Formic acid

Other names:	Acide formique
	Acido formico
	Add-F
	Amasil
	Ameisensaeure
	Aminic acid
	Bilorin
	Collo-Bueglatt
	Collo-Didax
	Formira
	Formisoton
	Formylic acid
	HCOOH
	Hydrogen carboxylic acid
	Kwas metaniowy
	Kyselina mravenci
	Methanoic acid
	Mierenzuur
	Myrmicyl
	Rcra waste number U123
	UN 1779
Inchi:	InChI=1S/CH2O2/c2-1-3/h1H,(H,2,3)
InchiKey:	BDAGIHXWWSANSR-UHFFFAOYSA-N
Formula:	CH2O2
SMILES:	O=CO
Mol. weight [g/mol]:	46.03
CAS:	64-18-6

Physical Properties

Property code	Value	Unit	Source
af	0.4730		KDB
affp	742.00	kJ/mol	NIST Webbook
aigt	874.26	K	KDB
basg	710.30	kJ/mol	NIST Webbook
chl	-253.80 ± 0.30	kJ/mol	NIST Webbook
chl	-254.60 ± 0.30	kJ/mol	NIST Webbook

dm	1.50	debye	KDB
fll	18.00	% in Air	KDB
flu	57.00	% in Air	KDB
fpc	332.04	K	KDB
gf	-351.20	kJ/mol	KDB
gyrad	0.1880		KDB
hf	-378.30	kJ/mol	NIST Webbook
hf	-379.00	kJ/mol	NIST Webbook
hf	-379.20 ± 0.60	kJ/mol	NIST Webbook
hf	-378.90	kJ/mol	KDB
hf	-378.60	kJ/mol	NIST Webbook
hf	-378.50 ± 0.60	kJ/mol	NIST Webbook
hfl	-424.80 ± 0.30	kJ/mol	NIST Webbook
hfl	-425.09	kJ/mol	NIST Webbook
hfl	-425.50 ± 0.30	kJ/mol	NIST Webbook
hfus	4.72	kJ/mol	Joback Method
hvap	46.30 ± 0.50	kJ/mol	NIST Webbook
hvap	36.00	kJ/mol	NIST Webbook
hvap	19.90	kJ/mol	NIST Webbook
hvap	46.30	kJ/mol	NIST Webbook
hvap	46.30 ± 0.50	kJ/mol	NIST Webbook
ie	11.16 ± 0.03	eV	NIST Webbook
ie	11.16 ± 0.03	eV	NIST Webbook
ie	11.05 ± 0.01	eV	NIST Webbook
ie	11.33	eV	NIST Webbook
ie	11.31 ± 0.00	eV	NIST Webbook
ie	11.05 ± 0.03	eV	NIST Webbook
ie	11.35 ± 0.03	eV	NIST Webbook
ie	11.33	eV	NIST Webbook
ie	11.50	eV	NIST Webbook
ie	11.33 ± 0.00	eV	NIST Webbook
ie	11.31	eV	NIST Webbook
ie	11.34	eV	NIST Webbook
ie	10.70	eV	NIST Webbook
ie	11.51	eV	NIST Webbook
ie	11.30	eV	NIST Webbook
ie	11.33	eV	NIST Webbook
ie	11.33 ± 0.01	eV	NIST Webbook
log10ws	0.66		Crippen Method
logp	-0.299		Crippen Method
mcvol	32.390	ml/mol	McGowan Method
nfpaf	%!d(float64=2)		KDB
nfpah	%!d(float64=3)		KDB
pc	7390.00	kPa	KDB

