



Emergency Contact: Chemtrec (800) 424-9300
Or Norco (208) 336-1643

1125 West Amity Road
Boise, ID 83705
(208) 336-1643

Ammonia in Nitrogen 0.0001% to 5.0%

MATERIAL SAFETY DATA SHEET

Identification

Product Name: Ammonia in Nitrogen 0.0001% to 5.0%
CAS Number: N/A
Chemical Family: Gas Mixture
Chemical Formula: NH₃ 0.0001% to 5.0% in Nitrogen
Common Names/Synonyms: None
TDG (Canada) Classification: 2.2
WHMIS Classification: A, D2B
MSDS Identification Code/Number: # 2005
Prepared By: Quality Department

Revision Date: 01/03/06
Last Review Date: 01/27/12

Composition/Information on Ingredients

Exposure Limits¹:

INGREDIENT	% VOLUME	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ OR LC ₅₀ Route/Species
Nitrogen FORMULA: N ₂ CAS #: 7727-37-9 RTECS #: QW9700000	95-100	Not Available	Not Available	Simple Asphyxiant
Ammonia FORMULA: NH ₃ CAS #: 7664-41-7 RTECS #: BO0875000	0.0001% to 5.0%	8 Hr TWA 50 PPM	25 PPM TWA 35 PPM (STEL)	LC50: 7338 PPM / 1Hr Inhalation / rat

¹ Refer to individual state or provincial regulations, as applicable for limits which may be more stringent than those listed here.

² As stated in 29 CFR 1910.1000, Subpart Z (revised July 1, 1993)

³ As stated in the ACGIH 2007 Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) booklet.

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

IDLH: 300 PPM (Ammonia)

Hazards Identification

Emergency Overview:

Colorless gas with ammonia odor which may cause eye, skin and respiratory irritation. High concentrations of gas may accumulate in confined or poorly ventilated areas, displacing oxygen and causing unconsciousness or death. Exposure to ammonia present in this product may cause eye, skin and respiratory irritation and or eye damage. Inhalation of high concentrations may damage the lungs causing chemical pneumonitis and swelling with fluid retention (edema). Use only with adequate ventilation. Contents under pressure. Avoid heat and flames. Protect containers from physical damage. Use and store below 125°F (52°C).

Hazards Identification Continued

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 No

Synergistic Effects

Absorption in particles enhances irritation effects.

Carcinogenicity: NTP: No IARC: No OSHA: No

Eye Effects:

Contact may cause eye irritation with associated redness, swelling, and tears. Ammonia can cause eye damage with corneal burns if not rinsed promptly. Contact with rapidly expanding gas near the point of release may cause frostbite.

Skin Effects:

Contact may cause skin irritation and redness. Contact with rapidly expanding gas near the point of release may cause frostbite.

Ingestion Effects:

Accidental ingestion is unlikely as at ambient temperature and pressure (NTP) this product is a gas.

Inhalation Effects:

Products which contain small amounts of ammonia may act as simple asphyxiants. Release of sufficient quantities of these products may cause asphyxiation or suffocation by displacing oxygen content in the air.

Ammonia is irritating and corrosive to the upper respiratory system and mucous membranes. Inhalation may cause chemical pneumonitis and pulmonary edema. Symptoms are dependent upon concentration inhaled and may include burning sensation, coughing, wheezing, shortness of breath, headache, nausea with eventual collapse and death.

Medical Conditions Aggravated By Exposure:

May aggravate pre-existing corneal disease, glaucoma, and respiratory disease.

First Aid Measures

Eyes:

Immediately flush eyes with large amounts of water for at least 15 minutes opening and closing eyelids to ensure adequate rinsing. If frostbite is suspected, flush with cool water for 15 minutes and obtain immediate medical attention.

Skin:

Remove contaminated clothing and flush affected area with large quantities of water. If irritation persists, seek medical attention. If frostbite is suspected, flush with cool water for 15 minutes and obtain immediate medical attention.

Ingestion:

Not anticipated, product is a gas at normal conditions.

Inhalation:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Seek medical attention.

Fire Fighting Measures

Conditions of Flammability: Not flammable		
Flash Point: None	Method: Not Applicable	Autoignition Temperature: None
LEL (%): None	UEL (%): None	
Hazardous combustion products: NH ₃ and NO _x		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

Fire and Explosion Hazards:

The majority of this product constitutes a nonflammable inert gas. Ammonia is present in concentrations below the Lower Explosive Limits (LEL). Cylinders may rupture violently from pressure when involved in a fire situation.

Extinguishing Media:

Use water spray to keep cylinders cool. Use extinguishing agent appropriate for the combustible material.

Fire Fighting Instructions:

Continue to cool heat or flame exposed containers until well after the flames are extinguished. Since ammonia is soluble in water, it is the best extinguishing medium. Water will extinguish the fire and also absorb the escaped ammonia gas. Prevent entry of corrosive run-off waters into waterways and sewers. Firefighters should wear a full-facepiece, NIOSH/MSHA-approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear.

Accidental Release Measures

Evacuate all personnel from affected area. Deny entry to unauthorized and unprotected individuals. Use appropriate protective equipment including respiratory protection for high or unknown concentrations. Personnel should not re-enter hazard area until ammonia is dispersed and adequate atmospheric oxygen is re-established. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container valve, contact the appropriate emergency telephone number listed in Section 1, or call your closest Norco location.

