

SC “Achema”

Safety data sheet

In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Non concentrated nitric acid

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SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 The product identifier

The trade name of product: Non concentrated nitric acid.

Chemical name: nitric acid, HNO₃.

Identification number in accordance with Regulation (EC) No. 1272/2008: 007-004-001.

EC Number: 231-714-2.

CAS Number: 7697-37-2.

REACH registration number: 01-2119487297-23-xxxx.

Other means of identification: none.

1.2. Relevant identified uses of the mixture and uses advised against

1.2.1 Uses:

Industrial use:

- Industrial use [SU3, SU4, SU8, SU9, SU10, SU12, SU14, SU15, SU16]: Nitric acid used in production and for industrial use – concentration <75% (PC0, PC7, PC12, PC14, PC15, PC19, PC20, PC33, PC35, PC37).

Professional uses:

- Professional uses [SU1, SU22]: Nitric acid professional/specialized use – concentration <75% (PC12, PC14, PC15, PC20, PC21, PC35).

Further customer use:

- None.

1.2.2 Uses advised against:

Further usage: Usage of cleaning equipment which has more than 3% nitric acid (PC3, PC12, PC31, PC35).

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier: AB Achema

Full address: Jonalaukio k., Ruklos sen., LT-55296

Country: Lithuania

Tel. No.: +370 349 56736

URL website: www.achema.lt

Person responsible for the Safety Data Sheet (with e-mail address): R. Dambrauskas, e-mail: r.dambrauskas@achema.com

1.4. Emergency telephone number

Please contact: Poison Information and Control Office in the Republic of Lithuania by phone ++370 52362052, cell phone +370 687 53378, on site <http://www.apsinuodijau.lt/information-in-english/> or by the Common emergency Center by 112.

Helpdesk services work 24 hours a day, 365 days a year.

Other remarks (language in which assistance is provided): assistance is provided in Lithuanian.

Poison Control Centers in Europe are available on site <http://www.who.int/pcs/poisons/centre/directory/euro/en/>.

Telephone numbers of poison control centers in the European Economic Area: **IRELAND** (Dublin) +353 1 8379964;



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SECTION 2. HAZARDS IDENTIFICATION

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2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]:

Acute Toxicity – Category 3;

Skin Corr. 1A.

2.2 Label elements

Labeling according to Regulation (EC) No. 1272/2008 [CLP]:



Hazard pictogram (s):

GHS05

GHS06

Signal word: DANGER

Hazard statements:

H331 – Toxic if inhaled.

H314 – Causes severe skin burns and eye damage.

EUH071 – Corrosive to the respiratory tract.

Precautionary statements:

P271 – Use only outdoors or in a well-ventilated area.

P280 – Wear protective gloves/ protective clothing/ eye protection/ face protection.

P261 – Do not breathe dust/ fume/ mist/ vapors/ spray.

P264 – Wash hands thoroughly after handling.

P301+310 – IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P301+P330+P331 – IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P303+P361+P353 – IF ON SKIN (or hair): remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

P303+P352 – IF ON SKIN (or hair): rinse with plenty of water/shower.

P312 – Call a POISON CENTER/doctor/if you feel unwell.

P321 – Specific treatment: if on skin wash with 0,5 % boric acid solution.

P363 – Wash contaminated clothing before reuse.

P304+P340 IF INHALED: remove victim to fresh air and keep at rest in a position comfortable for breathing.

2.3 Other hazards

The substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII. In content of oxygen or when heated may form NO_x vapors.

The product is non-flammable but can increase the risk of fire in contact with flammable materials. Mix well with water. The product is a strong acid.

Non concentrated nitric acid is hygroscopic, freely soluble in water, and releases heat when dissolved. Nitric acid smokes in the air, releasing toxic nitrogen oxides and nitric acid fumes, which form mist with air humidity. Nitric acid vapors are 2.2 times heavier than air.

The product is a strong acid. It decomposes organic compounds, can oxidize some organic matter. Living tissues and plant materials are decomposed when exposed to nitric acid.

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SECTION 3. COMPOSITION OR INFORMATION ON INGREDIENTS

3.2 Mixtures

In accordance with Regulation (EC). 1907/2006 nitric acid solution is treated as a mixture.

Hazardous components

CAS number	EC number..	Identification Numbers according to Regulation (EC) No. 1272/2008	REACH registration No.	The mass fraction %	Name	Classification according to Regulation (EC) 1272/2008
7697-37-2	231-714-2	007-004-00-1	01-2119487297-23-xxxx	Not less than 56	Nitric acid	Acute Tox. 3, H331; Ox. Liq. 2, H272; Met. Corr 1, H290; Skin Corr. 1A, H314. Specific concentration limits: Oxidizing liquids: Ox. Liq. 2: ≥ 99,0 %; Ox. Liq. 3 : ≥ 65% – < 99,0%; Skin Corr. 1A: ≥ 20,0 %; Skin Corr. 1B: ≥ 5,0 % - < 20,0 %

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General information

Immediate first aid is required. Give first aid and consult a doctor immediately. First-aid measures should be suitably protected (see section “Handling and Storage”). Remove the person exposed to nitric acid from any further exposure of the acid. Ensure that the equipment for washing eyes and safety showers are located close to the work area.

The material can get through: lungs, skin, eyes and mouth.

Inhalation: If the victim of inhalation feels negative symptoms (e.g. dizziness, sleepiness) assist him or carry him out into fresh air. Keep the victim warm and in a position where they can breath easily. Give artificial respiration if necessary. If it is difficult for them to breathe, give oxygen. Consult a doctor. Do not give mouth to mouth resuscitation, it can be dangerous. In case of severe inhalation, consult a doctor immediately.

Skin contact: Immediately remove contaminated clothing or footwear. Immediately rinse the skin with plenty of water (for at least 15 minutes). If skin burns appear, call a doctor immediately. If made contact with skin, can be rinsed with 0.5% boric acid solution.

Eye contact: Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses if present and easy to do. Consult an eye specialist immediately, even if there are no immediate symptoms. Do not let the victim touch his eyes.

Ingestion: Rinse mouth, do NOT induce vomiting. Solution with pH < 1.5 or unknown: Do NOT give anything to drink, do not induce vomiting. If the person is fully conscious: Rinse mouth out with water, seek medical advice immediately. Solution with pH > 1.5 and in small quantities: Give water to drink and seek medical advice immediately.

Individual protection measures recommended for first-aiders: For the victim delivered from affected area the first aid should be given with hand protection (see section 8.2.2 of this SDS). In areas where there is a risk of nitric acid, providing first aid, the person must use eye and face protection, skin protection, respiratory protection (see section 8.2.2

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of this SDS for requirements).

4.2 Most important symptoms and effects (acute and delayed)

Inhalation: Nitric acid fumes and nitrogen oxides are severely irritating to the upper respiratory tract and lung tissues. They can cause acute respiratory irritation, pain, shortness of breath, pulmonary edema, as well as delayed adverse effects, during which the victim feels relatively well for several weeks, but after this time person may die (bronchopneumonia and / or pulmonary fibrosis). Repeated exposure to high concentrations may adversely affect lungs and teeth, tooth enamel.

After skin contact: Burns skin and living tissues.

Eye contact: Nitric acid fumes and nitrogen oxides are severely irritating to the eyes, cause severe eye damage, damage the cornea of the eyes, cause conjunctivitis.

Ingestion: Causes severe burns to mucous membranes and causes poisoning (the product is classified as acute toxicity category 3 according to Regulation (EC) No. 1272/2008).

