



SAFETY DATA SHEET FOR CHEMICALS
MSDS

ANHYDROUS AMMONIA GAS

REVISION DATE: 5/17/2018

1. - IDENTIFICATION OF PRODUCT AND COMPANY

Product name: Anhydrous gas ammonia.

Internal Code of product identification: 11.01.0.

Company name: USQUÍMICA DO BRASIL LTDA.

Address: Rua da Lagoa, 431 - Cumbica - Guarulhos - SP.

Company Phone: (11) 3821-7000 (PBX system) - (11) 2481-3355.

Emergency call 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 cooling industries.

2. - HAZARDS IDENTIFICATION

Substances classification

Gases under pressure, Liquefied gas
Corrosion/irritation of skin, Category 1A
Acute toxicity - Oral, Category 3
Acute toxicity - Dermal, Category 3
Acute toxicity - inhalation, Category 3
Toxicity to organs - specific targets - Single Exposure - Category 1
Toxicity to organs - specific targets - Repeat Exposure - Category 2
Serious eye damage / eye irritation - Category 1
Sensitization respiratory, 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 extremely pungent odor, which makes it easy to detect by smell even at low concentrations.

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

Effects of the product: Toxic effects to the human health.

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

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

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

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

Ingestion: It causes corrosion and immediate damage to the gastrointestinal tract.

Burns: Liquid ammonia can cause skin burns.

Adverse Effects on the Environment: Because it is very soluble in water and, even in low concentrations, it is harmful to aquatic life. Exposed animals may suffer tissue damage and be put to death. Burn the plants by 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 trichloride and strong oxidizers, can cause extremely exothermic or explosive reactions.

In contact with heavy metals and their compounds can form explosive products. In contact with chlorine and its compounds, the release of chlorine gas may result. 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 quickly. Gas is lighter than air. Ammonia is stable when



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stored and used under normal storage and handling conditions. Above 450°C it can decompose, releasing nitrogen and hydrogen, the latter is highly flammable. Polymerization does not occur.

Main symptoms: Inhalation can cause breathing difficulties, bronchospasm, burns in the mucous membranes of the mouth, pharynx and larynx, constriction and chest pain and salivation. Depending of the concentration and time of exposure, the respiratory condition may progress with edema and glottis spasm, asphyxia, cyanosis, pulmonary edema, respiratory arrest and death. The liquid Ammonia contact with skin may cause serious burns. Exposure of the eyes to Ammonia in gaseous form can cause lacrimation eyes, 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 intoxication begin with irritation of the eyes, nose and throat, followed by cough, suffocation, chest pain and vomiting.

Emergency Overview: Depending of the proportions, isolate and evacuate the area. Try to block the leak or transfer the product. Stay with the wind blowing at his back. People must only be allowed access to contaminated areas if they are using protective clothing and a mask with an air supply.

GHS labeling elements, including precautionary phrases:

LABELING ELEMENTS	DATA
Product identification and supplier emergency phone.	Commercial Name: AMMONIA ANHYDROUS GAS. Synonym: AMMONIA GAS. Emergency call number: SUATRANS - COTEC - Environmental Emergency. DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.
Chemical composition.	<ul style="list-style-type: none">Anhydrous ammonia gas (NH₃), minimum = 99.5% (m / m).Water, maximum = 0.5% (m / m).
Pictograms of hazard.	
Warning words.	DANGER
Hazard phrase.	<ul style="list-style-type: none">- H280: Contains gas under pressure: it can explode under the action of heat.- H330: Fatal if inhaled.- H301: Toxic if ingested.- H314: Causes severe skin burn and eye damage.- H334: May cause allergy, asthma or breathing difficulties when inhaled.- H341: Suspected of causing genetic defects.- H370: It causes damage to the respiratory system.- H373: May cause damage to respiratory system by repeated or prolonged exposure.- H410: Very toxic to aquatic organisms, with prolonged effects



