.00	930.63
303.15	100.00	879.57
303.15	1000.00	880.52
303.15	3000.00	882.29
303.15	5000.00	884.05
303.15	10000.00	888.3
303.15	15000.00	892.37
303.15	20000.00	896.14
303.15	25000.00	899.89

303.15	30000.00	903.55
303.15	35000.00	906.97
303.15	40000.00	910.27
303.15	50000.00	916.73
303.15	60000.00	922.74
313.15	100.00	869.49
313.15	1000.00	869.89
313.15	3000.00	871.87
313.15	5000.00	873.76
313.15	10000.00	878.33
313.15	15000.00	882.44
313.15	20000.00	886.62
313.15	25000.00	890.61
313.15	30000.00	894.38
313.15	35000.00	898.09
313.15	40000.00	901.45
313.15	50000.00	908.24
313.15	60000.00	914.32
323.15	100.00	858.83
323.15	1000.00	859.81
323.15	3000.00	861.81
323.15	5000.00	863.85
323.15	10000.00	868.67
323.15	15000.00	873.18
323.15	20000.00	877.67
323.15	25000.00	881.64
323.15	30000.00	885.65
323.15	35000.00	889.44
323.15	40000.00	893.13
323.15	50000.00	900.12
323.15	60000.00	906.77
333.15	100.00	848.52
333.15	1000.00	849.45
333.15	3000.00	851.71
333.15	5000.00	853.79
333.15	10000.00	858.86
333.15	15000.00	863.66
333.15	20000.00	868.26
333.15	25000.00	872.72
333.15	30000.00	876.79
333.15	35000.00	880.79
333.15	40000.00	884.78
333.15	50000.00	892.02
333.15	60000.00	898.8

343.15	100.00	837.8
343.15	1000.00	839.04
343.15	3000.00	841.41
343.15	5000.00	843.76
343.15	10000.00	849.05
343.15	15000.00	854.23
343.15	20000.00	859.25
343.15	25000.00	863.69
343.15	30000.00	868.17
343.15	35000.00	872.41
343.15	40000.00	876.28
343.15	50000.00	884.03
343.15	60000.00	890.84
353.15	100.00	827.35
353.15	1000.00	828.43
353.15	3000.00	831.13
353.15	5000.00	833.48
353.15	10000.00	839.27
353.15	15000.00	844.84
353.15	20000.00	849.86
353.15	25000.00	854.79
353.15	30000.00	859.45
353.15	35000.00	863.9
353.15	40000.00	868.0
353.15	50000.00	875.94
353.15	60000.00	883.37
363.15	100.00	816.63
363.15	1000.00	817.89
363.15	3000.00	820.7
363.15	5000.00	823.32
363.15	10000.00	829.23
363.15	15000.00	835.46
363.15	20000.00	840.59
363.15	25000.00	845.61
363.15	30000.00	850.57
363.15	35000.00	855.31
363.15	40000.00	859.8
363.15	50000.00	868.09
363.15	60000.00	875.9

Reference *https://www.doi.org/10.1016/j.fluid.2018.04.024*

Sources

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The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Experimental investigations on the liquid thermal conductivity of five saturated fatty acid methyl esters components of biodiesel:	https://www.doi.org/10.1016/j.jct.2018.05.019
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Thermodynamic Properties of Mixtures Containing Ionic Liquids. 8. Activity Coefficients at Infinite Dilution of Hydrocarbons, Alcohols, Esters, and Aldehydes in 1-Hexyl-3-methylimidazolium Bis(trifluoromethylsulfonyl) Imide Using Gas-Liquid Chromatography:	https://www.doi.org/10.1021/je0503554
Liquid-Liquid Equilibria Measurements for the Five Linear C6 Esters with Octane:	https://www.doi.org/10.1021/acs.jced.5b01058
KDB:	https://www.cheric.org/files/research/kdb/mol/mol1075.mol
Vapor-Liquid Equilibrium Data for the Binary Methyl Esters (Butyrate, Pentanoate, and Hexanoate) (1) + Propanenitrile (2) Systems at 93.32 kPa:	https://www.doi.org/10.1021/je060469v
KDB:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=1075
Thermodynamic study of (alkyl esters + alpha,omega-alkyl dihalides) IV: Hex and Vex for 25 binary mixtures	https://www.doi.org/10.1016/j.jct.2006.05.004
Experimental Study of Thermodynamic Properties of Mixtures Containing Ionic Liquids. 1. Activity Coefficients at Infinite Dilution of 1-Hexyl-3-methylimidazolium Ethyl Sulfate Using Gas-Liquid Chromatography and Transpiration Method:	https://www.doi.org/10.1021/je0602723
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Mixing thermodynamic properties of ester-containing solutions: A study on the ternary (methyl alkanoate + methanol + water) and the corresponding binary mixtures:	https://www.doi.org/10.1016/j.jct.2015.02.019
Density and interfacial tensions for fatty acid methyl esters (from methyl octanoate to methyl octadecanoate) + water + methanol mixtures at atmospheric pressure conditions:	https://www.doi.org/10.1016/j.jct.2018.02.010
Isobaric Vapor-Liquid Equilibria and Excess Properties for the Binary Systems of Methyl Esters + Heptane:	http://link.springer.com/article/10.1007/BF02311772
Thermodynamic Properties of Mixtures Containing Ionic Liquids. 9. Activity Coefficients at Infinite Dilution of Hydrocarbons, Alcohols, Esters, and Aldehydes in 1-Hexyl-3-methylimidazolium Bis(trifluoromethylsulfonyl) Imide Using Gas-Liquid Chromatography and Literature Data:	https://www.doi.org/10.1021/je030117d
Aqueous Solubility Prediction Method:	https://www.doi.org/10.1021/je050440b
A Study on Properties Derived from Densities and Viscosities for the Binary Mixtures of Methyl Pentanoate or Methyl Heptanoate + n-Octane + n-Hexadecane and their Binary Subsystems at Various Temperatures:	http://onschallenge.wikispaces.com/file/view/AqueousDataset002.xlsx/351826032/AqueousDa
Simple Physicochemical Behavior of Binaries and Ternaries of Octane or Iso-octane with Methyl Esters (Ethanoate, Butanoate, Pentanoate):	https://www.doi.org/10.1021/je034017j
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Legend

chl:	Standard liquid enthalpy of combustion
cpg:	Ideal gas heat capacity
cpl:	Liquid phase heat capacity
dvisc:	Dynamic viscosity
gf:	Standard Gibbs free energy of formation
hf:	Enthalpy of formation at standard conditions
hfl:	Liquid phase enthalpy of formation at standard conditions
hfus:	Enthalpy of fusion 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
rfi:	Refractive Index
rhoc:	Critical density
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tcondl:	Liquid thermal conductivity
tf:	Normal melting (fusion) point
vc:	Critical Volume