

n-Butyl ether

Other names:	(n-C4H9)2O 1,1'-OXYBIS-BUTANE 1,1'-Oxybis(butane) 1,1'-oxybisbutane 1-Butoxybutane 5-oxanonane BUTYL OXIDE Butane, 1,1'-oxybis- Butyl ether DIBUTYL ETHER Di-n-butyl ether Dibutyl oxide Ether butylique NSC 8459 UN 1149 n-Dibutyl ether
Inchi:	InChI=1S/C8H18O/c1-3-5-7-9-8-6-4-2/h3-8H2,1-2H3
InchiKey:	DURPTKYDGMDSBL-UHFFFAOYSA-N
Formula:	C8H18O
SMILES:	CCCCOCCCC
Mol. weight [g/mol]:	130.23
CAS:	142-96-1

Physical Properties

Property code	Value	Unit	Source
af	0.5020		KDB
affp	845.70	kJ/mol	NIST Webbook
basg	818.30	kJ/mol	NIST Webbook
basg	815.50 ± 0.50	kJ/mol	NIST Webbook
basg	815.50 ± 0.50	kJ/mol	NIST Webbook
basg	816.50	kJ/mol	NIST Webbook
chl	-5343.10 ± 2.80	kJ/mol	NIST Webbook
chl	-5342.63 ± 0.92	kJ/mol	NIST Webbook
chl	-5343.40 ± 3.30	kJ/mol	NIST Webbook
dm	1.20	debye	KDB
gf	-88.59	kJ/mol	KDB
hf	-334.10	kJ/mol	KDB

hf	-334.00 ± 2.00	kJ/mol	NIST Webbook
hf	-334.00	kJ/mol	NIST Webbook
hfl	-377.60 ± 2.80	kJ/mol	NIST Webbook
hfl	-378.00 ± 1.00	kJ/mol	NIST Webbook
hfus	17.66	kJ/mol	Joback Method
hvap	44.70 ± 0.10	kJ/mol	NIST Webbook
hvap	45.00	kJ/mol	NIST Webbook
hvap	45.00 ± 0.10	kJ/mol	NIST Webbook
hvap	44.40	kJ/mol	NIST Webbook
hvap	44.99	kJ/mol	NIST Webbook
ie	9.40	eV	NIST Webbook
ie	9.51 ± 0.01	eV	NIST Webbook
ie	9.28 ± 0.05	eV	NIST Webbook
ie	9.44	eV	NIST Webbook
log10ws	-1.85		Estimated Solubility Method
log10ws	-1.85		Aqueous Solubility Prediction Method
logp	2.603		Crippen Method
mcvol	129.450	ml/mol	McGowan Method
nfpaf	%!d(float64=3)		KDB
nfpah	%!d(float64=2)		KDB
pc	3010.00	kPa	KDB
pc	3010.00 ± 30.07	kPa	NIST Webbook
rinpol	875.00		NIST Webbook
rinpol	873.00		NIST Webbook
rinpol	875.00		NIST Webbook
rinpol	858.00		NIST Webbook
rinpol	876.00		NIST Webbook
rinpol	875.00		NIST Webbook
rinpol	872.00		NIST Webbook
rinpol	880.20		NIST Webbook
rinpol	888.00		NIST Webbook
rinpol	862.00		NIST Webbook
rinpol	858.00		NIST Webbook
rinpol	859.00		NIST Webbook
rinpol	857.00		NIST Webbook
rinpol	865.00		NIST Webbook
rinpol	858.00		NIST Webbook
rinpol	858.00		NIST Webbook
rinpol	865.00		NIST Webbook
rinpol	861.00		NIST Webbook
rinpol	875.00		NIST Webbook
rinpol	865.00		NIST Webbook
rinpol	854.40		NIST Webbook

