

**ANHYDROUS AMMONIA GAS**

REVISION DATE: 09/16/2024

**1. - PRODUCT AND COMPANY IDENTIFICATION**

**Product name:** Anhydrous ammonia gas.

**Internal product identification code:** 11.01.0.

**Company name:** USIQUÍMICA DO BRASIL LTDA.

**Address:** Rua da Lagoa, 431 – Cumbica – Guarulhos – SP.

**Company telephone number:** (11) 3821-7000 (key trunk) – (11) 2481-3355.

**Emergency telephone numbers:** SUATRANS - COTEC - Environmental Emergency.  
DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.  
193 – Firefighters.

**Main recommended uses for the substance or mixture:**

Used in the fertilizer, pharmaceutical, textile and industrial refrigeration industries.

**2. - HAZARD IDENTIFICATION****Classification of the substance**

Gases under pressure, Liquefied Gas

Skin corrosion/irritation, category 1A

Acute toxicity - Oral, category 3

Acute toxicity - Dermal, category 3

Acute toxicity - Inhalation, category 3

Specific organ toxicity - exp. Single, category 1

Specific organ toxicity - exp. Repeated, category 2

Serious eye damage/ eye irritation, category 1

Respiratory sensitization, category 1

Skin sensitization, category 1 - subcategory 1A and 1B

Aspiration hazard, category 1

Dangerous to the aquatic environment - Acute, category 1

Germ cell mutagenicity, category 2

**Most important hazards:** Liquefied gas under pressure, toxic and aggressive to the environment, with an extremely pungent odor, which makes it easy to detect by smell even at low concentrations.

Due to its high solubility in water, ammonia, in gaseous form, dissolves in the mucous membranes of the eyes and respiratory tract, exerting an intense irritant effect and cellular damage due to its caustic alkaline action.

**Product effects:** Toxic effect on human health.

**Adverse effects on human health:** Contact with liquid Ammonia can cause severe burns to the eyes and skin. Its toxic action on mucous membranes stops breathing and prevents vision, even at low concentrations. It can cause burns and asphyxiation. A concentration of 500 ppm causes throat irritation. 2000 ppm is dangerous for small exposures and 5000 ppm can be fatal even in the case of brief exposure.

**Inhalation:** Inhalation of gaseous ammonia, in high concentrations, can cause death.

**Eye contact:** Liquid ammonia can cause severe eye burns and prevents vision even at low concentrations in the gaseous phase.

**Skin contact:** Liquid ammonia is a skin irritant that can cause skin burns.

**Ingestion:** Causes corrosion and immediate damage to the gastrointestinal tract.

**Burns:** Liquid ammonia can cause skin burns.

**Adverse effects on the Environment:** Because it is highly soluble in water and, even in low concentrations, it is harmful to aquatic life. Exposed animals may suffer tissue damage and even death. It burns plants through dehydration.

**Physical and chemical hazards:** Ammonia is an alkaline product that releases heat when it reacts with acid. In contact with halogens, boron, alkyl sulfates 1.2 dichloroethane, ethylene oxides, platinum, nitrogen trichlorate and strong oxidants, it can cause extremely exothermic or explosive reactions.

In contact with heavy metals and their compounds, it can form explosive products. In contact with chlorine and its compounds, it can result in the release of chloramine gas. Ammonia can produce a significant explosive mixture when in contact with hydrocarbons. The product is also incompatible with acetic aldehyde, acrolein, hydrazine and potassium ferrocyanide.

**Specific hazards:** Ammonia vaporizes rapidly. The gas is lighter than air. Ammonia is stable when stored and used under normal storage and handling conditions. Above 450°C it can decompose, releasing nitrogen and hydrogen, the latter

**ANHYDROUS AMMONIA GAS**


REVISION DATE: 09/16/2024

being highly flammable. No polymerization occurs.

**Main symptoms:** Inhalation can cause difficulty breathing, bronchospasm, burns to the mucous membranes of the mouth, pharynx and larynx, chest pain and constriction, and salivation. Depending on the concentration and time of exposure, the respiratory condition can progress to edema and glottis spasm, asphyxia, cyanosis, pulmonary edema, respiratory arrest and death. Contact of liquid Ammonia with the skin can cause severe burns. Eye exposure to Ammonia in gaseous form can cause tearing, redness and swelling of the eyelids. Accidents with liquid ammonia in the eyes are always serious and can cause permanent loss of vision. Repeated exposure to the product can cause chronic bronchitis. Symptoms of ammonia poisoning begin with irritation of the eyes, nose and throat, followed by coughing, choking, chest pain and vomiting.

