



SAFETY DATA SHEET FOR CHEMICALS
MSDS

ANHYDROUS HYDROFLUORIC ACID

REVISION DATE: 4/20/2018

1. - IDENTIFICATION OF PRODUCT AND COMPANY


Product name: Anhydrous Hydrofluoric Acid
Internal Code of product identification: 104.60.2
Company name: USIQUÍMICA 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: Surface treatment, electroplating, frosting and glass engraving, fluorides manufacturing, aluminum production, processing of uranium and graphite, ceramics, fluorocarbons (freon, frigen, teflon),

2. - HAZARDS IDENTIFICATION

Substances classification: Acute toxicity, category 2, oral, acute toxicity, category 2, inhalation, Acute toxicity, category 1, dermal, Skin lesion, category 1A,

GHS labeling elements, including precautionary phrases:

LABELING ELEMENTS	DATA
Product identification and supplier emergency phone	Commercial Name: Anhydrous Hydrofluoric Acid Synonym: Anhydrous Hydrofluoric Acid , hydrogen fluoride anhydrous. Emergency call number: SUATRANS - COTEC - Environmental Emergency. DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.
Hazard pictogram	
Warning words	DANGER
Hazard phrase	- H300: Fatal if ingested; - H310: Fatal in contact with the skin; - H314: Causes severe skin burn and eye damage; - H330: Fatal if inhaled.
Caution Phrases	- P280 Use protective gloves/protective clothing/eye protection/face shield. - 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+P310 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. Please Immediately contact a TOXICOLOGICAL INFORMATION CENTER/physician. - P305+P351+P338+P310 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. Please Immediately contact a TOXICOLOGICAL INFORMATION CENTER/physician. - P308+P311 IN CASE OF exposure or suspected of exposure: Please contact a TOXICOLOGICAL INFORMATION CENTER/physician.

Other hazards which do not result in classification:

No information found



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3. - COMPOSITION AND INFORMATION ON THE INGREDIENTS:

Substance: Anhydrous Hydrofluoric Acid.

Common chemical name or generic name: Hydrofluoric Acid Anhydrous, hydrogen fluoride anhydrous.

Chemical Abstract Service (CAS No.): 7664-39-3.

Chemical substance composition:

Minimum 99.95 % hydrofluoric acid.

There are no impurities that contribute to the hazard.

4. - FIRST AID MEASURES:

First aid measures:

- **Inhalation:** Exposure to fresh air. To consult a physician. Keeping the respiratory system free. In case of respiratory arrest: Proceeding to cardiopulmonary ventilation immediately; eventually oxygen support.

- **Skin contact:** Rinsing with plenty of water for at least 10 minutes. Removing contaminated clothing immediately. Applying gluconate gel or calcium gluconate.

Preparing: Boiling 5 g of calcium gluconate in 85 ml of hot distilled water, add 10 g of glycerol. Allowing 5 g of carmelose sodium to swell in the heated solution. Stable for 6 months, store in a cool place and massage on the skin until the pain reduce, in the meantime rinse with water and apply fresh gel. Continue gel therapy for another 15 minutes after the pain has ceased. If sodium gluconate is not available, apply several compresses completely wet with a 20% calcium gluconate solution. Medical attention is absolutely required!

Note: Eventually, the gel containing calcium gluconate or gluconate can be purchased at manipulation pharmacies through prescription procedures.

- **Eye contact:** rinse with plenty of water keeping your eyes open, protecting the unaffected eye (for at least 10 minutes). If the victim is wearing contact lenses, do not remove. Seeking physician counselling immediately, accompanied by the instruction guide for injuries caused by hydrofluoric acid.

- **Ingestion:** Give plenty of water to drink, add calcium (in the form of calcium gluconate or calcium lactate). Warning: in case of vomiting, risk of perforation! To manage more calcium gluconate solution. Seeking healthcare immediately. To ensure that injured people remain calm and protect them from heat loss.

Measures to be avoided: Do not induce vomiting.

GENERAL RECOMMENDATION: Countermeasures must be taken immediately. The first aid provider must protect himself.

Brief description of the main symptoms and effects: Very toxic by inhalation, in contact with skin and if intake. Causes severe burns. Inhalation of vapors in high concentration can cause shortness of breath (pulmonary edema). Ingestion causes burns of the upper digestive and respiratory tract. They penetrate the skin and attack the underlying and bone tissues.

Symptoms and effects most important, acute or delay:

Irritation and corrosion, bronchitis, vomiting with blood, cardiovascular disease, collapse, seizures. Risk of blindness!

Notes to the physician: It is recommended to consult a physician with experience in treating injuries caused by hydrofluoric acid. If systemic action is suspected, it requires urgent treatment and monitoring in an intensive care unit. Caution, ventricular fibrillation due to electrolyte imbalance. The physician must consult the instruction guide for injuries caused by hydrofluoric acid at the time of care for the victim.