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Caution Phrases.	<ul style="list-style-type: none">- P301 + P330 + P331: IN CASE OF INGESTION: Rinse the mouth. DO NOT induce vomiting.- P303 + P361 + P353: IN CASE OF SKIN CONTACT (or with the hair): Remove immediately all contaminated clothing. Wash the skin with water/take a shower.- P304 + P340: IN CASE OF INHALATION: Remove the person to a ventilated area and keep the person in a rest position that does not make it difficult to breathe.- P305 + P351 + P338: IN CASE OF EYES CONTACT: Rinse thoroughly with water for several minutes. If contact lenses are used, remove them if it is easy. Continue rinsing.- P308 + P311: IN CASE OF exposure or suspected of exposure: Please contact a TOXICOLOGICAL INFORMATION CENTER/physician.- P342 + P311: In case of respiratory symptoms: Please contact a TOXICOLOGICAL INFORMATION CENTER/physician.- P361 + P364: Remove immediately all contaminated clothing and wash it before using use it for again.- P377: Flame gas leak: do not extinguish unless the leak can be safely contained.- P381: Eliminate all sources of ignition if it can be done safely.- P391: Collect the spilled material.
Caution Phrases: Storage.	<ul style="list-style-type: none">- P403: Store in a well-ventilated place.- P410: Keep away from sunlight.

Other hazards which do not result in classification: Is not known

3. - COMPOSITION AND INFORMATION ON THE INGREDIENTS:

Substance: AMMONIA ANHYDROUS GAS (NH₃).

Chemical or common name: AMMONIA (NH₃).

Synonym: AMMONIA ANHYDROUS (NH₃).

CAS No. (Chemical Abstract Service): 7664-41-7.

Impurities that contribute to the hazard: None.

4. - FIRST AID MEASURES:

First aid measures:

Remove the victim to fresh air. If the victim is not breathing, applying artificial respiration using a face shield. Call a physician immediately. Remove contaminated clothing and footwear.

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

IMMEDIATE HEALTHCARE IS FUNDAMENTAL IN ALL CASES OF SERIOUS EXPOSURE. THE RESCUE TEAM MUST BE EQUIPPED WITH AUTONOMOUS BREATHING EQUIPMENT AND AWARE OF TOXICITY RISKS.

Cautions: In case of mouth-to-mouth breathing, there may be a chemical burn in the person attending. Immediately forward to the nearest hospital.

Inhalation: Remove the victim to an uncontaminated and ventilated area and supply oxygen if available. Apply resuscitation maneuvers in case of cardiorespiratory arrest. Caution: In case of mouth-to-mouth resuscitation, there may be a chemical burn in the person attending. Immediately refer the victim to the nearest hospital.

Skin contact: Quickly remove contaminated clothing and shoes and apply a neutralizing agent (trade name Diphoterine). In case of non-availability, wash the area with plenty of running water. Then use the neutralizer based on boric acid (5%) or boric acid water (3%). Do not rub the area achieved.

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

In case of non-availability, wash the eyes under running water for in abundance, lifting the eyelids to allow maximum product removal. Then use the neutralizer based on boric acid (5%) or boric acid water (3%). Do not rub your eyes with the hands. After these precautions, immediately refer the victim to the ophthalmologist.



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Ingestion: Due to the physical characteristics of ammonia, accidents due to ingestion are unlikely, but burns in the mouth, pharynx, esophagus and stomach may occur. Never give anything by mouth to people unconscious or in a convulsive condition. The conscious victim warning can drink water. Do not induce vomiting. If vomiting occurs spontaneously, the victim shall be lying on his side to prevent pulmonary aspiration. Forward the injured person to the physician informing the product characteristics.

Measures to be avoided: Do not induce vomiting. Do not give liquids to a victim, unconscious person or in a convulsive crisis. Do not do mouth-to-mouth breathing if the victim has inhaled or ingested the product. For these cases, use a resuscitation mask (face shield).

