Ethylene oxide

Other names:	1,2-Epoxyaethan
	1,2-Epoxyethane
	Aethylenoxid
	Amprolene
	Anprolene
	Anproline
	DIHYDROOXIRENE
	DIMETHYLENE OXIDE
	E.O.
	ENT-26263
	ETO
	Epoxyethane
	Ethene oxide
	Ethyleenoxide
	Etylenu tlenek
	FEMA No. 2433
	Merpol
	NCI-C50088
	OXIRANE
	Oxacyclopropane
	Oxane
	Oxidoethane
	Oxiraan
	Oxiran
	Oxirene, dihydro-
	Oxyfume
	Oxyfume 12
	Qazi-ketcham
	Rcra waste number U115
	Sterilizing gas ethylene oxide 100%
	T-Gas
	UN 1040
	«alpha»,«beta»-Oxidoethane
	Â«alphaÂ»,Â«betaÂ»-Oxidoethane
Inchi:	InChI=1S/C2H4O/c1-2-3-1/h1-2H2
InchiKey:	IAYPIBMASNFSPL-UHFFFAOYSA-N
Formula:	C2H4O
SMILES:	C1CO1
Mol. weight [g/mol]:	44.05
CAS:	75-21-8

Physical Properties

Property code	Value	Unit	Source
af	0.2020		KDB
affp	774.20	kJ/mol	NIST Webbook
aigt	702.04	K	KDB
basg	745.30	kJ/mol	NIST Webbook
chg	-1307.70 ± 0.84	kJ/mol	NIST Webbook
chg	-1306.00 ± 0.59	kJ/mol	NIST Webbook
chl	-1262.90 ± 1.30	kJ/mol	NIST Webbook
dm	1.90	debye	KDB
fll	3.00	% in Air	KDB
flu	100.00	% in Air	KDB
fpc	255.37	K	KDB
gf	-13.10	kJ/mol	KDB
hf	-52.67	kJ/mol	KDB
hf	-70.20	kJ/mol	NIST Webbook
hf	-52.63 ± 0.63	kJ/mol	NIST Webbook
hfl	-95.70 ± 1.30	kJ/mol	NIST Webbook
hfus	5.98	kJ/mol	Joback Method
hvap	25.90	kJ/mol	NIST Webbook
hvap	25.51	kJ/mol	NIST Webbook
ie	10.57	eV	NIST Webbook
ie	10.40	eV	NIST Webbook
ie	10.40 ± 0.10	eV	NIST Webbook
ie	10.15 ± 0.05	eV	NIST Webbook
ie	10.57	eV	NIST Webbook
ie	10.56 ± 0.01	eV	NIST Webbook
ie	10.57	eV	NIST Webbook
ie	10.60 ± 0.10	eV	NIST Webbook
ie	10.56	eV	NIST Webbook
ie	10.56 ± 0.01	eV	NIST Webbook
ie	10.57	eV	NIST Webbook
ie	10.57	eV	NIST Webbook
ie	10.57 ± 0.01	eV	NIST Webbook
ie	10.57	eV	NIST Webbook
ie	10.57	eV	NIST Webbook
ie	10.57	eV	NIST Webbook
log10ws	0.36		Crippen Method
logp	0.017		Crippen Method

mcvol	34.050	ml/mol	McGowan Method
nfpaf	%!d(float64=4)		KDB
nfpah	%!d(float64=2)		KDB
pc	7190.00	kPa	KDB
pc	7191.00 ± 75.84	kPa	NIST Webbook
pc	7233.00 ± 68.94	kPa	NIST Webbook
rhoc	319.82 ± 10.13	kg/m3	NIST Webbook
rhoc	314.10 ± 10.13	kg/m3	NIST Webbook
rinpol	405.00		NIST Webbook
rinpol	417.00		NIST Webbook
rinpol	417.00		NIST Webbook
rinpol	397.00		NIST Webbook
rinpol	405.00		NIST Webbook
rinpol	400.00		NIST Webbook
rinpol	400.00		NIST Webbook
rinpol	410.00		NIST Webbook
ripol	680.00		NIST Webbook
sl	149.45	J/mol×K	NIST Webbook
tb	283.88 ± 0.20	K	NIST Webbook
tb	283.70	K	KDB
tb	283.70	K	NIST Webbook
tb	283.55	K	NIST Webbook
tb	286.15 ± 1.50	K	NIST Webbook
tb	286.00 ± 4.00	K	NIST Webbook
tb	283.85 ± 0.40	K	NIST Webbook
tc	469.00	K	KDB
tc	468.90 ± 1.11	K	NIST Webbook
tc	469.00 ± 1.00	K	NIST Webbook
tc	465.20 ± 2.00	K	NIST Webbook
tf	161.90 ± 0.60	K	NIST Webbook
tf	161.45 ± 0.40	K	NIST Webbook
tf	160.60 ± 0.07	K	NIST Webbook
tf	160.55	K	NIST Webbook
tf	161.40	K	KDB
tt	160.65 ± 0.02	K	NIST Webbook
tt	160.65 ± 0.05	K	NIST Webbook
vc	0.140	m3/kmol	KDB
zc	0.2581350		KDB
zra	0.26		KDB