**Emergency overview:** Depending on the proportions, isolate and evacuate the area. Try to block the leak or transfer the product. Keep the wind at your back. People should only be allowed access to contaminated areas if they are wearing protective clothing and a mask with supplemental air.

**GHS labeling elements, including precautionary statements.**

LABEL ELEMENTS	DATA
Product identification and supplier's emergency telephone number.	Trade name: ANHYDROUS AMMONIA GAS. Synonym: AMMONIA GAS. Emergency telephone number: SUATRANS - COTEC - Environmental Emergency. DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.
Chemical composition.	<ul style="list-style-type: none"> <li>• Anhydrous ammonia gas (NH<sub>3</sub>), minimum = 99.5% (m/m).</li> <li>• Water, maximum = 0.5% (m/m).</li> </ul>
Hazard pictograms.	
Warning word.	<b>DANGER</b>
Hazard statement.	<ul style="list-style-type: none"> <li>- H280: Contains gas under pressure: may explode if heated.</li> <li>- H330: Fatal if inhaled.</li> <li>- H301: Toxic if swallowed.</li> <li>- H314: Causes severe skin burns and eye damage.</li> <li>- H334: May cause allergy symptoms, asthma symptoms or breathing difficulties if inhaled.</li> <li>- H341: Suspected of causing genetic defects.</li> <li>- H370: Causes damage to the respiratory system.</li> <li>- H373: May cause damage to the respiratory system through prolonged or repeated exposure.</li> <li>- H410: Very toxic to aquatic life with long-lasting effects</li> </ul>



## CHEMICAL PRODUCT SAFETY DATA SHEET MSDS

**ANHYDROUS AMMONIA GAS**

REVISION DATE: 09/16/2024

Precautionary statements.	<ul style="list-style-type: none"><li>- P301 + P330 + P331: IF SWALLOWED: Rinse mouth. DO NOT induce vomiting.</li><li>- P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.</li><li>- P304 + P340: IF INHALED: Move person to fresh air and keep at rest in a position comfortable for breathing.</li><li>- P305 + P351 + P338: IN CASE OF CONTACT WITH EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.</li><li>- P308 + P311: IN CASE OF exposure or suspected exposure: Call a POISON CENTER/doctor.</li><li>- P342 + P311: If respiratory symptoms occur: Call a POISON CENTER/doctor.</li><li>- P361 + P364: Take off immediately all contaminated clothing and wash it before reuse.</li><li>- P377: Leaking gas with flames: do not extinguish unless leak can be stopped safely.</li><li>- P381: Eliminate all sources of ignition if safe to do so.</li><li>- P391: Collect spilled material.</li></ul>
Precautionary statements: Storage.	<ul style="list-style-type: none"><li>- P403: Store in a well-ventilated place.</li><li>- P410: Keep away from sunlight.</li></ul>

**Other hazards not resulting in a classification:** Not known**3. - COMPOSITION AND INFORMATION ON INGREDIENTS****Substance:** ANHYDROUS AMMONIA GAS (NH<sub>3</sub>).**Chemical or common name:** AMMONIA (NH<sub>3</sub>).**Synonym:** ANHYDROUS AMMONIA (NH<sub>3</sub>).**CAS No. (Chemical Abstract Service):** 7664-41-7.**Impurities contributing to the hazard:** None.**4. - FIRST AID MEASURES****First aid measures:**

Move the victim to fresh air. If the victim is not breathing, give artificial respiration using a half-face mask. Call a doctor immediately. Remove contaminated clothing and shoes.

In case of contact with liquefied gas, thaw the affected part with warm water.

IMMEDIATE MEDICAL ASSISTANCE IS ESSENTIAL IN ALL CASES OF SERIOUS EXPOSURE. THE RESCUE TEAM MUST BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND AWARE OF THE RISKS OF TOXICITY.

**Cautions:** Mouth-to-mouth breathing can cause chemical burns to the person attending. Immediately take the victim to the nearest hospital.