rinpol	876.82		NIST Webbook
rinpol	854.90		NIST Webbook
rinpol	854.00		NIST Webbook
rinpol	876.00		NIST Webbook
ripol	970.00		NIST Webbook
ripol	976.00		NIST Webbook
ripol	965.00		NIST Webbook
ripol	968.00		NIST Webbook
ripol	970.00		NIST Webbook
ripol	967.00		NIST Webbook
ripol	967.00		NIST Webbook
ripol	976.00		NIST Webbook
ripol	977.00		NIST Webbook
ripol	970.00		NIST Webbook
ripol	976.00		NIST Webbook
ripol	974.00		NIST Webbook
ripol	971.00		NIST Webbook
tb	413.43	K	KDB
tc	584.10	K	KDB
tc	584.10 ± 0.58	K	NIST Webbook
tc	588.10	K	NIST Webbook
tf	177.75	K	NIST Webbook
tf	176.62	K	Aqueous Solubility Prediction Method
tf	177.90	K	KDB
tf	177.78 ± 0.05	K	NIST Webbook
tf	175.25 ± 0.40	K	NIST Webbook
vc	0.501	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	257.48	J/mol×K	404.86	Joback Method
cpg	270.17	J/mol×K	432.19	Joback Method
cpg	282.47	J/mol×K	459.51	Joback Method
cpg	294.38	J/mol×K	486.84	Joback Method
cpg	305.91	J/mol×K	514.16	Joback Method
cpg	317.06	J/mol×K	541.49	Joback Method
cpg	327.83	J/mol×K	568.81	Joback Method
cpl	278.16	J/mol×K	298.15	NIST Webbook
dvisc	0.0017915	Pa×s	235.94	Joback Method

dvisc	0.0002200	Pa×s	404.86	Joback Method
dvisc	0.0005852	Pa×s	303.50	Joback Method
dvisc	0.0003956	Pa×s	337.29	Joback Method
dvisc	0.0002873	Pa×s	371.08	Joback Method
dvisc	0.0009546	Pa×s	269.72	Joback Method
dvisc	0.0041498	Pa×s	202.15	Joback Method
hvapt	39.40	kJ/mol	413.00	NIST Webbook
hvapt	41.70	kJ/mol	375.50	NIST Webbook
hvapt	43.93 ± 0.42	kJ/mol	414.30	NIST Webbook
hvapt	40.60	kJ/mol	387.50	NIST Webbook
hvapt	36.40	kJ/mol	388.00	NIST Webbook
hvapt	40.90	kJ/mol	377.00	NIST Webbook
hvapt	36.49	kJ/mol	413.50	NIST Webbook
hvapt	39.75	kJ/mol	412.90	KDB
hvapt	46.90	kJ/mol	293.00	NIST Webbook
kvisc	0.0000007	m2/s	313.15	Kinematic Viscosities for Ether + Alkane Mixtures: Experimental Results and UNIFAC-VISCO Parameters
kvisc	0.0000009	m2/s	298.15	Kinematic Viscosities for Ether + Alkane Mixtures: Experimental Results and UNIFAC-VISCO Parameters
kvisc	0.0000010	m2/s	283.15	Kinematic Viscosities for Ether + Alkane Mixtures: Experimental Results and UNIFAC-VISCO Parameters
pvap	2.10	kPa	313.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures

pvap	0.08	kPa	263.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures
pvap	0.17	kPa	273.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures
pvap	96.21	kPa	413.15	Vapor-Liquid Equilibrium Data, Excess Enthalpy Data, and Azeotropic Data for the Binary System Dibutyl Ether + o-Xylene
pvap	0.34	kPa	283.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures
pvap	0.65	kPa	293.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures
pvap	3.57	kPa	323.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures

pvap	50.60	kPa	390.80	Vapor-Liquid Equilibrium Data, Excess Enthalpy Data, and Azeotropic Data for the Binary System Dibutyl Ether + o-Xylene
pvap	3.63	kPa	323.15	Vapor-Liquid Equilibrium Data, Excess Enthalpy Data, and Azeotropic Data for the Binary System Dibutyl Ether + o-Xylene
pvap	13.90	kPa	353.15	Vapor Liquid Equilibrium and Excess Enthalpy Data for Systems Containing N,N-Dimethylacetamide
pvap	2.07	kPa	313.15	Phase equilibrium properties of the ternary mixture dibutyl ether + toluene + heptane at 313.15 K
pvap	0.89	kPa	298.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures
pvap	9.33	kPa	343.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures

pvap	28.40	kPa	373.15	Thermodynamics of binary mixtures containing N-methyl-2-pyrrolidinone VLE measurements for systems with ethers Comparison with the Mod. UNIFAC (Do) and DISQUAC models Predictions for VLE, GE m, HEm and SLE?
pvap	5.86	kPa	333.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures
pvap	1.19	kPa	303.15	Isothermal vapour liquid equilibria and excess molar enthalpies of hex-2-yne + methyl butyl ether and hex-3-yne + dibutyl ether mixtures
rfi	1.39646		298.15	Isothermal Vapor-Liquid Equilibrium at 333.15 K, Density, and Refractive Index at 298.15 K for the Ternary Mixture of Dibutyl Ether + Ethanol + Benzene and Binary Subsystems
rfi	1.39700		298.15	Solubility of -Carotene in Binary Solvents Formed by Some Hydrocarbons with Dibutyl Ether and 1,2-Dimethoxyethane