Brief description of the main symptoms and effects: Toxic if inhaled. Causes severe skin burn with pain, blistering and skin peeling. The skin may become white or yellowish, with a wax appearance. It causes serious eye damage with watering, pain, eyelid edema, corneal ulceration and iris atrophy. It can lead to blindness. The contact of the liquefied gas with the eyes and the skin can cause "cold burns" (frostbite). It can cause allergic or asthmatic symptoms and breathing difficulties with cough and shortness of breath. Suspected of causing genetic defects. It causes damage to the lungs with irritation, edema and hemorrhage. In high concentrations it can cause respiratory arrest, cardiac arrhythmia and death from asphyxiation. Repeated and prolonged exposure to the product can cause permanent lung damage.

Protection of the first-aid: Adequate respiratory protection (autonomous equipment or mask with air supply) and PVC or nitrile gloves (covered).

Notes to the physician: Avoid contact with the product to help the victim. If necessary, symptomatic treatment should include, above all, supportive measures such as correction of hydro electrolytic, metabolic disorders, as well as respiratory assistance. In case of contact with the skin and/or eyes, do not rub the affected parts.

5. - FIRE FIGHTING MEASURES

Extinguishing measures appropriate: It presents a moderate risk to fire. In case of fire in installations, the best procedure is to stop the gas flow, closing the valve. Use spraying water, CO₂ or chemical powder, to extinguish the flame adjacent to the valve that controls the gas supply. Use spraying water to cool fire-exposed containers and discontinue the gas for personal protection. Water reduces the gas concentration due to the solubility of ammonia. For fire, involving liquid ammonia, use chemical powder or CO₂ to fight it.

Extinguishing measures not appropriate: Avoid using halogenated products.

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

Special methods to fight the fire: CAUTION! Corrosive liquid and gas under pressure.

Specific hazards of chemical combustion: It presents a 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_x).

Firefighting team protection measures: Use personal protective, mainly respiratory protective equipment. In case of fire, there is the possibility of decomposition with the release of toxic gases. Use self-contained mask or supplied air mask, and also PVC or nitrile clothing and gloves (covered). Evacuate all personnel from the risk area. Do not approach the area without a self-contained mask and protective clothing. Immediately cool the containers with water jets, observing the maximum distance and taking care not to extinguish the flames. Remove sources of ignition if there is not risk. Remove all cylinders from the fire area if there is not risk. Meanwhile continue to cool with water jets. Let the fire burn completely.

6. - MEASURES OF CONTROL FOR SPILL OR LEAK

Personal precautions, protective equipment and emergency procedures:

Staff that is not part of the emergency services: Do not breathe vapor or aerosols. Avoid to contact with the substance. Ensuring adequate ventilation. Evacuating the hazard area, observe emergency procedures. If necessary, consult a specialist.

Staff of the emergency service: 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, one must use neoprene or PVC gloves (lined internally and long-length type), rubber or leather boots, trevira overalls, tyvec or, preferably, level A or B.

Precautions to the environment: Keep people away. Discontinue the leak if without risk. Avoid contact with soil and waterways. High concentrations in the air endanger human, animal and vegetable life. Storage locations must have containment dikes.



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

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

7. - HANDLING AND STORAGE

Handling:

Precautions for safe handling.

Technical measures: Ensure that there is sufficient ventilation or exhaust in place to control ambient concentration at low levels. Always wear 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, piping, etc., and isolate it from incompatible substances.

Prevention of worker's exposure: Submit the entire system to periodic maintenance control. Preventive maintenance can avoid to leaks. Keep staff permanently trained.

Precautions and guidelines for safe handling: Handling containers and packaging using appropriate PPEs. Make sure that the packaging is identified and free from contaminants. Avoid breathing the vapor produced by the product.

Storage:

Conditions for safe storage, including any incompatibilities.

Remediation of fire and explosion: Ammonia must be kept away from sources of ignition.

Precautions and guidelines for safe handling: To reduce the possibility of a health risk, ensure sufficient ventilation or exhaustion in place to control the ambient concentration at low levels. Always use personal protective equipment. Avoid to contact with incompatible materials and environmental contamination, as mentioned in the previous fields.

