

**CONCENTRATED NITRIC ACID**

REVISION DATE: 09/17/2022

1. - PRODUCT AND COMPANY IDENTIFICATION**Product name:** NITRIC ACID 98/ 99%**Internal Code of product identification:** 106.01.0**Company name:** USIQUÍMICA DO BRASIL LTDA.**Address:** Rua da Lagoa, 431 - Cumbica - Guarulhos - SP.**Company Phone:** + 5511 3821-7000 (PBX system) - + 5511 2481-3355.**Emergency phone:** SUATRANS - COTEC - Environmental Emergency.

DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.

193 – Firefighters.

Main recommended uses for the substance: Explosives, organic synthesis, production of fertilizers and laboratory reagents.**2. - HAZARD IDENTIFICATION****Classification of Substance:**

Oxidizing and toxic Category 1,

Corrosion to metals Category 1,

Acute toxicity - Oral Category 4,

Acute toxicity - skin Category 4,

Acute toxicity- Inhalation Category 4, Corrosive/irritating

to skin Category 1C, Respiratory sensitizers Category 1,

Serious eye damage/eye irritation Category 1, Skin

sensitization Category 1, Aspiration hazard Category 2,

Chronic aquatic toxicity Category 4.

Adverse effects on human health:**Most important hazards:** Nitric acid is highly corrosive and toxic, energetic oxidizing, and can lead to flammability of other fuels. Handle the product safely. Their reactions with compounds such as cyanides, carbides, and metallic powders can be explosive.**Product Effects:** Corrosive and oxidizing.Adverse effects on human health: Nitric acid is toxic and very corrosive to the skin, eyes, digestive tract and respiratory tract. Nitric acid fumes and vapors can form a mixture of nitrogen oxides when reacting with metallic materials or organic compounds. Nitrogen oxides resulting from these chemical reactions, particularly nitrogen dioxide (NO₂), when aspirated in higher concentrations, cause breathing difficulties, pneumonitis, acute lung edema, loss of consciousness, and can lead to death.**Inhalation:** The inhalation of nitric acid vapors initially produces irritation of the upper airways, causing sneezing, coughing, chest pain, respiratory distress, salivation and dizziness, which may progress to pulmonary edema and death.**Eye contact:** Eye contact causes yellowish discoloration and severe burns, which can lead to loss of vision.**Skin contact:** In contact with the skin, it can cause from moderate irritation to serious injuries, depending on the concentration and time of action.**Ingestion:** When swallowed, yellowish scabs appear on the lips, tongue and roof of the mouth. Digestive tube necrosis, with gastric perforation, may progress to asphyxia due to glottic edema, convulsions and coma.**Burns:** Burning the skin produces yellow-brown, painful patches that may be accompanied by blistering or necrotic lesions that progressively deepen.**Adverse effects to the environment:** It can contaminate watercourses, making them unfit for any purpose. High concentrations in the air endanger human and animal life.**Physical and chemical hazards:** Nitric acid can react violently with organic fuels and strong bases, oxidize materials such as wood and particulate metals. It is corrosive to papers and clothing, reacts with water releasing heat and toxic fumes.**Specific hazards:** Avoid exposing the product to heat and incompatible materials. Their reactions with compounds such as cyanides, carbides, and metallic powders can be explosive. Main symptoms: inhalation of acid vapors


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nitric acid initially produces irritation of the upper airways, causing sneezing, coughing, chest pain, difficulty breathing, salivation, and dizziness, which may progress to pulmonary edema and death (see above: Adverse effects on human health).

Emergency overview: Isolate and evacuate area in case of leakage and/or spillage. Try to block the leak, contain the spilled liquid or transfer the product. Keep the wind blowing your back during emergency care. Access by people to contaminated areas should only be allowed if they are wearing specific clothing and adequate respiratory protection, with filters for acidic gases (or combined) or self-contained or air-induction masks.

