# Physical properties of selected gases

<table>
<thead>
<tr>
<th>Chemical formula</th>
<th>Compound name</th>
<th>Molar mass [g/mol]</th>
<th>Density [g/l] (0°C, 101.325kPa)</th>
<th>Specific volume [m³/kg] (25°C, 101.325kPa)</th>
<th>Heat capacity ratio γ = Cₚ/Cᵥ</th>
<th>Thermal conductivity [mW/(m·K)] (0°C, 101.325kPa)</th>
<th>Solubility in water [l/l] (0°C, 101.325kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₂</td>
<td>Nitrogen</td>
<td>28.014</td>
<td>1.250</td>
<td>0.8734</td>
<td>1.4013</td>
<td>24.001</td>
<td>0.0235</td>
</tr>
<tr>
<td>O₂</td>
<td>Oxygen</td>
<td>31.998</td>
<td>1.428</td>
<td>0.7643</td>
<td>1.3967</td>
<td>24.350</td>
<td>0.0489</td>
</tr>
<tr>
<td>CO</td>
<td>Carbon monoxide</td>
<td>28.010</td>
<td>1.250</td>
<td>0.8734</td>
<td>1.4013</td>
<td>24.740</td>
<td>0.0352</td>
</tr>
<tr>
<td>NO</td>
<td>Nitric oxide</td>
<td>30.010</td>
<td>1.340</td>
<td>0.805</td>
<td>1.394</td>
<td>23.703</td>
<td>0.074</td>
</tr>
<tr>
<td>NO₂</td>
<td>Nitrogen dioxide</td>
<td>46.006</td>
<td>2.051</td>
<td>0.512</td>
<td>1.31</td>
<td>12.961</td>
<td></td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
<td>44.010</td>
<td>1.974</td>
<td>0.5532</td>
<td>1.2941</td>
<td>14.674</td>
<td>1.7163</td>
</tr>
<tr>
<td>SO₂</td>
<td>Sulphur dioxide</td>
<td>64.064</td>
<td>2.915</td>
<td>0.3754</td>
<td>1.2805</td>
<td>8.434</td>
<td>79.79</td>
</tr>
<tr>
<td>N₂O</td>
<td>Nitrous oxide</td>
<td>44.013</td>
<td>1.975</td>
<td>0.553</td>
<td>1.2804</td>
<td>16.464</td>
<td>1.14²</td>
</tr>
<tr>
<td>H₂S</td>
<td>Hydrogen sulphide</td>
<td>34.076</td>
<td>1.533</td>
<td>0.7126</td>
<td>1.3310</td>
<td>15.609</td>
<td>4.67</td>
</tr>
<tr>
<td>CH₄</td>
<td>Methane</td>
<td>16.040</td>
<td>0.717</td>
<td>1.5227</td>
<td>1.3620</td>
<td>30.570</td>
<td>0.054³</td>
</tr>
<tr>
<td>C₂H₆</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH₃</td>
<td>Ammonia</td>
<td>17.031</td>
<td>0.769</td>
<td>1.4218</td>
<td>1.3160</td>
<td>22.916</td>
<td>862</td>
</tr>
<tr>
<td>H₂O</td>
<td>Water (vapour)</td>
<td>18.015</td>
<td>0.804¹</td>
<td>1.334²⁹</td>
<td>1.334</td>
<td>0.560</td>
<td>---</td>
</tr>
<tr>
<td>HCl</td>
<td>Hydrogen chloride</td>
<td>36.461</td>
<td>1.646</td>
<td>0.68</td>
<td>1.41</td>
<td>13.1577</td>
<td>506</td>
</tr>
<tr>
<td>Cl₂</td>
<td>Chlorine</td>
<td>70.906</td>
<td>3.207</td>
<td>0.3360</td>
<td>1.33</td>
<td>7.910</td>
<td>4.61</td>
</tr>
<tr>
<td>H₂</td>
<td>Hydrogen</td>
<td>2.016</td>
<td>0.0899</td>
<td>11.983</td>
<td>1.4054</td>
<td>172.580</td>
<td>0.0214</td>
</tr>
<tr>
<td>Air</td>
<td>Air – mixture of gases</td>
<td>28.800</td>
<td>1.282</td>
<td>0.8448</td>
<td>1.4018</td>
<td>24.360</td>
<td>0.0292</td>
</tr>
</tbody>
</table>

1) – hypothetical value for water vapour  
2) – under temperature of 5°C  
3) – under the temperature of 2°C

## Flammability limits in air (at STP conditions – 0°C, 101.325kPa)

<table>
<thead>
<tr>
<th>Chemical formula</th>
<th>Compound name</th>
<th>LFL / LEL [vol %] 4)</th>
<th>UFL / UEL [vol %] 5)</th>
<th>Autoignition temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>Carbon monoxide</td>
<td>12.5%</td>
<td>74%</td>
<td>609°C</td>
</tr>
<tr>
<td>CH₄</td>
<td>Methane</td>
<td>4.4% + 5.0%</td>
<td>15%</td>
<td>580°C</td>
</tr>
<tr>
<td>C₂H₆</td>
<td>Ethane</td>
<td>3%</td>
<td>12% + 12.4%</td>
<td>515°C</td>
</tr>
<tr>
<td>H₂</td>
<td>Hydrogen</td>
<td>4.0%</td>
<td>75%</td>
<td>500 ÷ 571°C</td>
</tr>
</tbody>
</table>

4) – LEL = lower explosive level  
5) – UEL = upper explosive level