rfi	1.39630		298.15	Ternary (liquid + liquid) equilibria for the extraction of ethanol, or 2-propanol from aqueous solutions with 1,1'-oxybis(butane) at different temperatures
rfi	1.39668		298.15	(Liquid + liquid) equilibrium of (dibutyl ether + methanol + water) at different temperatures
rfi	1.39700		298.15	Isobaric vapor-liquid equilibria for the binary systems 1-propyl alcohol + dipropyl ether and 1-butyl alcohol + dibutyl ether at 20 and 101.3 kPa
rfi	1.39920		293.15	Isobaric Vapor-Liquid Equilibria of the Ternary System Dibutyl Ether + 1-Pentanol + Nonane
rfi	1.39646		298.15	Isothermal vapor liquid equilibrium at 333.15K and excess volumes and molar refractivity deviation at 298.15K for the ternary system di-butyl ether (1) + ethanol (2) + toluene (3) and its binary subsystems
rhoI	746.24	kg/m3	318.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model

rhoI	755.00	kg/m3	308.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model
rhoI	750.62	kg/m3	313.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model
rhoI	741.87	kg/m3	323.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model
rhoI	755.22	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
rhoI	763.81	kg/m3	298.15	Excess Molar Enthalpies of Dipropyl Ether + Dibutyl Ether + (1-Hexene or Tetrahydrofuran) at 298.15 K
rhoI	764.23	kg/m3	298.15	Binary Liquid-Liquid Equilibrium (LLE) for Dibutyl Ether (DBE) + Water from (288.15 to 318.15) K and Ternary LLE for Systems of DBE + C1 !less thanless than C4 Alcohols + Water at 298.15 K

rhoI	768.05	kg/m3	293.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model
rhoI	768.00	kg/m3	293.00	KDB
rhoI	763.80	kg/m3	298.00	High-pressure vapor-liquid equilibria of the second generation biofuel blends (2-methylfuran + iso-octane) and (2-methyltetrahydrofuran + di-n-butyl ether): Experiments and PCP-SAFT modeling
rhoI	763.80	kg/m3	298.15	Isobaric vapor-liquid equilibrium, density and speed of sound of binary mixtures 2,2,4-trimethylpentane + 1-butanol or dibutyl ether (DBE) at 101.3 kPa
rhoI	764.08	kg/m3	298.15	Volumetric properties of (N,N-dimethylformamide + aliphatic diethers) at Temperatures ranging from (298.15 to 358.15) K
rhoI	750.92	kg/m3	313.15	Volumetric properties of (N,N-dimethylformamide + aliphatic diethers) at Temperatures ranging from (298.15 to 358.15) K

rhoI	737.68	kg/m3	328.15	Volumetric properties of (N,N-dimethylformamide + aliphatic diethers) at Temperatures ranging from (298.15 to 358.15) K
rhoI	724.25	kg/m3	343.15	Volumetric properties of (N,N-dimethylformamide + aliphatic diethers) at Temperatures ranging from (298.15 to 358.15) K
rhoI	759.40	kg/m3	303.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model
rhoI	772.33	kg/m3	288.15	Volumetric properties of binary mixtures of ethers and acetonitrile: Experimental results and application of the Prigogine Flory Patterson theory
rhoI	768.07	kg/m3	293.15	Volumetric properties of binary mixtures of ethers and acetonitrile: Experimental results and application of the Prigogine Flory Patterson theory
rhoI	763.76	kg/m3	298.15	Volumetric properties of binary mixtures of ethers and acetonitrile: Experimental results and application of the Prigogine Flory Patterson theory

rhoI	759.43	kg/m3	303.15	Volumetric properties of binary mixtures of ethers and acetonitrile: Experimental results and application of the Prigogine Flory Patterson theory
rhoI	763.81	kg/m3	298.15	Excess molar enthalpies of ternary mixtures (dibutyl ether or dipropyl ether + 2,2-dimethylbutane + 2,3-dimethylbutane) at the temperature 298.15 K
rhoI	764.11	kg/m3	298.15	Excess molar enthalpies of the binary systems: (Dibutyl ether + isomers of pentanol) at T = (298.15 and 308.15) K
rhoI	755.91	kg/m3	308.15	Excess molar enthalpies of the binary systems: (Dibutyl ether + isomers of pentanol) at T = (298.15 and 308.15) K
rhoI	759.60	kg/m3	303.15	Density, viscosity, and speed of sound of binary liquid mixtures of vinyl acetate with butyl vinyl ether, diisopropyl ether, anisole and dibutyl ether
rhoI	755.20	kg/m3	308.15	Density, viscosity, and speed of sound of binary liquid mixtures of vinyl acetate with butyl vinyl ether, diisopropyl ether, anisole and dibutyl ether

