Oxygen

Other names:	Dioxygen
	Liquid oxygen
	Molecular oxygen
	O2
	Oxygen molecule
	Pure oxygen
	UN 1072
	UN 1073
Inchi:	InChI=1S/O2/c1-2
InchiKey:	MYMOFIZGZYHOMD-UHFFFAOYSA-N
Formula:	O2
SMILES:	O=O
Mol. weight [g/mol]:	32.00
CAS:	7782-44-7

Physical Properties

Property code	Value	Unit	Source
af	0.0250		KDB
affp	421.00 ± 3.00	kJ/mol	NIST Webbook
affp	421.00	kJ/mol	NIST Webbook
basg	396.30	kJ/mol	NIST Webbook
dm	0.00	debye	KDB
ea	1.10 ± 0.10	eV	NIST Webbook
ea	0.45 ± 0.01	eV	NIST Webbook
ea	0.45 ± 0.02	eV	NIST Webbook
ea	0.73	eV	NIST Webbook
ea	1.27 ± 0.20	eV	NIST Webbook
ea	0.56 ± 0.10	eV	NIST Webbook
ea	0.48	eV	NIST Webbook
ea	0.15 ± 0.05	eV	NIST Webbook
ea	0.45 ± 0.01	eV	NIST Webbook
ea	0.44 ± 0.01	eV	NIST Webbook
ea	0.45 ± 0.10	eV	NIST Webbook
ea	0.44 ± 0.10	eV	NIST Webbook
ea	0.40 ± 0.10	eV	NIST Webbook
ea	0.43 ± 0.02	eV	NIST Webbook
ea	0.50 ± 0.10	eV	NIST Webbook

ea	0.43 ± 0.03	eV	NIST Webbook
ea	0.46 ± 0.05	eV	NIST Webbook
ea	0.45 ± 0.05	eV	NIST Webbook
ea	0.50 ± 0.20	eV	NIST Webbook
ea	1.12 ± 0.07	eV	NIST Webbook
gf	-447.78	kJ/mol	Joback Method
gyrad	0.6040		KDB
hf	-426.93	kJ/mol	Joback Method
hfus	6.37	kJ/mol	Joback Method
hvap	27.12	kJ/mol	Joback Method
ie	12.06 ± 0.00	eV	NIST Webbook
ie	12.20 ± 0.20	eV	NIST Webbook
ie	12.06 ± 0.00	eV	NIST Webbook
ie	12.08 ± 0.01	eV	NIST Webbook
ie	12.07 ± 0.01	eV	NIST Webbook
ie	12.13	eV	NIST Webbook
ie	12.08 ± 0.01	eV	NIST Webbook
ie	12.00 ± 0.50	eV	NIST Webbook
ie	12.08	eV	NIST Webbook
ie	12.08	eV	NIST Webbook
ie	12.30	eV	NIST Webbook
ie	12.07 ± 0.00	eV	NIST Webbook
ie	12.07 ± 0.00	eV	NIST Webbook
ie	12.33 ± 0.01	eV	NIST Webbook
ie	12.80 ± 0.50	eV	NIST Webbook
ie	12.00 ± 1.00	eV	NIST Webbook
ie	12.07 ± 0.01	eV	NIST Webbook
ie	12.07	eV	NIST Webbook
ie	12.07 ± 0.00	eV	NIST Webbook
ie	12.10 ± 0.10	eV	NIST Webbook
ie	12.08 ± 0.00	eV	NIST Webbook
log10ws	-0.95		Crippen Method
logp	0.067		Crippen Method
mcvol	18.300	ml/mol	McGowan Method
pc	4985.19 ± 30.39	kPa	NIST Webbook
pc	4992.28 ± 30.39	kPa	NIST Webbook
pc	5043.00 ± 0.50	kPa	NIST Webbook
pc	5003.43 ± 30.39	kPa	NIST Webbook
pc	5043.00	kPa	KDB
pt	0.15	kPa	KDB
rhoc	435.18 ± 0.45	kg/m3	NIST Webbook
sgb	205.15 ± 0.01	J/mol×K	NIST Webbook
tb	90.20 ± 0.20	K	NIST Webbook
tb	90.20	K	KDB

tc	154.59	K	KDB
tc	154.58 ± 0.00	K	NIST Webbook
tc	154.58 ± 0.00	K	NIST Webbook
tc	155.15 ± 0.30	K	NIST Webbook
tf	54.80 ± 0.20	K	NIST Webbook
tf	54.36	K	KDB
tt	54.33 ± 0.06	K	NIST Webbook
tt	54.36	K	KDB
vc	0.073	m3/kmol	KDB
zc	0.2864140		KDB
zra	0.29		KDB

