

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

1.1 Identification of the substance or mixture

Substance name: Nitric acid, solution 60 -62 %
Chemical name and formula: Nitric acid, HNO₃
Trade name: Nitric acid
CAS number: 7697-37-2
EC number: 231-714-2
ID No, Appendix VI,CLP : 007-030-00-3
REACH Registration number: 01-2119487297-23-0031
UFI #: PT10-D0TS-J00Y-Q17F

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses:

Manufacture, Intermediate, Formulation, Distribution, Fertilizers, Washing and cleaning products, Surface treatment, Laboratory use, Processing aid, pH-regulating agents, Ion exchanger

Common technical functions: Intermediate, pH-regulating agent, Cleaning product, oxidizing agent

Uses advises against: Consumer use of cleaning products, contained Nitric acid with concentration more than 3%. Substance under restriction of regulation 2019/1148.

1.3 Details of the supplier of the substance or mixture

Name: AGROPOLYCHIM JSC
Address: Industrial zone
9160 Devnya
Phone N°: +359 / 519 97 / 526, 511
Fax N°: +359 / 519 9 / 33 63
E-mail of person responsible for eSDS: m.tsvetkova@agropolychim.bg

1.4 Emergency telephone number

European Emergency N°: 112
National center for Prevention and Treatment
of Intoxications N°: +359 2 9154 346 (24 h / day)
Emergency telephone at the company: +359 / 519 97 530
Opening hours (including time zone): 24 hours GMT+2

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance

2.1.1 Classification according to Regulation (EC) No 1272/2008/EC

Acute toxicity 3, H331
Skin Corr. 1A, H314
Met. Corr. 1, H290

2.1.2 Additional information

For full text of EU Hazard-statements: see section 16.

2.2 Label elements

2.2.1 Labeling according to Directive 1272/2008/EC

Hazard pictogram:

GHS06



GHS05



Signal word(s): Danger

Hazard statements:

H290: May be corrosive to metals.
H314: Causes severe skin burns and eye damage.
H331: Toxic if inhaled.

Additional labelling requirements (CLP supplemental hazard statement):

EUH071: Corrosive to the respiratory tract.

Precautionary statements:

Prevention:

P260: Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P305+P351+P338+P310: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P303+P361+P353+P310: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER/doctor.
P304+P340+P311 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor.

Storage:

P403 + P233: Store in a well-ventilated place. Keep in container tightly closed.

Additional information on the label: Substance under restriction of regulation 2019/1148 - not provided, introduced, owned, or used by the general public / consumer use.

2.3 Other hazards

- **PBT/vPvB:** The substance does not meet the criteria for persistence, bioaccumulation and toxicity or strong persistence and strong bioaccumulation according to Regulation (EU) No. 1907/2006, Annex XIII.
- **Endocrine disrupting properties:** no data available.
- **Presence of nanoforms:** there is no data on the presence of nanoforms.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition

Chemical name	CAS-No. EC-No. Registration No	Classification (Regulation (EC) No 1272/2008)	Conc. (% w/w)	SCL- Specific Concentration limits
Nitric acid	7697-37-2 231-714-2 01-2119487297-23-0031	>=20 - <=65: Acute toxicity 3, H331 Skin Corr. 1A, H314 Met. Corr. 1, H290 Corrosive to the respiratory tract, EUH071	60 – 62	C≥20% - corrosive to the skin 1A H314; ATE = 2.65 mg/L (HNO3 money) – acute toxicity cat.3 H331
Water	7732-18-5 231-791-2	Not classified.	3. - 40	

4. FIRST AID MEASURES

4.1 Description of first aid measures

- General advice** : Remove from exposure.
Immediate medical attention is required.
First aider needs to protect himself.
- If inhaled** : Move to fresh air.
Keep patient warm and at rest.
If breathing is irregular or stopped, administer artificial respiration.
Mouth to mouth resuscitation may be dangerous.
Give oxygen if available.