rhoI	750.80	kg/m3	313.15	Density, viscosity, and speed of sound of binary liquid mixtures of vinyl acetate with butyl vinyl ether, diisopropyl ether, anisole and dibutyl ether
rhoI	772.45	kg/m3	288.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model
rhoI	710.54	kg/m3	358.15	Volumetric properties of (N,N-dimethylformamide + aliphatic diethers) at Temperatures ranging from (298.15 to 358.15) K
rhoI	763.70	kg/m3	298.15	Excess Enthalpies in Binary Systems of Isomeric C8 Aliphatic Monoethers with Acetonitrile and Their Description by the COSMO-SAC Model
speedsI	1220.10	m/s	298.15	Densities, Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene

speedsl	1179.00	m/s	308.15	Densities, Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene
srf	0.02	N/m	368.19	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	358.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	353.17	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	348.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	343.17	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	338.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	333.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	328.20	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether

srf	0.02	N/m	323.20	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	318.13	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	373.17	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	308.05	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	303.17	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	298.11	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	293.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	288.19	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	283.20	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	278.19	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	273.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.03	N/m	268.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether

srf	0.03	N/m	263.17	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	298.20	KDB
srf	0.02	N/m	363.19	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether
srf	0.02	N/m	313.18	Surface Tension of Diethyl Ether, Diisopropyl Ether, and Dibutyl Ether

Correlations

Information	Value
Property code	pvap
Equation	$\ln(P_{vp}) = A + B/(T + C)$
Coeff. A	1.53293e+01
Coeff. B	-3.84219e+03
Coeff. C	-5.62840e+01
Temperature range (K), min.	311.72
Temperature range (K), max.	439.82

Datasets

Mass density, kg/m3

Temperature, K - Liquid	Pressure, kPa - Liquid	Mass density, kg/m3 - Liquid
283.15	100.00	777.0
288.15	100.00	772.71
293.15	100.00	768.41
298.15	100.00	764.09
303.15	100.00	759.76
308.15	100.00	755.41
318.15	100.00	746.7

323.15	100.00	742.29
328.15	100.00	737.85
333.15	100.00	733.4
283.15	5000.00	781.24
288.15	5000.00	777.03
293.15	5000.00	772.85
298.15	5000.00	768.6
303.15	5000.00	764.4
308.15	5000.00	760.14
318.15	5000.00	751.63
323.15	5000.00	747.39
328.15	5000.00	743.06
333.15	5000.00	738.78
283.15	10000.00	785.22
288.15	10000.00	781.07
293.15	10000.00	777.07
298.15	10000.00	772.95
303.15	10000.00	768.85
308.15	10000.00	764.73
318.15	10000.00	756.5
323.15	10000.00	752.4
328.15	10000.00	748.22
333.15	10000.00	744.06
283.15	15000.00	789.01
288.15	15000.00	785.0
293.15	15000.00	781.04
298.15	15000.00	777.05
303.15	15000.00	773.07
308.15	15000.00	769.04
318.15	15000.00	761.07
323.15	15000.00	757.08
328.15	15000.00	753.05
333.15	15000.00	749.04
283.15	20000.00	792.62
288.15	20000.00	788.61
293.15	20000.00	784.83
298.15	20000.00	780.93
303.15	20000.00	777.07
308.15	20000.00	773.17
318.15	20000.00	765.43
323.15	20000.00	761.57
328.15	20000.00	757.64
333.15	20000.00	753.72
283.15	25000.00	796.12