**Inhalation:** Remove the victim to a non-contaminated and ventilated area and administer oxygen if available. Apply resuscitation maneuvers in the event of cardiorespiratory arrest. Caution: In the event of mouth-to-mouth resuscitation, the person treating the victim may be chemically burned.

Immediately take the victim to the nearest hospital.

**Skin contact:** Quickly remove contaminated clothing and shoes and apply a neutralizing agent (trade name Diphoterine). If this is not available, wash the area with plenty of running water. Next, use a neutralizing agent based on boric acid (5%) or boric water (3%). Do not rub the affected area.

**Eye contact:** Immediate care is essential. The first 10 seconds are critical to prevent blindness. Apply a neutralizing agent to the eyes (trade name Diphoterine).

If this is not available, wash the eyes with plenty of running water, lifting the eyelids to allow maximum removal of the product. Next, use a neutralizing agent based on boric acid (5%) or boric water (3%). Do not rub the eyes with your hands. After these cautions, immediately refer the victim to an ophthalmologist.

**Ingestion:** Due to the physical characteristics of ammonia, accidents due to ingestion are unlikely, but burns to the mouth, pharynx, esophagus and stomach may occur. Never give anything by mouth to unconscious or convulsive people. A conscious and alert victim may drink water. Do not induce vomiting. If vomiting occurs spontaneously, the victim should be laid on their side to prevent pulmonary aspiration. Refer the victim to a doctor and inform them of the characteristics of the product.

**ANHYDROUS AMMONIA GAS**

REVISION DATE: 09/16/2024

**Actions to be avoided:** Do not induce vomiting. Do not administer liquids to a torporous, unconscious or convulsive victim. Do not perform mouth-to-mouth breathing if the victim has inhaled or ingested the product. In these cases, use a resuscitation mask (half-face mask).

**Brief description of the main symptoms and effects:** Toxic if inhaled. Causes severe skin burns with pain, blistering and peeling of the skin. The skin may become white or yellowish, with a waxy appearance. Causes serious eye injuries with tearing, pain, eyelid edema, corneal ulceration and iris atrophy. Can lead to blindness. Contact of liquefied gas with eyes and skin can cause "frostbite". Can cause allergic or asthmatic symptoms and breathing difficulties with coughing and shortness of breath. Suspected of causing genetic defects. Causes lung damage with irritation, edema and hemorrhage. In high concentrations it can cause respiratory arrest, cardiac arrhythmia and death by asphyxiation. Repeated and prolonged exposure to the product can cause permanent lung damage.

**Protection of the first responder:** Adequate respiratory protection (self-contained breathing apparatus or mask with air supply) and PVC or nitrile gloves (lined).

**Notes to the doctor:** Avoid contact with the product when assisting the victim. If necessary, symptomatic treatment should include, above all, support measures such as correction of hydroelectrolytic and metabolic disorders, in addition to respiratory assistance. In case of contact with the skin, do not rub the affected area.

**5. - FIRE-FIGHTING MEASURES**

**Appropriate extinguishing media:** Presents moderate fire risk. In cases of fire in facilities, the best procedure is to stop the flow of gas by closing the valve. Use water fog, CO<sub>2</sub> or dry chemical to extinguish the flame adjacent to the valve that controls the gas supply. Use water fog to cool containers exposed to fire and stop the gas for personal protection. Water reduces the concentration of the gas due to the solubility of ammonia. For fires involving liquid ammonia, use dry chemical or CO<sub>2</sub> to fight it.

**Inappropriate extinguishing media:** Avoid the use of halogenated products.

**Specific hazards of the substance:** Wastewater from fire control can cause pollution.

**Special fire-fighting methods:** CAUTION! Corrosive liquid and gas under pressure.

**Specific hazards of combustion of the chemical:** Presents moderate risk when exposed to heat or flame. In the presence of oil and other combustible materials, the risk of fire increases. Under the action of heat, it can decompose, releasing toxic nitrous gases (NO<sub>x</sub>).