4.3 Indication of any immediate medical attention and special treatment needed

Instructions for doctors. Following exposure to acid/NO_x fumes. The exposed person may need to be kept under medical surveillance for at least 48 hours as delayed pulmonary edema may develop.

SECTION 5. FIRE-FIGHTING MEASURES**5.1 Extinguishing media**

Suitable extinguishing media: Pulverized water in important quantity. Carbon dioxide (CO₂). Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media: Do not use chemical or powder extinguishers. Do not attempt to suppress the fire with steam or sand.

5.2 Special material or mixture of hazards

EUH071: Corrosive to the respiratory tract. Nitric acid is non-flammable, but has oxidizing properties, so in contact with flammable materials, it can increase the risk of fire, ignite fire. May accelerate the burning of other combustible materials (wood, cotton, straw). Toxic gases are released (NO_x). On contact with ordinary metals (steel, galvanized, aluminum) corrosion may occur and generate highly flammable hydrogen gas. May explode in contact with a powerful reducing agent.

5.3 Advice for firefighters

Cool down the containers/equipment exposed to heat with a water spray. Use water spray to disperse vapors and to protect personnel. Avoid disposal of contaminated fire fighting water to the environment. Wear self-contained breathing apparatus and full-body acid-resistant clothing, acid-resistant boots or boots, rubber gloves, eye protection, in accordance with LST EN 469.

5.4 Other information

The water used for extinguishing is contaminated and must be collected. Do not empty into drains or sewers.

SECTION 6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

6.1.1. For personnel not involved in emergency situations: Wear chemical protective clothing, rubber gloves, eye-protecting lenses, face protection (safety shields) in the workplace. Use local exhaust ventilation (in enclosed spaces). Equipment, apparatus and pipelines must be tight, filling and discharging equipment must be well sealed. Ventilate the

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area where the material spilled or leached to disperse methanol vapors. Do not breathe vapor / water by means of deposition / neutralization of vapor clouds and isolate leakage sources as soon as possible. Avoid any direct contact with the product. For more see section 8.

6.1.2. For the personnel involved in emergency situations: Wear breathing apparatus and full body-covering, acid-resistant clothing, acid-resistant boots or boots and gloves. Avoid contact with skin and eyes, avoid inhaling vapor. Evacuate non-emergency personnel.

6.2 Environmental precautions

Due to its high acidity, the product poses a threat to the aquatic ecosystem. Do not allow product to spread into the environment. Do not discharge into drains and / or rivers. In case of accidental plumbing or sewage system pollution, inform the systems supervising institutions. Dilute with water and neutralize the acid with, for example soda or sodium carbonate, before discharging contaminated material into treatment plants or water courses.

6.3 Methods and material for containment and cleaning up

6.3.1. Containment. Stop the leak.

6.3.2. Cleaning. Pump (scoop) as much as possible of the spilled non concentrated nitric acid into tight and labelled containers. Degas with large amounts of water, neutralize via alkaline solutions (extinguished lime, sodium chloride). Use tools made of corrosion-resistant metal. Neutralize contaminated solid materials via nitric acid and confine into specially labelled containers made of stainless steel or plastic.

6.3.3. Other information. Do not use organic compounds or sawdust to collect spilled acid. If needed ventilate the spilled area.

6.4 Reference to other sections

For more information on exposure controls/personal protection or disposal considerations, please check section 8 and 13 of this safety data sheet.

SECTION 7. HANDLING AND STORAGE

7.1 Precaution for safe handling. Protective measures

Protective measures: Supply-exhaust ventilation in accordance with STR 2.09.02 must be installed in order to prevent the accumulation of harmful substances in production premises and laboratories where nitric acid is used (indoors). The production of non-concentrated nitric acid must use sealed equipment, apparatus and piping as well as sealed filling and discharge equipment. Ensure adequate ventilation of the work station. Only use materials resistant to acids. Avoid any direct contact with the product. Do not breathe fumes. For preference use pumping techniques for unloading and discharging. Provide an adapted retention system. Avoid any direct contact with the product. Do not breathe vapors. Use protective goggles, work clothes, gloves and boots. Dilutions or neutralizations are very highly exothermic. Carry out slowly. Always add acid to water, not water to acid. Never introduce water or any aqueous agent into tanks or containers containing acids. Do not mix with incompatible materials (see section 10).

Fire prevention measures. Keep the product away from sources of ignition. Avoid contamination through any materials, including metal dust and organic materials. Keep the product away from moisture.

Aerosol and dust prevention measures. Use adequate ventilation. A local supply-exhaust ventilation system must be used in accordance with STR 2.09.02. When the wind is blowing, do not allow aerosols to form and circulate.

Environment protection measures. Do not allow to enter surface water or groundwater or sewage system.

Recommendations concerning good general hygiene practices at the work place. Do not eat, drink or smoke while handling the product. After use / cleaning, wash hands, remove contaminated clothing and protective equipment before beginning to eat, smoke and use the toilet.

7.2 Conditions for safe storage including any incompatibilities

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Technical measures and storage conditions: The floor of the warehouse should be impermeable, acid resistant and designed to form a water-tight basin. All storage and metal building constructions must be covered with acid / corrosion resistant materials. **Attention:** Nitric acid disperses / decomposes concrete. Keep away from heat, ignition sources, direct sunlight and incompatible substances. The storage temperature for non concentrated nitric acid must not exceed 40 ° C. The warehouse must contain a sufficient quantity of neutralizing agents (sodium chloride, lime) and water.

Ground and protect against corrosion of electrical equipment.

Storage tanks and containers: non concentrated nitric acid is stored in closed storage tanks and containers made of corrosion-resistant (stainless) steel (preferably low carbon) eg 304L (DIN / EN 1.4306) or plastic (eg PVC, PTFE). Install suitable safety valves to prevent overpressure. Hatches in storage rooms and containers must be sealed with gaskets made of fluoroplastic or teflon. Protect containers from corrosion and physical damage. To prevent overpressure and spillage, no more than 90% by volume of non concentrated nitric acid may be added to stationary storage facilities and tanks.

Non concentrated nitric acid is poured into specially designed corrosion-resistant (stainless) steel railway tanks, road tankers, nitric acid-resistant plastic (PEHD) containers with a capacity of 1 m³. When transporting non concentrated nitric acid in tank-vehicles with a capacity of more than 7,500 l without internal bulkheads, non concentrated nitric acid may not be added to tank-vehicles in a capacity of less than 80% by volume, in accordance with the recommendations of Fertilizers Europe. Tank-vehicles, rail-tankers and plastic containers shall not contain more than 90% by volume of non concentrated nitric acid or in accordance with the requirements for that vehicle. Road tankers, rail tanks, plastic containers filled with non-concentrated nitric acid must be clean, free of residues of other products. The hatches of railway tanks, road transport tanks or road tankers must be sealed with gaskets made of fluoroplastic or teflon.

Periodically and safely, barrels, metal or plastic containers must be ventilated to prevent the accumulation of hydrogen (where there are no safety valves). Do not mix with alkaline materials.

Containers to which non concentrated nitric acid is added must be clean, free from residues of other products. Do not use base metals, carbon or rubber steel, polypropylene.

When storing the product in Lithuania in stationary containers with a volume of more than 50 m³, these containers must be registered with the state register management institution in accordance with the 2006 Chief State Labor Inspector of the Republic of Lithuania. August 1 order no. 1-178 “On the Approval of the List-Classification of Potentially Dangerous Equipment to be Registered in the State Register, Indicating Their Parameters”.