Appropriate elements of labeling:

LABEL ELEMENTS	DATA
Product identification and supplier emergency telephone number.	Technical name: Concentrated nitric acid (HNO ₃) Technical name: Nitric Acid 98/ 99% Emergency phone: SUATRANS - COTEC - Environmental Emergency. DDG (0800) 0111-767 - (0800) 7071-767 - 24 HOURS.
Chemical composition	HNO ₃ minimum 98%
Hazard pictograms	
Warning words	DANGER
Danger phrases	H272 - May intensify fire, oxidizer H330 - Fatal if inhaled H314 - Causes severe skin burns and eye damage H318 - Causes serious eye damage H370 - Causes damage to the organs of the respiratory system H372 - Causes damage to organs (respiratory system and teeth) H304- It can be fatal if swallowed and penetrate into the respiratory tracts.
Caution Phrases	P301 + P310- IN CASE OF INGESTION: Immediately contact a TOXICOLOGICAL INFORMATION CENTER/doctor. P301+P330+P331 - IN CASE OF INGESTION: Rinse your 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 EYE 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 exposure: Contact a TOXICOLOGICAL INFORMATION CENTER/doctor. P331- DO NOT induce vomiting. P361 + P364- Remove at once all contaminated clothing and wash it before using it again. p370 + p378- In case of fire: For extinction, check item 3 of this sheet.

Other hazards which do not result in classification: No other hazards occur

3. - COMPOSITION AND INFORMATION ON THE INGREDIENTS

Substance: CONCENTRATED NITRIC ACID.

Common chemical name or generic name: NITRIC ACID 98/ 99%.

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Synonym: SMOLDERING NITRIC ACID.

Chemical Abstract Service (CAS No): 7697-37-2

Chemical composition of the substance: Minimum 98% nitric acid.

There are no impurities that contribute to the danger.

4. - FIRST AID MEASURES

Inhalation: Remove casualty to uncontaminated, ventilated area and administer oxygen, if available. Apply resuscitation maneuvers in case of cardiorespiratory arrest. Quickly seek medical attention.

Skin contact: Quickly remove contaminated clothing and shoes and wash the affected parts with plenty of running water for at least 15 minutes. Don't scrub the spot. Quickly seek medical attention.

Eye contact: Immediate service is essential. The first 10 seconds are critical to avoiding blindness. Washing eyes with running water for 15 minutes, lifting eyelids to allow maximum removal of product. After these cares, refer immediately to the ophthalmologist.

Ingestion: Never give anything by mouth to unconscious or convulsive people. The conscious injured person can drink water or milk. Due to the strong corrosive power of nitric acid, vomiting is contraindicated. If vomiting occurs spontaneously, the victim should be laid on their side to prevent pulmonary aspiration. Quickly seek medical attention.

Actions to be avoided: Do not induce vomiting. Do not administer liquids to torporous, unconscious or convulsive patients.

Brief description of the main symptoms and effects: Nitric acid is very corrosive to the skin, eyes, digestive tract and respiratory tract.

Protection of the first aid provider: Use the indicated personal protection equipment. Access to people in contaminated areas should only be allowed if they are wearing specific clothing and adequate respiratory protection, with filters for acidic gases (or combined), self-contained mask or with air intake.

Notes to the physician: In the inhalation of vapors containing nitrogen oxide, pulmonary edema may occur later, which requires prolonged medical observation in a hospital environment. Aspiration can occur during ingestion and/or vomiting, it is life-threatening. Gastric lavages should be performed by an experienced professional, considering the risk of gastrointestinal perforation and the induction of vomiting by passing the nasogastric tube and introducing liquid for its performance. Assess kidney function.

5. - FIREFIGHTING MEASURES

Suitable extinguishing measures: The product is not combustible. When involved in fire, use appropriate extinguishing media to fight it, depending on the fuel involved in the fire.

Inappropriate extinguishing measures: The product is not combustible. When involved in fire, do not use inappropriate means of extinguishing, depending on the fuel involved in the fire.

Specific hazards: Nitric acid is not combustible, but an oxidizer, which can cause fire when in contact with other fuels or organic materials. It reacts with most metals to release hydrogen gas, which can form explosive mixtures with air.

Special Methods: Avoid the to application of excess water, as there may be contamination of water courses.

