1,3-Dioxolane

Other names:	1,3-Dioxacyclopentane
	1,3-Dioxolan
	1,3-Dioxole, dihydro-
	Dioxolan
	Dioxolane
	Ethylene glycol formal
	Formal glycol
	Glycolformal
	dihydro-1,3-dioxole
	ethylene glycol methylene ether
	formaldehyde ethylene acetal
Inchi:	InChI=1S/C3H6O2/c1-2-5-3-4-1/h1-3H2
InchiKey:	WNXJIVFYUVYPPR-UHFFFAOYSA-N
Formula:	C3H6O2
SMILES:	C1COCO1
Mol. weight [g/mol]:	74.08
CAS:	646-06-0

Physical Properties

Property code	Value	Unit	Source
chl	-1705.00	kJ/mol	NIST Webbook
chl	-1700.80 ± 1.40	kJ/mol	NIST Webbook
chl	-1700.00	kJ/mol	NIST Webbook
dvisc	0.0005310	Pa×s	Excess Molar Volumes and Viscosity Deviations of Binary Liquid Mixtures of 1,3-Dioxolane and 1,4-Dioxane with Butyl Acetate, Butyric Acid, Butylamine, and 2-Butanone at 298.15 K
gf	-153.60	kJ/mol	Joback Method
hf	-301.70 ± 2.20	kJ/mol	NIST Webbook
hfl	-337.20 ± 1.40	kJ/mol	NIST Webbook
hfus	12.35	kJ/mol	Joback Method
hvap	36.00 ± 0.40	kJ/mol	NIST Webbook
hvap	35.50	kJ/mol	NIST Webbook
ie	10.10	eV	NIST Webbook
ie	10.02	eV	NIST Webbook

ie	9.90	eV	NIST Webbook
log10ws	0.36		Crippen Method
logp	-0.009		Crippen Method
mcvol	54.010	ml/mol	McGowan Method
pc	5818.28	kPa	Joback Method
rinpol	593.00		NIST Webbook
rinpol	592.00		NIST Webbook
rinpol	635.00		NIST Webbook
rinpol	597.00		NIST Webbook
rinpol	635.00		NIST Webbook
rinpol	592.00		NIST Webbook
rinpol	638.00		NIST Webbook
rinpol	594.00		NIST Webbook
rinpol	597.00		NIST Webbook
rinpol	582.00		NIST Webbook
rinpol	608.00		NIST Webbook
rinpol	590.00		NIST Webbook
ripol	935.00		NIST Webbook
sg	310.50 ± 4.10	J/mol×K	NIST Webbook
sl	280.20	J/mol×K	NIST Webbook
tb	347.70	K	NIST Webbook
tb	339.12	K	Study of isobaric vapour liquid equilibrium of some cyclic ethers with 1-chloropropane: Experimental results and SAFT-VR modelling
tb	348.57	K	Vapor-Liquid Equilibrium Data for Methanol + 1,3-Dioxolane + Water and Constituent Binary Systems at 101.3 kPa.
tb	348.00	K	Study of Solution Properties of Some Alkali Bromides in Aqueous Binary Mixtures of 1,3-Dioxolane in View of Different Models
tb	348.75	K	NIST Webbook
tc	543.20	K	Joback Method
tf	175.90 ± 0.60	K	NIST Webbook
tf	175.85	K	NIST Webbook
tt	175.93 ± 0.02	K	NIST Webbook
vc	0.188	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	87.73	J/mol×K	341.89	Joback Method
cpg	104.62	J/mol×K	408.99	Joback Method
cpg	112.37	J/mol×K	442.54	Joback Method
cpg	119.68	J/mol×K	476.09	Joback Method
cpg	126.57	J/mol×K	509.65	Joback Method
cpg	133.05	J/mol×K	543.20	Joback Method
cpg	96.41	J/mol×K	375.44	Joback Method
cpl	128.10	J/mol×K	323.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model
cpl	118.80	J/mol×K	288.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model
cpl	120.30	J/mol×K	293.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model
cpl	121.70	J/mol×K	298.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model
cpl	123.30	J/mol×K	303.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model