pt	2.36 ± 0.01	kPa	NIST Webbook
rinpol	490.00		NIST Webbook
rinpol	495.00		NIST Webbook
rinpol	512.00		NIST Webbook
rinpol	512.00		NIST Webbook
rinpol	543.00		NIST Webbook
rinpol	512.00		NIST Webbook
rinpol	490.00		NIST Webbook
rinpol	495.00		NIST Webbook
ripol	1470.00		NIST Webbook
ripol	1501.00		NIST Webbook
ripol	1505.00		NIST Webbook
ripol	1492.00		NIST Webbook
ripol	1521.00		NIST Webbook
ripol	1485.00		NIST Webbook
ripol	1532.00		NIST Webbook
ripol	1470.00		NIST Webbook
ripol	1528.00		NIST Webbook
ripol	1470.00		NIST Webbook
ripol	1543.60		NIST Webbook
ripol	1528.00		NIST Webbook
ripol	1499.00		NIST Webbook
ripol	1533.00		NIST Webbook
ripol	1510.00		NIST Webbook
sg	248.70 ± 0.42	J/mol×K	NIST Webbook
sl	128.40	J/mol×K	NIST Webbook
sl	131.84	J/mol×K	NIST Webbook
sl	143.10	J/mol×K	NIST Webbook
tb	373.40 ± 0.60	K	NIST Webbook
tb	374.15 ± 1.50	K	NIST Webbook
tb	374.15 ± 1.50	K	NIST Webbook
tb	373.80 ± 1.00	K	NIST Webbook
tb	373.75 ± 1.00	K	NIST Webbook
tb	373.95 ± 1.00	K	NIST Webbook
tb	372.00 ± 1.50	K	NIST Webbook
tb	373.65 ± 1.00	K	NIST Webbook
tb	378.45 ± 1.00	K	NIST Webbook
tb	378.45 ± 1.00	K	NIST Webbook
tb	374.55 ± 0.50	K	NIST Webbook
tb	373.35 ± 0.30	K	NIST Webbook
tb	373.90 ± 0.20	K	NIST Webbook
tb	374.05 ± 0.60	K	NIST Webbook
tb	373.75 ± 1.00	K	NIST Webbook
tb	373.90 ± 0.30	K	NIST Webbook

tb	373.90 ± 0.50	K	NIST Webbook
tb	373.90 ± 0.50	K	NIST Webbook
tb	373.85 ± 0.20	K	NIST Webbook
tb	373.95 ± 0.50	K	NIST Webbook
tb	374.15 ± 1.00	K	NIST Webbook
tb	380.85 ± 5.00	K	NIST Webbook
tb	373.63 ± 0.10	K	NIST Webbook
tb	373.75 ± 0.40	K	NIST Webbook
tb	373.85 ± 0.30	K	NIST Webbook
tb	373.80	K	NIST Webbook
tb	373.60 ± 0.20	K	Effect of Dissolved Salts on the Enthalpy of Mixing of the Methanol + Formic Acid System at 303.15 K
tb	374.20 ± 0.10	K	Ternary liquid-liquid phase equilibria of (water-carboxylic acid-1-undecanol) systems at 298.15 K
tb	373.70 ± 0.40	K	NIST Webbook
tb	383.05	K	Liquid liquid equilibria of ternary systems (water + carboxylic acid + cumene) at 298.15K
tb	374.40 ± 0.10	K	Liquid Phase Equilibria of Water + Formic Acid + Dimethyl Carbonate Ternary System at Several Temperatures
tb	374.40 ± 0.10	K	(Liquid + liquid) equilibria of the (water + carboxylic acid + dibasic esters mixture (DBE-2)) ternary systems
tb	374.20 ± 0.10	K	Phase equilibrium of (water + formic or acetic acid + ethyl heptanoate) ternary liquid systems at different temperatures
tb	373.80 ± 0.30	K	NIST Webbook
tb	374.00	K	KDB
tb	374.40 ± 0.10	K	Liquid-Liquid Equilibria for Ternary Systems of Water + Formic Acid + Dibasic Esters
tb	374.15 ± 0.20	K	Determination and correlation of liquid liquid equilibria for the (water + carboxylic acid + dimethyl maleate) ternary systems at T = 298.2K
tb	376.15 ± 2.00	K	NIST Webbook