It is allowed to store up to 50 tons of nitric acid at a time in a warehouse. Larger amounts of nitric acid can be stored in facilities where according to the Resolution of the Government of the Republic of Lithuania No.16.08.2004. 966 “On the Approval of the Description and Listing of Criteria for the Listing and Classification of Substances, Mixtures or Preparations of Hazardous Substances in Hazardous Substances” (Official Gazette, 2004, No. 130-4649) with all subsequent amendments and supplements; and in part 2 of Annex I to Regulation 2012/18/EU, requirements for hazardous objects are met.

7.3 Specific end use (s)

Nitric acid registration procedures in the REACH dossier for nitric acid usage, which are not mentioned in the 1.2.1 subsection of this SDS and for which this SDS attachment does not include exposure scenarios are:

Formulation:

F-2: Mixtures containing < 70% nitric acid.

F-1: Mixtures containing > 70% nitric acid.

Industrial use:

IW-4: nitric acid < 70% used as a reactive processing measure in industry (cleaning measure, pH regulator, emitted gas cleaning, ion-exchange resin regeneration, metal processing, plastic processing, surface processing product).

IW-3: Nitric acid < 70% used as a reactive treatment agent in the industry (cleaning measure, pH regulator, emitted gas cleaning, ion-exchange resin regeneration, metal processing, plastic processing, surface processing product).

Final user use:

C-1: use of nitric acid as cleaning agents, containing <3% of nitric acid.

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

The limit value of the component of the chemical substance and the preparation in the ambient air:

Long-term exposure limit (IPRD): Not applicable to nitric acid according to hygiene norm HN 23. Nitrogen dioxide (CAS No. 10102-44-0) has an IPRD of 0.96 mg / m³ or 0.5 ppm (according to HN 23). The IPRD of nitric monoxide (CAS No. 10102-43-9) is 2.5 mg / m³ or 2 ppm (according to HN 23).

Short-term exposure limit (TPRD): TPRD of nitric acid: 2.6 mg / m³ or 1 ppm (according to HN 23). Nitrogen dioxide (CAS No. 10102-44-0) TPRD is 1,91 mg / m³ or 1 ppm (according to HN 23). TPRD of nitric monoxide (CAS No. 10102-43-9), is not applicable according to HN 23 in Lithuania.

Limit value (NRD): NRD not applicable for nitric acid, nitrogen dioxide (CAS No. 10102-44-0), nitric monoxide (CAS No. 10102-43-9) in Lithuania according to HN 23.

Occupational exposure limit (s) according to Directive 98/24/EC: not applicable for product

Occupational exposure limit (s) according to Directive 2004/37/EC: not applicable for product.

Any other national occupational exposure limits: no data available.

Non-limiting value (s) (DNEL)

DNEL values SDS for referred product use in p. 1.2.1, exposure scenarios in the SDS attachment are presented in the tables.

Exposure scenario (1): Use of nitric acid for production and industrial use - concentration <75%.

Worker (oral)	In accordance with all hygiene requirements no effect via oral is found.	
DNEL value Worker (inhalation) DNEL = 1.3 mg / m ³ DNEL value	Calculated for fluid by MEASE	RCR
PROC1	0,001 mg/m ³	0,0008
PROC2	0,001 mg/m ³	0,0008
PROC3	0,01 mg/m ³	0,0077
PROC4	0,05 mg/m ³	0,0385
PROC5	0,05 mg/m ³	0,0385
PROC8a	0,05 mg/m ³	0,0385
PROC8b	0,01 mg/m ³	0,0077
PROC9	0,01 mg/m ³	0,0077
PROC10	0,05 mg/m ³	0,0385
PROC13	0,01 mg/m ³	0,0077
PROC14	0,01 mg/m ³	0,0077
PROC15	0,01 mg/m ³	0,0077
PROC 7 – with mask ATP 20	0,05 mg/m ³	0,0385

Exposure scenario (2): professional / specialized use for nitric acid - concentration <75%.

Worker (oral)	In accordance with all hygiene requirements no effect via oral is found.	
For professional (specialist) worker (if inhaled) DNEL = 1,3 mg/m ³	Estimated by MEASE	RCR
PROC5	0,1 mg/m ³	0,08
PROC8a	0,05 mg/m ³	0,04
PROC8b	0,05 mg/m ³	0,04
PROC9	0,05 mg/m ³	0,04
PROC10	0,05 mg/m ³	0,04
PROC13	0,05 mg/m ³	0,04
PROC14	0,1 mg/m ³	0,08
PROC15	0,01 mg/m ³	0,01

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PROC19	0,05 mg/m ³	0,04
PROC 11 with mask APF40	0,5 mg/m ³	0,38

Predicted inactive concentration(s) PNEC:

Task in the field of environmental protection	PNEC value, mg/l
Freshwater	Qualitative treatment was used. pH was used as an estimation factor. The registration dossier for nitric acid states that PNEC was not detected because nitric acid is a strong acid that greatly changes the pH of the solution. The concentration increase in nitric acid has a lower effect than the effect of reducing the pH of the solution.
Freshwater sediment	The registration dossier for nitric acid states that PNEC was not detected because nitric acid is a strong acid that greatly changes the pH of the solution. The concentration increase in nitric acid has a lower effect than the effect of reducing the pH of the solution.
Sea water	Not applicable.
Sea water sediment	Not applicable.
Food chain	Not applicable because nitric acid does not exhibit bio accumulative properties. Data source - nitric acid registration dossier.
Microorganisms in sewage treatment system	Not applicable.
Soil (agricultural)	Not applicable. Data source - nitric acid registration dossier.
Air	

During storage and use of the product, the levels of nitric acid vapor and nitrogen oxides (NO_x) in the air must be measured (monitoring must be carried out).

The product must be manufactured and used in a professional manner by the Minister of Social Security and Labor of the Republic of Lithuania and the Minister of Health of 2001 of 24 of July Order No. 97/406 „On approval of Regulations for the Protection of Workers from Chemical Agents at Work and for the Protection of Workers against the Exposure to Carcinogens and Mutagens at Work“ (Official Gazette, 2001, No. 65-2396), with all the subsequent amendments and additions.

8.2 Exposure control

8.2.1. The technical management measures:

Indoor facilities must have local supply - exhaust ventilation according to STR 2.09.02. Regular air monitoring must be carried out at the environment of the workplace. Disinfectant shower rooms and devices for water to flow must be installed.

8.2.2. Individual protection measures, such as personal protective equipment

8.2.2.1. Eye and (or) face protection: To ensure protection of eyes wear chemically resistant protective goggles or face shield according to LST EN 166 or self-contained breathing apparatus with full face mask according to LST EN 402.

8.2.2.2. Skin and body protection: Use acid-resistant special protective suit according to LST EN ISO13688 and LST EN 13034, acid-resistant boots or boots according to LST EN ISO 20345.

8.2.2.3. Hand protection: Use protective gloves according to LST EN 420, LST EN 374-1 due to chemical protection, LST EN 388 due to mechanical protection. Protective gloves must be made of one of the materials listed in the table, at least as specified, for penetration of thickness and resistance.

Glove material	Glove thickness, mm	Penetration time, min*
Fluorocarbon rubber	n.m. 0.40	> 480
Viton butyl	0.70	> 480
LLDPE	0.062	> 480
Butyl rubber	n.m. 0.50	120
Polychloroprene	n.m. 0.50	120
Nitrile synthetic rubber	n.m. 0.50	120

* - Time of penetration of glove material is the time that the product in contact with the glove penetrates through it completely. The shorter the penetration time, the glove material is less resistant to the product.

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Incompatible protective gloves made of:

- Nitrile / neoprene;
- Nitrile rubber / nitrile latex;
- PVA;
- Textile;
- Leather.