**Protective measures for firefighters:** Use personal protective equipment, especially respiratory protection. In the event of fire, there is a possibility of decomposition with the release of toxic gases. Use a self-contained respirator or a respirator with supplied air, as well as PVC or nitrile clothing and gloves (lined). Evacuate all personnel from the risk area. Do not approach the area without a self-contained respirator and protective clothing. Immediately cool the containers with water jets, keeping a maximum distance and taking care not to extinguish the flames. Remove sources of ignition if there is no risk. Remove all cylinders from the fire area if there is no risk. In the meantime, continue to cool with water jets. Let the fire burn out completely.

**6. - CONTROL MEASURES FOR SPILLS OR LEAKS**

**Personal precautions, protective equipment and emergency procedures.**

**Non-emergency personnel:** Do not breathe vapors or aerosols. Avoid contact with the substance. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures. If necessary, consult a specialist.

**Emergency service personnel:** Protective equipment: Full face mask with filter for acid gases in small leaks. Depending on the situation, use a full-face mask attached to a cylinder containing breathable air. As a complement to the information, you should use neoprene or PVC gloves (lined internally and long-sleeved), rubber or leather boots, Trevira, Tyvec or, preferably, level A or B overalls.

**Environmental precautions:** Keep people away. Stop the leak if there is no risk. Avoid contact with soil and waterways. High concentrations in the air endanger human, animal and plant life. Storage sites must have containment dikes.

**Differences in the actions for large and small leaks:** For small leaks, first isolate the area in all directions within a radius of 30 meters. Next, protect people in the direction of the wind within a radius of 100 meters. For large leaks, first isolate the area in all directions within a radius of 60 meters. Then, protect people in the direction of the wind within a radius of 600 meters during the day or 2,200 meters at night.

**Cleaning methods:** Use personal protective equipment (specific PVC clothing and self-contained respiratory protection equipment or air supply), isolate the area, and remove all sources of ignition. Reduce the product vapor with fog or fine jets of water.

**ANHYDROUS AMMONIA GAS**

REVISION DATE: 09/16/2024

**7. - HANDLING AND STORAGE****Handling:****Precautions for safe handling.**

**Technical measures:** Ensure sufficient ventilation or the existence of an exhaust system in the area to control ambient concentrations at low levels. Always use personal protective equipment (PVC clothing, neoprene gloves, boots and a mask with a chemical filter or self-contained breathing apparatus). Prevent physical damage to tanks, cylinders, pipes, etc., and isolate them from incompatible substances.

**Prevention of worker exposure:** Submit the entire system to periodic maintenance checks. Preventive maintenance can prevent leaks. Keep staff permanently trained.

**Precautions and guidelines for safe handling:** Handle containers and packaging using appropriate PPE. Make sure that the packaging is identified and free of contaminants. Avoid breathing the vapor produced by the product.

**Storage:****Safe storage conditions, including any incompatibilities.**

**Fire and explosion prevention:** Ammonia should be kept away from sources of ignition.

**Precautions and guidelines for safe handling:** To reduce the possibility of health risks, ensure sufficient ventilation or the existence of an exhaust system in the area to control the ambient concentration to low levels. Always use personal protective equipment.

Avoid contact with incompatible materials and environmental contamination, as mentioned in the previous fields.

**Storage:** Always use specified material compatible with Ammonia (piping: Carbon steel - ASTM A 106; Tanks: Carbon steel - standardized - ASTM A 285/A 515/A 516). Systems to be used with ammonia must be purged beforehand with inert gas. When it is not possible to eliminate air contamination, use stainless steel.

**Technical Measures**

**Adequate conditions:** Storage areas must be exclusively reserved for this purpose, well-ventilated and clean, equipped with containment dikes, fire-fighting system, cooling system and abatement system for leaks. Equipped with a safety valve system.

**Recommended packaging materials:** Not applicable.

**Incompatible products and materials:** See previous information.

**Special shipping information:** Cylinders must be transported in an upright position, in a well-ventilated vehicle. Cylinders transported in an enclosed vehicle, in a non-ventilated compartment, may present serious safety risks.

**8. - EXPOSURE CONTROL AND PERSONAL PROTECTION****Specific control parameters**

Occupational exposure limits:

20 ppm / 14 mg/m<sup>3</sup> up to 48 hours per week (NR 15 - Annex 11).

TLV-TWA – 25 ppm (17 mg/ m<sup>3</sup>) (ACGIH).

TLV-STEL – 35 ppm (24 mg/ m<sup>3</sup>) (ACGIH).