tb	374.05	K	Quaternary phase equilibrium of water-carboxylic acid mixture (formic-propionic acid or acetic-propionic acid)-solvent liquid systems at 298.15 K
tb	373.85 ± 0.40	K	NIST Webbook
tc	580.00	K	NIST Webbook
tc	588.00 ± 10.00	K	NIST Webbook
tc	577.00 ± 30.00	K	NIST Webbook
tc	588.00	K	KDB
tf	281.50 ± 0.30	K	NIST Webbook
tf	281.55 ± 0.20	K	NIST Webbook
tf	281.40 ± 0.05	K	NIST Webbook
tf	280.85 ± 0.50	K	NIST Webbook
tf	281.55 ± 0.10	K	NIST Webbook
tf	282.00 ± 1.50	K	NIST Webbook
tf	281.47 ± 0.10	K	NIST Webbook
tf	281.40 ± 0.30	K	NIST Webbook
tf	281.40	K	KDB
tf	281.70 ± 1.50	K	NIST Webbook
tf	282.85	K	Differential scanning calorimetry determination of phase diagrams and water activities of aqueous carboxylic acid solutions
tt	281.45 ± 0.10	K	NIST Webbook
tt	281.40 ± 0.06	K	NIST Webbook
vc	0.125	m3/kmol	KDB
zc	0.1889290		KDB
zra	0.18		KDB

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	61.87	J/mol×K	534.36	Joback Method
cpg	54.85	J/mol×K	420.20	Joback Method
cpg	52.92	J/mol×K	391.66	Joback Method
cpg	50.91	J/mol×K	363.12	Joback Method
cpg	60.22	J/mol×K	505.82	Joback Method
cpg	58.49	J/mol×K	477.28	Joback Method
cpg	56.71	J/mol×K	448.74	Joback Method
cpl	100.00	J/mol×K	290.00	NIST Webbook
cpl	98.30	J/mol×K	291.50	NIST Webbook

cpl	98.10	J/mol×K	298.15	NIST Webbook
cpl	95.40	J/mol×K	298.00	NIST Webbook
cpl	99.04	J/mol×K	298.15	NIST Webbook
dvisc	0.0012050 ± 0.0000030	Pa×s	313.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
dvisc	0.0014370 ± 0.0000030	Pa×s	303.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
dvisc	0.0006770 ± 0.0000030	Pa×s	353.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
dvisc	0.0010220 ± 0.0000030	Pa×s	323.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
dvisc	0.0007660 ± 0.0000030	Pa×s	343.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K

dvisc	0.0008790 ± 0.0000030	Pa×s	333.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
hfust	12.68	kJ/mol	281.40	NIST Webbook
hfust	12.68	kJ/mol	281.40	NIST Webbook
hsubt	60.70	kJ/mol	266.50	NIST Webbook
hsubt	60.10	kJ/mol	264.00	NIST Webbook
hsubt	62.00 ± 1.00	kJ/mol	210.50	NIST Webbook
hsubt	60.50	kJ/mol	274.50	NIST Webbook
hvapt	21.92	kJ/mol	373.90	KDB
hvapt	22.69	kJ/mol	373.80	NIST Webbook
hvapt	35.20	kJ/mol	346.00	NIST Webbook
hvapt	36.80	kJ/mol	290.00	NIST Webbook
hvapt	21.10	kJ/mol	338.00	NIST Webbook
hvapt	20.40	kJ/mol	315.00	NIST Webbook
hvapt	20.90	kJ/mol	323.00	NIST Webbook
hvapt	20.30	kJ/mol	323.00	NIST Webbook
hvapt	29.60	kJ/mol	303.00	NIST Webbook
hvapt	35.20	kJ/mol	342.00	NIST Webbook
hvapt	47.70	kJ/mol	334.50	NIST Webbook
pvap	200.60	kPa	398.15	Isobaric and Isothermal Vapor Liquid Equilibria for the Binary System of Water + Formic Acid at 99.41 kPa, 388.15 K, and 398.15 K
pvap	153.70	kPa	388.15	Isobaric and Isothermal Vapor Liquid Equilibria for the Binary System of Water + Formic Acid at 99.41 kPa, 388.15 K, and 398.15 K
pvap	51.00	kPa	352.20	Vapor Liquid Equilibrium of Gamma-Valerolactone and Formic Acid at p = 51 kPa

