



MATERIAL SAFETY DATA SHEET

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| Safety & Training Department | Anhydrous Ammonia | |
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| PRODUCT IDENTIFICATION | |
| Product Name (s): | Ammonia, Anhydrous Ammonia |
| CAS No.: | 7664-41-7 |

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| MANUFACTURER'S INFORMATION | |
| Manufacturer: | Dawood Hercules Chemicals Limited. |
| Address: | 28-Km Sheikhpura Road, Sheikhpura, Lahore, Pakistan. |
| Telephone No: | (092-42) 7352762-67 |
| Fax No: | 092-42-6360343 |
| E-mail: | info.dh@dawoodgroup.com |

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| MATERIAL IDENTIFICATION AND USE | |
| Chemical Name: | Ammonia Anhydrous |
| Chemical Formula: | NH ₃ |
| Molecular Weight: | 17.03 |
| Trade Name Synonym: | Ammonia, Anhydrous Ammonia |
| Material Uses: | Fertilizer, Refrigerant |

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| PHYSICAL DATA | |
| Physical State: | Liquid |
| Odour and appearance: | Sharp, Irritating / Colourless |
| Odour Threshold (ppm): | 1-5 |
| Specific Gravity: | 0.682 @ 33.3 |
| Vapour Pressure (mm): | 6612 mm @ 20 |
| Vapour Density (Air=a): | 0.6 @ 0 |
| Boiling Point (°C): | -33.3 |
| Freezing Point (°C): | -77.7 |
| Solubility in Water (20°C): | 51 g/100 ml |
| PH: | 14 |
| Density (g/ml): | 0.682 @ -33.3 °C |

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| REACTIVITY DATA | |
| Chemical Stability: | Yes |
| Incompatibility | Corrodes copper, TIN, lead. Brass, bronze and galvanized steel. |
| Reactivity and Under What Conditions: | Violent reaction when mixed with: acids, oxidizing agents, silver compounds, mercury, halogens, interhalogens, halides, ethylene oxide |
| Hazardous Decomposition Products: | Burning ammonia gas may form NO _x . |

FIRE AND EXPLOSION HAZARD OF MATERIAL

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| Flammability | Yes |
| Means of Extinction: | Where fire is involved use any fire fighting agent appropriate for surrounding material. Use water spray to cool fire exposed surface. |
| Special Procedures: | When using water, use fog nozzle only. Do not apply water directly to liquid spill. Water fog may be used to knock down vapours. Use protective clothing. Contain spilled material to prevent it from entering water streams or sewers. |
| Upper Explosion Limit (% by Volume): | 25 % in air. |
| Lower explosion Limit (% by Volume): | 16 % in air |
| Auto Ignition Temperature (°C): | 651 |
| Hazardous Combustion Products: | Burning ammonia gas may form NO _x |

TOXICOLOGICAL PROPERTIES

Route of Entry

- Skin Contact
- Inhalation Acute
- Eye Contact

Effects of Acute Exposure to Product:

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| Skin: | Contact with liquid may cause chemical burns and frostbite. |
| Eye: | Slight irritation, tearing to severe irritation, swollen eyelids and blindness coughing, breathing difficulties, death due to suffocation or edema. |
| Effects of Chronic Exposure to Product: | May cause long term irritation of eyes, nose and upper respiratory tract. |
| Irritancy of Product: | Extreme |

PREVENTIVE MEASURES

Personal Protective Equipment:

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| Gloves: | Rubber/neoprene |
| Respiratory: | Chemical Cart. (>300 ppm) |
| Eye: | Chemical Goggles. |
| Footwear: | Rubber/neoprene - High Top. |
| Clothing: | Chemical resistant. |
| Other: | Use vapour proof suit if concentration >500 ppm. |

Engineering controls (e.g. ventilation):

Use exhaust fans for enclosed area.

Leak and Spill Procedure:

Contain liquid spill. Do not add water to liquid.
Water fog may be used on vapour cloud.

Waste Disposal:

Liquid ammonia can be pumped into an appropriate tank. Contact the manufacturer and local government agency for disposal procedures.

Handling Procedures and Equipment:

Use appropriate personal protective equipment.
Mechanical equipment should be compatible with ammonia.

Storage Requirements:

Limit quantity of material in storage. Restrict access to storage area. Post appropriate warning signs.
Keep storage area separate from populated work areas. Inspect periodically for deficiencies.