

**PRODUCT NAME: AMMONIA**

### 1. Product and Company Identification

BOC India Limited,  
Oxygen House  
P-43 Taratala Road  
Kolkata 700 0888

BOC India Limited  
Unit:

TELEPHONE NUMBER: (033) 24014708-20  
Customer Service Center: 1800 345 6789

PRODUCT NAME: AMMONIA  
CHEMICAL NAME: Ammonia  
COMMON NAMES/SYNONYMS: Ammonia Anhydrous; Anhydrous Ammonia

### 2. Composition, Information on Ingredients

**EXPOSURE LIMITS<sup>1</sup>:**

INGREDIENT	% VOLUME	PEL-OSHA	TLV	
Ammonia FORMULA: NH <sub>3</sub>	100.0	50 ppm	25 ppm	

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations

### 3. Hazards Identification

**EMERGENCY OVERVIEW**

**Colorless gas with strong irritating odor. Corrosive gas. Can cause severe irritation and burns to exposed tissue including eyes and skin. Inhalation may damage the lungs, causing swelling and fluid retention (edema) and chemical pneumonitis. Slightly flammable. Contents under pressure. Use and store below 52 °C.**

**PRODUCT NAME: AMMONIA****ROUTE OF ENTRY:**

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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**HEALTH EFFECTS:**

Exposure Limits Yes	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen Yes
Synergistic Effects Combined effects of inhaled ammonia and carbon particles in the rat have been reported to be greater than the effects caused by ammonia or carbon alone.		

Carcinogenicity: -- OSHA: No

**EYE EFFECTS:** Ammonia is highly irritating. Mild concentrations of product will cause conjunctivitis. Contact with higher concentrations of product will cause swelling, painful burns, lesions and possible loss of vision.

**SKIN EFFECTS:** Mild concentrations of product will cause irritation and rashes. Contact with higher concentrations of product will cause caustic-like dermal burns and inflammation. Toxic level exposure may cause skin lesions resulting in early necrosis and scarring.

**INGESTION EFFECTS:** Since product is a gas at room temperature, ingestion is unlikely.

**INHALATION EFFECTS:** Ammonia is corrosive and severely irritating to the upper respiratory tract, mucous membranes and eyes. Severity of injury depends on the concentration and duration of exposure. Inhalation may cause severe irritation, burning sensations, and coughing, wheezing, shortness of breath, headache, and nausea, with eventual collapse and death.

Inhalation of excessive amounts affects the upper airway (larynx and bronchi) by causing caustic-like burning resulting in edema and chemical pneumonitis. If it enters the deep lung, pulmonary edema will result. Pulmonary edema and chemical pneumonitis can cause death.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** May aggravate pre-existing, eye, skin, and respiratory disorders. Individual with decreased liver function are more susceptible to the effects of inhalation as increased circulating ammonia can lead to hepatic coma.

#### 4. First Aid Measures

**EYES:** Immediately flush eyes with large amounts of water for at least 20-30 minutes. Part eyelids to assure complete flushing. PERSONS WITH POTENTIAL EXPOSURE TO AMMONIA SHOULD NOT WEAR CONTACT LENSES. Seek immediate medical attention.

**SKIN:** Remove contaminated clothing as rapidly as possible. Flush affected area with copious quantities of water. If irritation persists or skin appears damaged, seek immediate medical attention.

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**INGESTION:** Not expected for gas. If ingested, DO NOT INDUCE VOMITING. Seek immediate medical attention.

**INHALATION:** PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Keep victim warm and quiet. Assure that mucus or vomited material does not obstruct the airway by positional drainage. Observe for signs of pulmonary edema.

## 5. Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition: Temperature: 690 °C
LEL (%): 15	UEL(%): 28	
Hazardous combustion products: Ammonia, nitrogen oxides		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

**FIRE AND EXPLOSION HAZARDS:** The minimum ignition energy for ammonia is very high. It is approximately 500 times greater than the energy required for igniting hydrocarbons and 1000 to 10,000 times greater than that required for hydrogen; however, low concentrations are required for ignition. Release in a confined space may present an explosion hazard. Cylinders may vent rapidly or rupture violently from pressure when involved in a fire situation.

**EXTINGUISHING MEDIA:** Water fog. Use media suitable for surrounding fire.

**FIRE FIGHTING INSTRUCTIONS:** If possible, stop the flow of gas. Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear with butyl rubber clothing as necessary to prevent exposure. Since ammonia is soluble in water, it is the best extinguishing medium. Water will extinguish the fire and also absorb the escaped ammonia gas. Use water spray to cool surrounding containers. Prevent entry of corrosive run-off waters into waterways and sewers. Continue to cool fire-exposed containers until well after flames have been extinguished.