cpl	124.40	J/mol×K	308.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model	
cpl	125.30	J/mol×K	313.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model	
cpl	120.84	J/mol×K	298.15	NIST Webbook	
cpl	126.80	J/mol×K	318.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model	
cpl	129.50	J/mol×K	328.15	Thermophysical properties of dimethyl sulfoxide + cyclic and linear ethers at 308.15K Application of an extended cell model	
cpl	118.00	J/mol×K	298.00	NIST Webbook	
dvisc	0.0004580	Pa×s	318.15	Studies on Thermodynamic and Transport Properties of Binary Mixtures of Acetonitrile with Some Cyclic Ethers at Different Temperatures by Volumetric, Viscometric, and Interferometric Techniques	

dvisc	0.0005128	Pa×s	308.15	Studies on Thermodynamic and Transport Properties of Binary Mixtures of Acetonitrile with Some Cyclic Ethers at Different Temperatures by Volumetric, Viscometric, and Interferometric Techniques
dvisc	0.0005878	Pa×s	298.15	Studies on Thermodynamic and Transport Properties of Binary Mixtures of Acetonitrile with Some Cyclic Ethers at Different Temperatures by Volumetric, Viscometric, and Interferometric Techniques
hfust	6.57	kJ/mol	175.90	NIST Webbook
hfust	6.57	kJ/mol	175.90	NIST Webbook
hfust	2.68	kJ/mol	142.40	NIST Webbook
hvapt	33.70	kJ/mol	326.00	NIST Webbook
hvapt	35.80	kJ/mol	301.50	NIST Webbook
hvapt	34.60	kJ/mol	326.00	NIST Webbook
hvapt	33.70	kJ/mol	339.00	NIST Webbook
hvapt	34.10	kJ/mol	317.50	NIST Webbook
kvisc	0.0000005	m2/s	313.15	Experimental and predicted viscosities of binary mixtures of cyclic ethers with 1-chloropentane or 1-chlorohexane at 283.15, 298.15, and 313.15K
kvisc	0.0000006	m2/s	298.15	Experimental and predicted viscosities of binary mixtures of cyclic ethers with 1-chloropentane or 1-chlorohexane at 283.15, 298.15, and 313.15K

kvisc	0.0000007	m2/s	283.15	Experimental and predicted viscosities of binary mixtures of cyclic ethers with 1-chloropentane or 1-chlorohexane at 283.15, 298.15, and 313.15K
pvap	26.83	kPa	313.15	Isothermal vapour-liquid equilibrium for cyclic ethers with 1-chloropentane
pvap	13.54	kPa	298.15	Isothermal (vapour + liquid) equilibrium of (cyclic ethers + chlorohexane) mixtures: Experimental results and SAFT modelling
pvap	49.01	kPa	328.15	Isothermal vapour-liquid equilibrium for cyclic ethers with 1-chloropentane
pvap	26.73	kPa	313.16	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols
pvap	23.08	kPa	309.76	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols
pvap	13.54	kPa	298.15	Isothermal vapour-liquid equilibrium for cyclic ethers with 1-chloropentane

pvap	6.20	kPa	282.96	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	31.18	kPa	316.81	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	7.14	kPa	285.51	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	19.15	kPa	305.57	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	17.05	kPa	303.00	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	

pvap	15.69	kPa	301.25	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	13.59	kPa	298.12	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	10.78	kPa	293.48	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	7.91	kPa	287.44	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	
pvap	5.42	kPa	280.46	Vapor Pressure and Its Temperature Dependence of 28 Organic Compounds: Cyclic Amines, Cyclic Ethers, and Cyclic and Open Chain Secondary Alcohols	