rfi	1.37210 ± 0.00001	298.15	Phase equilibrium of (water + formic or acetic acid + ethyl heptanoate) ternary liquid systems at different temperatures
rfi	1.37144 ± 0.00001	298.20	(Liquid + liquid) equilibria of the (water + carboxylic acid + dibasic esters mixture (DBE-2)) ternary systems
rfi	1.36990	298.20	Vapor Liquid Equilibrium of Gamma-Valerolactone and Formic Acid at p = 51 kPa
rfi	1.37144 ± 0.00001	298.20	Liquid Phase Equilibria of Water + Formic Acid + Dimethyl Carbonate Ternary System at Several Temperatures
rfi	1.37110	293.15	Liquid liquid equilibria of ternary systems (water + carboxylic acid + cumene) at 298.15K
rfi	1.37090 ± 0.00050	293.15	Determination and correlation of liquid liquid equilibria for the (water + carboxylic acid + dimethyl maleate) ternary systems at T = 298.2K
rfi	1.37210 ± 0.00002	293.15	Ternary liquid-liquid phase equilibria of (water-carboxylic acid-1-undecanol) systems at 298.15 K
rfi	1.37459 ± 0.00001	298.15	Refractive Index, Surface Tension, and Density of Aqueous Mixtures of Carboxylic Acids at 298.15 K

rfi	1.37110 ± 0.00020	293.20	Liquid-liquid equilibrium data for systems containing of formic acid, water, and primary normal alcohols at T = 298.2 K
rfi	1.37144 ± 0.00005	293.20	Liquid-Liquid Equilibria for Ternary Systems of Water + Formic Acid + Dibasic Esters
rfi	1.37200	293.15	Phase Equilibria of Binary Systems Comprising Formic Acid, N,N-Dimethylformamide, 1-Chloro-2-ethylhexane, and 2-Ethyl-1-hexanol
rfi	1.37110	293.15	Quaternary phase equilibrium of water-carboxylic acid mixture (formic-propionic acid or acetic-propionic acid)-solvent liquid systems at 298.15 K
rfi	1.36939	298.20	Modeling phase equilibria of ternary systems (water + formic acid + ester or alcohol) through UNIFAC-original, SERLAS, NRTL, NRTL-modified, and three-suffix Margules: Parameter estimation using genetic algorithm
rfi	1.37130	298.20	Tie-line data for water- formic acid-1-decanol ternary system at T = (298.2, 303.2, 313.2, 323.2) K

rfi	1.37100		298.15	Liquid Phase Equilibria of Aqueous Mixtures of Carboxylic Acids (C1-C4) with Ethylbenzene: Thermodynamic and Mathematical Modeling
rfi	1.37140		293.20	Vapor Liquid Equilibrium of Gamma-Valerolactone and Formic Acid at p = 51 kPa
rfi	1.37100 ± 0.00020		293.20	Experimental and Correlational Study of Phase Equilibria in Aqueous Solutions of Formic and Butyric Acids with Isoamyl Acetate and Methyl Isoamyl Ketone at T = 298.15 K
rhol	1218.50	kg/m3	293.15	Quaternary phase equilibrium of water-carboxylic acid mixture (formic-propionic acid or acetic-propionic acid)-solvent liquid systems at 298.15 K
rhol	1214.10	kg/m3	298.20	Modeling phase equilibria of ternary systems (water + formic acid + ester or alcohol) through UNIFAC-original, SERLAS, NRTL, NRTL-modified, and three-suffix Margules: Parameter estimation using genetic algorithm
rhol	1219.32	kg/m3	298.20	Tie-line data for water- formic acid-1-decanol ternary system at T = (298.2, 303.2, 313.2, 323.2) K

