

Section 1. Chemical Product and Company Identification

PRODUCT IDENTIFIER: ANHYDROUS AMMONIA

INTENDED USE: Fertilizers, Manufacture of Chemicals, Manufacture of synthetic fibers, Refrigerant, Cleaning solutions, Pollution Control, Other Industrial Uses

USES ADVISED AGAINST: Consumer use

CONTACT INFORMATION:
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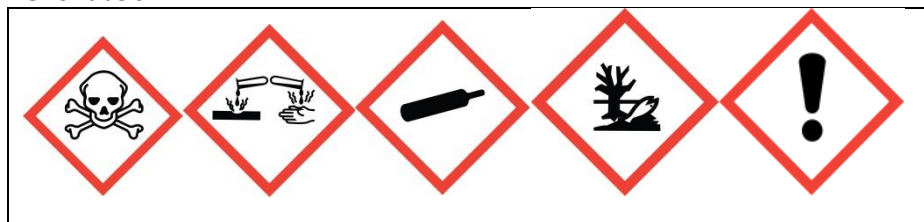
IN CASE OF EMERGENCY CALL: 00973 17 731777

Section 2. Hazards Identification

GHS Full Text Phrases:

Acute Tox. 3 (Inhalation: gas)	Acute toxicity (inhalation: gas) Category 3
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Flam. Gas 2	Flammable gases Category 2
Liquefied gas	Gases under pressure Liquefied gas
Skin Corr. 1B	Skin corrosion/irritation Category 1B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H221	Flammable gas
H280	Contains gas under pressure; may explode if heated
H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H331	Toxic if inhaled
H335	May cause respiratory irritation
H400	Very toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

GHS Labels



Safety Data Sheet

Classified according to UN-GHS

Revision Date: 1st Mar, 2019

Reissue Date: 1st Mar, 2021

Section 3. Composition and Information on Ingredients		
Component Name:	Identification	% Contents by Weight
Ammonia	CAS No 7664-41-7	>99.5
Ammonium Hydroxide	CAS No 1336-21-6	<0.5
Synonyms:	Liquid Ammonia	

Chemical Name:	Ammonia
Chemical Formula:	NH ₃ CAS # 7664-41-7 EC no: 231-635-3 Index no: 007-001-00-5 GHS No
MIXTURES:	Not Applicable

Section 4. First Aid Measures	
General:	Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). If frostbite or freezing occurs, immediately flush with plenty of lukewarm water to GENTLY warm the affected area. Do not use hot water. Do not rub affected area. Get immediate medical attention.
Eye Contact:	Flush eyes with large quantities of water. Seek medical attention immediately.
Ingestion:	Ingestion is not a likely route of exposure for Ammonia.
Inhalation:	Remove person to fresh air. If not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention.
Skin Contact:	Flush affected area with large quantities of water. Remove contaminated clothing immediately. If liquid comes in contact with skin, remove contaminated clothing and flush with plenty of lukewarm water for several minutes. Seek medical attention immediately.
Emergency aid:	Remove patient to uncontaminated area
Eye	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.

Section 4. First Aid Measures

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

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 5000 ppm may be fatal.

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.

Note to Physician: Bronchospasm may be treated with the use of a bronchodilator such as albuterol and an anticholinergic inhalant such as Atrovent.

Respiratory injury may appear as a delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Supportive treatment with necessary ventilation actions, including oxygen, may warrant consideration.

Section 5. Fire and Explosion Data

Extinguishing Media: Dry chemical, carbon dioxide or water, water spray or alcohol-resistant foam if gas flow cannot be stopped.

Special Fire Fighting Instructions: Evacuate all personnel from area. If possible without risk, stop the flow of Ammonia, then fight fire according to types of materials that are burning.

Extinguish fire only if gas flow can be stopped. This will avoid possible accumulation and re-ignition of a flammable gas mixture. Self-contained breathing apparatus (SCBA) may be required.