Storage: Always use specified Ammonia-compatible material (piping: Carbon steel - ASTM A 106;

Tanks: Carbon Steel - standardized- ASTM A 285 / A 515 / A 516). Systems to be used with ammonia must first be purged with inert gas. When it is not possible to eliminate air contamination, use stainless steel.

Technical Measures:

Adequate conditions: Storage areas should be reserved exclusively for this purpose, well ventilated and clean, equipped with containment dykes, a fire fighting system, a cooling system and a reduction in leakage. Provide a safety valve system.

Recommended packaging materials: Not applicable.

Incompatible product and materials. Please see previous information.

Special shipment information: The cylinders must be transported in an upright position in a well-ventilated vehicle. Cylinders transported in an enclosed vehicle in an unventilated compartment can present serious safety risks.

8. - EXPOSURE CONTROLS AND INDIVIDUAL PROTECTION

Parameters of specific control

Occupational exposure limits:

20 ppm / 14mg / m³ up to 48 hours a week (NR 15 - Annex 11).

TLV-TWA - 25 ppm (17 mg / m³) (ACGIH).

TLV-STEL - 35 ppm (24 mg / m³) (ACGIH).

Biological indicators: Blood count, platelets, arterial blood gas. Please see table I of NR 7 of Ordinance 3214/78 of the Ministry of Labor and Employment.

Measures of engineering control: To reduce the possibility of a health potential risk, ensure sufficient ventilation or exhaustion in place to control the concentration of the environment at low levels.

Appropriate personal protective equipment:

Protection for the eyes/face: Use chemical safety glasses and / or face shield.

Skin and body protection: Using PVC clothing and boots.



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Hand protection: Use PVC, neoprene, nitrile or natural latex long-length gloves.

Respiratory protection: Panorama Mask with NH₃ filter or combined. In large concentrations, use an autonomous mask (positive pressure) or air-supplied mask.

Attention: masks with mechanical filters do not protect workers exposed to an oxygen deficient atmosphere. Special precautions: Provide the area with emergency showers and eye wash. Never eat, drink or smoke in the work area. Practice good personal hygiene mainly before eating, drinking and smoke.

Parameters of specific control: Occupational exposure limits: 20 ppm / 14mg / m³ (LT - NR 15 - Annex 11) - ammonia 25 ppm / 17mg / m³ (LT - ACGIH) - Ammonia

Biological indicators: Please see table I of NR 7 of Ordinance 3214/78 of the Ministry of Labor and Employment (www.mte.gov.br)

Other limits and values: Not considered.

Appropriate personal protective equipment:

Respiratory protection: Mask with filter for ammonia vapors (NH₃). In large concentrations, use autonomous masks, or masks with supplied air.

Hand protection: Use PVC gloves (Long-length).

Eye Protection: Wear safety glasses and, if possible, with face shield.

Skin and body protection: Use clothes suitable for operating with chemical products, which can be increased with a trevira cover.

Special precautions: Provide the shower and eye wash area. 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 they are effectively washed before reuse. Chemical products must only be handled by trained and qualified people. All PPEs, according to NR-6, must have the CA (Certificate of Approval). Strictly follow operational and safety procedures in the work recommended by the organization. In areas where chemical is handled, the workers' exposure monitoring must be carried out, according to (Environmental Risk Prevention Program ERPP Ordinance 3,214/78 of MTB - NR-09).

Hygiene measures: Keep workplaces within hygiene standards. Periodically make employees aware of the safe handling of the product.

9. - PHYSICAL AND CHEMICAL PROPERTIES

Physical condition: 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% w/w at 25°C and 760 mmHg).

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

Partition coefficient octanol / water: Not determined.

Auto-ignition temperature: 651 °C

Decomposition temperature: above 450 ° C.

Viscosity: 0.00118 Pa.sa 20 ° C and 95%.

Further information

Molecular weight: 17 kg / kmol. Hygroscopic substance.