The manufacturer or consumer of the product must choose the appropriate glove material from the available options based on the nature of their work, the likelihood of contact with the product, the probable duration of exposure. When constantly working with the product it is recommended that the material of used gloves can withstand from being penetrated for at least 480 minutes. When working with the product, gloves can not be used for longer than the penetration time.

Skin protection creams do not adequately protect the product.

Please note that the penetration time of the glove material in this section has been set at 22 °C and using 50-65% aqueous nitric acid solution. Using the product at a temperature higher than 22 °C, or at normal temperature using product mixtures with other materials, the glove material may be less resistant and therefore the permitted shelf life of the gloves must be shortened in such cases.

We recommend that when you start using a new type or other manufacturer's gloves, make sure that they are chemically and mechanically resistant to working conditions. If you have any questions about the suitability of the gloves, please contact the manufacturers / suppliers of gloves.

The inside of the gloves should not contain powders which can cause hand skin allergies.

Before using the gloves, please always make sure there are no tears, cracks, or other defects. When the work is finished, the gloves must be cleaned and washed thoroughly before they are dry. After work, care must be taken to the hand skin.

8.2.2.4. Respiratory protection: In case of emergency (upon permeation occurring, when the working environments' concentration of nitric acid in the air exceeds the limit values of the permissible concentration), use respiratory personal protective equipment: masks with V, M, A2B2E2K2P3 (ABEK2) filter or analogous brand filter according to LST EN 14387, analogous brand filtering gas masks, insulating gas masks or breathing apparatus according to LST EN 402. The use of filter gas masks is allowed only in an environment containing at least 17 % oxygen.

8.2.2.5. Other protection: Do not eat, drink or smoke at workplace. Wash hands before breaks and at the end of work. Keep work clothes away from other clothes and objects.

8.2.3 Environmental exposure controls: Run regular /stable pH of discharged waste water control, to prevent access to sewers and the environment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance: colorless or yellowish evaporating liquid at 20 °C temperature and 1013 hPa pressure.

b) Odor: Pungent.

c) Odour threshold: The smell is felt from a few drops product.

d) pH: <1.

e) Melting point/Freezing point °C: At a pressure of 1013 hPa, 232 K or –41 °C. Validation: registration of nitric acid in the REACH dossier summarizes that the melting point of nitric acid is definitely lower than –20 °C. In this case, referring ECHA's dossier “Guidance on information requirements and chemical safety assessment. Section R.7a: Specific guidance for data entry “melting point for substances may not be determined”.

f) The initial boiling point or boiling point range: At a pressure of 1013 hPa, 356 K or 83 °C. Validation: registration of nitric acid in the REACH dossier states that the boiling point range is obtained when nitric acid is not sufficiently pure.

g) Flash Point: According to the REACH regulation attachment VII column 2 using an explanation: it is not detected as the product is a solution of inorganic matter.

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h) Evaporation rate: Unknown;

i) Flammability (solid, gas): Non-flammable;

j) Upper (lower) flammability or explosive limit values: Not applicable, non-explosive;

k) Vapor pressure: 6.1 E +03 Pa at 293 K or 20 °C. Validation: registration of nitric acid according to REACH dossier states that the results of several tests have been similar, so the final vapor pressure value was decided to be the average of the results of several tests.

l) Vapor density: 2;

m) Relative density: 1.346 g / cm³ at 20 °C.

The density of aqueous solutions of nitric acid at the following concentrations at 20 °C is equal (data source: nitric acid registration dossier according to Regulation (EC) No 1907/2006 (REACH)):

- 1 % - 1,0036 g/cm³;

- 10 % - 1,0543 g/cm³;

- 20 % - 1,1150 g/cm³;

- 30 % - 1,1800 g/cm³;

- 40 % - 1,2463 g/cm³;

- 50 % - 1,3100 g/cm³.

n) Solubility: 500 g/l at 20 °C. Validation: The solubility temperature for nitric acid in REACH dossier is not provided. Such solubility is expected at room temperature. Based on the fact that nitric acid is highly soluble in water, it was determined that the solubility of nitric acid in water is > 500 g/l at 20°C.

o) Partition coefficient n-octanol/water: According to REACH regulation attachment VII column 2, using an explanation: it is not established as the product is a solution of inorganic matter.

p) Auto-ignition temperature: Not applicable. Validation: Inorganic oxides in which an inorganic element has the highest degree of oxidation can no longer react with oxygen, therefore they are considered non-flammable. Within nitric acid, nitrogen has the highest degree of possible oxidation (5+), therefore nitric acid is considered non-flammable and it is not sensitive to self-ignition.

q) Decomposition Temperature: 83 °C 1013 hPa;

r) Viscosity: 0.75 mPa at 25 °C. Validation: Nitric acid dossiers contain several values from different sources of literature. The final value is decided by calculating the arithmetic mean of all the results.

s) Explosives (explosive) properties: Based on REACH regulation attachment VII column 2, explosive properties may not be determined if there are no chemical groups in the product molecules that could lead to explosive properties. Based on the chemical structure of nitric acid criteria which are applied according to ADR, it is stated that nitric acid has no chemical groups that could lead to explosive properties.

t) Oxidizing Properties: Oxidizing.

9.2 Other information

Miscible with water in all proportion.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

The product is a strong acid. It decomposes organic compounds, can oxidize some organic matter. Living tissues and plant materials are decomposed when exposed to nitric acid.

10.2 Chemical stability

The product is not completely stable under recommended storage and handling conditions. Nitric acid smokes in the air, releasing toxic nitrogen oxides and nitric acid fumes, which form mist with air humidity. Nitric acid fumes, nitrogen oxides (NO_x) may be released from exposure to light, oxygen or heating.

10.3 Possibility of hazardous reactions

Reacts with metals releasing hydrogen. Reacts well with carbon steel. Decomposes / corrodes concrete. For fire treatment of the product, see section 5 of this SDS. Dilution of nitric acid with water or neutralization results in a very strong exothermic reaction.

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10.4 Conditions to avoid

Avoid exposure to light, direct sunlight, heating, ignition sources, high temperatures, nitric acid fumes, damage to mechanical seals, contamination by any material, including metal dust and organic materials. Do not use base metals, carbon or rubber steel, polypropylene. Keep the product away from moisture.

The storage temperature for non concentrated nitric acid must not exceed 40 °C.

10.5 Incompatible materials

Carbon steel, concrete, chlorates, chlorides, chromates, flammable substances, nitrates, oxidizers, organic substances, permanganates, reducing agents, sulfur, strong acids, strong bases, crushed metals (eg powders and dusts (especially zinc)), alkaline substances, substances containing copper, nickel, cobalt, zinc and their alloys, fertilizers containing sulfur, urea, NPK, NP and NK fertilizers.

10.6 Hazardous decay products

Nitric acid smokes in the air, releasing toxic nitrogen oxides and nitric acid fumes, which form mist with air humidity. Nitric acid may emit nitric acid fumes, nitrogen oxides (NO_x) from light, contact with oxygen, organic materials or heating.

Contact with carbon steel liberates toxic nitrogen oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity: Of high toxicity after inhalation.

Inhalation: LC50 (1 h) on rats EBPO 403: >2650 ppm (male/female) based on test material.

Corrosive substance and not an acute toxicant via inhalation.

Practical experience/occurrence on people: Not determined.