Fire fighter Protection: Use personal protective equipment, especially respiratory protection. In case of fire there is the possibility of decomposition with the release of irritating toxic gases. Wear self-contained or blown air mask, and acid-resistant PVC clothing.

6. - CONTROL MEASURES FOR SPILLING OR LEAKING

Personal precautions:

Removal of ignition sources: Nitric acid is not combustible. As it is oxidizing, avoid contact with other fuels or organic materials.

Prevention of inhalation and contact with skin, mucous membranes and eyes: Use personal protective equipment appropriate. Access by people to contaminated areas should only be allowed if they are wearing specific clothing and adequate respiratory protection, with filters for acidic gases (or combined) or self-contained or air-induction masks.

Precautions to the environment: It can contaminate waterways, making them unfit for use in any

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purpose. High concentrations in the air endanger human and animal life. Storage sites must have containment dikes.

Cleaning methods: Use personal protective equipment and isolate the area. Remove all organics and fuel and provide adequate ventilation for gas dispersion

Recovery: Try to contain the spilled product with a sand dam or earth. If possible, transfer the product. Never use organic material to contain spillage.

Neutralization: Heat release results.

Disposal: Try to reuse the product, if possible, or neutralize the residue before taking it to the proper final disposal.

Prevention of secondary hazards: Review directions contained in the previous fields.

7. - HANDLING AND STORAGE**Handling**

Technical measures Prevent physical damage to tanks, piping and valves. Isolate them from incompatible substances.

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

Prevention of fire and explosion: Nitric acid is non-combustible but can cause fire when in contact with other fuels or organic materials. It reacts with most metals to release hydrogen gas, which can form explosive mixtures with air.

Precautions for safe handling: To reduce the possibility of a health risk, ensure sufficient ventilation or the existence of exhaust in the room to control the ambient concentration at low levels. Always use personal protective equipment: specific clothing and adequate respiratory protection, with filters for acidic gases (or combined) or self-contained or air-induction masks.

Orientation for safe handling: Avoid contact with incompatible materials and environmental contaminations as mentioned in the previous fields.

Storage**Appropriate technical measures:**

Storage conditions: Follow the equipment manufacturer's guidance.

Appropriate: Always use specified material compatible with 53% nitric acid.

Trucks and Storage Tanks:

Sheets: stainless steel ASTM A-240 TP 304 L.

Flanges: stainless steel ASTM A-182 F 304 L.

Tubes: stainless steel ASTM A-312 TP 304 L.

Connections: stainless steel ASTM A-403 WP 304 L.

Valves: stainless steel ASTM A-351 CF3.

Screw: Stainless steel ASTM A 193 gr B8

Nut: ASTM stainless steel A 194 gr B8

To avoid: Avoid light and heat, avoid contact with organic or incompatible material. See previous information.

Risk signaling: Signal signs containing the indication of CORROSIVE.

Incompatible product and materials: See previous information.

Safe materials for packaging:

Recommendations: Always use specified material compatible with 53% nitric acid (example: stainless steel, Teflon).

Unsuitable: Do not use packaging made with material incompatible with 53% nitric acid (example: organic material or wood). For this concentration, aluminum is also not a recommended material for packaging.

8. - EXPOSURE CONTROLS AND PERSONAL PROTECTION

Measures of engineering control: To reduce the possibility of a health risk, ensure sufficient ventilation or the existence of exhaust in the room to control ambient concentration to low levels. Equip the area with emergency showers and eyewash stations.

Parameters of specific control:**Occupational exposure limits:**

TLV-TWA - 2 ppm (~ 5mg/m₃) (ACGIH).

TLV-STEL-4 ppm (~10mg/m₃) (ACGIH).

Brazilian: not defined by NR-15 of Ordinance 3214/78 of the Ministry of Labor and Employment

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

Recommended monitoring procedures : Subject exposed individuals to periodic tests of respiratory function; periodic medical examination should emphasize the possibility of bronchial hyperreactivity occurring in long-term exposures.

Personal Protective Equipment:

Respiratory protection: Wear respiratory protection if the concentration in the environment is above the action limit or half the tolerance limit. Panorama mask with filter against acid gases or multipurpose (combined) as long as recommended according to the concentration determined in the environment. For large leaks and/or spills, use a self-contained mask (or air intake). Attention: masks with mechanical filters do not protect workers exposed to oxygen deficient atmosphere.