Although ammonia have explosive limits, it must be treated as a toxic gas as a priority and must not be forgotten, but when carrying out hot work, since it has combustibility characteristics



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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. Decomposes above 450°C. Polymerization does not occur.

Reactivity: Reacts with the products listed below.

Possibility of hazardous 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 trichloride, strong oxidizers. The product is also incompatible with acrophonies, hydrazine, 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. Highly explosive combinations with mercury also stand out.

Hazardous decomposition products: Under fire it can decompose, releasing toxic gases.

11. - TOXICOLOGICAL INFORMATION

Information according to the different manners of exposure:

Main symptoms: It is a strong irritant of the upper and lower respiratory system. Symptoms depend of the concentration inhaled and the duration of exposure, which may cause a burning sensation, cough, difficult breathing, headache, nausea and eventually fainting. Moderate concentrations of vapor cause dermatitis or conjunctivitis. Higher concentrations or contact with skin and eyes cause eye burns and inflammation, with possible loss of vision. Contact with skin tissue or 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 in breathing. Exposure to high concentrations, even for short terms, can result in lung damage. Acute chemical pneumonitis can occur. Pulmonary edema can settle in up to 48 hours after severe exposure.

ACGIH: LC₅₀ = 7338 ppm (1h, rat).

DL₅₀ oral, 350 mg/kg(rat).

Corrosion/irritation of skin: Causes severe skin burn with pain, blistering and skin peeling. The skin may become white or yellowish, with a wax appearance. It can cause pustules, tissue death and gangrene in more severe cases. Contact with liquefied gas can cause frostbite.

Severe ocular lesions/eye irritation: It causes serious eye damage with watering, pain, eyelid edema, corneal ulceration and iris atrophy. It can lead to blindness. Contact with liquefied gas can cause frostbite.

Respiratory or skin sensitization: It can cause allergic or asthmatic symptoms and breathing difficulties with cough and shortness of breath. The product is not expected to cause sensitization : to skin.

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

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

Toxicity to reproduction: The product is not expected to present toxicity to reproduction

Chronic toxicity: Repeated exposure to concentrations above the tolerance limits for occupational exposure can determine respiratory functional disorders.

Genotoxicity: In a human study 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



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Environmental effects, behaviors and impacts of the product.

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

Persistence/ degradability: The released product tends to form ammonium hydroxide (NH₄OH).

Bio accumulative potential: Plants have a high affinity for gaseous ammonia.

Mobility of the soil: Ammonia is highly volatile.

Other adverse effects: Due to the corrosive nature of Ammonia, animals exposed to this product may suffer tissue damage and be put to death, depending on the environmental concentration. Plants can be adversely destroyed by dehydration from excess ammonia. Decomposition gases, like some nitrogen oxides, can contribute to the formation of acid rain. High concentrations of the product can impact the aquatic environment by decreasing the concentration of dissolved oxygen due to favoring and / or inducing the eutrophication process. The photolytic cycle of nitrogen oxides controls ozone concentrations at low altitude. However, the interference of hydrocarbons in the photolytic cycle can increase ozone concentrations, compromising the upper and lower airways, especially those most susceptible, such as children, the elderly and those with heart and lung diseases.

13. - CONSIDERATION ON THE FINAL DISPOSAL

Recommended methods for final destination:

The treatment and disposal of product wastes must be carried out in an appropriate environment, by people trained with the use of special equipment and the recommended PPE's 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 notices of spills and disposal methods. CONAMA Resolution 005/1993, Law No. 12,305, of August 2, 2010 (National Policy on Solid Waste).

Waste of products:

Please consult environmental regulatory agencies for counselling on the acceptable disposal practices. Please contact the relevant local authorities. It can be incinerated when in compliance with local regulations. Or dispose of at an approved chemical waste landfill.

- Used Package:

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

14. - TRANSPORT INFORMATION

National and International Regulations

Land:

Resolution No. 5232 of December 14, 2016 of the National Land Transportation Agency (ANTT), *Approves the Complementary Instructions to the Regulation of Land Transportation of Dangerous Products and its amendments.*

ONU number: 1005

Appropriate name for shipment: AMMONIA, ANHYDROUS.