If a portable container (such as 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. Where not portable, 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

Safety Data Sheet

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Revision Date: 1st Mar, 2019

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	may form toxic oxides of Nitrogen.
	If relief valves are inoperative, heat exposed storage containers may become explosion hazards due to over pressurization.
	Runoff from firefighting may be contaminated; check pH Ammonia can form explosive compounds when combined with mercury.
Exposure Limits:	
OSHA:	PEL = 50 ppm
ACGIH:	TLV/TWA = 25 ppm
NIOSH:	IDLH = 300 ppm
	TLV-STEL = 35 ppm
Flash Point:	Not applicable
Autoignition	1204 °F (651 °C)
Flammable Range:	16%- 25%
Hazardous Combustion Products:	Oxides of nitrogen.

Section 6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled:

Wear self-contained breathing apparatus (SCBA) when entering release area if concentrations exceed allowable exposure limits. Fully protective suits are required in large releases.

Always be aware of fire and explosion potential in the case of large releases.

Evacuate immediate area. Eliminate any possible sources of ignition, and provide maximum explosion-proof ventilation. Shut off source of leak if possible. Ammonia vapors can be controlled with water spray, however; runoff may be contaminated. Releases that exceed 100 lbs (45.4 kgs) during a 24-hour period must be reported. (See Section 15).

CAUTION: ADDING WATER DIRECTLY TO LIQUID SPILLS WILL INCREASE VOLATILIZATION OF AMMONIA, THUS INCREASING THE POSSIBILITY OF EXPOSURE.

All responders must be adequately protected from exposure.

The atmosphere must have at least 19.5% oxygen before personnel can be allowed in the area without self-contained breathing apparatus (SCBA).

Section 7. Handling and Storage

Only trained persons should handle anhydrous ammonia. Store in cool (26.7 DegC / 80 DegF) and well ventilated areas.

OSHA 29 CFR 1910.111 prescribes handling and storage requirements for anhydrous ammonia as a hazardous material.

Use only Carbon Steel, Stainless Steel and Black Iron for Ammonia containers and piping. Do not use any non-ferrous metals such as Copper, Bronze, Brass, tin, zinc or galvanized metals. Protect containers from physical damage

Keep away from ignition sources, especially in indoor spaces.

Keep separated and away from incompatible substances.

Section 8. Exposure Controls/Personal Protection

Exposure limits for Ammonia: Vapour

OSHA	50 ppm	35 mg/m ³ PEL	8 Hour TWA
NIOSH	35 ppm	27 mg/m ³ STEL	15 Minutes
	25 ppm	18 mg/m ³ REL	10 Hour TWA
	300 ppm	IDLH	
ACGIH	25 ppm	18 mg/m ³ STEL	8 Hour TWA
	35 ppm	27 mg/m ³ STEL	15 Minutes
Toxicity:	LD50, (Oral / Rat) 350 mg/kg		

Ventilation: Provide adequate natural or mechanical ventilation to maintain Ammonia concentrations below exposure limits.

Respiratory Protection: Emergency Use

Self-contained breathing apparatus (SCBA) or positive pressure airline with full face mask with escape pack should be worn in areas of a large release or unknown concentration.

Eye Protection: Safety glasses. Chemical goggles with full face shield.

Skin Protection: Rubber or Neoprene gloves and chemical resistant outer garment should be worn. Total encapsulating chemical suit may be necessary in large release area. Fire resistant suit and gloves in emergency situations.

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.

Section 8. Exposure Controls/Personal Protection

Other Protective Equipment:	Safety shoes are recommended. Safety shower and eyewash fountain should be readily available.
Workplace Protective Equipment:	Protective equipment should be stored near, but outside of anhydrous ammonia area. Water for first aid, such as an eyewash station and safety shower, should be kept available in the immediate vicinity according to 29 CFR 1910.111 for workplace requirement.
Hazardous Release Response	Level A or Level B ensemble including positive-pressure SCBA should be used
OSHA References for PPE	29 CFR 1910.133 for eye protection requirement 29 CFR 1910.134 for respiratory protection requirement 29 CFR 1910.111 for respiratory protection requirements for bulk installations
Caution:	Contact with cold, evaporating liquid on gloves or clothing may cause cryogenic burns or frostbite. Cold temperatures may also cause embrittlement of PPE material resulting in breakage and exposure.