288.15	25000.00	792.26
293.15	25000.00	788.51
298.15	25000.00	784.66
303.15	25000.00	780.91
308.15	25000.00	777.08
318.15	25000.00	769.53
323.15	25000.00	765.77
328.15	25000.00	761.95
333.15	25000.00	758.2
283.15	30000.00	799.48
288.15	30000.00	795.67
293.15	30000.00	792.02
298.15	30000.00	788.29
303.15	30000.00	784.58
308.15	30000.00	780.86
318.15	30000.00	773.46
323.15	30000.00	769.82
328.15	30000.00	766.06
333.15	30000.00	762.39
283.15	35000.00	802.7
288.15	35000.00	799.01
293.15	35000.00	795.4
298.15	35000.00	791.72
303.15	35000.00	788.11
308.15	35000.00	784.45
318.15	35000.00	777.24
323.15	35000.00	773.67
328.15	35000.00	770.02
333.15	35000.00	766.45
283.15	40000.00	805.84
288.15	40000.00	802.2
293.15	40000.00	798.65
298.15	40000.00	795.05
303.15	40000.00	791.5
308.15	40000.00	787.91
318.15	40000.00	780.87
323.15	40000.00	777.34
328.15	40000.00	773.78
333.15	40000.00	770.3
283.15	45000.00	808.84
288.15	45000.00	805.31
293.15	45000.00	801.84
298.15	45000.00	798.27
303.15	45000.00	794.77

308.15	45000.00	791.25
318.15	45000.00	784.34
323.15	45000.00	780.89
328.15	45000.00	777.42
333.15	45000.00	773.98
283.15	50000.00	811.78
288.15	50000.00	808.25
293.15	50000.00	804.88
298.15	50000.00	801.34
303.15	50000.00	797.96
308.15	50000.00	794.48
318.15	50000.00	787.7
323.15	50000.00	784.31
328.15	50000.00	780.92
333.15	50000.00	777.5
283.15	55000.00	814.68
288.15	55000.00	811.16
293.15	55000.00	807.8
298.15	55000.00	804.38
303.15	55000.00	801.03
308.15	55000.00	797.62
318.15	55000.00	790.93
323.15	55000.00	787.61
328.15	55000.00	784.25
333.15	55000.00	780.96
283.15	60000.00	817.42
288.15	60000.00	814.04
293.15	60000.00	810.68
298.15	60000.00	807.34
303.15	60000.00	804.04
308.15	60000.00	800.63
318.15	60000.00	794.06
323.15	60000.00	790.8
328.15	60000.00	787.5
333.15	60000.00	784.27
283.15	65000.00	820.1
288.15	65000.00	816.76
293.15	65000.00	813.46
298.15	65000.00	810.16
303.15	65000.00	806.89
308.15	65000.00	803.58
318.15	65000.00	797.14
323.15	65000.00	793.92
328.15	65000.00	790.65

333.15

65000.00

787.49

Reference

<https://www.doi.org/10.1016/j.fluid.2016.02.009>

Temperature, K	Pressure, kPa	Mass density, kg/m3
298.15	100.00	763.8
298.15	1000.00	764.7
298.15	5000.00	768.2
298.15	10000.00	772.4
298.15	15000.00	776.4
298.15	20000.00	780.2
298.15	25000.00	783.7
298.15	30000.00	787.3
298.15	35000.00	790.6
298.15	40000.00	793.8
298.15	45000.00	796.9
298.15	50000.00	799.8
298.15	55000.00	802.8
298.15	60000.00	805.6
298.15	65000.00	808.3
298.15	70000.00	811.0
298.15	80000.00	816.1
298.15	90000.00	821.0
298.15	100000.00	825.5
298.15	110000.00	830.0
298.15	120000.00	834.2
298.15	130000.00	838.3
298.15	140000.00	842.1
313.15	100.00	750.7
313.15	1000.00	751.6
313.15	5000.00	755.6
313.15	10000.00	760.1
313.15	15000.00	764.5
313.15	20000.00	768.6
313.15	25000.00	772.3
313.15	30000.00	776.2
313.15	35000.00	779.7
313.15	40000.00	783.1
313.15	45000.00	786.4
313.15	50000.00	789.7
313.15	55000.00	792.7
313.15	60000.00	795.7
313.15	65000.00	798.6

