Ethanol, 2-(2-ethoxyethoxy)-

Other names:

(Ethoxyethoxy)ethanol
1-Hydroxy-3,6-dioxaoctane
2-(2'-ethoxyethoxy)ethanol
2-(2-Ethoxyethoxy)ethanol
2-(Ethoxyethoxy)ethanol
2-(«beta»-Ethoxyethoxy)ethanol
2-(«beta»-Ethoxyethoxy)ethanol diglycol
2-(Â«betaÂ»-Ethoxyethoxy)ethanol
2-(Â«betaÂ»-Ethoxyethoxy)ethanol diglycol
2-2-Ethoxyethoxy;ethanol
3,6-Dioxa-1-octanol
3,6-Dioxa-1-oktanol
3,6-Dioxaoctan-1-ol
3-oxa-1,5-pentanediol, ethyl ether
APV
Carbitol
Carbitol cellosolve
Carbitol low gravity
Carbitol solvent
DEGEE
DEGMEE
Diethoxol
Diethylene Glycol ethyl ether
Diethylene glycol monoethyl ether
Diethylene glycol monomethyl ether
Diglycol
Diglycol monoethyl ether
Dioxitol
Dioxitol-low gravity
Dowanol
Dowanol 17
Dowanol DE
Eastman DE
Ehanol, 2,2'-oxybis-, monoethyl ether
Ektasolve DE
Ektasolve DE, DE-HG
Ethanol, 2,2'-oxybis-, monoethyl ether
Ethoxy diglycol
Ethyl Di-Icinol
Ethyl carbitol

	Ethyl diethylene glycol
	Ethyl digol
	Ethyldiglycol
	Ethylene diglycol monoethyl ether
	Karbitol
	Losungsmittel apv
	Monoethyl ether of diethylene glycol
	O-Ethyldigol
	Poly-Solv
	Poly-Solv DE
	Poly-solv DE ethanol, 2,2'-oxybis-, monoethyl ether
	Solvent APV Spec
	Solvolsol
	Transcutol
	Transcutol P
	diethylene glycol, ethyl ether
	diethylene glycol, monoethyl ether
	ethyldiethylene glycol
Inchi:	InChI=1S/C6H14O3/c1-2-8-5-6-9-4-3-7/h7H,2-6H2,1H3
InchiKey:	XXJWXESWEXIICW-UHFFFAOYSA-N
Formula:	C6H14O3
SMILES:	CCOCCOCCO
Mol. weight [g/mol]:	134.17
CAS:	111-90-0

Physical Properties

Property code	Value	Unit	Source
gf	-347.18	kJ/mol	Joback Method
hf	-583.84	kJ/mol	Joback Method
hfus	17.76	kJ/mol	Joback Method
hvap	50.45	kJ/mol	Joback Method
log10ws	0.23		Crippen Method
logp	0.032		Crippen Method
mcvol	113.010	ml/mol	McGowan Method
pc	3167.00 ± 26.00	kPa	NIST Webbook
rinpol	985.00		NIST Webbook
rinpol	1003.00		NIST Webbook
rinpol	1007.00		NIST Webbook
rinpol	1009.10		NIST Webbook
rinpol	951.00		NIST Webbook

rinpol	999.00		NIST Webbook
rinpol	976.00		NIST Webbook
rinpol	1007.10		NIST Webbook
rinpol	982.90		NIST Webbook
rinpol	979.00		NIST Webbook
rinpol	982.90		NIST Webbook
rinpol	976.00		NIST Webbook
rinpol	1006.00		NIST Webbook
rinpol	986.00		NIST Webbook
rinpol	1001.00		NIST Webbook
rinpol	1006.00		NIST Webbook
rinpol	1011.00		NIST Webbook
rinpol	985.00		NIST Webbook
ripol	1619.00		NIST Webbook
ripol	1577.00		NIST Webbook
ripol	1579.00		NIST Webbook
ripol	1619.00		NIST Webbook
ripol	1615.00		NIST Webbook
ripol	1622.00		NIST Webbook
ripol	1636.00		NIST Webbook
ripol	1583.00		NIST Webbook
ripol	1628.00		NIST Webbook
ripol	1589.00		NIST Webbook
ripol	1589.00		NIST Webbook
tb	475.20	K	NIST Webbook
tb	468.00 ± 2.00	K	NIST Webbook
tc	670.00 ± 4.00	K	NIST Webbook
tf	262.66	K	Joback Method
vc	0.426	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	279.75	J/mol×K	554.37	Joback Method
cpg	261.94	J/mol×K	500.59	Joback Method
cpg	252.66	J/mol×K	473.70	Joback Method
cpg	288.27	J/mol×K	581.26	Joback Method
cpg	304.54	J/mol×K	635.03	Joback Method
cpg	296.54	J/mol×K	608.15	Joback Method
cpg	270.97	J/mol×K	527.48	Joback Method

