



## MATERIAL SAFETY DATA SHEET

**Date-Issued:** 26 June 2017

**MSDS Ref. No:** 1.0

**Date-Revised:** 30 April 2021

### 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Ammonia, Anhydrous

**GENERAL USE:**

**HS CODE:** 28141000

**PRODUCT FORMULATION NAME:** NH<sub>3</sub>

**CHEMICAL FAMILY:** Inorganic Nitrogen Compound

**GENERIC NAME:** Anhydrous Ammonia

**MANUFACTURER**  
Jaysons Chemical Industries

**24 HR. EMERGENCY**  
**TELEPHONE NUMBERS**  
**+91 9819788302**

### 2. COMPOSITION / INFORMATION ON INGREDIENTS

#### **Anhydrous Ammonia 99.5% wt**

Ammonia gas or liquid is very corrosive to body tissues, reacting with body moisture on contact. Inhalation: The odour recognition threshold for ammonia ranges from 0.7 PPM for persons with an acute sense of smell to over 50 PPM for acclimatized individuals. Generally, concentrations of up to 25 PPM are tolerated although unpleasant and pungent. Above this concentration, irritation of the eyes, nose and throat may begin. The extent of irritation increases with increasing ammonia concentration, and decreases with acclimatization. NIOSH has established 300 PPM as the concentration immediately dangerous to life and health (IDLH), which is defined as the concentration above which self-rescue may be difficult or impossible due to physiological effects. At concentrations above 1000 PPM increasing chest tightness, bronchospasm and severe eye and skin irritation may result. Delayed effects such as chemical pneumonitis and pulmonary edema may develop several hours after exposure. Exposure to high concentrations (5,000 ppm) may cause death. Effects may be more pronounced at lower concentrations in children, the elderly, and persons with impaired lung function.

### **Anhydrous Ammonia, Liquor Ammonia, Methyl Amine and Sulphur Dioxide**

**Head Office** - 801, 8th Floor, Peninsula Park, Plot No. A-4, End of Veera Desai Road, Andheri (West), Mumbai – 400053, Maharashtra, India

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### 3. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

**PHYSICAL APPEARANCE:** Colorless liquid

**IMMEDIATE CONCERNS:** **CAUTION!**

#### POTENTIAL HEALTH EFFECTS

##### Hazard Description

Ammonia is an irritant and corrosive to the skin, eyes, respiratory tract and mucous membranes. Exposure to liquid or rapidly expanding gases may cause severe chemical burns and frostbite to the eyes, lungs and skin. Skin and respiratory related diseases could be aggravated by exposure.

#### SIGNS AND SYMPTOMS OF OVEREXPOSURE

**EYES:** May cause severe irritation, eye burns or permanent eye damage.

**SKIN:** Irritation, corrosive burns, blister formation may result. Contact with liquid may produce a caustic burn and frostbite.

**INGESTION:** Ingestion is unlikely since the material is a gas under normal atmospheric conditions. If ingested, it may cause burns and severe pain of the mouth, throat, esophagus and stomach or may be fatal.

**INHALATION:** Exposure may result in severe irritation and / or burns of the nose, throat and respiratory tract. It may cause bronchospasm, pulmonary edema or respiratory arrest. **Extreme exposure may result in death from spasm, inflammation or edema. Brief inhalation exposure to 5,000 ppm may be fatal.**

### 4. FIRST AID MEASURES

**EYES:** Flush with copious amounts of tepid water for a minimum of 20 minutes. Eyelids should be held apart and away from eyeball for thorough rinsing. Seek medical attention.

**SKIN:** Flush with copious amounts of tepid water for a minimum of 20 minutes while removing contaminated clothing, jewelry and shoes. Do not rub or apply ointment on affected area. Clothing may initially freeze to skin. Thaw frozen clothing from skin before removing. For liquid ammonia contact, seek immediate medical attention. For severe vapor contact or if irritation persists, seek medical attention.

**INGESTION:** If conscious, give large amounts of water to drink. May drink orange juice, citrus juice or diluted vinegar (1:4) to counteract ammonia. If unconscious, do not give anything by mouth. **DO NOT INDUCE VOMITING!** Seek medical attention.

**INHALATION:** Remove to fresh air. If not breathing, administer artificial respiration. If trained to do so, administer supplemental oxygen, if required. In case of severe exposure or if irritation persists or if breathing difficulties arise, get medical attention.