313.15	70000.00	801.4
313.15	80000.00	806.7
313.15	90000.00	811.9
313.15	100000.00	816.7
313.15	110000.00	821.4
313.15	120000.00	825.7
313.15	130000.00	830.1
313.15	140000.00	834.2
333.15	100.00	733.0
333.15	1000.00	734.0
333.15	5000.00	738.5
333.15	10000.00	743.6
333.15	15000.00	748.6
333.15	20000.00	753.1
333.15	25000.00	757.5
333.15	30000.00	761.5
333.15	35000.00	765.5
333.15	40000.00	769.2
333.15	45000.00	772.7
333.15	50000.00	776.2
333.15	55000.00	779.6
333.15	60000.00	782.7
333.15	65000.00	785.8
333.15	70000.00	788.8
333.15	80000.00	794.6
333.15	90000.00	800.0
333.15	100000.00	805.2
333.15	110000.00	810.0
333.15	120000.00	814.7
333.15	130000.00	819.3
333.15	140000.00	823.5
353.15	100.00	715.0
353.15	1000.00	716.2
353.15	5000.00	721.3
353.15	10000.00	727.2
353.15	15000.00	732.7
353.15	20000.00	737.8
353.15	25000.00	742.6
353.15	30000.00	747.1
353.15	35000.00	751.4
353.15	40000.00	755.4
353.15	45000.00	759.3
353.15	50000.00	763.0
353.15	55000.00	766.6

353.15	60000.00	770.1
353.15	65000.00	773.4
353.15	70000.00	776.7
353.15	80000.00	782.7
353.15	90000.00	788.5
353.15	100000.00	794.0
353.15	110000.00	799.2
353.15	120000.00	804.0
353.15	130000.00	808.7
353.15	140000.00	813.3
373.15	1000.00	697.9
373.15	5000.00	703.8
373.15	10000.00	710.5
373.15	15000.00	716.7
373.15	20000.00	722.4
373.15	25000.00	727.7
373.15	30000.00	732.7
373.15	35000.00	737.4
373.15	40000.00	741.9
373.15	45000.00	746.1
373.15	50000.00	750.0
373.15	55000.00	754.0
373.15	60000.00	757.7
373.15	65000.00	761.2
373.15	70000.00	764.6
373.15	80000.00	771.2
373.15	90000.00	777.3
373.15	100000.00	783.0
373.15	110000.00	788.5
373.15	120000.00	793.6
373.15	130000.00	798.6
373.15	140000.00	803.3
393.15	1000.00	679.0
393.15	5000.00	685.9
393.15	10000.00	693.5
393.15	15000.00	700.6
393.15	20000.00	706.9
393.15	25000.00	712.8
393.15	30000.00	718.3
393.15	35000.00	723.5
393.15	40000.00	728.3
393.15	45000.00	732.8
393.15	50000.00	737.2
393.15	55000.00	741.4

393.15	60000.00	745.3
393.15	65000.00	749.1
393.15	70000.00	752.8
393.15	80000.00	759.7
393.15	90000.00	766.2
393.15	100000.00	772.3
393.15	110000.00	778.1
393.15	120000.00	783.4
393.15	130000.00	788.6
393.15	140000.00	793.6

Reference

<https://www.doi.org/10.1016/j.jct.2018.11.010>

Temperature, K	Pressure, kPa	Mass density, kg/m3
293.15	100.00	768.0
293.15	10000.00	776.4
293.15	20000.00	783.9
293.15	30000.00	790.8
293.15	40000.00	797.2
293.15	50000.00	803.2
293.15	60000.00	808.7
293.15	70000.00	814.0
293.15	80000.00	819.1
293.15	90000.00	823.8
293.15	100000.00	828.6
293.15	110000.00	832.8
293.15	120000.00	837.0
293.15	130000.00	841.0
293.15	140000.00	844.9
313.15	100.00	750.5
313.15	10000.00	759.8
313.15	20000.00	768.1
313.15	30000.00	775.9
313.15	40000.00	782.8
313.15	50000.00	789.4
313.15	60000.00	795.4
313.15	70000.00	801.5
313.15	80000.00	806.8
313.15	90000.00	812.0
313.15	100000.00	816.7
313.15	110000.00	821.4
313.15	120000.00	825.9
313.15	130000.00	830.2

313.15	140000.00	834.3
333.15	100.00	733.5
333.15	10000.00	744.1
333.15	20000.00	753.5
333.15	30000.00	761.9
333.15	40000.00	769.5
333.15	50000.00	776.6
333.15	60000.00	783.1
333.15	70000.00	789.2
333.15	80000.00	795.0
333.15	90000.00	800.7
333.15	100000.00	805.7
333.15	110000.00	810.5
333.15	120000.00	814.7
333.15	130000.00	819.4
333.15	140000.00	823.7
353.15	100.00	715.1
353.15	10000.00	727.2
353.15	20000.00	737.8
353.15	30000.00	747.1
353.15	40000.00	755.5
353.15	50000.00	763.2
353.15	60000.00	770.2
353.15	70000.00	776.4
353.15	80000.00	782.7
353.15	90000.00	788.4
353.15	100000.00	794.0
353.15	110000.00	799.2
353.15	120000.00	804.2
353.15	130000.00	808.6
353.15	140000.00	813.3
373.15	100.00	696.4
373.15	10000.00	710.3
373.15	20000.00	722.3
373.15	30000.00	732.8
373.15	40000.00	741.8
373.15	50000.00	750.1
373.15	60000.00	757.6
373.15	70000.00	764.7
373.15	80000.00	771.1
373.15	90000.00	777.2
373.15	100000.00	783.0
373.15	110000.00	788.6
373.15	120000.00	793.5