pvap	49.01	kPa	328.15	Isothermal (vapour + liquid) equilibrium of (cyclic ethers + chlorohexane) mixtures: Experimental results and SAFT modelling
rfi	1.39740		298.15	Physics and Chemistry of Lithium Halides in 1,3-Dioxolane and Its Binary Mixtures with Acetonitrile probed by Conductometric, Volumetric, Viscometric, Refractometric and Acoustic Study
rfi	1.39779		298.15	Vapor-Liquid Equilibria for Binary and Ternary Mixtures of 1,3-Dioxolane, 2-Propanol, and 2,2,4-Trimethylpentane at 101.3 kPa
rfi	1.39800		298.15	Studies on liquid liquid interactions of some ternary mixtures by density, viscosity, ultrasonic speed and refractive index measurements
rhol	1058.70	kg/m3	298.15	Probing subsistence of ion-pair and triple-ion of an ionic salt in liquid environments by means of conductometric contrivance
rhol	1058.62	kg/m3	298.15	Experimental and predicted viscosities of the ternary mixture (hexane + 1,3-dioxolane + 2-butanol) at 298.15 and 313.15 K

rhol	1051.80	kg/m3	303.15	Viscous synergy and antagonism and isentropic compressibility of ternary mixtures containing 1,3-dioxolane, water and monoalkanols at 303.15K
rhol	1058.90	kg/m3	298.15	Densities, Speeds of Sound, Excess Molar Enthalpies, and Heat Capacities of o-Chlorotoluene and Cyclic Ether Mixtures
rhol	1052.60	kg/m3	303.15	Densities, Speeds of Sound, Excess Molar Enthalpies, and Heat Capacities of o-Chlorotoluene and Cyclic Ether Mixtures
rhol	1058.73	kg/m3	298.15	Ionic solvation of tetrabutylammonium hexafluorophosphate in pure nitromethane, 1, 3-dioxolane and nitrobenzene: A comparative physicochemical study
rhol	1059.00	kg/m3	298.15	Vapour liquid equilibrium of cyclic ethers with 1-chlorohexane: Experimental results and UNIFAC predictions
rhol	1058.62	kg/m3	298.15	(Vapour + liquid) equilibrium of binary mixtures (1,3-dioxolane or 1,4-dioxane + 2-methyl-1-propanol or 2-methyl-2-propanol) at isobaric conditions
rhol	1058.62	kg/m3	298.15	Surface study of mixtures containing cyclic ethers and isomeric chlorobutanes

rhol	1058.76	kg/m3	298.15	Isothermal Vapor-Liquid Equilibria and Excess Gibbs Energies for Binary Mixtures of Cyclic Ethers with 1,2-Dichloroethane
rhol	1047.20	kg/m3	298.15	Thermodynamic properties of liquid mixtures containing 1,3-dioxolane and anilines: Excess molar volumes, excess molar enthalpies, excess Gibb's free energy and isentropic compressibilities changes of mixing
rhol	1046.30	kg/m3	308.15	Densities, Speeds of Sound, Excess Molar Enthalpies, and Heat Capacities of o-Chlorotoluene and Cyclic Ether Mixtures
sfust	37.33	J/mol×K	175.90	NIST Webbook
sfust	18.80	J/mol×K	142.40	NIST Webbook
speedsl	1270.90	m/s	313.15	Densities and speeds of sound for binary mixtures of (1,3-dioxolane or 1,4-dioxane) with (2-methyl-1-propanol or 2-methyl-2-propanol) at the temperatures 298.15 K and 313.15 K
speedsl	1271.60	m/s	313.15	Speeds of Sound and Isentropic Compressibilities for Binary Mixtures of a Cyclic Diether with a Cyclic Compound at Three Temperatures

