

# Urea, tetramethyl-

<b>Other names:</b>	((CH <sub>3</sub> ) <sub>2</sub> N) <sub>2</sub> CO 1,1,3,3-Tetramethylurea N,N,N',N'-Tetramethylurea NSC 91488 TMU Temur Tetramethylurea Tetramethyluree Urea, 1,1,3,3-tetramethyl- Urea, N,N,N',N'-tetramethyl- urea, tetramethyl
<b>Inchi:</b>	InChI=1S/C5H12N2O/c1-6(2)5(8)7(3)4/h1-4H3
<b>InchiKey:</b>	AVQQQNCBBIEMEU-UHFFFAOYSA-N
<b>Formula:</b>	C <sub>5</sub> H <sub>12</sub> N <sub>2</sub> O
<b>SMILES:</b>	CN(C)C(=O)N(C)C
<b>Mol. weight [g/mol]:</b>	116.16
<b>CAS:</b>	632-22-4

## Physical Properties

Property code	Value	Unit	Source
affp	930.60	kJ/mol	NIST Webbook
basg	899.60	kJ/mol	NIST Webbook
chl	-3420.36 ± 0.81	kJ/mol	NIST Webbook
gf	83.86	kJ/mol	Joback Method
hf	-205.60 ± 1.10	kJ/mol	NIST Webbook
hfl	-262.20 ± 1.10	kJ/mol	NIST Webbook
hfus	16.35	kJ/mol	Joback Method
hvap	56.60 ± 0.80	kJ/mol	NIST Webbook
ie	8.64	eV	NIST Webbook
ie	8.74 ± 0.05	eV	NIST Webbook
ie	8.67	eV	NIST Webbook
log10ws	0.94		Aqueous Solubility Prediction Method
log10ws	0.94		Estimated Solubility Method
logp	0.230		Crippen Method
mcvol	102.840	ml/mol	McGowan Method

pc	3722.56	kPa	Joback Method
tb	449.70	K	NIST Webbook
tc	567.86	K	Joback Method
tf	272.05	K	Aqueous Solubility Prediction Method
tf	272.00 ± 0.10	K	NIST Webbook
tf	272.20 ± 0.10	K	NIST Webbook
tt	270.48 ± 0.02	K	NIST Webbook
vc	0.357	m <sup>3</sup> /kmol	Joback Method

## Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	255.33	J/mol×K	567.86	Joback Method
cpg	237.32	J/mol×K	509.42	Joback Method
cpg	227.61	J/mol×K	480.21	Joback Method
cpg	217.40	J/mol×K	450.99	Joback Method
cpg	206.67	J/mol×K	421.77	Joback Method
cpg	195.42	J/mol×K	392.55	Joback Method
cpg	246.56	J/mol×K	538.64	Joback Method
cpl	241.20	J/mol×K	320.00	NIST Webbook
hfust	13.40	kJ/mol	272.20	NIST Webbook
hfust	13.40	kJ/mol	272.20	NIST Webbook
hfust	13.40	kJ/mol	272.20	NIST Webbook
hfust	14.00	kJ/mol	272.10	NIST Webbook
hfust	13.40	kJ/mol	272.20	NIST Webbook
hvapt	52.20	kJ/mol	385.00	NIST Webbook
hvapt	41.70	kJ/mol	385.00	NIST Webbook
rho1	962.04	kg/m <sup>3</sup>	298.15	Volume-related interaction parameters for dilute solutions of tetramethylurea in normal and heavy water between 278.15 K and 318.15 K
rho1	971.20	kg/m <sup>3</sup>	288.15	Volume-related interaction parameters for dilute solutions of tetramethylurea in normal and heavy water between 278.15 K and 318.15 K

rho1	943.62	kg/m3	318.15	Solutions of Urea and Tetramethylurea in Formamide and Water: A Comparative Analysis of Volume Characteristics and Solute-Solute Interaction Parameters at Temperatures from 288.15 to 328.15 K and Ambient Pressure
rho1	952.85	kg/m3	308.15	Solutions of Urea and Tetramethylurea in Formamide and Water: A Comparative Analysis of Volume Characteristics and Solute-Solute Interaction Parameters at Temperatures from 288.15 to 328.15 K and Ambient Pressure
rho1	962.05	kg/m3	298.15	Solutions of Urea and Tetramethylurea in Formamide and Water: A Comparative Analysis of Volume Characteristics and Solute-Solute Interaction Parameters at Temperatures from 288.15 to 328.15 K and Ambient Pressure