Effects on animals

	Exposure dose/concentration	Class	Method	Symptoms/delayed effect	Remarks
Acute ingestion toxicity	According to REACH regulation, an acute toxicity study does not need to be conducted if the material is classified as corrosive to skin (Column 2, attachment VIII, section 8.5).				
Acute skin contact toxicity	According to REACH regulation, an acute toxicity study does not need to be conducted if the material is classified as corrosive to skin (Column 2, attachment VIII, section 8.5).				
Acute inhalation toxicity	LC50 (4 h): > 2.65 mg/L	Rats (male/female)	OECD 403	Acute inhalation toxicity determined	None
	LC50 (1 h): about 2500 ppm (male/female)	Rats (male/female)	OECD 403	Acute inhalation toxicity determined	None
	LC50 (1 h): about 2200 ppm (male)				
	LC50 (1 h): ca. 2800 ppm (female)				

Other information: No data available.

Assessment/classification: based on available data, the classification criteria are met according to Regulation (EC) No. 1272/2008 as acute toxicant when inhaled Category 3.

Skin irritation or/and sensitization: based on available data, according to Regulation (EC) No. 1272/2008 nitric acid is classified as corrosive to skin, category 1A. Based on the regulation (EC) No. 1272/2008 annex VIII section 8.1.1

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column 2, experimental tests were not carried out on the basis that nitric acid is a strong acid and has a pH <2.

High harmfulness for eyes and eye irritation: Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No 1272/2008. Nitric acid is classified as corrosive to skin, category 1A in accordance with regulation (EC) No. 1272/2008 annex VI table 3.1, therefore, according to REACH regulation annex VII section 8.2 column 2, experimental tests were not carried out on the basis that nitric acid is a strong acid, its pH < 2 and it is classified as corrosive to the skin.

Sensitizing of the airways or skin: EUH071: Corrodes respiratory system.

The registration of nitric acid in REACH dossier also provides information on the collected data about the effects of nitric acid on people with asthma. Summarizing the data, it was concluded that nitric acid is not related to moderate cough, asthma or dyspnea.

Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No 1272/2008.

Mutagenicity: test (AMES) result is negative. From the results obtained on nitric acid (OECD 471), sodium (OECD 471, 473) and potassium (EBPO 471, 473 and 476) nitrates and due to their structural similarities with nitric acid, it is possible to conclude that nitric acid is not expected to cause genetic toxicity. Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No 1272/2008.

Carcinogenicity: Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No 1272/2008.

Reproductive toxicity: According to OECD 422 (rat) NOAEL 1500 mg/kg day no adverse effects on reproduction and development have been established. The summary of carried out results in the studies of nitric acid registration according to REACH dossier states that the local corrosive effects of nitric acid are significantly predominant in comparison with systemic effects. Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No 1272/2008.

Specific toxicity for particular organ (STOT) (one time effect): Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No 1272/2008.

Specific toxicity for particular organ (STOT) (repeated effect): Oral: combined repeated toxicity study. Developmental Toxicity Screening Test according to OECD 422 (Rat) NOAEL-1500 mg/kg per day. Inhalation: repeated inhalation toxicity study according to OECD 413 (rats) NOAEC – ≥ 2.15 ppm. Skin: no data. Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No 1272/2008.

Aspiration hazard: None.

SECTION 12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Based on available data, the product does not meet the criteria for classification as dangerous for the environment in accordance with Regulation (EC) No. 1272/2008.

Toxicity to aquatic invertebrates (short-term effect).

Aquatic invertebrates – Daphnia LC50 – >100 mg/l (48 h);

LC50 (96 h) (ceriodaphnia dubia, USEPA method): pH value – 4,6;

The shore crab LC50 – 180 mg/l (48 h);

Toxicity to aquatic invertebrates (long-term effect.): No valid data.

Toxicity to algae and aquatic plants. In accordance with REACH regulation annex XI section 1.5, the study does not need to be conducted if studies have already been carried out on materials which have an analogical structure. In the environment nitric acid dissociates into hydrogen (H⁺) and nitrate ions. Hydrogen ion reduces pH, but in the aquatic environment, the pH decrease is limited due to buffering properties. Water eco toxicological studies are required at pH 6-9. At such a pH, the nitric acid effect is reduced to the effect of nitrates, therefore to evaluate the nitric acid toxicity to algae and aquatic plants the results of investigations (Admiral, 1977) may be used, obtained with potassium nitrate. During these experiments, marine benthic pollen was affected to potassium nitrate. Determined NOEC = 6.75 mmol/L

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(i. e. 682 mg KNO₃/l or 419 mg nitrate/l).

Toxicity to soil dwelling organisms: Depending on the pH level. Increasing the concentration of nitrate varies slightly.

Toxicity to terrestrial plants: Depending on the pH level. Increasing the concentration of nitrate varies slightly.

12.2 Persistence and readability

Not applicable (because the organic material).

12.3 Bio accumulative potential

Not applicable (because the organic material).

12.4 Mobility in soil

Not applicable.

12.5 PBT and vPvB assessment

According to Annex XIII of Regulation (EC) No 1907/2006, no PBT and vPvB assessment has been conducted to inorganic material.

12.6 Other adverse effects

Not applicable.

SECTION 13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods**

13.1.1. Waste from residues: Non concentrated nitric acid waste and other nitric acid solutions waste containing 5 % or more of nitric acid according to Regulation (EC) No. 1357/2014 is classified as hazardous waste by **HP 8** „Corrosive“, hazard statement code H314 “Causes severe skin burns and eye damage”. Do not empty into drains (environment). Nitric acid waste must be fully neutralized with lime or sodium alkali, diluted with water, collected in closed and labeled stainless steel or acid-resistant plastic containers. Nitric acid waste must be stored under lock. Transfer waste to waste management companies. The final waste code is assigned by the waste holder / manager. It is recommended not to encourage the disposal of the product with wastewater. Non concentrated nitric acid waste in Lithuania must be managed in accordance with the Law on Waste Management of the Republic of Lithuania, in other countries - in accordance with the requirements of national legislation.

13.1.2. Non concentrated nitric acid waste product packaging: Emptied rail and road tankers should be cleaned by appropriate method and then re-used. According to Regulation (EC) No. 1357/2014 the packing of nitric acid solution is classified as hazardous waste by **HP 8** „Corrosive“, hazard statement code H314 “Causes severe skin burns and eye damage”. Non concentrated nitric acid packaging waste must be transferred to waste handling companies. The final waste code is assigned by the waste holder / manager. Non concentrated nitric acid waste in Lithuania must be managed in accordance with the Law on Waste Management of the Republic of Lithuania, in other countries - in accordance with the requirements of national legislation.

Do not remove label until packing is thoroughly cleaned.

SECTION 14. TRANSPORT INFORMATION

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14.1 UN number

UN No. 2031

UN proper shipping name

Nitric acid

14.3 Transportation (transport) of hazard class (-s)

8

14.4 Packaging group

II

14.5 Environmental hazard

Limited: LQ22 EmS: F-A, S-B. marine pollutant: NO.

14.6 Special precautions for use

None.

14.7 Bulk shipment of MARPOL 73/78 Annex II and IBC Code

It is not foreseeable that the product will be transported unpackaged, therefore this subsection is not fulfilled.

15. REGULATORY INFORMATION

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- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC;
- Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH);
- Commission Regulation (EC) No 552/2009 of 22 June 2009 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards Annex XVII;
- REGULATION (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives;
- Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC;
- Regulation (EU) No 98/2013 of the European Parliament and of the Council of 15 January 2013 on the marketing and use of explosives precursors;
- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);
- The International Rule for Transport of Dangerous Substances by Railway (RID);
- The International Maritime Dangerous Goods (IMDG);
- International Convention for the Prevention of Pollution from Ships (MARPOL 73/78);
- The International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code) (the IBC Code).