cpl	311.20	J/mol×K	327.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	310.40	J/mol×K	325.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	309.70	J/mol×K	323.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	309.00	J/mol×K	321.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	308.20	J/mol×K	319.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	307.50	J/mol×K	317.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	306.90	J/mol×K	315.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)

cpl	305.50	J/mol×K	311.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	304.90	J/mol×K	309.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	304.30	J/mol×K	307.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	303.70	J/mol×K	305.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	303.10	J/mol×K	303.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	302.50	J/mol×K	301.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	312.00	J/mol×K	329.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)

cpl	301.70	J/mol×K	298.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	301.40	J/mol×K	297.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	300.90	J/mol×K	295.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	300.40	J/mol×K	293.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	299.40	J/mol×K	289.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	298.90	J/mol×K	287.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	298.50	J/mol×K	285.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	

cpl	298.00	J/mol×K	283.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	297.60	J/mol×K	281.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	297.20	J/mol×K	279.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	296.80	J/mol×K	277.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	312.80	J/mol×K	331.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	296.50	J/mol×K	275.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)
cpl	313.60	J/mol×K	333.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)

cpl	299.90	J/mol×K	291.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	314.40	J/mol×K	335.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	315.20	J/mol×K	337.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	316.10	J/mol×K	339.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	301.90	J/mol×K	299.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
cpl	306.20	J/mol×K	313.15	Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm)	
dvisc	0.0044640	Pa×s	293.15	Viscosities of binary mixtures of some n-ethoxyethanols with ethyl tert-butyl ether at T = (293.15, 298.15, and 303.15) K	

dvisc	0.0035310	Pa×s	303.15	Viscosities of binary mixtures of some n-ethoxyethanols with ethyl tert-butyl ether at T = (293.15, 298.15, and 303.15) K
dvisc	0.0039760	Pa×s	298.15	Viscosities of binary mixtures of some n-ethoxyethanols with ethyl tert-butyl ether at T = (293.15, 298.15, and 303.15) K
hvapt	52.10	kJ/mol	396.50	NIST Webbook
rfi	1.42500		298.15	Thermodynamic and optical studies of some ethylene glycol ethers in aqueous solutions at T = 298.15 K
rfi	1.42530		298.15	Density and refractive index in mixtures of ionic liquids and organic solvents: Correlations and predictions
rfi	1.42530		298.15	Volumetric and viscometric study of aqueous binary mixtures of some glycol ethers at T = (275.15 and 283.15) K
rhol	974.67	kg/m3	308.50	Excess Molar Enthalpies and Hydrogen Bonding in Binary Mixtures Containing Ethers and Benzyl Alcohol at 308.15 K and Atmospheric Pressure
rhol	952.20	kg/m3	333.15	Thermophysical properties of glycols and glymes
rhol	961.30	kg/m3	323.15	Thermophysical properties of glycols and glymes

rhol	970.30	kg/m3	313.15	Thermophysical properties of glycols and glymes
rhol	965.33	kg/m3	318.15	Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 288.15-318.15 K
rhol	974.80	kg/m3	308.15	Thermophysical properties of glycols and glymes
rhol	979.30	kg/m3	303.15	Thermophysical properties of glycols and glymes
rhol	983.70	kg/m3	298.15	Thermophysical properties of glycols and glymes
rhol	988.20	kg/m3	293.15	Thermophysical properties of glycols and glymes
rhol	992.60	kg/m3	288.15	Thermophysical properties of glycols and glymes
rhol	997.10	kg/m3	283.15	Thermophysical properties of glycols and glymes
rhol	916.80	kg/m3	373.15	Thermophysical properties of glycols and glymes
rhol	921.40	kg/m3	368.15	Thermophysical properties of glycols and glymes
rhol	926.10	kg/m3	363.15	Thermophysical properties of glycols and glymes
rhol	930.70	kg/m3	358.15	Thermophysical properties of glycols and glymes
rhol	935.30	kg/m3	353.15	Thermophysical properties of glycols and glymes