5. - FIRE FIGHTING MEASURES

Extinguishing measures appropriate: To adapt fire-fighting measures to local conditions and the surrounding environment.

Not appropriate: No limitations on extinguishing agents are given for this substance / mixture.

Specific hazards: Not combustible. Possibility of formation of dangerous fumes in case of fire in the surrounding areas. A fire may increase the release of toxic and corrosive acid gases.

fire fighter protection: Special protective equipment for staff deployed for firefighting. Do not stay in the danger zone without self-contained breathing apparatus suitable for breathing independently of the environment. To avoid contact with the skin, keep a safe distance and wear suitable protective clothing. Refresh closed containers exposed to fire with sprayable water. Suppress (throw) with water jets (fog) the gases, vapors and mists. Avoid contamination of surface water and groundwater with water to fire



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fighting.

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: Do not empty waste into the sewage.

Methods and materials for containment and cleaning: Cover drains. Collect, emend and pump leaks.

Neutralization: Carefully dissolve the material in water. To neutralize immediately with sodium carbonate or caustic soda diluted at 10%. Add in excess calcium chloride until fluoride and / or carbonate precipitates. Separating insoluble materials for disposal in landfill. Follow-up by an expert from the environmental agency is recommended.

Note: Additionally, the waste material can be neutralized as calcium oxide (quicklime). The calcium contained in the solution will sequester waste fluoride forming a precipitate called calcium fluoride (water insoluble material that can be separated by filtering).

Disposal: The waste must be disposed in according with the current environmental legislation. Keep chemicals in their original containers. Do not mix with other wastes. The handling of dirty containers must be conducted in the same way as the product itself. An MSDS must be generated from the generated waste.

Differences in the measures of large and small leaks: There is no differentiation.

7. - HANDLING AND STORAGE

Handling:

Technical measures: Use only in areas provided with adequate exhaust ventilation. Providing the product handling area with emergency shower set and eye wash. Handling must only be done with the indicated PPEs and under safe conditions.

Prevention of worker's exposure: Avoid a formation of vapors / aerosol. Working with exhaust / chimney. Do not inhale the substance / mixture. Wear specific PPEs - splash glasses, face shield, PVC gloves and protective clothing. To avoid inhaling alkaline vapors.

Washing after handling and decontaminate PPEs after use. The PPEs must be approved for use only with the respective CAs - Certificates of Approval.

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:

Appropriate: Keep the container hermetically sealed in a dry, cool and well-ventilated area. Never expose the container containing the product to direct sunlight.

To be avoided: Contact with the following incompatible materials: metals, alkaline metals, permanganates, glass, concrete, alkaline hydroxides (solutions) aggregated the information contained in the emergency sheet of this product.

Hygiene measures:

Appropriate: Always sanitize the hands before handling any food, as there is a risk of contamination of the food. Contaminated clothing must be washed and sanitized before the use. Keeping gloves free from moisture and decontaminated.

Inappropriate: Direct contact with the product and / or its residues.

Technical measures:

Adequate conditions: Providing the storage area with containment capable of supporting the stored capacity. To avoid percolating the product through the soil in order to achieve the underground layers of the soil. The tanks must have a containment dam of capacity above the capacity of the storage tank. It is suggested 1.5 times.

Packaging safe materials:

Recommended: Synthetic materials, for example, high density polyethylene (packaging approved group I or X).



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8. - EXPOSURE CONTROLS AND INDIVIDUAL PROTECTION

Parameters of specific control:

Occupational exposure limits: LT: Brazil - Average value 48h: 2.5 ppm (HYDROFLUORIC ACID)

LT: Brazil - Limit Value: 5.0 ppm

LT: USA - TWA: 3 ppm (AS FLUORIDE)

LT: USA - STEL: 3 ppm (AS FLUORIDE)

Biological indicators: Fish (species not determined) = lethal at 60 ppm, unspecified period. **Other limits and values:** N.A.

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. Engineering control measures are the most effective in reducing product exposure.

Appropriate personal protective equipment:

Respiratory protection: Use respirator with air supply, positive pressure and face shield (PA mask) in case of product leakage or large gas emanation or even full face mask with filter for acid gases.

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

Hand protection: Gloves resistant to hydrofluoric acid (nitrile, viton, pvc or neoprene).

Eye Protection: Chemical type safety glasses for handling closed drum or panoramic mask when handling the product.

Skin and body protection: Complete set (rubber or leather boots and tyvec type overalls or similar).

Thermal hazards: N.A.

Special precautions: Providing the places for handling hydrofluoric acid, with an emergency shower and eye wash set. 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 NPR-9 (Environmental Risk Prevention Program) ERPP Ordinance 3,214/78 of MTB (NR-09).

Hygiene measures: Avoid to contact with skin, eyes and clothing. Contaminated clothing at work must not be taken off-site.