**Biological indicators:** CBC, platelets, arterial blood gas analysis. See Table I of NR 7 of Ordinance 3214/78 of the Ministry of Labor and Employment.

**Engineering control measures:** To reduce the possibility of potential health risk, ensure sufficient ventilation or the existence of exhaust in the location to control the concentration in the environment to low levels.

**Appropriate personal protective equipment:**

**Eye/face protection:** Wear chemical safety glasses and/or face shields.

**Skin and body protection:** Wear PVC clothing and boots.

**Hand protection:** Wear long PVC, neoprene, nitrile or natural latex gloves.

**Respiratory protection:** Panorama mask with NH<sub>3</sub> filter or combined. In large concentrations, use an autonomous mask (positive pressure) or a mask with supplied air.

**Attention:** masks with mechanical filters, do not protect workers exposed to an oxygen-deficient atmosphere.

Special precautions: Provide the area with emergency showers and eyewash stations. Never eat, drink or smoke in the work area. Practice good personal hygiene, especially before eating, drinking, and smoking.

**Specific control parameters:****Occupational exposure limits:**

20 ppm / 14mg/m<sup>3</sup> (LT - NR 15 - Annex 11) - ammonia

25 ppm / 17mg/m<sup>3</sup> (LT - ACGIH) - Ammonia



## CHEMICAL PRODUCT SAFETY DATA SHEET MSDS

### **ANHYDROUS AMMONIA GAS**

REVISION DATE: 09/16/2024

**Biological indicators:** See table I of NR 7 of Ordinance 3214/78 of the Ministry of Labor and Employment ([www.mte.gov.br](http://www.mte.gov.br))

**Other limits and values:** Not considered.

**Appropriate personal protective equipment:**

**Respiratory protection:** Mask with filter for ammonia vapors (NH<sub>3</sub>). In large concentrations, use self-contained masks or masks with supplied air.

**Hand protection:** Use PVC gloves (long barrel).

**Eye protection:** Wear wide-vision safety glasses and, if possible, a face shield.

**Skin and body protection:** Wear clothing suitable for working with chemical products, which can be enhanced with a Trevira cover.

**Special precautions:** Provide the area with showers and eyewash stations. Never eat, drink or smoke in the work area. Practice good personal hygiene, especially before eating and drinking. If possible, avoid smoking. Separate contaminated clothing, ensuring that it is effectively washed before reuse. Chemical products should only be handled by trained and qualified personnel. All PPE, according to NR-6, must have the CA (Certificate of Approval). Strictly follow the operational and safety procedures recommended by the organization. In places where chemical products are handled, workers' exposure must be monitored, according to PPRA (Environmental Risk Prevention Program) Ordinance 3.214/78 of the MTB - NR-09).

**Hygiene measures:** Keep workplaces within hygiene standards. Periodically educate employees on safe handling of the product.

## **9. - PHYSICAL AND CHEMICAL PROPERTIES**

**Physical state:** Liquefied compressed gas.

**Form:** Gas.

**Color:** Colorless.

**Odor:** Characteristic, pungent, suffocating odor.

**pH:** Not applicable.

**Melting point:** -77.73 °C (literature data).

**Boiling point:** -33.35 °C (literature data).

**Flash point:** Not applicable.

**Evaporation rate:** Not determined.

**Flammability:** Not applicable.

**Vapor pressure:** Not applicable.

**Vapor density:** 0.597 (dry air at 0 °C and 1 atm).

**Density:** (Gas at 21.1 °C, 1 atm): 0.71g/ml.

**Solubility:** In water: soluble (45.6% p/p at 25°C and 760 mmHg).

**In organic solvents:** soluble in methanol (29.3% p/p) and ethanol (21.0% p/p).

**Octanol/water partition coefficient:** Not determined.

**Auto-ignition temperature:** 651 °C

**Decomposition temperature:** above 450°C.

**Viscosity:** 0.00118 Pa.s at 20°C and 95%.

**Other information**

**Molecular weight:** 17 kg/kmol. Hygroscopic substance.

Although ammonia has explosive limits, it should be treated as a toxic gas as a priority and should not be forgotten when carrying out hot work, since it has flammability characteristics at high temperatures.

## **10. - STABILITY AND REACTIVITY**

**Specific conditions:**

**Chemical stability:** The product is stable when stored and used under normal storage and handling conditions. It decomposes above 450 °C. No polymerization occurs.