rhol	943.10	kg/m3	343.15	Thermophysical properties of glycols and glymes
rhol	939.90	kg/m3	348.15	Thermophysical properties of glycols and glymes
rhol	944.40	kg/m3	343.15	Thermophysical properties of glycols and glymes
rhol	949.00	kg/m3	338.15	Thermophysical properties of glycols and glymes
rhol	953.50	kg/m3	333.15	Thermophysical properties of glycols and glymes
rhol	958.10	kg/m3	328.15	Thermophysical properties of glycols and glymes
rhol	962.50	kg/m3	323.15	Thermophysical properties of glycols and glymes
rhol	967.00	kg/m3	318.15	Thermophysical properties of glycols and glymes
rhol	971.50	kg/m3	313.15	Thermophysical properties of glycols and glymes
rhol	976.00	kg/m3	308.15	Thermophysical properties of glycols and glymes
rhol	980.40	kg/m3	303.15	Thermophysical properties of glycols and glymes
rhol	984.90	kg/m3	298.15	Thermophysical properties of glycols and glymes
rhol	989.40	kg/m3	293.15	Thermophysical properties of glycols and glymes
rhol	993.90	kg/m3	288.15	Thermophysical properties of glycols and glymes

rhol	992.17	kg/m3	288.15	Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 288.15-318.15 K
rhol	983.08	kg/m3	298.15	Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 288.15-318.15 K
rhol	974.27	kg/m3	308.15	Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 288.15-318.15 K
rhol	983.11	kg/m3	298.15	Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 288.15-318.15 K
rhol	974.18	kg/m3	308.15	Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 288.15-318.15 K
rhol	965.33	kg/m3	318.15	Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 288.15-318.15 K

rhol	983.84	kg/m3	298.15	Speeds of Sound and Isentropic Compressibilities of n-Alkoxyethanols and Polyethers with Propylamine at 298.15K

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.63980e+01
Coeff. B	-5.15308e+03
Coeff. C	-3.75940e+01
Temperature range (K), min.	357.45
Temperature range (K), max.	502.40

Datasets

Mass density, kg/m3

Temperature, K - Liquid	Pressure, kPa - Liquid	Mass density, kg/m3 - Liquid
283.15	100.00	997.7
283.15	1000.00	998.2
283.15	2500.00	999.1
283.15	5000.00	1000.6
283.15	7500.00	1002.0
283.15	10000.00	1003.4
283.15	15000.00	1006.1
283.15	20000.00	1008.8
283.15	25000.00	1011.3
293.15	100.00	988.4
293.15	1000.00	988.9
293.15	2500.00	989.8
293.15	5000.00	991.3

293.15	7500.00	992.8
293.15	10000.00	994.3
293.15	15000.00	997.2
293.15	20000.00	999.9
293.15	25000.00	1002.6
303.15	100.00	979.5
303.15	1000.00	980.1
303.15	2500.00	981.1
303.15	5000.00	982.6
303.15	7500.00	984.2
303.15	10000.00	985.8
303.15	15000.00	988.8
303.15	20000.00	991.7
303.15	25000.00	994.6
313.15	100.00	970.6
313.15	1000.00	971.2
313.15	2500.00	972.2
313.15	5000.00	973.9
313.15	7500.00	975.5
313.15	10000.00	977.1
313.15	15000.00	980.3
313.15	20000.00	983.4
313.15	25000.00	986.3
323.15	100.00	961.5
323.15	1000.00	962.1
323.15	2500.00	963.2
323.15	5000.00	965.0
323.15	7500.00	966.8
323.15	10000.00	968.5
323.15	15000.00	971.9
323.15	20000.00	975.1
323.15	25000.00	978.2
333.15	100.00	952.4
333.15	1000.00	953.1
333.15	2500.00	954.3
333.15	5000.00	956.1
333.15	7500.00	958.0
333.15	10000.00	959.7
333.15	15000.00	963.2
333.15	20000.00	966.5
333.15	25000.00	969.8
343.15	100.00	943.4
343.15	1000.00	944.1
343.15	2500.00	945.3

343.15	5000.00	947.3
343.15	7500.00	949.2
343.15	10000.00	951.1
343.15	15000.00	954.8
343.15	20000.00	958.3
343.15	25000.00	961.6
353.15	100.00	934.1
353.15	1000.00	934.9
353.15	2500.00	936.1
353.15	5000.00	938.2
353.15	7500.00	940.2
353.15	10000.00	942.2
353.15	15000.00	946.0
353.15	20000.00	949.7
353.15	25000.00	953.2
Reference		*https://www.doi.org/10.1021/je034218n*