- In case of skin contact** : Remove/Take off immediately all contaminated clothing.
Wash off immediately with plenty of water for at least 15 minutes.
Burns must be treated by a physician.
If skin irritation persists, call a physician.
- In case of eye contact** : Rinse immediately with plenty of water, also under the eyelids,
for at least 15 minutes.
Seek medical advice immediately. Symptoms may be delayed.
- If swallowed** : Do NOT induce vomiting.
Do not give anything to drink.
If swallowed, rinse mouth with water (only if the person is conscious).
Take victim immediately to hospital.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms** : **Inhalation:** Respiratory irritation Pain
Breathing difficulties
Aspiration may cause pulmonary oedema and pneumonitis.
Symptoms may be delayed.
- Skin contact:** Causes severe burns.
- Eye contact:** Causes serious eye damage.
- Risks** : Causes serious eye damage.
Toxic if inhaled.
Causes severe burns.

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment** : Risk of delayed pulmonary oedema.
Keep under medical supervision for at least 48 hours.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

5.1.1 Suitable extinguishing media

Carbon dioxide (CO₂)
Water spray
Alcohol-resistant foam.

5.1.2 Unsuitable extinguishing media

Powders / chemical extinguishers/Foam

Do not attempt to smother the fire with steam or sand

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting : May explode in contact with a powerful reducing agent.
Reacts with common metals liberating hydrogen.

Hazardous decomposition products formed under fire conditions – Nitrous oxides (NO_x).

5.3 Advice for fire-fighters

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 firefighting water to the environment.

Do not attempt to fight the fire without suitable protective equipment:

- Acid-resistant clothing
- Complete protective clothing
- Self-contained breathing apparatus

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Do not breathe vapours.

Avoid all contact with the product.

Personal protection through wearing a tightly closed chemical protection suit and a self-contained breathing apparatus.

Evacuate personnel to safe areas.

Suppress (knock down) vapours with water spray.

6.2 Environmental precautions

Do not allow product to spread into the environment

Do not discharge into drains and / or rivers

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

Prevent further leakage or spillage.

Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

Large spills should be collected mechanically (remove by pumping) for disposal.
Dilute with plenty of water.
Neutralize with following product(s): soda ash, Calcium hydroxide

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.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

- | | |
|--|--|
| Advice on safe handling | : Ensure adequate ventilation.
Avoid inhalation, ingestion and contact with skin and eyes.
Use personal protective equipment.
Only add small quantities of acids and bases to water, never the opposite. Always use stirring.
Dilution and neutralization are highly exothermic reactions. |
| Advice on protection against fire and explosion | : Keep away from combustible material. Keep away from heat and sources of ignition. May explode in contact with a powerful reducing agent. Reacts with common metals liberating hydrogen. |
| Hygiene measures | : When using do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product. Do not wear contact lenses. |

7.2 Conditions for safe storage, including any incompatibilities

- | | |
|--|--|
| Requirements for storage areas and containers | Keep in a cool, well-ventilated place. Store away from sources of heat, ignition and direct sunlight. Keep in an area equipped with acid resistant flooring. |
| Suitable materials for containers: | Corrosive resistant Stainless steel Aluminum plastics (e.g. PVC, PTFE) glass. |
| Unsuitable materials for containers: | Metals Carbon steel Polypropylene |

7.3 Specific end use(s)

Please check the identified uses in section 16 and on the annex for exposure scenario of this safety data sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Components	Exposure route	Value type (Form of exposure)	Control parameters	Basis
nitric acid	Inhalation- acute and long-term effects	STEL	1 ppm 2,6 mg/m ³	2006/15/EC
Further information	Indicative			

DNEL:

nitric acid :

- End Use: Workers**
 Exposure routes: Inhalation
 Potential health effects: Acute,
 Local effects Value: 2,6 mg/m³
- End Use: Workers**
 Exposure routes: Inhalation
 Potential health effects: Long-term,
 Local effects Value: 2,6 mg/m³
- End Use: Consumer use**
 Exposure routes: Inhalation
 Potential health effects: Acute,
 Local effects Value: 1,3 mg/m³
- End Use: Consumer use**
 Exposure routes: Inhalation
 Potential health effects: Long-term,
 Local effects Value: 1,3 mg/m³

PNEC:

nitric acid : Not relevant

8.2 Exposure controls

Personal protective equipment

Eye protection: Wear goggles and if needed face-shield.

