1,9-Diaminononane

Other names:	1,9-Diaminonane
	1,9-Nonamethylenediamine
	1,9-Nonanediamine
	Nonamethylenediamine
Inchi:	InChI=1S/C9H22N2/c10-8-6-4-2-1-3-5-7-9-11/h1-11H2
InchiKey:	SXJVFQLYZSNZBT-UHFFFAOYSA-N
Formula:	C9H22N2
SMILES:	NCCCCCCCCCN
Mol. weight [g/mol]:	158.28
CAS:	646-24-2

Physical Properties

Property code	Value	Unit	Source
basg	946.00 ± 21.00	kJ/mol	NIST Webbook
gf	157.80	kJ/mol	Joback Method
hf	-161.51	kJ/mol	Joback Method
hfus	70.69	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.68	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.28	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.28	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.22	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.13	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.11	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines

hfus	71.88	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	71.89	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.68	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	71.54	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	71.48	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	71.48	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	71.43	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	71.09	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	71.09	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	72.69	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	70.69	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	70.63	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	70.39	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	70.29	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	70.29	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines

hfus	70.11	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	73.26	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	69.89	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	69.49	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	69.25	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	69.26	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	69.09	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	68.99	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	68.69	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	68.68	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	68.40	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	68.29	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	68.12	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	67.83	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines

hfus	71.55	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hfus	69.89	kJ/mol	Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines
hvap	56.91	kJ/mol	Joback Method
log10ws	-2.46		Crippen Method
logp	1.635		Crippen Method
mcvol	157.630	ml/mol	McGowan Method
pc	2630.00	kPa	Critical Pressures and Temperatures of n-Diaminoalkanes (C2 to C12)
rinpol	1373.00		NIST Webbook
rinpol	1373.00		NIST Webbook
ripol	1954.00		NIST Webbook
tb	550.38	K	Joback Method
tc	736.57	K	Joback Method
tf	357.71	K	Joback Method
vc	0.598	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	478.75	J/mol×K	736.57	Joback Method
cpg	400.76	J/mol×K	550.38	Joback Method
cpg	415.36	J/mol×K	581.41	Joback Method
cpg	429.29	J/mol×K	612.44	Joback Method
cpg	442.57	J/mol×K	643.48	Joback Method
cpg	455.23	J/mol×K	674.51	Joback Method
cpg	467.28	J/mol×K	705.54	Joback Method
cpl	406.98	J/mol×K	353.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K

cpl	398.93	J/mol×K	311.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	399.04	J/mol×K	312.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	399.17	J/mol×K	314.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	399.32	J/mol×K	315.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	399.47	J/mol×K	317.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	399.64	J/mol×K	318.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	399.82	J/mol×K	320.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K

cpl	400.02	J/mol×K	321.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	400.22	J/mol×K	323.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	400.44	J/mol×K	324.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	400.67	J/mol×K	326.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	400.92	J/mol×K	327.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	401.17	J/mol×K	329.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	401.44	J/mol×K	330.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K

cpl	401.72	J/mol×K	332.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	402.02	J/mol×K	333.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	402.32	J/mol×K	335.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	402.64	J/mol×K	336.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	402.97	J/mol×K	338.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	403.32	J/mol×K	339.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	403.67	J/mol×K	341.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K

cpl	404.04	J/mol×K	342.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	404.43	J/mol×K	344.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	404.82	J/mol×K	345.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	405.23	J/mol×K	347.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	405.65	J/mol×K	348.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	406.08	J/mol×K	350.15	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
cpl	406.52	J/mol×K	351.65	Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K
hfust	36.24	kJ/mol	308.10	NIST Webbook

Pressure Dependent Properties

Property code	Value	Unit	Pressure [kPa]	Source
tbrp	531.70	K	101.00	NIST Webbook

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.57036e+01
Coeff. B	-4.90800e+03
Coeff. C	-8.89490e+01
Temperature range (K), min.	407.32
Temperature range (K), max.	561.23

Sources

Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
Vapor pressure and enthalpy of vaporization of linear aliphatic alkanediamines:	https://www.doi.org/10.1016/j.jct.2011.06.008
Critical Pressures and Temperatures of n-Diaminoalkanes (C2 to C12):	https://www.doi.org/10.1021/je050424e
The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Heat Capacities of Some Liquid a,?-Alkanediamines in the Temperature Range between (293.15 and 353.15) K:	https://www.doi.org/10.1021/je900537y
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C646242&Units=SI

Legend

basg:	Gas basicity
cpg:	Ideal gas heat capacity
cpl:	Liquid phase heat capacity

gf:	Standard Gibbs free energy of formation
hf:	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
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure
pvap:	Vapor pressure
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
tb:	Normal Boiling Point Temperature
tbrp:	Boiling point at reduced pressure
tc:	Critical Temperature
tf:	Normal melting (fusion) point
vc:	Critical Volume