Sources

Thermodynamics of the solubility of reserpine in {2-(2-ethoxyethoxy)ethanol + water} mixed solvent systems at different temperatures:	https://www.doi.org/10.1016/j.jct.2014.12.032
Density, Speed of Sound, and Viscosity of Diethylene Glycol Monoethyl Ether + N,N-Dimethylformamide (Ethanol, Water) at T = 298.15-318.15 K:	https://www.doi.org/10.1021/acs.jced.8b01012
Solubility of (E)-N-Cyclohexyl-2-(3-hydroxybenzylidine) Hydrazine Carbothioamide in Different Pure Solvents at (298.15 to 338.15) K:	https://www.doi.org/10.1021/je5003708
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Solubility of N-(4-Chlorophenyl)-2-(pyridin-4-ylcarbonyl)hydrazinecarbothioamide (Isoniazid Analogue) in Transcutol + Water Cosolvent Mixtures at (298.15 to 333.15) K:	https://www.doi.org/10.1021/je5002522
Solubility and thermodynamic function of a bioactive compound bergenin in various pharmaceutically acceptable neat solvents at different temperatures:	https://www.doi.org/10.1016/j.jct.2016.05.003
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Measurement and Correlation of Tadalafil Solubility in Five Pure Solvents at (298.15 to 333.15) K:	https://www.doi.org/10.1021/je400982r
Excess Molar Enthalpies and Hydrogen Bonding in Binary Mixtures Containing Ethers and Benzyl Alcohol at 308.15 K and Atmospheric Pressure:	https://www.doi.org/10.1021/je0504212
The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Liquid Density Measurements of Diethylene Glycol Monoalkyl Ethers as a Function of Temperature and Pressure:	https://www.doi.org/10.1021/je034218n
Correlation of Solubility of Bioactive Compound Reserpine in Eight Green Solvents at (298.15 to 338.15) K:	https://www.doi.org/10.1021/je500893g
Volumetric and viscometric study of aqueous binary mixtures of some glycol ethers at T = (275.15 and 283.15) K:	https://www.doi.org/10.1016/j.jct.2011.07.008
Measurement and Prediction of Molar Heat Capacities of Liquid Polyoxyethylene Glycol Monoalkyl Ethers (CnEm):	https://www.doi.org/10.1021/acs.jced.5b00051
Thermodynamic and optical studies of some ethylene glycol ethers in aqueous solutions at T = 298.15 K:	https://www.doi.org/10.1016/j.jct.2009.01.010
Solubility and Thermodynamic Analysis of Tenoxicam in Different Pure Solvents at Different Temperatures:	https://www.doi.org/10.1021/acs.jced.5b00382
Density and refractive index in mixtures of ionic liquids and organic solvents: Correlations and predictions:	https://www.doi.org/10.1016/j.jct.2008.01.023
Thermophysical properties of glycols and glymes:	https://www.doi.org/10.1021/acs.jced.5b00662
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
Solubilization Behavior of Paracetamol in Transcutol Water Mixtures at (298.15 to 333.15) K:	https://www.doi.org/10.1021/je4008525

Solubility and thermodynamic function of a new anticancer drug ibrutinib in 2-(2-ethoxyethoxy)ethanol + water mixtures at different temperatures:	https://www.doi.org/10.1016/j.jct.2015.04.014
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C111900&Units=SI
Speeds of Sound and Isentropic Compressibilities of n-Alkoxyethanols and Polyethers with Propylamine at 298.15K:	https://www.doi.org/10.1007/s10765-006-0047-0
Viscosities of binary mixtures of some methoxyethanols with ethyl tert-butyl ether at T = (293.15, 298.15, and 303.15) K:	https://www.doi.org/10.1016/j.jct.2007.01.010
Solubility of N-(4-Chlorophenyl)-2-(pyridin-4-ylcarbonyl)hydrazinecarbothioamide (Isoniazid Analogue) in Five Pure Solvents at (298.15 to 338.15) K:	https://www.doi.org/10.1021/je500457p
Solubility of Metoclopramide Hydrochloride in Six Green Solvents at (298.15 to 338.15) K:	https://www.doi.org/10.1021/je500154k
Volumetric, acoustic, and viscometric studies of molecular interactions in binary mixtures of diethylene glycol monomethyl ether with 1-alkanols at temperatures from (293.15 to 308.15) K:	https://www.doi.org/10.1016/j.jct.2009.08.009
Measurement, Correlation, and Thermodynamics of Solubility of Isatin in Nine Different Green Solvents at (298.15 to 338.15) K:	https://www.doi.org/10.1021/je501036r

Legend

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
hfus:	Enthalpy of fusion at standard conditions
hvap:	Enthalpy of vaporization at standard conditions
hvapt:	Enthalpy of vaporization at a given temperature
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
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
vc:	Critical Volume