### 5. FIRE FIGHTING MEASURES

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**Flashpoint:** None

**Flammable Limits in Air:** LEL/UEL 16% to 25% (listed as 15% to 28% in the NIOSH Pocket Guide to Chemical Hazards.)

**Extinguishing Media:** Dry Chemical, CO<sub>2</sub>, water spray or alcohol-resistant foam if gas flow cannot be stopped

**Auto Ignition Temperature:** 1,204°F (If catalyzed), 1,570°F (If un-catalyzed)

### Special Fire-Fighting Procedure

Must wear protective clothing and a positive pressure SCBA. Stop source if possible. If a portable container (such as a cylinder or trailer) can be moved from the fire area without risk to the individual, do so to prevent the pressure relief valve of the trailer from discharging or the cylinder from rupturing. Fight fires using dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Cool fire-exposed containers with water spray. Stay upwind when containers are threatened. Use water spray to knock down vapor and dilute.

### Unusual Fire and Explosion Hazards

- Outdoors, ammonia is not generally a fire hazard. Indoors, in confined areas, ammonia may be a fire hazard, especially if oil and other combustible materials are present. Combustion may form toxic nitrogen oxides.
- If relief valves are inoperative, heat exposed storage containers may become explosion hazards due to over pressurization.

## 6. ACCIDENTAL RELEASE MEASURES

### Steps to be Taken

Stop source of leak if possible, provided it can be done in a safe manner. Leave the area of a spill by moving laterally and upwind. Isolate the affected area. Non-responders should evacuate the area, or shelter in place. Only properly trained and equipped persons should respond to an ammonia release. Wear eye, hand and respiratory protection and protective clothing; see **PROTECTIVE EQUIPMENT**. Stay upwind and use water spray downwind of container to absorb the evolved gas. Contain spill and runoff from entering drains, sewers, and water systems by utilizing methods such as diking, containment, and absorption. CAUTION: ADDING WATER DIRECTLY TO LIQUID SPILLS WILL INCREASE VOLATILIZATION OF AMMONIA, THUS INCREASING THE POSSIBILITY OF EXPOSURE.

### Waste Disposal

Listed as hazardous substance under CWA (40 CFR 116.4, 40 CFR 117.3). Reportable Quantity 100 pounds. Classified as hazardous waste under RCRA (40CFR 261.22 Corrosive #D002). Comply with all regulations. Suitably diluted product may be utilized on agricultural land as fertilizer. Keep spill from entering streams, lakes, or any water systems.

## 7. HANDLING AND STORAGE

Only trained persons should handle anhydrous ammonia. Store in cool (26.7°C / 80°F) and well-ventilated areas, with containers tightly closed. OSHA 29 CFR 1910.111 prescribes

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handling and storage requirements for anhydrous ammonia as a hazardous material. Use only stainless steel, carbon steel or black iron for anhydrous ammonia containers or piping. Do not use plastic. Do not use any non-ferrous metals such as copper, brass, bronze, tin, zinc or galvanized metals. Protect containers from physical damage. Keep away from ignition sources, especially in indoor spaces.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE GUIDELINES:

#### Protective Equipment

At a minimum, splash proof, chemical safety goggles, ammonia resistant, gloves (such as rubber), and ammonia-impervious clothing should be worn to prevent contact during normal loading, unloading and transfer operations and handling small spills. Face shield and boots can be worn as additional protection. For a hazardous material release response, Level A or Level B ensemble including positive-pressure SCBA should be used.

#### Eye Protection

Chemical splash goggles should be worn when handling anhydrous ammonia. A face shield can be worn over chemical splash goggles as additional protection. Do not wear contact lenses when handling anhydrous ammonia. Refer to 29 CFR 1910.133 for OSHA eye protection requirements.

#### Respiratory Protection

Respiratory protection approved by NIOSH for ammonia must be used when applicable safety and health exposure limits are exceeded. For escape in emergencies, NIOSH approved respiratory protection that consists of a full-face gas mask and canisters approved for ammonia or SCBA should be used. A positive pressure SCBA is required for entry into ammonia atmospheres at unknown concentrations or above 300 ppm (IDLH). Refer to 29 CFR 1910.134 and ANSI: Z88.2 for OSHA respiratory protection requirements. Also refer to 29 CFR 1910.111 for respiratory protection requirements at bulk installations.