National legislation (Lithuania):

- Applicable Law on Waste Disposal of the Republic of Lithuania;
- Applicable Law on Package and Package Waste Handling of the Republic of Lithuania;
- HN23 Maximum Allowable Concentrations of Hazardous Chemical Substances and Preparations in Working Environment. General Requirements;
- HN36 Banned and Restricted Substances;
- Applicable Regulations for Workers "Protection against the Impact of Chemical Factors" and Regulations for Workers "Protection against Carcinogenous and Mutagenous Impacts";
- Applicable Procedure of Safety Data Sheet Requirements and Supply thereof to Professional Users;
- Applicable Rules on Labelling of Items (Products) to be Sold in Lithuania and Referring Price thereof;
- Applicable Rules on Waste Disposal;
- 17 of August 2004 Governments of the LR resolution No. 966 „On Prevention, Response and Investigation of dangerous objects and substances, mixtures or preparations classified as hazardous materials, and a list of criteria for designation of the Approval, as subsequently amended and supplemented. (Official Gazette, 2004, No. 130-4649; 2005 No. 131-4731, 2008, No. 109-4159; 2009 No. 90-3855; 2010, No. 59-2894; 2012 No. 61-3078), as amended and supplemented.
- Chief State Labor Inspector of the Republic of Lithuania in 2006 August 1 Order no. 1-178 “On the Approval of the List-Classification of Potentially Dangerous Equipment to be Registered in the State Register, Indicating Their Parameters”.
- LR 2001 by the Minister of Social Security and Labor and the Minister of Health July 24 Order No.97 / 406 “On the

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approval of provisions for the protection of workers from chemical agents at work and the protection of workers from the effects of carcinogens and mutagens at work” (Official Gazette, 2001, No. 65-2396, TAR identification code 1012230ISAK0097 / 406), with all subsequent amendments and additions;

- LST EN 149 “Respiratory protective devices. Filterable half mask for particle protection. Requirements, testing, marking”;
- LST EN 166 “Personal eye protection. Technical requirements”;
- LST EN ISO 374-1 “Protective gloves against hazardous chemicals and micro-organisms. Part 1. Protective gloves against hazardous chemicals and micro-organisms. Part 1. Terminology and chemical resistance requirements (ISO 374-1: 2016)”;
- LST EN 388 “Protective gloves against mechanical hazards”;
- LST EN 402 “Respiratory protective devices. A lung-operated, life-saving, autonomous, open-air compressed air breathing apparatus with full-face mask or mouthpiece set-up. Requirements, tests, marking”;
- LST EN 420 “Protective gloves. General requirements and test methods”;
- LST EN 469 “Protective clothing for firefighters. Performance requirements for firefighting protective clothing”;
- LST EN 14387 “Respiratory protective devices. Gas filters and composite filters. Requirements, tests, marking”;
- LST EN 14605 “Protective clothing from liquid chemicals. Protective clothing with fluids (type 3 clothing) or spray (type 4 clothing), with its impermeable connections, including its elements protecting only certain body parts (PB clothing [3] and PB (4) clothing) using requirements”;
- LST EN ISO 20345 “Personal protective equipment. Safe footwear (ISO 20345:2011)”.

Additional information on the relevant Community provisions on safety, health and the environment for the product:

It is allowed to store up to 50 tons of nitric acid at a time in a warehouse. Larger amounts of nitric acid can be stored in facilities where according to the Resolution of the Government of the Republic of Lithuania No.16.08.2004. 966 “On the Approval of the Description and Listing of Criteria for the Listing and Classification of Substances, Mixtures or Preparations of Hazardous Substances in Hazardous Substances” (Official Gazette, 2004, No. 130-4649) with all subsequent amendments and supplements; and in part 2 of Annex I to Regulation 2012/18/EU, requirements for hazardous objects are met.

Restrictions on the product as regards Regulation (EU) No. 98/2013: nitric acid falls within the scope of Regulation (EU) No. 98/2013, and therefore it can not be supplied to members of the general public either in pure form or in mixtures or substances unless it is present in concentrations below 3% by mass.

15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this product. Exposure scenarios are presented in SDS attachment.

SECTION 16. OTHER INFORMATION

Revision date: 2020.05.31

Version No.: 6.0

Revision No.: 0

Issuing date: 2020.05.31

(i) A clear evidence of added, deleted or modified information:

The following changes were made to the safety data sheet as compared to the previous version:

- sub-section 1.3: Updated information about company zip code and phone number.
- sub-section 1.4: supplemented by contact information (telephone numbers) of poison control centres in the European Economic Area.

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- sub-section 3.2: The hazard classification of nitric acid is provided in Lithuanian, not English.
- section 4: changed and supplemented information on first aid measures.
- sub-section 5.3: information on personal protective equipment for emergency responders is included.
- section 7: changed and supplemented information on handling and storage.
- sub-section 8.1: supplemented with what materials to measure and monitor.
- sub-section 8.2.2: revised / corrected information on personal protective equipment.
- section 9: supplemented information on the density of nitric acid solutions.
- section 10: supplemented information on stability and reactivity.
- section 11: amended and supplemented toxicological information.
- sub-section 15.1: supplemented legislation documents.

(ii) List of abbreviations and acronyms used throughout the Safety Data Sheet:

ADR – European Agreement on Dangerous Goods by Road;

RID – Regulations Concerning the International Carriage of Dangerous Goods by Rail;

IMDG – International Maritime Organisation;

IATA – International Air Transport Association;

IMO – Cross-border maritime transport organization;

SMGS – Agreement on the International Carriage of Goods by Rail.;

OECD – Organization for Economic Co-Operation and Development;

CAS – Chemical Abstracts Service;

CO₂ – Carbon Dioxide;

EC – European Community;

EU – European Union;

H – Hazard Statement;

HNO₃ – Nitric acid;

LC50 – Median lethal dose;

PC – Product Category;

PVC – Polyvinyl Chloride;

PROC – Process Category;

TPRV – Short-term exposure limit;

IPRD – Long-term exposure limit;

Cat. – Category.

Acute Tox. 3 – Acute toxicity category 3;

Met. Corr 1 – Metal corrosion causing material category 1;

Ox. Liq 2 – Oxidizing liquids category 2;

Skin. Corr. 1A – Skin corrosion/irritation category 1A;

Explanation of the utilization sector (SU):

SU1 – Agriculture, forestry, fisheries.

SU3 – Industrial use: the use of materials as such or in mixtures.

SU4 – Food industry.

SU8 – Production of bulk, high-volume chemicals (including petroleum products).

SU9 – Production of small chemicals.

SU10 – Composition (mixing) and repackaging (except alloy) of items.

SU12 – Production of plastic products, including production and processing.

SU14 – Production of metals including alloys.

SU15 – Production of metal products, except machinery and installations.

SU16 – Production of computer, electronic and optical, electrical equipment products.

SU22 – Public property (administration, education, entertainment, services, craftsmen).

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Product category (PC) explanation:

- PC0 – Other.
- PC3 – Air control products.
- PC7 – Untreated Crude metals and alloy.
- PC12 – Fertilizer.
- PC14 – Metal surface processing products, including galvanic and galvanic products.
- PC15 – Non-surface metal processing products.
- PC19 – Intermediate.
- PC20 – Products such as p-regulators, flocculants, sedimentation tanks, neutralizing agents.
- PC21 – Laboratory chemicals.
- PC31 – Polishers and wax mixtures.
- PC33 – Semiconductors.
- PC35 – Washing and cleaning equipment (including solvents).
- PC37 – Chemicals for water purification.