Risk class: 2.3

Subsidiary Risk: 8

Risk number: 268

Packaging group: N.A.

Waterway:

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

ONU number: 1005

Appropriate name for shipment: AMMONIA, ANHYDROUS

Risk class: 2.3

Subsidiary Risk: 8

Risk number: 268

Packaging group: N.A.



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EmS: F-C, S-U

Air:

ANAC - Civil Aviation National Agency - Resolution No. 129 of as 8 January, 2009

RBAC No. 175 - (BRAZILIAN CIVIL AVIATION REGULATION) - TRANSPORT OF DANGEROUS MATERIALS 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)

ONU number: 1005

Appropriate name for shipment: AMMONIA, ANHYDRA

Risk class: 2.3

Subsidiary Risk: 8

Risk number: 268

Packaging group: N.A.

15. - INFORMATION ON THE REGULATIONS

Specific regulations for the chemicals:

Federal Decree No. 2,657, of as July 3, 1998; Standard ABNT-NBR 14725: 2014;

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

16. - OTHER INFORMATION

The information in this sheet corresponds to the current status of our knowledge and our product experience and is not exhaustive. Applies to the product under the conditions specified, unless mention otherwise. In case of combinations or mixtures, make sure that no new hazards can appear. This information does not exempt, in any case, the user of the product from respecting the all legislative, regulatory and administrative texts related to the product, safety, hygiene and protection of human and environmental health.

Bibliographical References:

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIALS HYGIENISTS. TLVs® and BEIs®: Based on the "Documentation" dos Limites de Exposição Ocupacional (TLVs®) for Chemical Substances and Physical Agents & Biological Exposure Indices (BEIs®). Brazilian Association of Occupational Hygienists Translation. São Paulo, 2016.

BRAZIL. MINISTRY OF LABOR AND EMPLOYMENT (MTE) Regulatory Standard (NR) No. 7: Programa de controle médico de saúde ocupacional. Brasília, DF. Jun. 1978.

BRAZIL. MINISTRY OF LABOR AND EMPLOYMENT (MTE) Regulatory Standard (NR) No. 15: Atividades e operações insalubres. Brasília, DF. Jun. 1978.

EPA of USA. 2011. EPI Suite™ for Microsoft® Windows, v 4.10. United States: Environmental Protection Agency, Washington. 2011. Available at:

< <http://www.epa.gov/oppt/exposure/pubs/episuite.htm>>. Access on: January, 2018

Globally Harmonized System of Classification and Labelling of Chemicals (GHS). 7. rev. United Nations, 2017.

HSDB - HAZARDOUS SUBSTANCES DATA BANK. Available at: <<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>>. Access on: January, 2018

IARC - INTERNATIONAL AGENCY FOR RESEARCH ON CANCER. Available at: <<http://monographs.iarc.fr/ENG/Classification/index.php>>. Access on: January, 2018

IPCS - INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY - INCHEM. Available at: <<http://www.inchem.org/>>. Access on: January, 2018

IUCLID - INTERNATIONAL UNIFORM CHEMICAL INFORMATION DATABASE. [S.I.]: European chemical Bureau. Available at: <<http://ecb.jrc.ec.europa.eu>>. Access on: January, 2018



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NIOSH - NATIONAL INSTITUTE OF OCCUPATIONAL AND SAFETY. International Chemical Safety Cards. Available at:
<<http://www.cdc.gov/niosh/>>. Access on: January, 2018

NITE-GHS JAPAN - NATIONAL INSTITUTE OF TECHNOLOGY AND EVALUATION. Available at:
<http://www.safe.nite.go.jp/english/ghs_index.html>. Access on: January, 2018

U.S. ENVIRONMENTAL PROTECTION AGENCY. ECOSAR - Ecological Structure-Activity Relationships. Versão 1.11.
Available at: <<http://www.epa.gov/oppt/newchems/tools/21ecosar.htm>>. Access on: January, 2018