rho1	971.22	kg/m3	288.15	Solutions of Urea and Tetramethylurea in Formamide and Water: A Comparative Analysis of Volume Characteristics and Solute-Solute Interaction Parameters at Temperatures from 288.15 to 328.15 K and Ambient Pressure
rho1	967.00	kg/m3	293.15	Investigation of the Solubilities of Carbon Dioxide in Some Low Volatile Solvents and Their Thermodynamic Properties
rho1	943.62	kg/m3	318.15	Volume-related interaction parameters for dilute solutions of tetramethylurea in normal and heavy water between 278.15 K and 318.15 K
rho1	952.84	kg/m3	308.15	Volume-related interaction parameters for dilute solutions of tetramethylurea in normal and heavy water between 278.15 K and 318.15 K
rho1	980.34	kg/m3	278.15	Volume-related interaction parameters for dilute solutions of tetramethylurea in normal and heavy water between 278.15 K and 318.15 K

rho1	934.38	kg/m3	328.15	Volume-related solvation and pair interaction parameters for dilute solutions of urea and tetramethylurea in ethylene glycol between 288.15 K and 328.15 K: A comparative analysis
rho1	943.65	kg/m3	318.15	Volume-related solvation and pair interaction parameters for dilute solutions of urea and tetramethylurea in ethylene glycol between 288.15 K and 328.15 K: A comparative analysis
rho1	952.88	kg/m3	308.15	Volume-related solvation and pair interaction parameters for dilute solutions of urea and tetramethylurea in ethylene glycol between 288.15 K and 328.15 K: A comparative analysis
rho1	962.07	kg/m3	298.15	Volume-related solvation and pair interaction parameters for dilute solutions of urea and tetramethylurea in ethylene glycol between 288.15 K and 328.15 K: A comparative analysis

rhoI	934.35	kg/m <sup>3</sup>	328.15	Solutions of Urea and Tetramethylurea in Formamide and Water: A Comparative Analysis of Volume Characteristics and Solute-Solute Interaction Parameters at Temperatures from 288.15 to 328.15 K and Ambient Pressure
rhoI	971.23	kg/m <sup>3</sup>	288.15	Volume-related solvation and pair interaction parameters for dilute solutions of urea and tetramethylurea in ethylene glycol between 288.15 K and 328.15 K: A comparative analysis
sfust	49.20	J/mol×K	272.20	NIST Webbook
sfust	49.20	J/mol×K	272.20	NIST Webbook
speedsl	1374.53	m/s	303.15	Effect of temperature and ionic strength on volumetric and acoustic properties of solutions of urea alkyl derivatives in aqueous NaCl
speedsl	1393.92	m/s	298.15	Effect of temperature and ionic strength on volumetric and acoustic properties of solutions of urea alkyl derivatives in aqueous NaCl
speedsl	1413.44	m/s	293.15	Effect of temperature and ionic strength on volumetric and acoustic properties of solutions of urea alkyl derivatives in aqueous NaCl

speedsl	1397.60	m/s	298.15	Volumetric and compressibility properties of liquid water as a solute in glycolic, propylene carbonate, and tetramethylurea solutions at T = 298.15 K
speedsl	1355.31	m/s	308.15	Effect of temperature and ionic strength on volumetric and acoustic properties of solutions of urea alkyl derivatives in aqueous NaCl
speedsl	1432.53	m/s	288.15	Effect of temperature and ionic strength on volumetric and acoustic properties of solutions of urea alkyl derivatives in aqueous NaCl

## Correlations

Information	Value
Property code	pvap
Equation	$\ln(P_{vp}) = A + B/(T + C)$
Coeff. A	1.20526e+01
Coeff. B	-3.16454e+03
Coeff. C	-6.47090e+01
Temperature range (K), min.	293.85
Temperature range (K), max.	534.14

## Sources

- Volume-related interaction parameters for dilute solutions of tetramethylurea in formic acid and heavy water between 278.15 K and 318.15 K: The Yaws Handbook of Vapor Pressure: Enthalpy-related interaction parameters in H/D isotopically distinguishable aqueous solutions of tetramethylurea cyclic derivatives at 298.15 K: <https://www.doi.org/10.1016/j.tca.2009.12.008>
- [http://pubs.acs.org/doi/suppl/10.1021/ci034243x/suppl\\_file/ci034243xsi20040112\\_053635.txt](http://pubs.acs.org/doi/suppl/10.1021/ci034243x/suppl_file/ci034243xsi20040112_053635.txt)
- <https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure>
- <https://www.doi.org/10.1016/j.tca.2011.05.019>
- <http://webbook.nist.gov/cgi/cbook.cgi?ID=C632224&Units=SI>