rhol	1219.50	kg/m3	298.15	Liquid Phase Equilibria of Aqueous Mixtures of Carboxylic Acids (C1-C4) with Ethylbenzene: Thermodynamic and Mathematical Modeling
rhol	1226.00	kg/m3	288.00	KDB
rhol	1220.04 ± 0.01	kg/m3	298.20	(Liquid + liquid) equilibria of the (water + carboxylic acid + dibasic esters mixture (DBE-2)) ternary systems
rhol	1219.50 ± 0.03	kg/m3	293.20	Experimental and Correlational Study of Phase Equilibria in Aqueous Solutions of Formic and Butyric Acids with Isoamyl Acetate and Methyl Isoamyl Ketone at T = 298.15 K
rhol	1220.04 ± 0.50	kg/m3	298.20	Liquid Phase Equilibria of Water + Formic Acid + Dimethyl Carbonate Ternary System at Several Temperatures
rhol	1218.50	kg/m3	293.15	Liquid liquid equilibria of ternary systems (water + carboxylic acid + cumene) at 298.15K
rhol	1221.10 ± 0.10	kg/m3	293.15	Determination and correlation of liquid liquid equilibria for the (water + carboxylic acid + dimethyl maleate) ternary systems at T = 298.2K

rhol	1218.50 ± 0.05	kg/m3	293.15	Ternary liquid-liquid phase equilibria of (water-carboxylic acid-1-undecanol) systems at 298.15 K
rhol	1211.29 ± 0.10	kg/m3	298.15	Refractive Index, Surface Tension, and Density of Aqueous Mixtures of Carboxylic Acids at 298.15 K
rhol	1221.00	kg/m3	298.15	Effect of Dissolved Salts on the Enthalpy of Mixing of the Methanol + Formic Acid System at 303.15 K
rhol	1142.08 ± 0.05	kg/m3	353.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
rhol	1154.99 ± 0.05	kg/m3	343.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
rhol	1167.44 ± 0.05	kg/m3	333.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
rhol	1180.63 ± 0.05	kg/m3	323.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K

rhol	1192.81 ± 0.05	kg/m3	313.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
rhol	1205.07 ± 0.05	kg/m3	303.15	Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K
rhol	1220.04 ± 0.01	kg/m3	293.20	Liquid-Liquid Equilibria for Ternary Systems of Water + Formic Acid + Dibasic Esters
rhol	1219.50 ± 0.01	kg/m3	293.20	Liquid-liquid equilibrium data for systems containing of formic acid, water, and primary normal alcohols at T = 298.2 K
rhol	1218.50 ± 0.01	kg/m3	293.15	Phase equilibrium of (water + formic or acetic acid + ethyl heptanoate) ternary liquid systems at different temperatures
sfust	45.05	J/mol×K	281.40	NIST Webbook
srf	0.04 ± 0.00	N/m	298.15	Refractive Index, Surface Tension, and Density of Aqueous Mixtures of Carboxylic Acids at 298.15 K
srf	0.04	N/m	293.20	KDB

Sources

Liquid liquid equilibria of ternary systems (water + carboxylic acid + cumene) at 298.15K:	https://www.doi.org/10.1016/j.fluid.2006.07.011

