# Ammonium nitrate

**Other names:** ammonium nitrate [AN]
nitric acid ammonium salt
**Inchi:** InChI=1S/H4N2O3/c1-5-2(3)4/h1H4
**InchiKey:** ASFXIDPWCNUKTK-UHFFFAOYSA-N
**Formula:** H4N2O3
**SMILES:** NO[N+](=O)[O-]
**Mol. weight [g/mol]:** 80.04
**CAS:** 6484-52-2

# Physical Properties

| Property code | Value | Unit | Source |
|---|---|---|---|
| gf | -53.88 | kJ/mol | Joback Method |
| hf | -152.52 | kJ/mol | Joback Method |
| hfus | 13.50 | kJ/mol | Joback Method |
| hsub | 174.90 | kJ/mol | NIST Webbook |
| hvap | 45.24 | kJ/mol | Joback Method |
| log10ws | -0.41 | | Crippen Method |
| logp | -0.932 | | Crippen Method |
| mcvol | 44.130 | ml/mol | McGowan Method |
| pc | 7355.34 | kPa | Joback Method |
| tb | 446.19 | K | Joback Method |
| tc | 677.44 | K | Joback Method |
| tf | 338.86 | K | Joback Method |
| tt | 324.15 | K | Influence of selected potassium salts on thermal stability of ammonium nitrate |
| vc | 0.165 | m3/kmol | Joback Method |

# Temperature Dependent Properties

| Property code | Value | Unit | Temperature [K] | Source |
|---|---|---|---|---|
| cpg | 85.28 | J/mol×K | 446.19 | Joback Method |
| cpg | 88.79 | J/mol×K | 484.73 | Joback Method |
| cpg | 92.19 | J/mol×K | 523.27 | Joback Method |

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|---|---|---|---|---|
| cpg | 95.46 | J/mol×K | 561.82 | Joback Method |
| cpg | 98.59 | J/mol×K | 600.36 | Joback Method |
| cpg | 101.57 | J/mol×K | 638.90 | Joback Method |
| cpg | 104.40 | J/mol×K | 677.44 | Joback Method |
| hsubt | 178.70 | kJ/mol | 393.50 | NIST Webbook |
| psub | 5.62e-05 | kPa | 330.60 | The vaporization of NH4NO3 |
| psub | 1.12e-05 | kPa | 315.50 | The vaporization of NH4NO3 |
| psub | 1.79e-05 | kPa | 320.80 | The vaporization of NH4NO3 |
| psub | 2.11e-05 | kPa | 321.80 | The vaporization of NH4NO3 |
| psub | 2.14e-05 | kPa | 322.10 | The vaporization of NH4NO3 |
| psub | 3.82e-05 | kPa | 327.50 | The vaporization of NH4NO3 |
| psub | 8.07e-06 | kPa | 313.20 | The vaporization of NH4NO3 |
| psub | 6.05e-05 | kPa | 332.10 | The vaporization of NH4NO3 |
| psub | 7.83e-05 | kPa | 333.90 | The vaporization of NH4NO3 |
| psub | 7.82e-05 | kPa | 334.20 | The vaporization of NH4NO3 |
| psub | 1.05e-04 | kPa | 335.80 | The vaporization of NH4NO3 |
| psub | 1.39e-04 | kPa | 340.20 | The vaporization of NH4NO3 |
| psub | 1.60e-04 | kPa | 341.40 | The vaporization of NH4NO3 |
| psub | 1.79e-04 | kPa | 342.60 | The vaporization of NH4NO3 |
| psub | 2.18e-04 | kPa | 344.60 | The vaporization of NH4NO3 |
| psub | 2.33e-04 | kPa | 344.80 | The vaporization of NH4NO3 |
| psub | 2.40e-04 | kPa | 345.70 | The vaporization of NH4NO3 |
| psub | 2.62e-04 | kPa | 345.90 | The vaporization of NH4NO3 |
| psub | 2.56e-04 | kPa | 346.50 | The vaporization of NH4NO3 |
| psub | 2.57e-04 | kPa | 346.50 | The vaporization of NH4NO3 |
| psub | 2.66e-04 | kPa | 347.10 | The vaporization of NH4NO3 |

