SAFETY DATA SHEET FOR CHEMICALS
MSDS

AMMONIA SOLUTION 05/ 06%

REVISION DATE: 9/9/2019

1. - IDENTIFICATION OF PRODUCT AND COMPANY

Product name: Ammonia solution 05/ 06%.
Internal Code of product identification: 186.01.0 **Company name:** USIQUÍMICA DO BRASIL LTDA.
Address: Rua da Lagoa, 431 - Cumbica - Guarulhos - SP.
Company Phone: (11) 3821-7000 - PBX System.
Emergency call numbers: SUATRANS - COTEC - Environmental Emergency.
DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.
193 - Firefighters.

Main recommended uses for the substance: Textile, agricultural, rubber, leather, lubricants, food, cosmetics, wastewater treatment, film production, photo printing, inks and among other industries.

2. - HAZARDS IDENTIFICATION

Substance classification or mixture (according to ABNT NBR 14.725-2): Acute toxicity - Oral - Category 4.
Acute toxicity - inhalation - Category 2. Corrosion/irritation to skin- Category 1B.
Serious eye damage / eye irritation - Category 1. Toxicity to organs - specific targets - Single Exposure - Category 3.
Dangerous to the aquatic environment- Acute - Category 1.

Labeling elements (according to ABNT NBR 14.725-2):

LABELING ELEMENTS	DATA
Product identification and supplier emergency phone.	Commercial Name: AMMONIA SOLUTION 05/ 06%. Synonym: AMMONIA (aqueous solution of), ammoniacal water, aqueous solution, hydrated ammonia. Emergency call number: SUATRANS - COTEC - Environmental Emergency. DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.
Chemical composition	NH4OH
Hazard pictogram	
Warning words	**DANGER**
Hazard phrase	H302 Harmful if swallowed. H314 Causes severe skin burn and eye damage. H318 Causes serious eye damage. H330 Fatal if inhaled. H335 May cause irritation to the respiratory tracts. H400 Very toxic to aquatic organisms, with prolonged effects.
Caution Phrases	P260 No inhaling dusts/fumes/gases/vapors/fumes/aerosols. P261 Avoid inhaling dusts/fumes/gases/vapors/fumes/aerosols. P264 Rinse carefully after handling. P270 Do not eat, drink or smoke when using this product. P271 Use only in outdoor environments or in well ventilated areas. P273 - Avoid to release for the environment. P280 Use protective gloves/protective clothing/eye protection/face shield. P284 [In case of inadequate ventilation]. Using respiratory protective equipment.

	P301 + P312 IN CASE OF INGESTION: If you feel discomfort, please contact a TOXICOLOGICAL INFORMATION CENTER/physician/. 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. Rinse 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 - IN CASE OF EYE CONTACT: Rinse thoroughly with water for several minutes. If contact lenses are used, remove them if it is easy. Continue rinsing. P310 Please Immediately contact a TOXICOLOGICAL INFORMATION CENTER/physician. P312 If you feel discomfort, please contact a TOXICOLOGICAL INFORMATION CENTER/physician. P320 Specific treatment is urgent (see ... on this label). P321 Specific treatment (see ... on this label). P330 Rinse the mouth. P391 Collect the spilled material. P403 + P233 Store in a well-ventilated place. Keep the container hermetically sealed. P405 Store in a place locked with a key. P501 Dispose of contents / container in accordance with federal, state and municipal legislation.
Further information	The Safety Data Sheet for chemicals (MSDS) for this hazardous chemical can be requested via telephone (11) 3821-7000, or by email: laboratorio@usiquimica.com.br

Other hazards which do not result in classification:
In contact with sodium hypochlorite, chlorine gas is released into the environment.

3. - COMPOSITION AND INFORMATION ON THE INGREDIENTS:

Mixture: AMMONIUM HYDROXIDE (NH_4OH). Ammonium hydroxide is a mixture obtained from the reaction between anhydrous ammonia (NH_3), demineralized water or reverse osmosis water.
Common chemical name or generic name: AMMONIUM HYDROXIDE/AMMONIA.
Synonym: AMMONIA (aqueous solution of), ammoniacal water, aqueous solution, hydrated ammonia.
Chemical Abstract Service (CAS No.): 1336-21-6.
Chemical substance composition: 05.6 - 05.8% ammonia in solution.
Ingredients or impurities that contribute to the hazard: Anhydrous gas ammonia (CAS 7664-41-7)

4. - FIRST AID MEASURES:

Inhalation: Remove the victim to an uncontaminated and ventilated area and manage oxygen, if available. Apply resuscitation maneuvers in case of cardiorespiratory arrest.
Cautions: In case of mouth-to-mouth breathing, there may be a chemical burn in the person attending. Immediately forward to the nearest hospital.
Skin contact: Quickly remove contaminated clothing and shoes and wash affected parts with running water in abundance during 15 minutes. Do not rub the area.
Eye contact: Immediate service is essential. The first 10 seconds are critical to avoid blindness. Wash your eyes under running water for 15 minutes, lifting the eyelids to allow maximum product removal. After these precautions, immediately refer to the ophthalmologist.
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 to

physician informing the product characteristics.
Symptoms and effects most important , acute or delay
Measures to be avoided: Do not induce vomiting. Do not give liquids to a victim, unconscious person or in a convulsive crisis.
Brief description of the main symptoms and effects: Ammonium hydroxide is toxic by inhalation
(Ammonia gases) and has a caustic effect when in contact with the body.
Acute effects: Inhalation can cause burns on the nasal mucosa, pharynx and larynx, cough, chest pain, bronchial spasm with difficulty breathing and pulmonary edema. Ammonium hydroxide when in contact with the skin can produce tissue necrosis and deep burns. Contact with the eyes causes lacrimation, conjunctivitis and irritation and ulceration of the cornea which can result in temporary or permanent blindness.
Chronic effects: Prolonged or repeated contact with the skin can cause dermatitis.
Notes to the physician: Rapid penetration of liquid ammonia into eye tissues can cause corneal perforation, delayed cataracts, glaucoma, iritis and atrophy of the retina. Accidents due to inhalation of irritating gases require medical observation to prevent pulmonary edema of late installation, up to 48 hours after inhalation. Acute chemical pneumonitis can occur when inhaling ammonia in high concentrations, even at short exposures.

5. - FIRE FIGHTING MEASURES

Extinguishing measures appropriate: The product is not combustible. When involved in a fire, use appropriate extinguishing media to fight it, depending on the fuel involved in the fire. The best procedure is to stop the flow of liquid by closing valves. Give preference to using water, and other products such as foam or dry chemical powder can also be used. Remove all electrical sources.
Use water to cool fire-exposed containers and discontinue the flow for personal protection. Water reduces the concentration of gases and liquid, since it is soluble in water.
Water in mist form; Dry chemical powder; Hydrocarbon foam.
Extinguishing measures not appropriate: Avoid using halogenated products.
Specific hazards: 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.
Firefighting team protection measures: 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 level “A” PVC clothing. Cool containers exposed to fire, toxic gases. Use a self-contained mask with an ammonia gas filter or supplied air mask, and level “A” PVC clothing. Cool containers exposed to fire.
Additional Information:
Special recommendations: Contain ammonia leak and use water in mist form; use autonomous respiratory protection; Low fire risk product due to the difficulty in ignition when exposed to heat or flames; promote the extinguishing of the fire only if the leakage of the product is small.

6. - MEASURES OF CONTROL FOR SPILL OR LEAK

Personal precautions, protective equipment and emergency procedures:
For the staff that is not part of the emergency services: Isolate leakage of ignition sources. Prevent sparks or flames. Do not smoke. Evacuate the area within a radius of 50 meters. Do not touch damaged containers or spilled material without using appropriate clothing. Avoid inhalation, contact with eyes and skin. Use personal protective equipment as described in Section 8.
For the staff of the emergency department: Use PPE complete with boots, waterproof clothing and gloves, hermetic safety glasses for chemicals and adequate respiratory protection.
Precautions to the environment: It can contaminate water courses, making them unsuitable for any purpose. In case of leak, to protect the environment, it is necessary to retain the liquid; directing it to a holding tank, where the waste will be equalized for disposal. The treatment can be done by neutralizing the alkalinity of the liquid from chemical treatment. Neutralization reactions can generate heat and smoke, which can be controlled by the rate at which the reagent is added.
Methods and materials for containment and cleaning: Use natural or spill containment barriers. Collect the spilled product and place in suitable containers. Absorb the remaining product with earth, dry sand or other non-combustible material and place in appropriate containers and remove them to a safe place. Do not allow water to enter the containers. For final destination, proceed according Section 13 of this MSDS.
Differences in the measures of large and small leaks: There is no distinction between the actions of large and small

leaks for this product.
Recovery: If possible, perform the transfer of the product.
Neutralization: Heat release results.
Disposal: Try to reuse the product, if possible or neutralize the residue before taking it to the appropriate final disposal.
Secondary hazard prevention: Review guidelines contained in the previous fields.