Section 9. Physical and Chemical Properties

Physical state:	Gas.
Flammability	Not Available
Flammable limits: (In air)	Lower Explosive Limit: 16% Upper Explosive Limit: 25%
Color:	Colorless liquid
Odor:	Pungent. [Strong].
Odor Limit	1-50 ppm
Vapour Pressure	8.7 at 21.1 DegC
pH:	N/A
Specific Gravity of Gas (air =1)	0.596 at 0 DegC
Specific Gravity of liquid (water =1)	0.682 at -33 DegC compared to water at 4.3 DegC
Vapor density:	0.77 kg/m ³ at 0 DegC
Liquid Density	608 kg/m ³ at 21.1 DegC
Melting/freezing point:	-77.77°C (-108°F)
Solubility in Water (per 45 kg of Water)	40 kg at 0 DegC & 23 kg at 20 DegC

Safety Data Sheet

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Section 9. Physical and Chemical Properties

Boiling Point	-33 DegC (-28 DegF) at 1 atm
Flash Point	Not Available
Evaporation Rate	Not Available
% Volatile	100% @ 100 DegC (212 DegF)
Partition Coefficient (n-octanol/Water)	-1.14 at 25 DegC (68 DegF)
Critical Temperature:	133 DegC
Critical Pressure	111.5 atm
Gas Specific Volume	1.3 m ³ /kg at 0 DegC & 1 atm
Surface Tension	23.4 dynes/cm at 11.11 DegC
Viscosity: Dynamic:	10 mPa.s (10 cP)

Section 10. Stability and Reactivity Data

Chemical Stability:	Stable
Conditions to Avoid:	High temperatures (>426DegC (800 DegF))
Incompatibility (Materials to Avoid):	Copper, silver, cadmium and zinc and their alloys; mercury, tin, acids, alcohols, aldehydes, halogens and oxidizers.
Reactivity:	<ul style="list-style-type: none"> 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. Anhydrous ammonia has potentially explosive reactions with strong oxidizers.
Stability	<ul style="list-style-type: none"> Flammable Gas; Contains gas under pressure; May explode if heated Can form explosive mixtures with air.
Conditions to Avoid	<ul style="list-style-type: none"> 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 Polymerization:	Will not occur under normal conditions of storage and use.

Section 10. Stability and Reactivity Data

Hazardous
Decomposition
Products

- Anhydrous Ammonia decomposes to hydrogen and nitrogen gases above 450 DegC (842 DegF).
- 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.

Section 11. Toxicological Information

Routes of Entry:	Inhalation, eye or skin contact
Acute toxicity	Toxic if inhaled
LC50 (Inhalation):	5.1 mg/l (exposure for 1 hour for rat); 2000 ppm (rat, 4 hours)
LD50 (Oral) rat:	350 mg/kg
Skin Corrosivity:	Ammonia is corrosive to the skin. Causes skin burns and eye damage
Respiratory and Skin sensitization	Not categorized
Germ Cell Mutagenicity	Not classified
Teratogenicity	Not classified
Carcinogenicity	Not classified
Specific Target Organ Toxicity	May cause respiratory irritation
Aspiration Hazard	No classified
Symptoms/Injuries after inhalation	Toxic if inhaled
Symptoms/Injuries after skin contact	Corrosive. Causes burns. Symptoms may include redness, pain. Serous sin burns. Blisters
Symptoms/Injuries after eye contact	Causes permanent damage to the cornea, iris, or conjunctiva. Redness. Pain. Blurred vision. Severe burns.
Symptoms/Injuries after ingestion	Ingestion is unlikely route of exposure for a gas
Additional Notes:	Rats exposed continuously to 180 ppm Ammonia for 90 days did not show any abnormalities of organs or tissues. Mild nasal irritation was observed in 12 out of 49 rats exposed to 380 ppm Ammonia. At 655 ppm Ammonia, 32 out of 51 rats died by day 25 of exposure and 50 out of 51 rats had died after 65 days of exposure.

Section 12. Ecological Information

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Aquatic Toxicity:	Currently, the following aquatic toxicity data are available for Ammonia: <ul style="list-style-type: none"> Daphnia magna (48 hour) LC50 = 189 mg/l Rainbow trout (24 hour) LC50 = 0.97 mg/l Fat head minnow (96 hour) LC50 = 8.2 mg/l
Mobility:	Not available
Persistence and Biodegradability:	Not available
Potential to Bioaccumulate:	Not available
Remarks:	<ul style="list-style-type: none"> Do not release large amounts of Ammonia to the atmosphere. It does not contain any Class I or Class II ozone depleting chemicals.