speedsl	1339.90	m/s	298.15	Speeds of Sound and Isentropic Compressibilities for Binary Mixtures of a Cyclic Diether with a Cyclic Compound at Three Temperatures
speedsl	1406.30	m/s	283.15	Speeds of Sound and Isentropic Compressibilities for Binary Mixtures of a Cyclic Diether with a Cyclic Compound at Three Temperatures
speedsl	1340.20	m/s	298.15	Densities and speeds of sound for binary mixtures of (1,3-dioxolane or 1,4-dioxane) with (2-methyl-1-propanol or 2-methyl-2-propanol) at the temperatures 298.15 K and 313.15 K
srf	0.03	N/m	288.15	Densities, Viscosities, Refractive Indices, and Surface Tensions for the Mixtures of 1,3-Dioxolane + 2-Propanol or + 2,2,4-Trimethylpentane at (288.15, 298.15, and 308.15) K and 1,3-Dioxolane + 2-Propanol + 2,2,4-Trimethylpentane at 298.15 K
srf	0.03	N/m	298.15	Densities, Viscosities, Refractive Indices, and Surface Tensions for the Mixtures of 1,3-Dioxolane + 2-Propanol or + 2,2,4-Trimethylpentane at (288.15, 298.15, and 308.15) K and 1,3-Dioxolane + 2-Propanol + 2,2,4-Trimethylpentane at 298.15 K

srf	0.03	N/m	308.15	Densities, Viscosities, Refractive Indices, and Surface Tensions for the Mixtures of 1,3-Dioxolane + 2-Propanol or + 2,2,4-Trimethylpentane at (288.15, 298.15, and 308.15) K and 1,3-Dioxolane + 2-Propanol + 2,2,4-Trimethylpentane at 298.15 K

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.46333e+01
Coeff. B	-3.02711e+03
Coeff. C	-4.54420e+01
Temperature range (K), min.	256.45
Temperature range (K), max.	372.15

Sources

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Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
Thermodynamic properties of liquid mixtures containing 1,3-dioxolane and amines. Excess molar volumes, excess molar enthalpies, excess Gibb's free energy and isentropic	https://www.doi.org/10.1016/j.tca.2010.07.027
Studies on liquid liquid interactions of some ternary mixtures by density, isothermal Vapor-Liquid Equilibria and Excess Molar Enthalpies at Different Temperatures: Binary Mixtures of Cyclic Ethers with 1,2-Dichloroethane:	https://www.doi.org/10.1016/j.tca.2009.07.011
Isothermal Vapor-Liquid Equilibria and Excess Molar Enthalpies at Different Temperatures: Binary Mixtures of Cyclic Ethers with 2-Propanol	https://www.doi.org/10.1021/acs.jced.7b01091
The Yaws Handbook of Vapor Pressure	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
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Excess Molar Volumes and Viscosity Deviations of Binary Liquid Mixtures of Dioxolane and 1,4-Dioxane + Ethyl Acetate, Butyric Acid, Butylamine, and 2-Butanone at 298.15 K	https://www.doi.org/10.1021/je0504109
Densities, Speeds of Sound, Isentropic Compressibilities, and Excess Molar Volumes for Binary Mixtures of 1,3-Dioxolane + Water at (293.15, 298.15, and 303.15) K	https://www.doi.org/10.1021/je400722h
Molar Enthalpies and Heat Capacities of Binary Mixtures of Cyclic Ethers + Some Isocyanate Salts in Coaqueous Solutions of 1,3-Dioxolane + Water by Calorimetric, Viscometric, and Speed of Sound Measurements	https://www.doi.org/10.1021/je800562h
Excess molar volumes and excess isentropic compressibilities of mixtures of 1,3-dioxolane, 1,4-dioxane and cyclic alkanones:	https://www.doi.org/10.1016/j.jct.2018.05.012
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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
hfust:	Enthalpy of fusion at a given temperature
hvap:	Enthalpy of vaporization at standard conditions

hvapt:	Enthalpy of vaporization at a given temperature
ie:	Ionization energy
kvisc:	Kinematic viscosity
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
sfust:	Entropy of fusion at a given temperature
sg:	Molar entropy at standard conditions
sl:	Liquid phase molar entropy at standard conditions
speedsl:	Speed of sound in fluid
srf:	Surface Tension
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
tt:	Triple Point Temperature
vc:	Critical Volume