Determination and correlation of liquid liquid equilibria for the (water + carboxylic acid + dimethyl maleate) ternary systems at T = 298.2K:	https://www.doi.org/10.1016/j.fluid.2008.04.014
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Tie-line data for water- formic acid-1-decanol ternary system at T = (288.2, 303.2, 313.2, 323.2) K:	https://www.doi.org/10.1016/j.tca.2012.08.001
Liquid Phase Equilibria of Aqueous Mixtures of Carboxylic Acids (C1-C4) with Ethylbenzene: Thermodynamic and Mathematical Modeling:	https://www.doi.org/10.1021/acs.jced.6b00112
Ternary liquid-liquid phase equilibria of (water-carboxylic acid-1-undecanol) systems at 298.15 K:	https://www.doi.org/10.1016/j.fluid.2012.06.020
Liquid-Liquid Equilibria for Ternary Systems of Water + Formic Acid + Dibasic Esters:	https://www.doi.org/10.1021/je700206y
Refractive Index, Surface Tension, and Density of Aqueous Mixtures of Carboxylic Acids at 298.15 K:	https://www.doi.org/10.1021/je060084c
Liquid-liquid equilibrium data for systems containing of formic acid, water, and primary normal alcohols at T = 298.2 K:	https://www.doi.org/10.1016/j.fluid.2013.06.006
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Liquid Phase Equilibria of Water + Formic Acid + Dimethyl Carbonate Ternary System at Several Temperatures:	https://www.doi.org/10.1021/je500422t
Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
(Liquid + liquid) equilibria of the (water + carboxylic acid + dibasic esters mixture (DBE-2)) ternary systems:	https://www.doi.org/10.1016/j.fluid.2014.03.002
Isobaric and Isothermal Vapor Liquid Equilibria for the Binary System of Water + Formic Acid at 99.41 kPa, 388.15 K, and 398.15 K:	https://www.doi.org/10.1021/acs.jced.6b00139
Phase equilibrium of (water + formic or acetic acid + ethyl heptanoate) ternary liquid systems at different temperatures:	https://www.doi.org/10.1016/j.fluid.2013.07.015
Vapor Liquid Equilibrium of Gamma-Valerolactone and Formic Acid at p = 31 kPa:	https://www.doi.org/10.1021/acs.jced.6b00867
Differential scanning calorimetry determination of phase diagrams and water activities of aqueous carboxylic acid solutions:	https://www.doi.org/10.1016/j.tca.2018.03.002
Effect of Dissolved Salts on the Enthalpy of Mixing of the Methanol + Formic Acid System at 303.15 K:	https://www.doi.org/10.1021/je800568m
Quaternary phase equilibrium of water-carboxylic acid mixture (formic-propionic acid or acetic-propionic acid)-solvent liquid systems at 298.15 K:	https://www.doi.org/10.1016/j.fluid.2011.09.014
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C64186&Units=SI
KDB:	https://www.cheric.org/files/research/kdb/mol/mol929.mol
Phase Equilibria of Binary Systems Comprising Formic Acid, N,N-Dimethylformamide, 1-Chloro-2-ethylhexane, and 2-Ethyl-1-hexanol:	https://www.doi.org/10.1021/je800123c
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Modeling phase equilibria of ternary systems (water + formic acid + ester or alcohol) through UNIFAC-original, SERLAS, NRTL, NRTL-modified, and three-suffix Margules: Parameter estimation using genetic algorithm:	https://www.doi.org/10.1016/j.fluid.2016.08.041
Experimental and Correlational Study of Phase Equilibria in Aqueous Solutions of Formic and Butyric Acids with Isoamyl Acetate and Methyl Isoamyl Ketone at T = 298.15 K:	https://www.doi.org/10.1021/je401095k
Densities and Viscosities of N,N-Dimethylformamide + Formic Acid, and + Acetic Acid in the Temperature Range from (303.15 to 353.15) K:	https://www.doi.org/10.1021/je700755t

Legend

af:	Acentric Factor
affp:	Proton affinity
aigt:	Autoignition Temperature
basg:	Gas basicity
chl:	Standard liquid enthalpy of combustion
cpg:	Ideal gas heat capacity
cpl:	Liquid phase heat capacity
dm:	Dipole Moment
dvisc:	Dynamic viscosity
fll:	Lower Flammability Limit
flu:	Upper Flammability Limit
fpc:	Flash Point (Closed Cup Method)
gf:	Standard Gibbs free energy of formation

gyrad:	Radius of Gyration
hf:	Enthalpy of formation at standard conditions
hfl:	Liquid phase enthalpy of formation at standard conditions
hfus:	Enthalpy of fusion at standard conditions
hfust:	Enthalpy of fusion at a given temperature
hsubt:	Enthalpy of sublimation at a given temperature
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
nfpaf:	NFPA Fire Rating
nfpah:	NFPA Health Rating
pc:	Critical Pressure
pt:	Triple Point Pressure
pvap:	Vapor pressure
rfi:	Refractive Index
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
sfust:	Entropy of fusion at a given temperature
sg:	Molar entropy at standard conditions
sl:	Liquid phase molar entropy at standard conditions
srf:	Surface Tension
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
tt:	Triple Point Temperature
vc:	Critical Volume
zc:	Critical Compressibility
zra:	Rackett Parameter