9. - PHYSICAL AND CHEMICAL PROPERTIES

Aspect (physical condition, shape and color): Liquid under pressure. Gas to room temperature.

Colorless. **Odor:** Extremely Pungent.

Odor limit: Unknown. **pH:** Not available.

Specific temperatures or temperature ranges in which physical condition changes occur: Boiling point: 19.5° C

Freezing Point / Range: -83.4°C.

Decomposition temperature: Not available.

Flash point: Does not apply. **Auto-ignition temperature:** Does not apply.

Explosive limits: Does not apply.

LEL: (lower explosive limit): Does not apply.

UEL: (upper explosive limit): Does not apply. **Vapor pressure:** 103 kPa at 20°C.

Vapor density: (air = 1): 0.99 to 14°C.



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Density: 0.975 to 20°C.

Solubility: Soluble in water. Releases heat on dilution.

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

Viscosity: Not available.

10. - STABILITY AND REACTIVITY

Specific conditions:

Reactivity: It can attack glass, concrete and other metals containing silica, as well as those that cast iron. It will attack natural rubber, leather and greatly organic materials. It can generate flammable hydrogen in contact with some metals.

Chemical stability: Stable if kept in proper packaging and stored in a ventilated environment and away from heat sources.

Possibility of hazardous reactions: Risk of ignition or formation of flammable gases or vapors in contact with: metals, alkaline metals.

Condition to be avoided: Strong heating.

Incompatible materials: glass, metals, quartz and silicate ceramics. Releases hydrogen due to reaction with metals.

Hazardous decomposition products: Hydrogen, by reaction with metals and silicon by reaction with silicate fluoride, for example: glass or sand.

Hazard of explosion / exothermic reaction with: Potassium permanganate, silicon compounds, alkaline hydroxides, phosphorus oxides, bismuth acid, strong alkaline hydroxide solutions.

11. - TOXICOLOGICAL INFORMATION 1

Information according to the different manners of exposure:

Acute Toxicity: CL₅₀/ inhalation / 1h / rat = 1276 ppm.

LC₅₀/ inhalation / 1h / mouse = 342 ppm.

Corrosion/irritation of skin: Mixture causes severe skin burns, and symptoms can be delayed. **Ingestion:** Severe burns in the mouth and throat, as well as perforation of the esophagus and stomach. Vomiting with blood. **Inhalation:** Burn of mucous membranes. Respiratory tract injury. The resulting injuries can cause bronchitis, pneumonia and pulmonary edema.

Severe ocular lesions/eye irritation: Causes serious eye damage. **Risk of blindness!**

Respiratory or skin sensitization: If inhaled it causes burns of the mucous membranes, damage to the respiratory tract. The resulting injuries can affect the following: bronchitis, Pneumonia, Pulmonary edema. Mixture causes severe skin burns, and symptoms can be delayed. Possible consequences: Necrosis after substance penetration is difficult to heal wounds

Germ cell mutagenicity: Such an effect is not expected.

Carcinogenicity: Such an effect is not expected

Reproductive toxicity: Such an effect is not expected.

Toxicity to organs - specific targets - single exposure: The substance or mixture is not classified as a specific toxicant with an organ target, singular exposure.

Toxicity to organs - specific targets - repeated exposure: The substance or mixture is not classified as a specific target organ toxicant, repeated exposure.

Aspiration hazard: The classification criteria were not met with respect to the available data.

12. - ECOLOGICAL INFORMATION

Environmental effects, behaviors and impacts of the product:

Ecotoxicity: There is no information available.

Persistence and degradability: There are no information available. **Bio accumulative potential:** There is no information available.

Mobility in soil: There is no information available.

Other adverse effects: Hazard to drinking water supply if allowed due to entry into the soil or aquifers. Harmful effect due to pH change. Although diluted, it forms toxic and corrosive mixtures with water. Additional information about the ecology. Discharge into the environment must be avoided.

13. - CONSIDERATION ON THE FINAL DISPOSAL



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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 lime, 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 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: 1052.

Appropriate name for shipment: HYDROGEN FLUORIDE, ANHYDROUS.

Risk class: 8 (corrosive).

Risk subclass: 6.1 (toxic).

Risk number: 886.

Packaging group: I

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: 1052.

Appropriate name for shipment: HYDROGEN FLUORIDE, ANHYDROUS.

Risk class: 8 (corrosive).

Risk subclass: 6.1 (toxic).

Risk number: 886.

Packaging group: I

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: 1052.

Appropriate name for shipment: HYDROGEN FLUORIDE, ANHYDROUS.

Risk class: 8 (corrosive).

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15. - INFORMATION ON THE REGULATIONS

Specific regulations for the chemicals:



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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.

Ordinance No. 1,274, as of August 25, 2003: Product subject to control and inspection by the Ministry of Justice - Federal Police Department - MJ / DPF, when it comes to import, export and re-export, prior authorization of DPF is essential to carry out these operations.

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.

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

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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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