Hand protection: Wear acid resistant gloves.

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

Protection of the skin and body: Wear acid resistant PVC clothing.

Hygiene measures: Keep workplaces within hygiene standards. Never eat, drink or smoke in the work area. Practice good personal hygiene especially before eating, drinking and smoking. Separate contaminated tools and clothing, ensuring that they are effectively washed before reuse.

9. - PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid.

Form: Smoldering liquid.

Color: Colorless to light brown. Vapors are usually reddish brown.

Odor: Characteristic asphyxiating odor.

pH: < 1 - Strongly acidic.

Specific temperatures:

Boiling point: 86 °C.

Boiling temperature range: Not applicable.

Distillation range : Not applicable.

Melting point: Not determined.

Decomposition temperature: Not determined.

Flash point: Not applicable.

Auto-ignition temperature: Not applicable.

Upper/lower explosive limits: Not applicable.

Vapor pressure: 6.8 mm Hg at 20°C.

Vapor Density: Not determined.

Density: 1.507 g/cm³ at 20 °C

Solubility: Soluble in water (heat release).

Partition coefficient octanol / water: Not determined.

Evaporation rate: Not determined.

Further information: In addition to the fact that the product is corrosive, its oxidizing effect must not be forgotten.

10. - STABILITY AND REACTIVITY

Specific conditions:

Instability: Nitric acid breaks down in air, in contact with light and organic substances. Dangerous reactions: Its reactions with compounds such as alcohols, amines, ammonia, aldehydes, hydrazine's, acetic anhydride, ketones, flammable substances, alkali metals, sulfuric acid, hydrocarbons, can be exothermic and explosive.

Conditions to avoid: Avoid contact with combustible and organic materials as it can cause fire. In contact with some metals it can release hydrogen.

Materials or incompatible substances: May react violently with organic fuels and strong bases, oxidize materials such as wood and particulate metals. It is corrosive to papers and clothing, reacts with water releasing heat and toxic fumes.

Need to add additives and inhibitors: Not applicable.

Hazardous decomposition products Under the action of fire, it can decompose, releasing toxic nitrous gases (NOx).

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

Acute toxicity: The inhalation of nitric acid vapors initially produces irritation of the upper airways, causing sneezing, coughing, chest pain, respiratory distress, salivation and dizziness, which may progress to pulmonary edema and death.

Lethal dose (human) - LDLo = 430 mg/kg. Toxicity.

Lethal dose (rat): Via Respiration (LC50): 49 ppm (4 h).

Toxicity (sea water) LC50 (48 h) = 330ppm-1000 ppm

Local effects: Nitric acid is very corrosive to the skin, eyes, digestive tract and respiratory tract.

Sensitization: Avoid contact with product. Always use personal protective equipment.

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

Toxicologically synergistic effects: Smoking, in the development of chronic bronchitis.

Specific effects: It has no carcinogenic effect, according to the International Agency for Research on Cancer - IARC.

Lethal Dose: IDLH: 25 ppm.

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

Mobility: The product is an energetic oxidizer.

Persistence/ degradability: The released product tends to form NOx.

Bioaccumulation: It contaminates the soil, requiring a neutralization and restoration work.

Expected behavior: Rapid dissipation of the gas cloud.

Environmental impact: Due to the corrosive nature of nitric acid, animals exposed to this product may suffer tissue damage and death, depending on the environmental concentration. Plants contaminated with the product may be adversely affected or destroyed.

Ecotoxicity: Nitric acid is water soluble and even at low concentrations it is harmful to aquatic life. Harmful effect due to pH change.

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

The treatment and disposal of product residues must be done in a suitable environment, by people trained in 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. Neutralize slowly and carefully with lime if possible.

Product:

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

Product waste:

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

Used Package:

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

14. - TRANSPORT INFORMATION**National and International Regulations****Land:**

Resolution No. 5947/2021 of the Brazilian National Land Transport Agency (ANTT), Approves the Complementary Instructions to the Regulation of Land Transport of Dangerous Goods and its amendments.