(iii) Bibliography:

- 1) Registration of nitric acid according to REACH dossier is declared on the website of the European Chemicals Agency.
- 2) Admiraal W. (1977). Tolerance of estuarine benthic diatoms to high concentrations of ammonia, nitrite ion, nitrate ion and orthophosphate. Marine Biology 43: 307-315.
- 3) <http://gestis-en.itrust.de/nxt/gateway.dll?f=templates&fn=default.htm&vid=gestiseng:sdbeng> [data used 2018-07-10]

(iv) Applicable classification and procedures used to determine the classification of mixtures in accordance with Regulation (EC) No. 1272/2008 [CLP Regulation]:

Classification in accordance to regulation (EC) No. 1272/2008	Classification procedure
Acute Tox. 3	Based on the specific concentration limits that were determined by the nitric acid leading registrant with a calculating method and included in the nitric acid registration REACH dossier.
Skin Corr. 1A	Based on the specific concentration limits that are in Regulation (EC) No. 1272/2008 annex VI Table 3.1
Ox. Liq. 2	Based on the specific concentration limits that are in Regulation (EC) No. 1272/2008 annex VI Table 3.1
Met. Corr 1	Based on the specific concentration limits that were determined by the nitric acid leading registrant with a calculating method and included in the nitric acid registration REACH dossier.

(v) Relevant precautionary statements:

- H272 – May intensify fire; oxidizer;
- H290 – May be corrosive to metals.
- H314 – Causes severe skin burns and eye damage;
- H331 – Toxic if inhaled.
- EUH071 – Corrosive to the respiratory tract.
- P280 – Wear protective gloves/protective clothing/eye protection/face protection.
- P260 – Do not breathe vapors.
- P264 – Wash hands thoroughly after handling.
- P301+P330+P331 – IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
- P303+P361+P353 – IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304+P340 – IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

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P310 – Immediately call a POISON CENTER or doctor/physician.

P305+P351+P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P405 – Store locked up.

P501 – Dispose of contents/container of stainless steel/acid-resistant plastic sealed and labeled packaging/containers.

(vi) Training Advice:

To ensure the protection of people and the environment, people who manufacture, handle and use this product must be trained to work with hazardous substances, hazardous materials, have adequate hygiene skills, first aid principles and information on emergency procedures. This safety data sheet must be made available to those working with the product. Persons must be instructed before working with the product.

NOTE. The information provided in this safety data sheet is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any proceed, unless specified in the text.

Release info: This version replaces all previous documents.

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ANNEX

Exposure scenarios:

1 Exposure scenario (1): Manufacturing and industrial use of nitric acid – Concentration <75%

2 Exposure scenario (2): Professional use of nitric acid – Concentration < 75%

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1. Short title of exposure scenario (1)	
Manufacturing and industrial use of nitric acid – Concentration <75%	
Sector of use (SU)	SU 3, SU4, SU 8, SU 9, SU 10, SU12, SU14, SU 15, SU 16
Product category (PC)	PC0, PC7, PC12, PC14, PC15, PC19, PC20, PC33, PC35, PC37
Process category (PROC)	<p>PROC 1: Use in closed process, no likelihood of exposure.</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure.</p> <p>PROC 3: Use in closed batch process (synthesis or formulation).</p> <p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises.</p> <p>PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).</p> <p>PROC 7: Industrial spraying.</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing).</p> <p>PROC 10: Roller application or brushing.</p> <p>PROC 13: Treatment of articles by dipping and pouring.</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation.</p> <p>PROC 15: Use as laboratory reagent.</p>
Article category (AC)	Not applicable
Environmental release category (ERC)	<p>ERC 1 Manufacture of substances</p> <p>ERC 2 Formulation of preparations</p> <p>ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles.</p> <p>ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates).</p> <p>ERC 6b Industrial use of reactive processing aid</p> <p>ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers.</p> <p>ERC 7 Industrial use of substances in closed systems</p>
2. Operational conditions	
2.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Frequency of exposure at workplace:	220 days/year for each worker
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
2.2 Operational conditions related with substance/ product	
Physical state	Liquid
Concentration of substance in mixture	Aqueous solutions contain more than 25% nitric acid up to a maximum of 75% nitric acid.
2.3 Other relevant operational conditions	

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Based on the information retrieved, the maximum duration considered for this exposure scenario is a working shift of above 4h/day. Concentration of nitric acid in industrial application range from 25 to 75% and worst case will be taken into account.	
3. Risk Management Measures	
3.1 RMMs related to workers	
Organisational measures	Workers in the identified risky process/areas should be trained a) to avoid to work without protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of nitric acid and c) to follow the safer procedures instructed by the employer The employer has also to ascertain that the required PPE is available and used according to instructions.
Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use “to avoid direct contact and exposure by splashes (no working over one’s head)” (Good practice) • Store in cool, dry, clean, well ventilate areas away from alkaline products and metals. Do not store under direct sun light. Do not pile up the containers. Do not store at temperatures close to freezing point. (Good practice). • Compatible materials: stainless steel 316-L; high density polyethylene; glass • Local exhaust / general ventilation is not required but good practice
Respiratory protection	Respiratory protection: respiratory protection is not required to usual works. In foggy-vaporous situations like spraying, use of a spreading over all facemask with a suitable inorganic acid filler. In case of spraying a mask with an Assigned Protection Factor (APF) = 20 as given in BS EN 529:2005 are recommended. For short time exposure masks , EN149 type FF P3, EN 14387 type B or Type E model P3, EN 1827 class FMP3 are recommended (Non exhaustive list). For longer time of exposure full masks or masks with an apparatus providing fresh air are recommended – Full mask EN 143, EN 14387, EN 12083 class P3 or class XP3, EN12941 class TH3, EN 12942 TM3, EN14593 or EN138. (Non exhaustive list)
Hand protection	Hand protection is required: use impervious chemical resistant protective gloves complying with EN 374 (required): material: butyl rubber, PVC, PTFE fluoro elastomer.
Eye protection	Wearing of eye/face protection is required. Chemical goggles EN166 or face protection shield EN 402 or equivalent are required.
Skin and body protection	Wearing of suitable acid resistant protective clothing and rubber boots is required.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.
3.2 RMMs related to the environment	
Organisational measures	Procedural and/or control technologies are required to minimize emissions and the resulting exposure during cleaning and maintenance procedures.
Abatement measures related with wastewater	Nitric acid wastewater should be reused or discharged to the industrial wastewater and further neutralized if needed
Abatement measures waste air and solid waste	Nitric acid is not expected to be found in the solid waste nor to reach the air compartment, due to its low vapour pressure and degradation in NOx.
3.3 Waste related measures	