#### Ventilation

Maintain adequate ventilation to keep ammonia concentrations below the applicable standards.

### OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

#### Exposure Limits for Ammonia: Vapor

<b>OSHA</b>	50 ppm	35 mg / m <sup>3</sup> PEL	8-hou
<b>NIOSH</b>	35 ppm	27 mg / m <sup>3</sup> STEL	15 mi
	25 ppm	18 mg / m <sup>3</sup> REL	10-ho
	300 ppm	IDLH	
<b>ACGIH</b>	25 ppm	18 mg / m <sup>3</sup> TLV	8-hou
	35 ppm	27 mg / m <sup>3</sup> STEL	15 mi

**Toxicity:** LD 50, (Oral / Rat), 350 mg / kg

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Boiling Point:** -28°F at 1 atm  
**pH:** N/A  
**Specific Gravity of Gas (air = 1):** 0.596 at 32°F  
**Specific Gravity of Liquid (water = 1):** 0.682 at -28°F (compared to water at 39°F)  
**Percent Volatile:** 100% at 212°F  
**Appearance and Odor:** Colorless liquid or gas with pungent odor  
**Critical Temperature:** 271.4°F  
**Gas Specific Volume:** 20.78 Ft<sup>3</sup>/lb. at 32°F and 1 atm  
**Vapor Density (air = 1):** 0.0481 Lb./Ft<sup>3</sup> at 32°F  
**Liquid Density:** 38.00 Lb./Ft<sup>3</sup> at 70°F  
**Approximate Freezing Point:** -108°F  
**Weight (per gallon):** 5.15 pounds at 60°F  
**Vapor Pressure:** 114 psig 70°F  
**Solubility in Water (per 100 pounds of water):** 86.9 pounds at 32°F, 51 pounds at 68°F  
**Surface Tension:** 23.4 Dynes / cm at 52°F  
**Critical Pressure:** 111.5 atm

## 10. STABILITY AND REACTIVITY

### Chemical Reactivity

#### Stability

Stable at room temperature. Heating a closed container above room temperature causes vapor pressure to increase rapidly. Anhydrous ammonia will react exothermically with acids and water. Will not polymerize.

#### Conditions to Avoid

Anhydrous ammonia has potentially explosive reactions with strong oxidizers. Anhydrous ammonia forms explosive mixtures in air with hydrocarbons, chlorine, fluorine and silver nitrate. Anhydrous ammonia reacts to form explosive products, mixtures or compounds with mercury, gold, silver, iodine, bromine, silver oxide and silver chloride.

Avoid anhydrous ammonia contact with chlorine, which forms a chloramine gas, which is a primary skin irritant and sensitizer. Anhydrous ammonia is incompatible with acetaldehyde, acrolein, boron, chloric acid, chlorine monoxide, chlorites, nitrogen tetroxide, perchlorate, sulfur, tin and strong acids.

Avoid contact with galvanized surfaces, copper, brass, bronze, mercury, gold and silver. A corrosive reaction will occur.

#### Hazardous Decomposition Products

Anhydrous ammonia decomposes to hydrogen and nitrogen gases above 450°C (842°F). Decomposition temperatures may be lowered by contact with certain metals, such as iron, nickel and zinc and by catalytic surfaces such as porcelain and pumice.

## 11. TOXICOLOGICAL INFORMATION

Ammonia is an irritant and corrosive to the skin, eyes, respiratory tract and mucous membranes. Exposure to liquid or rapidly expanding gases may cause severe chemical burns

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and frostbite to the eyes, lungs and skin. Skin and respiratory related diseases could be aggravated by exposure.

- Not recognized by OSHA as a carcinogen
- Not listed in the National Toxicology Program
- Not listed as a carcinogen by the International Agency for Research on Cancer

Toxicity: LD 50, (Oral / Rat), 350 mg / kg

Ammonia acts as a fertilizer to promote plant growth. Under aerobic conditions ammonia will oxidize to nitrate and is neither persistent nor bio accumulative in the environment

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## 12. ECOLOGICAL INFORMATION

### Aquatic Toxicity

Ammonia is a toxic hazard to fish. In low concentrations in water and soil, Sub-lethal concentrations in water can have adverse physiological effects on marine species. Free ammonia concentrations of 2.5 mg per litre at pH 7.4 to 8.5 are considered harmful to marine life. In water, free NH<sub>3</sub> is considered to be the primary toxic form while the much more prevalent NH<sub>4</sub>OH form is much less harmful.