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	21.37	J/mol×K	289.79	Joback Method
cpg	11.77	J/mol×K	195.80	Joback Method
cpg	14.04	J/mol×K	214.60	Joback Method
cpg	16.12	J/mol×K	233.40	Joback Method
cpg	18.04	J/mol×K	252.20	Joback Method
cpg	19.78	J/mol×K	270.99	Joback Method
cpg	9.31	J/mol×K	177.00	Joback Method
dvisc	0.0114021	Pa×s	126.66	Joback Method
dvisc	0.0078823	Pa×s	135.05	Joback Method
dvisc	0.0056896	Pa×s	143.44	Joback Method
dvisc	0.0042575	Pa×s	151.83	Joback Method
dvisc	0.0032841	Pa×s	160.22	Joback Method
dvisc	0.0021038	Pa×s	177.00	Joback Method
dvisc	0.0025996	Pa×s	168.61	Joback Method
hvapt	9.26	kJ/mol	30.50	Measurements of enthalpy of sublimation of Ne, N2, O2, Ar, CO2, Kr, Xe, and H2O using a double paddle oscillator
rhol	1149.00	kg/m3	90.00	KDB
srf	0.02	N/m	80.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension

srf	0.01	N/m	90.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension
srf	0.01	N/m	100.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension
srf	0.01	N/m	115.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension
srf	0.01	N/m	120.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension
srf	0.01	N/m	124.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension
srf	0.00	N/m	128.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension
srf	0.00	N/m	132.00	The liquid gas interface of oxygen nitrogen solutions 1. Surface tension

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.37279e+01
Coeff. B	-7.81059e+02
Coeff. C	-4.45000e+00
Temperature range (K), min.	54.35
Temperature range (K), max.	154.58

Datasets

Speed of sound, m/s

Temperature, K - Fluid (supercritical or subcritical phases)	Pressure, kPa - Fluid (supercritical or subcritical phases)	Speed of sound, m/s - Fluid (supercritical or subcritical phases)
499.03	4920.00	434.71
399.09	4960.00	388.03
499.03	5910.00	436.52
449.94	6010.00	414.33
399.09	6020.00	389.77
499.03	7820.00	440.23
399.09	7950.00	393.26
449.95	8010.00	418.16
349.98	8030.00	367.01
299.97	9920.00	340.22
449.94	9970.00	422.01
399.11	9980.00	397.34
498.94	10000.00	444.64
349.99	10070.00	370.9
299.96	14860.00	352.65
499.02	14940.00	455.31
349.99	14980.00	382.53
449.94	15000.00	433.26
399.10	15010.00	408.72
349.99	19640.00	396.03
399.06	19900.00	421.58
449.94	20010.00	445.6
299.97	20050.00	370.99
499.04	20070.00	467.39
499.01	24900.00	479.52
449.94	24940.00	458.85
349.99	24980.00	414.2
399.09	25010.00	436.72
299.97	25030.00	392.82
399.09	29900.00	452.47
499.00	29910.00	492.81
299.97	29960.00	417.33
349.98	29990.00	433.29

449.94	30000.00	473.4
499.00	34730.00	506.11
399.08	34890.00	469.6
299.97	34960.00	443.87
449.93	35030.00	488.6
349.99	35080.00	454.09
299.97	39960.00	471.2
399.08	39970.00	487.82
498.99	40010.00	521.13
449.93	40050.00	504.35
350.03	40050.00	475.39
499.00	44900.00	535.41
399.08	44980.00	506.29
349.99	45020.00	497.15
299.97	45030.00	498.92
449.94	45090.00	520.58
349.98	49900.00	518.73
449.94	49910.00	536.52
499.03	49930.00	550.29
299.97	50010.00	525.82
399.09	50090.00	525.43
499.03	54810.00	564.89
399.08	54970.00	543.88
449.90	55090.00	553.54
349.99	55110.00	541.66
299.97	55140.00	552.86
349.99	59910.00	562.59
498.89	60010.00	580.54
449.90	60070.00	570.12
399.08	60070.00	563.14
299.97	60160.00	578.47
399.08	64900.00	581.28
350.03	64930.00	584.11
299.97	64960.00	602.28
498.89	65000.00	595.63
449.89	65180.00	587.16
349.99	68690.00	600.07
299.97	69690.00	624.95
498.83	69940.00	610.55
399.08	70100.00	600.65
449.89	70120.00	603.58
300.00	74030.00	645.07
399.07	74590.00	617.2
498.91	74960.00	625.69

449.88	75270.00	620.61
349.98	78850.00	641.85
399.07	79990.00	636.78
498.92	79990.00	640.74
449.87	80010.00	636.12
399.05	83180.00	648.15
498.93	84890.00	655.27
449.88	85020.00	652.33
449.79	87520.00	660.32
449.95	88050.00	662.01
498.91	90000.00	670.28
498.90	95000.00	684.96
498.91	100060.00	699.53

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Legend

af:	Acentric Factor
affp:	Proton affinity
basg:	Gas basicity
cpg:	Ideal gas heat capacity
dm:	Dipole Moment
dvisc:	Dynamic viscosity
ea:	Electron affinity
gf:	Standard Gibbs free energy of formation
gyrad:	Radius of Gyration
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
ie:	Ionization energy
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure
pt:	Triple Point Pressure
pvap:	Vapor pressure
rhoc:	Critical density

rhol:	Liquid Density
sgb:	Molar entropy at standard conditions (1 bar)
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
zc:	Critical Compressibility
zra:	Rackett Parameter