UN number: 2031

Appropriate name for shipment: NITRIC ACID, except smoky red, with more than 70% nitric acid

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Risk class: 8.**Subsidiary Risk:** 5.1**hazard number:** 885.**Packing group:** I**Waterway:**

DPC – Directorate of Ports and Coasts (Transport in Brazilian waters) Maritime Authority Regulations (NORMAM)

NORMAM 01/DPC: Vessels Used in Open-seas Navigation

UN number: 2031**Appropriate name for shipment:** NITRIC ACID, except smoky red, with more than 70% nitric acid**Risk class:** 8.**Subsidiary Risk:** 5.1**Risk number:** 885.**Packing group:** I**EmS:** F-A,S-B**- Air Transport:**

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

RBAC N°175 - (BRAZILIAN CIVIL AVIATION REGULATION) - TRANSPORTATION OF DANGEROUS ITEMS 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: 2031**Appropriate name for shipment:** NITRIC ACID, except smoky red, with more than 70% nitric acid**Risk class:** 8.**Subsidiary Risk:** 5.1**Risk number:** 885.**Packing group:** I**15. - REGULATORY INFORMATION****Specific regulations for the chemical product:**

Federal Decree No. 2,657, as of July 3, 1998;

Standard ABNT-NBR 14725:2014;

Ordinance No. 229, as of May 24, 2011 – Changes Regulatory Standard No. 26.

16. - OTHER INFORMATION

The information on this sheet corresponds to the current state of our knowledge and experience of the product and is not exhaustive. It applies to the product under the conditions specified, unless otherwise stated. In case of combinations or mixtures, make sure that no new danger can appear. This information does not, in any case, exempt the user of the product from complying with all legislative, regulatory and administrative texts relating 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 "Documentation" of Occupational Exposure Limits (TLVs®) for Chemical Substances and Physical Agents & Biological Exposure Index (BEIs®). Translation Brazilian Association of Occupational Hygienists. São Paulo, 2016.

BRAZIL. MINISTRY OF LABOR AND EMPLOYMENT (MTE). Regulatory Standard (NR) No. 7: Occupational Health Medical Control Program. Brasília, DF. Jun. 1978.

BRAZIL. MINISTRY OF LABOR AND EMPLOYMENT (MTE). Regulatory Standard (NR) No. 15: Unhealthy activities and operations. Brasília, DF. Jun. 1978.

US EPA. 2011. EPI Suite™ for Microsoft® Windows, v4.10. United States: Environmental Protection Agency, Washington. 2011. Available at:



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< <http://www.epa.gov/oppt/exposure/pubs/episuite.htm>>. Access on: September, 2022

Globally Harmonized System of Classification and Labelling of Chemicals (GHS). 9. rev. United Nations, 2021.

HSDB- HAZARDOUS SUBSTANCES DATA BANK. Available at: <<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>>. Access on: September, 2022

IARC- INTERNATIONAL AGENCY FOR RESEARCH ON CANCER. Available at: <<http://monographs.iarc.fr/ENG/Classification/index.php>>. Access on: September, 2022

IPCS - INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY - INCHEM. Available at: <<http://www.inchem.org/>>. Access on: September, 2022

IUCLID - INTERNATIONAL UNIFORM CHEMICAL INFORMATION DATABASE. [S.I.]: European chemical Bureau. Available at: <<http://ecb.irc.ec.europa.eu>>. Access on: September, 2022

NIOSH - NATIONAL INSTITUTE OF OCCUPATIONAL AND SAFETY. International Chemical Safety Cards. Available at: <<http://www.cdc.gov/niosh/>>. Access on: September, 2022

NITE-GHS JAPAN - NATIONAL INSTITUTE OF TECHNOLOGY AND EVALUATION. Available at: <http://www.safe.nite.go.jp/english/ghs_index.html>. Access on: September, 2022

U.S. ENVIRONMENTAL PROTECTION AGENCY. ECOSAR - Ecological Structure-Activity Relationships. Version 1.11 Available at: <<http://www.epa.gov/oppt/newchems/tools/21ecosar.htm>>. Access on: September, 2022