Section 13. Disposal Considerations

Disposal:	<ul style="list-style-type: none"> Classified as Resource Conservation and Recovery Act (RCRA) 40 CFR 261.22 Corrosive # D002 Hazardous Waste due to corrosivity Listed as hazardous substance under CWA (40 CFR 116.4, 40 CFR 117.3). Reportable quantity 100 pounds (45.35 kg). Suitably diluted product may be utilized on agricultural land as fertilizer. Keep spill from entering streams, lakes, or any water systems. Small amounts of Ammonia may be disposed of by discharge into water. A ratio often parts water to one part Ammonia should be sufficient for disposal. The subsequent solution of ammonium hydroxide can be neutralized and should be properly disposed of in accordance with regulations.
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Section 14. Transport Information

DOT Shipping Name:	AMMONIA, ANHYDROUS, 2.3, RQ, (8), Poison-Inhalation Hazard Zone "D"
Identification Number:	UN 1005
Hazard Class:	2.3 (Poison Gas) Subsidiary 8 (Corrosive)
National Fire Protection Association (NFPA)	<p>Hazardous Rating and Hazardous Materials Identification System Labels:</p> <p>Anhydrous Ammonia</p> <p>HEALTH = 3</p> <p>FLAMMABILITY = 1*</p> <p>REACTIVITY = 0</p> <p>PERSONAL PROTECTION = H</p> <p>* NFPA rates this gas a 1 as opposed to a 4 because it is "difficult to burn".</p>



Gulf Petrochemical Industries Co. (BSC)

Safety Data Sheet

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Shipping Label:	Hazard Class 2.3 (Poison Gas) subsidiary 8 (Corrosive)
Placard (When Required):	Poison Gas, Corrosive (Subsidiary)
Emergency Response Guidebook (ERG)	ID No 1005; Guide No 125

Section 15. Other Regulatory Information

U.S. Federal Regulations:

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302)

Reportable Quantity (RQ): 100 lbs (45.4 kgs)
Superfund Amendment and Reauthorization Act The material is subject to the reporting requirements of sections 304, 312 & 313

SARA Title III: Sections 302/304: Emergency Planning and Notification (40 CFR Part 355) Extremely Hazardous Substances: Ammonia is listed.

Threshold Planning Quantity (TPQ): 500 lbs (227 kgs)

Reportable Quantity (RQ): 100 lbs (45.4 kgs)

Sections 311/312: Hazardous Chemical Reporting (40 CFR Part 370)

IMMEDIATE HEALTH: Yes

PRESSURE: Yes

DELAYED HEALTH: No

REACTIVITY: No

FIRE: No

Section 313: Toxic Chemical Release Reporting (40 CFR Part 372)

Ammonia is on the list of chemicals which may require reporting under Section 313.

Clean Air Act: Section 112 (r): Risk Management Programs for Chemical Accidental Release (40 CFR PART 68)

Ammonia is listed as a regulated substance.

Threshold Quantity (TQ): 10,000 lbs (4535 kgs)

Toxic Substance Control Act TSCA Ammonia is listed on the TSCA inventory

Occupational Safety : And Health Process Safety Management of Highly Hazardous Chemicals. Ammonia is listed as a highly hazardous chemical.

Administration OSHA 29 CFR Part 1910.119 Threshold Quantity (TQ): 10,000 lbs (4535 kgs)



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Department of Homeland Security:	The chemical is listed under regulation 6 CFR Part 27, Chemical Facility Anti-Terrorism Standards at storage/process amounts greater than the threshold quantity of 10,000 pounds
Rail Transport Security:	The chemical is subject to 49 CFR 1580

Section 16. Other Information

NFPA Rating

Health Hazard	3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given
Fire Hazard	Must be preheated before ignition can occur
Reactivity	Normally stable, even under fire exposure conditions, and are not reactive with water
Fire Hazard	1 - Must be preheated before ignition can occur
Reactivity	0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

This information is based on the current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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