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# Gas Application Note

## Ammonia

Ammonia is a compound with the formula $NH_3$. It is normally encountered as a gas with a characteristic pungent odor. Although Ammonia contributes significantly to the nutritional needs of Earth, the gas itself is caustic and can cause serious health damage.

Ammonia used commercially is usually named Anhydrous Ammonia. This term emphasizes the absence of water. Because $NH_3$ boils at -33°C, the liquid must be stored under pressure or at low temperature. Its heat of vaporisation is, however, sufficiently high that $NH_3$ can be readily handled in ordinary beakers in a fume hood.

### Industrial Applications

The main uses of Ammonia are in the production of fertilizers, explosives, and synthesis of organonitrogen compounds.

Because of its many uses, Ammonia is one of the most highly produced inorganic chemicals. Dozens of chemical plants Worldwide produce Ammonia. The Worldwide Ammonia production in 2004 was 109 million metric tons. The People's Republic of China produced 28.4% of the Worldwide production followed by India with 8.6%, Russia with 8.4%, and the United States with 8.2%. About 80% or more of the Ammonia produced is used for fertilizing agricultural crops.

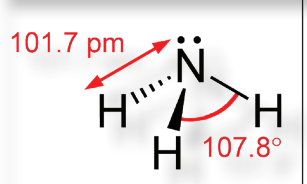
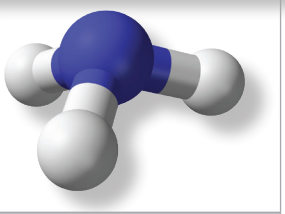
Ammonia is used in the manufacture of Nitric Acid; certain alkalies such as soda ash; dyes; pharmaceuticals such as sulfa drugs, vitamins and cosmetics; synthetic textile fibres such as nylon, rayon and acrylics; and for the manufacture of certain plastics such as phenolics and polyurethanes.

The pulp and paper industry uses Ammonia for pulping wood and as a casein dispersant in the coating of paper. Ammonia is used in several areas of water and wastewater treatment, such as pH control, in solution form to regenerate weak anion exchange resins, in conjunction with Chlorine to produce potable water and as an Oxygen scavenger in boiler water treatment.

The largest $NH_3$ market is Industrial Refrigeration. Ammonia is utilized in Food & Beverage production and Cold Storage as the refrigerant of choice due to its high efficiency and low cost when compared to major R-gasses like R-22, R404a and R407. Additionally, while Ammonia is both toxic to humans and combustible at high levels, it naturally absorbs into the atmosphere making it the "natural" refrigerant versus ozone depleting CFCs and HCFCs

**Potential industries and applications for gas detection products**

- Chemical Industry
- Fertiliser manufacturing
- Explosives / fireworks production
- Pulp and paper
- Water and wastewater treatment
- Industrial refrigeration

| Ammonia | |
|---|---|
|   |  |
| **General** | |
| **Systematic Name** | Ammonia<br>Azane |
| **Other Names** | Hydrogen Nitride<br>Spirit of Hartshorn<br>Nitrosil<br>Vaporole |
| **Molecular Formula** | $NH_3$ |
| **Appearance** | Colorless Gas with strong pungent odor |
| **CAS Number** | 7664-41-7 |
| **Properties** | |
| **Vapor Density** | 0.59 |
| **Melting Point** | -77.73°C (195.42K) |
| **Boiling Point** | -33.34°C (239.81K) |
| **Toxic Exposure Limits** | |
| **OSHA Permissible Exposure Limit (PEL)** | |
| Long-term exposure limit (8-hour TWA reference period) | |
| ppm | mg.m-3 |
| 50 | 035 |
| **ACGIH Threshold Limit Value** | |
| 8-hour TWA workday and a 40-hour workweek | 25ppm |

# Honeywell Product Offering

Sensepoint XCD

XNX Universal Transmitter

Series 3000 XPIS

FD Series Flame Detector

Manning EC-F9


Manning AirScan IR

Manning Vent Line

AirAlert 96d

SPM

CM4

VertexM

Vertex

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Ammonia_AppNote_V2_Americas
04/10
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