7. - HANDLING AND STORAGE

Recommendation for safe handling: In case of handling the product in plastic drums or barrels, prevent physical damage to the packaging.
Before handling the product, it should be checked that the packaging is in safe condition for use, with no cracks in the body or cover, also checking that the valves of the storage tank are in good condition. During handling, avoid proximity to heat sources or electrical sparks. Prevent physical damage to tanks, piping, and etc., isolate it from incompatible substances.
Handle in a ventilated area or with a general local ventilation / exhaust system. Avoid formation of dusts and mists. Avoid inhaling the product in case of formation of dusts or mists. Avoid contact with incompatible materials. Use protective gloves/protective clothing/eye protection/face shield as indicated in Section 8.
Prevention of worker's exposure: Masks with filters against Ammonia (or combined) must be used in case of small leaks or spills. In large leaks or spills necessary to use an autonomous of mask or air supply mask. Submit the entire system to periodic maintenance control. Preventive maintenance can avoid to leaks. Keep staff permanently trained.
Remediation of fire and explosion: Keeping at low temperatures. The release of gases begins with an increase in temperature and its decomposition occurs above 132.4 ° C.
Precautions 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, such as specific clothing and adequate respiratory protection, with filters suitable for ammonia gas vapors (NH_3). Combined filters are not indicated since their saturation is very fast. It can also use autonomous or air-add masks.
Guidance for safe handling: Following safety rules regarding handling methods and individual protection.
Storage
Appropriate technical measures: An in-depth knowledge of ammonium hydroxide is necessary to be able to store it safely and without risks.
Preferably store in a covered, dry, ventilated area, waterproof floor or on wooden pallets and away from incompatible materials. Attention to possible perforations with pointed elements contained in the pallets.
Conditions for safe storage, including any incompatibilities: Follow the equipment manufacturer's guidance.
Appropriate: The places destined for the storage of the product must be reserved exclusively for this purpose. Empty packages must be separated from full ones. Always use specified Ammonia-compatible material (piping: Carbon steel - ASTM A 106 Gr C;
Tanks: Carbon Steel - standardized- ASTM A 285/A 515/A 516; valve- ASTM A 105 / ASTM A
216 GR WCB).
To be avoided: The packaging should be stored in a ventilated place, away from sources of heat, flammable substances and must be clean and in a covered area. The risk of falls and mechanical shocks must also be avoided.
Risk signaling: Signaling plates with the indication of CORROSIVE PRODUCT.
Incompatible product and materials. Please see previous information.
Packaging safe materials:
Recommended: Ammonium hydroxide can be stored in stationary tanks, polyethylene IBCs or in carbon / stainless steel (ideal for products with concentrations above 28%), plastic drums, glass or plastic bottles (for small quantities).
Inadequate: Avoid incompatible material.

8. - EXPOSURE CONTROLS AND INDIVIDUAL PROTECTION

Measures of engineering control: Handling the product in a location with good natural or mechanical ventilation, in order to keep the concentration of vapors / dust below the tolerance limit. Promote mechanical ventilation and a direct exhaust system to the outside environment. These measures help to reduce product exposure. It is recommended to make emergency showers and eye washers available in the work area. The Measures of engineering control are

most effective to reduce product exposure. 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.

Parameters of specific control: Occupational exposure limits:

20 ppm / 14mg/m^3 (LT - NR 15 - Annex 11) - ammonia.

25 ppm / 17mg / m^3 (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.

Individual protection measures:

Respiratory protection: Mask with filter for ammonia vapors (NH_3). 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

Appearance: Liquid.

Color: Colorless.

Odor: Spicy and strongly penetrating, characteristic of ammonia.

pH: 10.5 - 13.0 - Method (IT.CQ-0009)

Specific temperatures or temperature ranges in which physical condition changes occur:

Boiling point: 28.3 ° C 101.3 kPa (30% NH3).

Melting point: -72.4 °C (30% NH3).

Decomposition temperature: Not available.

Flash point: Not available.

Auto-ignition temperature: 651 ° C (ammonia vapors).

Explosive limits: Not available.

LEL: (lower explosive limit): Not available.

UEL: (upper explosive limit): Not available.

Vapor density: 0.6.

Density: 0.970 - 0.980 - Method (IT.CQ-0009)

Solubility in water: Solubility in water: all proportions. Soluble in alcohol.

Evaporation rate: 0.80 to 25°C.

Flammability: Not available.

Vapor pressure: Not available.

Vapor density: Not available.

Relative density: Not available.

Partition coefficient - n-octanol / water: Not available.

Viscosity: Not available.