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	58.41	J/mol×K	371.23	NIST Webbook
cpg	53.51	J/mol×K	337.04	NIST Webbook
cpg	49.37	J/mol×K	307.18	NIST Webbook
cpl	86.90	J/mol×K	285.00	NIST Webbook
dvisc	0.0003680	Pa×s	222.28	Joback Method
dvisc	0.0004531	Pa×s	201.87	Joback Method
dvisc	0.0005846	Pa×s	181.46	Joback Method
dvisc	0.0003095	Pa×s	242.70	Joback Method
dvisc	0.0002674	Pa×s	263.11	Joback Method
dvisc	0.0002359	Pa×s	283.52	Joback Method
dvisc	0.0008047	Pa×s	161.05	Joback Method
hfust	5.17	kJ/mol	160.65	NIST Webbook
hfust	5.17	kJ/mol	160.70	NIST Webbook
hfust	5.17	kJ/mol	160.70	NIST Webbook
hvapt	26.90	kJ/mol	290.50	NIST Webbook
hvapt	25.53	kJ/mol	283.66	NIST Webbook
hvapt	25.54	kJ/mol	283.70	NIST Webbook
hvapt	26.80	kJ/mol	261.50	NIST Webbook
hvapt	26.80	kJ/mol	253.50	NIST Webbook
hvapt	25.50 ± 0.30	kJ/mol	283.66	NIST Webbook
hvapt	25.61	kJ/mol	283.80	KDB
pvap	766.70	kPa	348.15	Vapor-Liquid Equilibria on Seven Binary Systems: Ethylene Oxide + 2-Methylpropane; Acetophenone + Phenol; cis-1,3-Dichloropropene + 1,2-Dichloropropane; 1,5-Hexadiene + Allyl Chloride; Isopropyl Acetate + Acetonitrile; Vinyl Chloride + Methyl Chloride; and 1,4-Butanediol + c-Butyrolactone

pvap	174.71	kPa	298.15	Vapor-Liquid Equilibria on Seven Binary Systems: Ethylene Oxide + 2-Methylpropane; Acetophenone + Phenol; cis-1,3-Dichloropropene + 1,2-Dichloropropane; 1,5-Hexadiene + Allyl Chloride; Isopropyl Acetate + Acetonitrile; Vinyl Chloride + Methyl Chloride; and 1,4-Butanediol + c-Butyrolactone
rhol	899.00	kg/m3	273.00	KDB
sfust	32.20	J/mol×K	160.65	NIST Webbook
srf	0.03	N/m	243.20	KDB
svapt	89.99	J/mol×K	283.66	NIST Webbook

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.45512e+01
Coeff. B	-2.53439e+03
Coeff. C	-2.98490e+01
Temperature range (K), min.	207.53
Temperature range (K), max.	469.15

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/T + C*ln(T) + D*T^2
Coeff. A	6.64077e+01
Coeff. B	-5.01071e+03
Coeff. C	-7.94255e+00
Coeff. D	9.18560e-06
Temperature range (K), min.	160.71
Temperature range (K), max.	469.15

Sources

The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Vapor-Liquid Equilibria of Binary Systems of Ethene Oxide + Dodecane, Ethene Oxide + 1-Decanol, and Ethene Oxide + 1-Dodecanol and Prediction with the Predictive Soave-Redlich-Kwong (PSRK) Equation of State:	https://www.doi.org/10.1021/je100046a
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
KDB Vapor Pressure Data:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=1042
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C75218&Units=SI
KDB:	https://www.cheric.org/files/research/kdb/mol/mol1042.mol
Vapor-Liquid Equilibria on Seven Binary Systems: Ethylene Oxide + 2-Methylpropane; Acetophenone + Phenol; cis-1,3-Dichloropropene + 1,2-Dichloropropane; 1,5-Hexadiene + Allyl Chloride; Isopropyl Acetate + Acetonitrile; Vinyl Chloride + Methyl Chloride; and 1,4-Butanediol + c-Butyrolactone:	https://www.doi.org/10.1021/je050317k

Legend

af:	Acentric Factor
affp:	Proton affinity
aigt:	Autoignition Temperature
basg:	Gas basicity
chg:	Standard gas enthalpy of combustion
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
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
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
pvap:	Vapor pressure
rhoc:	Critical density
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
sfust:	Entropy of fusion at a given temperature
sl:	Liquid phase molar entropy at standard conditions
srf:	Surface Tension
svapt:	Entropy of vaporization at a given temperature
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