373.15	130000.00	798.5
373.15	140000.00	803.1
393.15	100.00	677.3
393.15	10000.00	693.9
393.15	20000.00	707.3
393.15	30000.00	718.4
393.15	40000.00	728.7
393.15	50000.00	737.2
393.15	60000.00	745.3
393.15	70000.00	752.8
393.15	80000.00	759.9
393.15	90000.00	766.2
393.15	100000.00	772.2
393.15	110000.00	778.1
393.15	120000.00	783.4
393.15	130000.00	788.6
393.15	140000.00	793.5

Reference

<https://www.doi.org/10.1021/je101286a>

Thermal conductivity, W/m/K

Temperature, K - Liquid	Pressure, kPa - Liquid	Thermal conductivity, W/m/K - Liquid
235.96	30000.00	0.1494
236.06	20000.00	0.1463
236.17	10100.00	0.1432
236.22	200.00	0.1403
236.40	20100.00	0.1462
236.55	20100.00	0.1464
236.56	5100.00	0.1418
236.58	10000.00	0.1432
236.62	200.00	0.1406
236.87	10100.00	0.1432
236.88	30100.00	0.1491
236.95	200.00	0.1402
236.96	5000.00	0.1414
237.10	5000.00	0.1419
237.29	30000.00	0.1488
254.45	30100.00	0.1455
254.65	10000.00	0.1394
254.73	5100.00	0.1379

254.84	30000.00	0.1460
254.85	10000.00	0.1400
254.96	20000.00	0.1429
255.01	5100.00	0.1384
255.03	10000.00	0.1402
255.06	200.00	0.1367
255.11	200.00	0.1368
255.11	20000.00	0.1431
255.35	30000.00	0.1456
255.36	5100.00	0.1379
255.45	200.00	0.1364
255.78	20000.00	0.1430
274.66	200.00	0.1316
274.78	10100.00	0.1352
274.84	200.00	0.1310
274.92	5000.00	0.1323
274.96	30400.00	0.1413
275.06	10200.00	0.1352
275.08	5200.00	0.1330
275.12	30100.00	0.1413
275.27	20300.00	0.1384
275.31	20000.00	0.1384
275.38	30200.00	0.1414
275.44	200.00	0.1312
275.50	10000.00	0.1346
275.56	5100.00	0.1324
275.87	20100.00	0.1380
294.81	10200.00	0.1306
294.81	20000.00	0.1344
294.96	30000.00	0.1383
295.02	30100.00	0.1378
295.03	5100.00	0.1281
295.07	10000.00	0.1299
295.13	5200.00	0.1284
295.17	200.00	0.1260
295.17	5000.00	0.1276
295.29	20000.00	0.1351
295.37	10000.00	0.1302
295.55	30000.00	0.1384
295.56	200.00	0.1266
295.78	20000.00	0.1347
295.95	200.00	0.1262
314.68	20000.00	0.1286
314.87	200.00	0.1201

314.97	30100.00	0.1326
315.00	20000.00	0.1285
315.10	5000.00	0.1219
315.16	10100.00	0.1246
315.16	30100.00	0.1326
315.21	200.00	0.1203
315.32	20000.00	0.1289
315.45	30000.00	0.1327
315.55	200.00	0.1200
315.55	10000.00	0.1245
315.63	5100.00	0.1223
315.95	10000.00	0.1250
315.97	5000.00	0.1218
334.91	200.00	0.1145
334.94	20000.00	0.1240
335.00	9900.00	0.1191
335.18	200.00	0.1142
335.28	20000.00	0.1241
335.29	5000.00	0.1168
335.31	10100.00	0.1197
335.41	30000.00	0.1280
335.59	200.00	0.1147
335.64	30100.00	0.1286
335.69	5000.00	0.1173
335.74	10100.00	0.1191
335.74	20000.00	0.1245
335.74	30000.00	0.1288
336.14	5100.00	0.1174
354.90	20100.00	0.1196
354.98	30000.00	0.1232
355.04	200.00	0.1083
355.04	20000.00	0.1195
355.09	5200.00	0.1114
355.19	10300.00	0.1145
355.24	30000.00	0.1229
355.28	10200.00	0.1142
355.34	5300.00	0.1118
355.47	30000.00	0.1231
355.56	20000.00	0.1190
355.63	200.00	0.1081
355.69	5200.00	0.1113
355.73	10100.00	0.1147
356.48	200.00	0.1087
374.72	200.00	0.1025