# Sources

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|---|---|
| **Phase Equilibria of the Na+, NH4+//SO42-, NO3--H2O Quaternary System at 303.15 and 323.15 K:** | https://www.doi.org/10.1021/acs.jced.7b01015 |
| **Densities, Viscosities, and Adiabatic Compressibilities of Some Mineral Salts in Water at Different Temperatures:** | https://www.doi.org/10.1021/je030205y |
| **Electrical Conductivity and Phase Transitions of Calcium Nitrate + Ammonium Nitrate + Water Mixtures:** | https://www.doi.org/10.1021/je900927a |
| **Electrical Conductivity of Aqueous Ethanol Solutions Containing Ammonium Salts under High Pressure at 298 K:** | https://www.doi.org/10.1021/je3008233 |
| **Volumetric properties of ammonium nitrate in N,N-dimethylformamide: Equilibrium Study in the KNO3 + NH4NO3 + H2O System at Temperature and Concentration:** | https://www.doi.org/10.1016/j.jct.2012.04.001 |
| **Temperatures from 293.15 to 323.15 K:** | https://www.doi.org/10.1021/acs.jced.8b01052 |
| **Dependences of the Electric Conductivity Of Dimethyl Sulfoxide + Ammonium Nitrate Electrolytes:** | https://www.doi.org/10.1021/je400402n |
| **Joback Method:** | https://en.wikipedia.org/wiki/Joback_method |
| **Crippen Method:** | http://pubs.acs.org/doi/abs/10.1021/ci990307l |
| **Water activity and activity coefficients of the mixed electrolytes {yNH4Cl + (1-y)NH4NO3} (aq) at 298.15K:** | https://www.doi.org/10.1016/j.fluid.2005.07.011 |
| **The vaporization of NH4NO3:** | https://www.doi.org/10.1016/j.jct.2010.01.012 |
| **McGowan Method:** | http://link.springer.com/article/10.1007/BF02311772 |
| **Viscosity of Ammonium Nitrate + Formamide Mixtures:** | https://www.doi.org/10.1021/je500284p |
| **Electrostriction of water and lower alcohols around ammonium nitrate - Volumetric approach:** | https://www.doi.org/10.1016/j.jct.2018.05.018 |
| **Stability and Thermodynamics of Thermochromic Cobalt(II) Chloride Complexes in Low-Melting Phase Change Materials:** | https://www.doi.org/10.1021/je9009267 |
| **NIST Webbook:** | http://webbook.nist.gov/cgi/cbook.cgi?ID=C6484522&Units=SI |
| **Influence of selected potassium salts on thermal stability of ammonium nitrate:** | https://www.doi.org/10.1016/j.tca.2019.178313 |
| **Solubility of alpha-glycine in water with additives at a temperature range of (293.15 - 343.15) K: Experimental data and thermodynamic modeling:** | https://www.doi.org/10.1016/j.fluid.2016.12.003 |
| **Thermal Conductivity and Density of (NH4)2SO4 + H2O, NH4NO3 + H2O, and (NH4)2SO4 + NH4NO3 + H2O Solutions at T = (278.15 to 333.15) K:** | https://www.doi.org/10.1021/je201390r |
| **Crippen Method:** | https://www.chemeo.com/doc/models/crippen_log10ws |

# Legend

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|---|---|
| **cpg:** | Ideal gas heat capacity |
| **gf:** | Standard Gibbs free energy of formation |
| **hf:** | Enthalpy of formation at standard conditions |
| **hfus:** | Enthalpy of fusion at standard conditions |
| **hsub:** | Enthalpy of sublimation at standard conditions |
| **hsubt:** | Enthalpy of sublimation 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 |
| **psub:** | Sublimation pressure |
| **tb:** | Normal Boiling Point Temperature |
| **tc:** | Critical Temperature |

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|---|---|
| **tf:** | Normal melting (fusion) point |
| **tt:** | Triple Point Temperature |
| **vc:** | Critical Volume |