### Products of Degradation

Nitrogen oxides (NO,NO<sub>2</sub> ...), nitrates

### Toxicity of the Products of Degradation

The products of degradation are less toxic than the original product. Special remarks on the products of degradation product may degrade water quality and taste. Notify downstream water users. Will dissolve and disperse in water

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## 13. DISPOSAL CONSIDERATIONS

**SMALL SPILL:** Warn personnel to move away. Keep unprotected personnel upwind of spill area. Do not approach liquid or vapor cloud without encapsulating suit and SCBA. If possible, to do so without hazard, isolate leak by shutting off supply of ammonia from containing vessel. Use water fog to suppress airborne vapors from leak or spill. Do not direct water into spilled liquid! Anhydrous ammonia will autorefrigerate reducing vapor release. Addition of water will warm cryogenic liquid resulting in greater gasification. Contain run-off water for later recovery and treatment. Call emergency number on this MSDS sheet for assistance.

**FOR LARGE SPILLS:** LARGE SPILL: → Stay indoors (unless evacuation has been called by local authorities) → Close all windows and doors, seal with duct tape or wet towels → Shut off furnace, exhaust fans, fireplaces, and air conditioners → Wait for and follow advice from local police or authorities → If smell is very strong, breath through a wet cloth  
**PRECAUTIONS**  
Keep ammonia handling facilities and containers locked. Protect against physical damage. Keep storage vessels away from direct heat. Ground all equipment. Keep away from

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incompatible materials such as oxidizing agents, reducing agents, metals, and acids. Keep children away from ammonia storage and handling equipment

WASTE DISPOSAL OR Call for assistance on treatment and disposal. Recover and place material in a suitable. RECYCLING container for intended use or disposal. Ensure disposal complies with government requirements and local regulations.

## 14. TRANSPORT INFORMATION

Hazard Class: (US Domestic): 2.2 (Non-Flammable Gas) (International): 2.3 (Poison Gas) subsidiary 8 (Corrosive)

Proper Shipping Description:

- (US Domestic): UN1005, Ammonia, Anhydrous, 2.2, RQ, Inhalation Hazard
- (International): UN1005, Ammonia, Anhydrous, 2.3, (8), RQ, Poison-Inhalation Hazard Zone "D"

Placard: (US Domestic): Non-Flammable Gas,  
(International): Poison Gas, Corrosive (Subsidiary)

Identification No: UN 1005

National Fire Protection Assoc. Hazardous Rating and Hazardous Materials Identification System Labels:

Anhydrous Ammonia

HEALTH = 3

FLAMMABILITY = 1

REACTIVITY = 0

PERSONAL PROTECTION = H

Transport Information DOT / TDG Classification: 2

PIN and Shipping Name PIN: UN1005

Shipping name: anhydrous ammonia

## 15. REGULATORY INFORMATION

### UNITED STATES

### SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

### 311/312 HAZARD CATEGORIES:

FIRE:

PRESSURE GENERATING:

REACTIVITY:

ACUTE:

CHRONIC:

### 313 REPORTABLE INGREDIENTS:

TITLE III NOTES:

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA RQ:

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA REGULATORY:

NATIONAL RESPONSE CENTER:

WHMIS (WORKER HAZARDOUS MATERIALS INFORMATION SYSTEM):

CANADA INGREDIENT DISCLOSURE LIST

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CANADIAN ENVIRONMENTAL PROTECTION ACT:  
EUROPEAN COMMUNITY  
EUROPEAN COMMUNITY REGULATORY:MEXICO  
STATE REGULATIONS  
REGULATIONS  
LOCAL REGULATIONS:

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## 16. OTHER INFORMATION

REASON FOR ISSUE:

APPROVED BY:            TITLE:

INFORMATION CONTACT:

REVISION SUMMARY Date-Issued:

NFPA CODESFIRE: 0 HEALTH: 2 REACTIVITY:

HMIS CODESFLAMMABILITY:HEALTH:PHYSICAL HAZARD:PERSONAL PROTECTION:

DATA SOURCES:

### MANUFACTURER DISCLAIMER:

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