374.90	30000.00	0.1186
374.98	5000.00	0.1054
374.99	30000.00	0.1183
375.00	200.00	0.1024
375.15	20000.00	0.1134
375.25	200.00	0.1024
375.25	5000.00	0.1049
375.26	10000.00	0.1088
375.52	20000.00	0.1128
375.58	10000.00	0.1082
375.70	5000.00	0.1055
375.95	30000.00	0.1198
375.97	20000.00	0.1141
376.07	10000.00	0.1085

Reference

<https://www.doi.org/10.1021/je900615b>

Viscosity, Pa*s

Temperature, K - Liquid	Pressure, kPa - Liquid	Viscosity, Pa*s - Liquid
243.15	100.00	0.0017336
243.15	4800.00	0.0018358
243.15	10290.00	0.0019540
243.15	15700.00	0.0020834
243.15	21120.00	0.0022209
253.15	100.00	0.0013786
253.15	4550.00	0.0014481
253.15	9650.00	0.0015396
253.15	14760.00	0.0016238
253.15	19760.00	0.0017160
263.15	100.00	0.0011256
263.15	4650.00	0.0011828
263.15	10000.00	0.0012560
263.15	15290.00	0.0013321
263.15	20520.00	0.0014037
273.15	100.00	0.0009420
273.15	4810.00	0.0009913
273.15	10200.00	0.0010492
273.15	15570.00	0.0011091
273.15	20870.00	0.0011706
283.15	100.00	0.0008032

283.15	4780.00	0.0008437
283.15	10150.00	0.0008898
283.15	15580.00	0.0009423
283.15	20830.00	0.0009923
293.15	100.00	0.0006906
293.15	4750.00	0.0007263
293.15	10180.00	0.0007684
293.15	15470.00	0.0008120
293.15	20760.00	0.0008546
303.15	100.00	0.0006080
303.15	4500.00	0.0006386
303.15	9570.00	0.0006735
303.15	14530.00	0.0007081
303.15	19670.00	0.0007436
313.15	100.00	0.0005388
313.15	4510.00	0.0005648
313.15	9600.00	0.0005966
313.15	14650.00	0.0006282
313.15	19640.00	0.0006571
323.15	100.00	0.0004805
323.15	4510.00	0.0005061
323.15	9570.00	0.0005306
323.15	14630.00	0.0005608
323.15	19600.00	0.0005900
333.15	100.00	0.0004326
333.15	4490.00	0.0004553
333.15	9580.00	0.0004806
333.15	14630.00	0.0005061
333.15	19620.00	0.0005317
343.15	100.00	0.0003914
343.15	4640.00	0.0004120
343.15	9640.00	0.0004352
343.15	14730.00	0.0004581
343.15	19730.00	0.0004822
353.15	100.00	0.0003538
353.15	4510.00	0.0003738
353.15	9570.00	0.0003945
353.15	14640.00	0.0004166
353.15	19630.00	0.0004373
363.15	100.00	0.0003236
363.15	4510.00	0.0003413
363.15	9720.00	0.0003622
363.15	15300.00	0.0003835
363.15	21100.00	0.0004070

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<https://www.doi.org/10.1016/j.jct.2018.07.024>

<https://www.doi.org/10.1021/je8005369>

<https://www.doi.org/10.1016/j.fluid.2017.12.029>

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<https://www.doi.org/10.1016/j.fluid.2019.03.038>

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<https://www.doi.org/10.1021/ja100010x>

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<https://www.mdpi.org/10.1016/j.jcta.2019.05.001>

Legend

af:	Acentric Factor
affp:	Proton affinity
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
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
kvisc:	Kinematic viscosity
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
rfi:	Refractive Index
rho:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
speedsl:	Speed of sound in fluid
srf:	Surface Tension
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tcondl:	Liquid thermal conductivity
tf:	Normal melting (fusion) point
vc:	Critical Volume

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