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Type of waste	Liquid waste. Packaging material	
Disposal technique	The neutralized liquid can be spilled in accordance to regulatory normative .The residue of the containers or the used container itself should be disposed in accordance with local requirements.	
Fraction released to environment during waste treatment	The pH of wastewater released from manufacturing sites should be between pH 6-9.	
4. Prediction of exposure resulting from the conditions described above and the substance properties.		
4.1. Human exposure		
Workers (oral)	No significant oral exposure due to good hygiene practice.	
Workers (inhalation) <i>DNEL = 1.3 mg/m³</i>	Liquid - Calculated with MEASE	RCR
PROC 1	0.001 mg/m ³	0.0008
PROC 2	0.001 mg/m ³	0.0008
PROC3	0.01 mg/m ³	0.0077
PROC 4	0.05 mg/m ³	0.0385
PROC 5	0.05 mg/m ³	0.0385
PROC 8a	0.05 mg/m ³	0.0385
PROC 8b	0.01 mg/m ³	0.0077
PROC 9	0.01 mg/m ³	0.0077
PROC 10	0.05 mg/m ³	0.0385
PROC 13	0.01 mg/m ³	0.0077
PROC 14	0.01 mg/m ³	0.0077
PROC15	0.01 mg/m ³	0.0077
PROC 7 – With mask APF 20	0.05 mg/m ³	0.0385
Workers (dermal)	As reported in the CLP Regulation No 1272/2008 Annex VI Table 3.1, nitric acid is corrosive above the 20% concentration limit. Therefore effective control measures are in place to prevent dermal exposure. Furthermore protective clothing and gloves are considered to be used consistently when handling corrosive substances. Production companies report the use of protective gloves and thus repeated daily dermal exposure to commercial product is considered negligible.	
4.2. Environmental exposure (qualitative assessment)		
Environmental release	The production of nitric acid can potentially result in aquatic emissions and locally increase the nitrate concentration while decreasing the pH in the aquatic environment. However, the pH of industrial effluents is normally measured frequently and can be neutralized easily.	
Waste water treatment plants (WWTP)	Not relevant. Nitric acid dissociates in H ⁺ and NO ³⁻ and will be neutralized before reaching WWTP.	
Aquatic pelagic compartment	Due to its high water solubility, nitric acid is mainly found in soil (migrating towards the groundwater table) and water compartments: there, nitric acid progressively dissociates affecting the pH of the receiving compartment. The higher the buffer capacity of the water is, the lower the effect on pH will be.	

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Sediments	Not relevant. There will be no absorption on particulate matter or surfaces.
Soil and groundwater	Not relevant. Infiltration, partial neutralization, dispersion, dilution.
Atmospheric compartment	Nitric acid is highly soluble and in air will react into NO _x . These NO _x emissions in the troposphere are small compared to releases from combustion processes
Secondary poisoning	Bioaccumulation in organisms is not relevant for nitric acid.

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1. Short title of exposure scenario (2)	
Professional use of nitric acid – Concentration < 75%	
Sector of use (SU)	SU 1, SU 22
Product category (PC)	PC12, PC14, PC15, PC20, PC21, PC35
Process category (PROC)	<p>PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.</p> <p>PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing).</p> <p>PROC 10: Roller application or brushing.</p> <p>PROC 11: Non industrial spraying.</p> <p>PROC 13: Treatment of articles by dipping and pouring.</p> <p>PROC 15: Use as laboratory reagent</p> <p>PROC 19: Hand-mixing with intimate contact and only PPE available.</p>
Article category (AC)	Not applicable
Environmental release category (ERC)	<p>ERC 8a (Wide dispersive indoor use of processing aids in open systems)</p> <p>ERC 8b (Wide dispersive indoor use of reactive substances in open systems)</p> <p>ERC 8e (Wide dispersive outdoor use of reactive substances in open systems)</p>
2. Operational conditions	
2.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Frequency of exposure at workplace:	220 days/year for each worker
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
2.2 Operational conditions related with substance/ product	
Physical state	Liquid
Concentration of substance in mixture	Nitric acid is used during the production phase of various cleaning products, although often the amount in the end products is limited due to its reactivity. Nevertheless in case of this scenario worst case scenario was considered with products containing more than 25% nitric acid but always less than 75%.
2.3 Other relevant operational conditions	
The amount used per professional workers varies from activity to activity. The maximum duration >4 h/day was considered as worst case assumption.	
3. Risk Management Measures	
3.1 RMMs related to workers	

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Organisational measures	Because nitric acid is corrosive, the risk management measures for human health should focus on the prevention of direct contact with the substance. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be taken (low concentration for example) as well as good practices that prevent direct eye/skin contact with nitric acid and prevent formation of aerosols and splashes are more important along with the personal protective equipment measures.		
	<i>HNO₃ concentration in product > 20%:</i>	<i>HNO₃ concentration in product between 5% and 20%:</i>	<i>HNO₃ concentration in product < 5%</i>
Respiratory protection	Compulsory	Recommended	Good practice
Hand protection	Compulsory	Recommended	Good practice
Eye protection	Compulsory	Recommended	Good practice
Skin and body protection	Compulsory	Recommended	Good practice
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate..		
3.2 RMMs related to the environment			
Organisational measures	Procedural and/or control technologies are required to minimise emissions and the resulting exposure during cleaning and maintenance procedures.		
Abatement measures related to wastewater	Different rules apply to professional users regarding control of their effluents. It is required that the flow of release to municipal wastewater or to surface water do not cause significant in pH changes. It is then dependant whether or not discharging is done to municipal wastewater equipped with sewage treatment plant or not.		
Abatement measures related to waste air	Nitric acid is not expected to be found in the solid waste nor to reach the air compartment, due to its low vapour pressure and degradation in NO _x . Therefore, no specific risk management measures for air emissions are provided..		
Abatement measures related to soil	For release to soil for fertilizer uses, the pH will be naturally neutralized by the medium before reaching the groundwater.		
3.3 Waste related measures			
Type of waste	Liquid waste – packaging material		
Disposal technique	The neutralised liquid can be spilled in accordance to applicable normative. The residue of the containers or the used container itself should be disposed in accordance with local requirements.		
4. Prediction of exposure resulting from the conditions described above and the substance properties.			
4.1. Human exposure			
Professionals (oral)	No significant oral exposure due to good hygiene practice.		
Professionals (dermal)	As reported in the CLP Regulation No 1272/2008 Annex VI Table 3.1, nitric acid is corrosive above the 20% concentration limit. Therefore effective control measures are in place to prevent dermal exposure. Furthermore protective clothing and gloves are considered to be used consistently when handling corrosive substances. Production companies report the use of protective gloves and		

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	thus repeated daily dermal exposure to commercial product is considered negligible.	
Professional (inhalation) <i>DNEL = 1.3 mg/m³</i>	Calculated with MEASE	RCR
PROC 5,	0.1 mg/m ³	0.08
PROC8a	0.05 mg/m ³	0.04
PROC8b	0.05 mg/m ³	0.04
PROC9	0.05 mg/m ³	0.04
PROC10	0.05 mg/m ³	0.04
PROC 13	0.05 mg/m ³	0.04
PROC14	0.1 mg/m ³	0.08
PROC15	0.01 mg/m ³	0.01
PROC19	0.05 mg/m ³	0.04
PROC 11 with mask APF40	0.5 mg/m ³	0.38
4.2. Environmental exposure (qualitative assessment)		
Environmental release	The production of nitric acid can potentially result in aquatic emissions and locally increase the nitrate concentration while decreasing the pH in the aquatic environment. However, the pH of industrial effluents is normally measured frequently and can be neutralized easily.	
Waste water treatment plants (WWTP)	Not relevant. Nitric acid dissociates in H ⁺ and NO ³⁻ and will be neutralized before reaching WWTP.	
Aquatic pelagic compartment	Due to its high water solubility, nitric acid is mainly found in soil (migrating towards the groundwater table) and water compartments: there, nitric acid progressively dissociates affecting the pH of the receiving compartment. The higher the buffer capacity of the water is, the lower the effect on pH will be.	
Sediments	Not relevant. There will be no absorption on particulate matter or surfaces.	
Soil and groundwater	Not relevant. Infiltration, partial neutralization, dispersion, dilution.	
Atmospheric compartment	Not relevant. Nitric acid release is negligible, due to its low vapour pressure and degradation in NO _x .	
Secondary poisoning	Bioaccumulation in organisms is not relevant for nitric acid.	