## 6. Accidental Release Measures

Immediately evacuate all personnel from affected area. Deny entry to unauthorized and unprotected individuals. Use appropriate protective equipment including skin and eye protection (See Section 8). Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Ventilate enclosed areas. Water spray may be used to knock down vapors. Clean-up waters may be corrosive. Prevent entry into waterways and sewers. Extinguish ignition sources. Consult a HAZMAT specialist and the appropriate emergency telephone number in Section 1 or your closest BOC location. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs.

## 7. Handling and Storage

**Electrical Classification:** Class 1, Group D.

Eliminate sources of ignition. Earth-ground and bond all lines and equipment associated with the ammonia system. Electrical equipment should be non-sparking or explosion proof.

Gaseous or liquid anhydrous ammonia corrodes certain metals at ambient temperatures. The presence of oxygen enhances the corrosion of ordinary or semi-alloy steels. The addition of water inhibits this enhancement. Keep anhydrous ammonia systems scrupulously dry.

Do not inhale. Prevent contact with skin, eyes, and clothing. Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve to trap in the discharge line to prevent hazardous back flow into the cylinder. Do not insert any object (i.e.: screwdriver) into valve cap openings as this can damage the valve causing leakage.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52 °C. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Post "NO SMOKING" signs in storage and use area. There should be no sources of accidental ignition in use and storage area.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

## 8. Exposure Controls, Personal Protection

**ENGINEERING CONTROLS:** Use natural and mechanical exhaust ventilation to limit concentrations to below current exposure limits.

**EYE/FACE PROTECTION:** Gas tight chemical goggles or full-face piece respirator.

**SKIN PROTECTION:** Appropriate protective and chemical-resistant gloves, boots, clothing, and splash protection, or fully encapsulating vapor protective clothing. (Butyl rubber is generally suitable but consult protective clothing manufacturer's specific data). Protect against cryogenic burns and frostbite.

**RESPIRATORY PROTECTION:** For emergency release use NIOSH approved air-supplying respirator systems (SCBA or airline/escape bottle) using a full-face mask and at a minimum Grade D air. For normal conditions below fifty times the exposure limit but where engineering can not control exposures below the applicable limits, than appropriately selected air-purifying respirators with full-face mask can be used.

**OTHER/GENERAL PROTECTION:** Safety shoes, safety shower, eyewash "fountain".

## 9. Physical and Chemical Properties

<b>PARAMETER</b>	<b>VALUE</b>	<b>UNITS</b>
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 21°C	: 94	psia
Vapor density at 16°C (Air = 1)	: 0.62	
Evaporation point	: Not Available	
Boiling point	: -33.3	°C
Freezing point	: -77.7	°C
PH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H <sub>2</sub> O)	: Very soluble	
Odor threshold	: Not Available	
Odor and appearance	: A colorless gas with a pungent odor.	

## 10. Stability and Reactivity

**STABILITY:** Stable.

**INCOMPATIBLE MATERIALS/CONDITIONS:** Reacts with acids and oxidizing materials (fluorine, chlorine, etc.) Corrosive to copper, zinc, and many metal surfaces. Reacts with hypochlorite or other halogen sources to form explosive compounds, which are pressure and temperature sensitive. Will react with water.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Thermal decomposition will produce nitrogen oxides and hydrogen at very high temperatures: 840°C.

**HAZARDOUS POLYMERIZATION:** Will not occur.

## 11. Toxicological Information

**INHALATION:** Ammonia can cause severe irritation and damage to the lungs and respiratory tract. The acute LC<sub>50</sub> (1 hour, rat) for ammonia is 7338 ppm. High level exposures may result in immediate and/or long-term respiratory problems. Symptoms may be delayed following exposure.

**SKIN AND EYE:** Contact with skin and eyes may cause burns and blisters or eye damage and partial or complete blindness.

**OTHER:** Genetic mutations observed in bacterial and mammalian test systems.

Toxic effects to the respiratory system, senses, liver, kidneys and bladder observed in mammalian species from prolonged inhalation exposures at above 100 ppm.

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## 12. Ecological Information

Product does not contain Class I or Class II ozone depleting substances. In the environment, bacteria convert ammonia to nitrate creating an oxygen demand (BOD) for several days afterward. See Section 3 for ecotoxicity values.

## 13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

## 14. Transport Information

PARAMETER	India	
PROPER SHIPPING NAME:	Ammonia, Anhydrous	
HAZARD CLASS:	2.2	
IDENTIFICATION NUMBER:	UN 1005	
SHIPPING LABEL:	NONFLAMMABLE GAS	

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

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