10. - STABILITY AND REACTIVITY

Reactivity: Ammonium hydroxide is an alkaline product that releases heat when it reacts with acid. **Stability:** Stable in normal conditions of temperature and pressure.

Possibility of hazardous reactions: Reacts violently with acids, strong oxidizers, halogens, acrylic acid, dimethyl sulfate, silver oxide, silver nitrate, hypochlorite, isocyanates and mercury.
Conditions to be avoided: Strong heating.
Incompatible materials: Sodium hypochlorite, iodine and strong acids. The product is also incompatible with acids, strong oxidizers, peroxides, chlorine and bromine.
Hazardous decomposition products: Burning can produce ammonia gas and nitrogen oxides.

11. - TOXICOLOGICAL INFORMATION

Acute toxicity: Inhalation can cause burns on the nasal mucosa, pharynx and larynx, cough, chest pain, bronchial spasm with difficulty breathing and pulmonary edema.
Product classified as acute toxic by mouth and inhalation.
DL50 (oral, rats): 530 mg/kg
LC50 (inhalation, rats, 4h): 0.5 to 2 mg/L
Corrosion/irritation to skin: Vapor in the presence of moisture is an irritant to the skin. Splashing the liquid can cause chemical burns and blisters if contact is prolonged.
Severe ocular lesions/eye irritation:
The ammonia vapors emitted by the solutions can cause irritation and watery eyes, serious damage can occur in high concentrations. Splashing the liquid can cause permanent eye damage.
Respiratory or skin sensitization: The product is corrosive to the respiratory tract.
Germ cell mutagenicity:
The product is not expected to present germ cell skin.
Carcinogenicity: Available toxicological studies are insufficient for conclusions.
Reproductive toxicity: The product is not expected to present toxicity to reproduction.
Toxicity to organs - specific targets - single exposure:
Exposure to high concentration ammonia vapors for short periods can cause serious damage to the lungs and can be fatal. Pulmonary edema can occur 48 hours after severe exposure, being proven to be fatal.
Toxicity to organs - specific targets - repeated exposure:
Ammonium hydroxide is a corrosive product and can cause pulmonary edema whose symptoms can be delayed up to 48 hours after exposure.
Aspiration hazard: The main complications resulting from ingestion are gastrointestinal bleeding, perforation in the oropharynx and shock secondary to heavy bleeding, acidosis and / or disseminated intravascular coagulation.

12. - ECOLOGICAL INFORMATION

Environmental effects, behaviors and impacts of the product:
Ecotoxicity: Aquatic: greatly toxic to aquatic organisms.
CE50 (*Daphnia magna*, 48h): 0.66 mg/L
Free (non-ionized) ammonia on the water surface is toxic to aquatic life, however the ammonium ion that predominates in most waters is not toxic. In the event of water contamination with ammonia, ammonium salts that may be formed do not present toxic risks. Raising the pH above 7.5 will induce an increase in the level of non-ionized ammonia.
LC50 (fish, various species) were <1 mg / L. Studies in fish have shown that repeated exposures produced adverse effects on the growth rate at concentrations greater than 0.0024 mg / L.
Persistence and degradability: In the soil, ammonia is rapidly oxidized by microorganisms to the nitrate ion. In fresh water, it can be nitrified by microorganisms or absorbed over sedimentary and colloidal particles, substantially biodegradable in water. In the atmosphere, it can be degraded by photolysis or neutralized by air polluting acids.
Bio accumulative potential: Low bio accumulative potential.
Mobility in soil: The $NH4^+$ ion is adsorbed by the soil. The adsorption of ammonia to sediments and suspended organic matter increases with the concentration of organic matter, concentration of metal ion, and with decreasing pH. The microbial population and absorption by plants also interfere in this process.
Other adverse effects: There are no known adverse effects other than those exposed.

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 as August 2, 2010 (National Policy on Solid Waste). Neutralize slowly and carefully with acid, if possible.
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 as Wednesday, December 14, 2016 of the National Land Transport Agency (ANTT), *Approves the Supplementary Instructions to the Regulation for the Land Transportation of Dangerous Products and their modifications.*
ONU number: Product not classified by the Legislation in force on the o transport of dangerous products.
Appropriate name for shipment: -
Risk class: -
Risk number: -
Packaging group: -

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: Product not classified by the Legislation in force on the o transport of dangerous products.
Appropriate name for shipment: -
Risk class: -
Risk number: -
Packaging group: -

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: Product not classified by the Legislation in force on the o transport of dangerous products.
Appropriate name for shipment: -
Risk class: -
Risk number: -
Packaging group: -

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.

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