**Reactivity:** Reacts with the products listed below.

**Possibility of dangerous reactions:** The combination of ammonia and mercury is highly explosive.

**Conditions to be avoided:** Avoid contact with acids.

**Incompatible materials:** Halogens, boron, 1,2-dichloroethane, ethylene oxides, platinum, nitrogen trichlorate, strong

**ANHYDROUS AMMONIA GAS**

REVISION DATE: 09/16/2024

oxidants. The product is also incompatible with acrophein, hydraxin, potassium ferrocyanide, non-oxidizing mineral acids, sulfuric acid, nitric acid, organic acid, amide, organic anhydrides, isocyanates, vinyl acetate, alkene oxides (ethylene, propylene), epichlorohydrin, aldehydes, ethers, gold, copper. Also noteworthy are combinations with mercury, which are highly explosive.

**Hazardous decomposition products:** Under the action of fire it can decompose, releasing toxic gases.

**11. - TOXICOLOGICAL INFORMATION****Information according to the different routes of exposure:**

**Main symptoms:** It is a strong irritant to the upper and lower respiratory system. The symptoms depend on the concentration inhaled and the duration of exposure, and can cause a burning sensation, coughing, difficulty breathing, headache, nausea and eventually fainting. Moderate concentrations of vapor cause dermatitis or conjunctivitis. Higher concentrations or contact with the skin and eyes cause burns and inflammation of the eyes, with possible loss of vision. Contact with skin tissue or the eyes can cause cold burns.

**Acute toxicity:** Ammonia is toxic by inhalation. Depending on the concentration, Ammonia vapor can cause immediate irritation of the eyes, nose and throat, coughing and difficulty breathing. Exposure to high concentrations, even for short periods, may result in lung damage. Acute chemical pneumonitis may occur. Pulmonary edema may develop up to 48 hours after severe exposure.

ACGIH: LC<sub>50</sub> = 7338 ppm (1h, rat).

Oral DL<sub>50</sub> = 350 mg/kg (rat).

**Skin corrosion/irritation:** Causes severe skin burns with pain, blistering and peeling of the skin. The skin may become white or yellowish, with a waxy appearance. May cause pustules, tissue death, and gangrene in more severe cases. Contact with liquefied gas may cause frostbite.

**Serious eye damage/eye irritation:** Causes serious eye injuries with tearing, pain, eyelid edema, corneal ulceration and iris atrophy. Can lead to blindness. Contact with liquefied gas may cause frostbite.

**Respiratory or skin sensitization:** Can cause allergic or asthmatic symptoms and breathing difficulties with coughing and shortness of breath. The product is not expected to cause skin sensitization.

**Germ cell mutagenicity:** Suspected of causing genetic defects. Positive result in *in vivo* micronucleus test. In blood samples from workers exposed to the substance, an increase in the incidence of chromosomal aberrations and sister chromatid exchange in the blood cells analyzed was observed. Negative result in Ames test (*Salmonella typhimurium*).

**Carcinogenicity:** The product is not expected to be carcinogenic. Not carcinogenic according to IARC, NTP and OSHA. Not teratogenic. Not toxic to reproduction. It has no carcinogenic effect, according to the International Agency for Research on Cancer - IARC.

**Reproductive toxicity:** The product is not expected to be toxic to reproduction.

**Chronic toxicity:** Repeated exposure to concentrations above the tolerance limits for occupational exposure may cause respiratory function disorders.

**Genotoxicity:** In a study conducted on humans on the genotoxic effects of ammonia, blood samples from 22 workers exposed to ammonia in a fertilizer factory and 44 unexposed workers were analyzed. An increase in the frequency of chromosomal aberrations, exchanges between sister chromatids and an increase in the mitotic index proved the genotoxicity of this chemical.