Volumetric and compressibility properties of liquid water as a solute in glycerol, propylene carbonate, and ethylene carbonate at 28.15 K and 28.15 K. *J. Chem. Eng. Data* 2007, 52, 13-15

Properties of solutions of urea alkyl derivatives in aqueous NaCl: Thermal Expansion and Structure of 1,3-Dimethylurea, Tetramethylurea, and Tetraethylurea. *J. Chem. Eng. Data* 2015, 60, 11-15

McGowan Method: Aqueous Solutions Derived from Density Measurements: *J. Chem. Eng. Data* 2012, 57, 11-15

<https://www.doi.org/10.1016/j.jct.2007.05.010>

<https://www.doi.org/10.1016/j.jct.2015.07.002>

<http://pubs.acs.org/doi/abs/10.1021/ci9903071>

<https://www.doi.org/10.1021/je900164a>

<http://onschallenge.wikispaces.com/file/view/AqueousDataset002.xlsx/351826032/AqueousDataset002.xlsx>

<http://link.springer.com/article/10.1007/BF02311772>

<https://www.doi.org/10.1016/j.jct.2012.11.007>

<https://www.doi.org/10.1016/j.jct.2019.04.009>

<https://www.doi.org/10.1016/j.jct.2016.05.004>

[https://en.wikipedia.org/wiki/Joback\\_method](https://en.wikipedia.org/wiki/Joback_method)

<https://www.doi.org/10.1021/acs.jced.5b00893>

<https://www.doi.org/10.1021/acs.jced.9b00794>

Densimetric and ultrasonic characterization of urea and its derivatives in water: Volume-related solvation and pair interaction parameters for dilute solutions and the thermodynamic properties of urea. *J. Chem. Eng. Data* 2019, 64, 11-15

Solubility and thermodynamic properties of CO<sub>2</sub> between 288 K and 328.15 K: A comparative analysis: *J. Chem. Eng. Data* 2019, 64, 11-15

Investigation of the Solubilities of Carbon Dioxide in Some Low Volatile Solvents of Urea and Dimethylurea in Formamide and Water: A Comparative Analysis of Volume Characteristics and Solute-Solute Interaction Parameters at Temperatures from 288.15 to 328.15 K and Ambient Pressure. *J. Chem. Eng. Data* 2019, 64, 11-15

## Legend

<b>affp:</b>	Proton affinity
<b>basg:</b>	Gas basicity
<b>chl:</b>	Standard liquid enthalpy of combustion
<b>cpg:</b>	Ideal gas heat capacity
<b>cpl:</b>	Liquid phase heat capacity
<b>gf:</b>	Standard Gibbs free energy of formation
<b>hf:</b>	Enthalpy of formation at standard conditions
<b>hfl:</b>	Liquid phase enthalpy of formation at standard conditions
<b>hfus:</b>	Enthalpy of fusion at standard conditions
<b>hfust:</b>	Enthalpy of fusion at a given temperature
<b>hvap:</b>	Enthalpy of vaporization at standard conditions
<b>hvapt:</b>	Enthalpy of vaporization at a given temperature
<b>ie:</b>	Ionization energy
<b>log10ws:</b>	Log10 of Water solubility in mol/l
<b>logp:</b>	Octanol/Water partition coefficient
<b>mcvol:</b>	McGowan's characteristic volume
<b>pc:</b>	Critical Pressure
<b>pvap:</b>	Vapor pressure
<b>rho:</b>	Liquid Density
<b>sfust:</b>	Entropy of fusion at a given temperature
<b>speedsl:</b>	Speed of sound in fluid
<b>tb:</b>	Normal Boiling Point Temperature
<b>tc:</b>	Critical Temperature
<b>tf:</b>	Normal melting (fusion) point
<b>tt:</b>	Triple Point Temperature
<b>vc:</b>	Critical Volume



Latest version available from:

<https://www.cheméo.com/cid/61-026-5/Urea-tetramethyl.pdf>

Generated by Cheméo on 2024-04-27 04:34:35.578987996 +0000 UTC m=+16481724.499565308.

Cheméo (<https://www.cheméo.com>) is the biggest free database of chemical and physical data for the process industry.