Handling and Storage

Electrical Classification:

Non-hazardous

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 reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous backflow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125° F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Use a "first in, first out" inventory system to prevent full cylinders being stored for excessive period of time.

For additional recommendations, consult Compressed Gas Association's Pamphlets P-1.

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.

Exposure Controls, Personal Protection

Engineering Controls:

Use local exhaust ventilation as necessary to maintain atmospheric oxygen levels above 19.5% and control air contaminants to below acceptable exposure guidelines.

Exposure Controls, Personal Protection Continued

Eye/Face Protection:

Goggles should be worn.

Skin Protection:

Protective gloves made of suitable material (i.e. butyl rubber) appropriate for the job.

Respiratory Protection:

Positive pressure air line with full facepiece and escape bottle or SCBA should be available for emergency use.

Other/General Protection:

Safety shoes, emergency eyewash station.

IDLH: 300 ppm (ammonia)

Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Above critical temp.	
Vapor density (Air = 1)	: Not Available	
Evaporation point	: Not Available	
Boiling point	: -195.8	°C (liquid as N ₂)
Freezing point	: Not Available	
pH	: Not Available	
Specific gravity at STP	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H ₂ O)	: Negligible	
Odor threshold	: 4.68 ppm	(Pure NH ₃ in Air)
Odor and appearance	: Colorless gas with ammonia odor	

Stability and Reactivity

Stability:

Stable

Incompatible Materials:

Ammonia is corrosive to copper, zinc, and many metal surfaces. Ammonia may react with hypochlorite or other halogen sources to form explosive compounds which are pressure and temperature sensitive.

Hazardous Decomposition Products:

Thermal decomposition will produce toxic fumes of NH₃ and NO_x.

Hazardous Polymerization:

Will not occur.

Toxicological Information

Eye:

Eye irritation was reported in 6 human volunteers exposed to 94 mg/m³ ammonia for 5 minutes. At 700 ppm eye irritation and permanent injury may result if prompt remedial measures are not taken. (Chris. Hazard Chem. Data, Vol. II 1984-85).

Skin:

Concentrations of 5 to 10% ammonia rarely cause burns to the skin.

Toxicological Information Continued
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Oral:

Deliberate suicidal ingestion of 5-10% ammonia (household ammonia) has resulted in esophageal burns.

Inhalation:

Irregular minute ventilation with cyclic patterns of hypernea, increases in blood pressure and pulse rate, variable lacrimation, and general complaints of upper respiratory irritation were reported during human exposures to 500 ppm ammonia for 30 minutes.

Chronic:

Guinea pigs (12) exposed to 170 ppm ammonia 6Hr/day, 5 day/week for up to 18 weeks exhibited congestion of the spleen, liver, and kidneys with degenerative changes in suprarenal glands. No adverse effects were observed in the 4 exposed animals and 2 control animals killed at 6 and 12 weeks.

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. Ammonia combines with sulfate ion in the atmosphere or in washout by rainfall resulting in a rapid return of ammonia to the soil.

Disposal Considerations

Do not attempt to dispose of waste or unused quantities in refillable cylinders. Return in the shipping container *properly labeled with any valve outlet plugs or caps secure and valve protection cap in place* to Norco for proper disposal. Non refillable cylinders may be safely vented outdoors and disposed of in accordance with State and/or local regulations or return to NorLab for disposal.

Transport Information

PARAMETER	United States DOT	Canada TDG
Proper Shipping Name:	Compressed Gas, N.O.S., (Nitrogen, Ammonia)	Compressed Gas, N.O.S.,
Hazard Class:	2.2	2.2
Identification Number	1956	1956
Shipping label:	Non-flammable gas	Non-flammable gas

Note: If net weight of ammonia is \geq 100 pounds, the container and shipping papers must also be marked with the letters "RQ".

Regulatory Information

Ammonia is listed under the accident prevention provisions of section 112(R) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

SARA Title III Notification and Information:

Releases of ammonia in quantities equal to or greater than the reportable quantity (RQ) of 100 pounds are subject to reporting to the National Response Center under CERCLA, Section 304 SARA Title III.

SARA Title III – Hazard Classes:

Acute Health Hazard
Sudden Release of Pressure Hazard

SARA Title III – Section 313 Supplier Notification:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and for 40 CFR 372:

CAS Number	Ingredient Name	Percent by Volume
7664-41-7	Ammonia	0.0001% to 5.0%

This information must be included on all MSDSs that are copied and distributed for this material.

Regulatory Information Continued

EPCRA Section 302:

This product contains ammonia a designated extremely hazardous Substance (EHS) with a Threshold Planning Quantity (TQP) of 500 pounds. The presence of EHSs in quantities in excess of the TQP requires certain emergency planning activities to be conducted.

California Proposition 65: This product does not contain ingredient(s) known to the State of California to cause cancer or reproductive toxicity.

Other Information

NFPA Hazard Codes

Health: 1
 Flammability: 0
 Instability: 0

HMIS Hazard Codes

Health: 1
 Flammability: 0
 Physical Hazard: 3

Ratings System

0 = No Hazard
 1 = Slight Hazard
 2 = Moderate Hazard
 3 = Serious Hazard
 4 = Severe Hazard

Hazard ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, *CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition*.

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.

Disclaimer of Expressed and Implied Warranties:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).