**12. - ECOLOGICAL INFORMATION****Environmental effects, behaviors and impacts of the product.**

**Ecotoxicity:** Ammonia is very soluble in water and even in low concentrations can be harmful to aquatic life. Very toxic to aquatic life. CL50 (Rainbow trout, 96 h): 0.97 mg/L

**Persistence/degradability:** The released product tends to form ammonium hydroxide (NH<sub>4</sub>OH).

**Bioaccumulative potential:** Plants have a high affinity for gaseous ammonia.

**Soil mobility:** Ammonia is highly volatile.

**Other adverse effects:** Due to the corrosive nature of Ammonia, animals exposed to this product may suffer tissue damage and even death, depending on the environmental concentration. Plants may be adversely destroyed by dehydration due to excess ammonia. Decomposition gases, such as some nitrogen oxides, may contribute to the formation of acid rain. High concentrations of the product may impact the aquatic environment by reducing the concentration of dissolved oxygen due to the favoring and/or induction of the eutrophication process. The photolytic cycle of nitrogen oxides controls ozone concentrations at low altitudes. However, the interference of hydrocarbons in the photolytic cycle may increase ozone concentrations, compromising the upper and lower airways, especially in the

**ANHYDROUS AMMONIA GAS**

REVISION DATE: 09/16/2024

most susceptible, such as children, the elderly and those with heart and lung diseases.

**13. - CONSIDERATIONS ON FINAL DISPOSAL****Recommended methods for final disposal:**

The treatment and disposal of product residues must be carried out in a suitable environment, by trained personnel using special equipment and the recommended PPE to avoid contact with the product, its vapors or mists. Leaks must be contained and collected for later disposal after neutralization.

**Product:**

Ensure that all Federal, State and local agencies receive appropriate notification of spills and disposal methods. CONAMA Resolution 005/1993, Law No. 12,305, of August 2, 2010 (National Solid Waste Policy).

**Product residues:**

Consult environmental regulatory agencies for advice on acceptable disposal practices. Contact the relevant local authorities. It can be incinerated when in compliance with local regulations. Or disposed of in an approved chemical waste landfill.

**Used packaging:**

Empty packaging must be drained and capped before handling and transport operations. If the packaging is not properly washed and decontaminated, it is considered to contain product.

**14. - TRANSPORTATION INFORMATION****National and international regulations****Land:**

Resolution No. 5998/2022 of the National Land Transportation Agency (ANTT), *Approves the Complementary Instructions to the Regulation for the Land Transportation of Dangerous Goods and its modifications.*

**UN Number:** 1005

**Proper shipping name:** AMMONIA, ANHYDROUS.

**Risk class:** 2.3

**Subsidiary Risk:** 8

**Risk number:** 268

**Packing group:** N.A.

**Waterway:**

DPC - Directorate of Ports and Coasts (Transport in Brazilian waters) Maritime Authority Standards (NORMAM) NORMAM 01/DPC: Vessels Used in Navigation on the Open Sea

**UN Number:** 1005

**Proper shipping name:** AMMONIA, ANHYDROUS

**Risk class:** 2.3

**Subsidiary Risk:** 8

**Risk number:** 268

**Packing group:** N.A.

**EmS:** F-C, S-U

**Air:**

ANAC - National Civil Aviation Agency - Resolution No. 129 of January 08, 2009

RBAC N°175 – (BRAZILIAN CIVIL AVIATION REGULATIONS) - TRANSPORTATION OF DANGEROUS GOODS IN CIVIL AIRCRAFT

IS No. 175-001 - SUPPLEMENTARY INSTRUCTION - IS

ICAO - "International Civil Aviation Organization" - Doc 9284-NA/905

IATA - "International Air Transport Association"

Dangerous Goods Regulation (DGR)

**UN Number:** 1005

**Proper shipping name:** AMMONIA, ANHYDROUS

**Risk class:** 2.3

**Subsidiary Risk:** 8

**Risk number:** 268

**Packing group:** N.A.



**15. - INFORMATION ON REGULATIONS****Specific regulations for the chemical product:**

Federal Decree No. 2,657, of July 03, 1998;

ABNT-NBR Standard 14725:2014;

Ordinance No. 229, of May 24, 2011 - Amends Regulatory Standard No. 26.

**16. - OTHER INFORMATION**

The information contained in this sheet corresponds to the current state of our knowledge and experience with the product and is not exhaustive. It applies to the product under the conditions specified, unless otherwise stated. In the case of combinations or mixtures, ensure that no new hazards may arise. This information does not exempt the user of the product from complying, under any circumstances, with all legislative, regulatory and administrative texts relating to the product, safety, hygiene and protection of human and environmental health.

**Bibliographic references:**

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