Hand protection

Material : butyl-rubber

Break through time : 300 min

Material : Fluorinated rubber

Break through time : > 480 min

Remarks: The selected protective gloves must satisfy the specifications of EU Directive

89/686/EEC and the standard EN 374 derived from it. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

- Skin and body protection** : Chemical resistant protective suit. Boots
- Respiratory protection** : Use the indicated respiratory protection if the occupational exposure limit is exceeded and/or in the case of dust or aerosol formation.
- Short time exposure:** Suitable mask (EN 149, EN 14387 or EN 1827).
Recommended filter type: Type B / Type E.
Long term exposure: Full face mask (e.g. EN 143, EN 14387 or EN 12083)
 Self-contained breathing apparatus (EN 133).
- Protective measures:** Ensure that eyewash stations and safety showers are close to the workstation location.
- Environmental exposure controls**
- General advice** : Prevent product from entering environment and drains. Inform the responsible authorities in case of entry into waterways or drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	liquid
Odour:	pungent
Molecular weight:	63.01 g/mol
Odour threshold:	0.75 mg/m ³ (0.29 ppm)
pH:	< 1
Melting point:	-18,8°C at 1013 hPa (20%); -18,5°C at 1013 hPa (55%);
Boiling point:	104°C at 1013 hPa (20%); 118°C at 1013 hPa (55%);
Flash point:	Not applicable (inorganic substance)
Evaporation rate:	Not applicable
Flammability:	Nonflammable
Explosive limites :	Not applicable
Vapour pressure :	20,3 hPa at 20°C (20%); 9,5 hPa at 20°C (55%);
Vapour density:	2
Relative density:	1,120 g/cm ³ at 20°C (20%); 1,340 g/cm ³ at 20°C (55%)
Solubility in water:	500 g/L fully soluble at 20°C
Partition coefficient:	Not applicable (inorganic substance)
Auto ignition temperature:	Not applicable (inorganic substance)

Decomposition temperature: 83°C (100%)
Viscosity: 0.75 mPa s at 25°C (10%)
Oxidising properties: Not classified as oxidizing substance with concentration up to 65%
Explosive properties: Nonexplosive

9.2 Other information

Soluble in water in all proportion

10. STABILITY AND REACTIVITY

10.1 Reactivity

Stable under recommended storage and handling conditions (see section 7).

10.2 Chemical stability

Thermally stable in reaction term at designed storage conditions.
Slightly decompose to nitrogen oxides when in contact with light or organic matter.

10.3 Possibility of hazardous reactions

May react violently with reducing agents, strong bases, organic material, chlorides and finely divided metals
Exothermic reaction with water

10.4 Conditions to avoid

High temperature, light, containment

10.5 Incompatible materials

- reducing materials
- combustible materials
- metallic powders
- carbon steel
- chlorates
- carbides
- chromium contained acids
- alcohols

10.6 Hazardous decomposition products

When nitric acid is heated, Nitrogen oxides (NO_x) may be formed.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Toxicity endpoints	Outcome of the effects assessment
Absorption, metabolism, distribution and elimination	Nitric acid don't possess bio cumulative potential as nitrate is highly soluble in water and easily discharged with human urine. No information concerning the effect on human health.
Acute toxicity	<p>Dermal : No data available (study waived based on corrosivity of the test substance)</p> <p>Oral: No data available (study waived based on corrosivity of the test substance)</p> <p>Inhalation: Adverse effect observed (LC50: >2650 mg/m³)</p> <p>In absence of data, nitric acid is not classified for acute toxicity via oral and dermal route.</p>
Irritation / corrosion	Nitric acid is classified as a skin corrosive substance category 1A (concentration > or = 20%) and category 1B (5% < or = concentration and 20%) according to the CLP Regulation Annex VI, table 3.1 (EC Regulation 1272/2008 on classification, labelling and packaging of substances and mixtures). Therefore, in vitro testing for skin irritation or corrosion with this substance is not useful. In vivo testing can be waived according to the REACH Regulation as nitric acid is a strong acid (pH < 2) (column 2 adaptation, Annex VIII, section 8.1.1).
Sensitisation	<p>Skin: No data available. Not assessed as nitric acid is classified for skin corrosion.</p> <p>Eye: No data available.</p> <p>Respiratory tract: No data available.</p>
Repeated dose toxicity	<p>No reliable data available.</p> <p>Oral: At low concentration, nitric acid as soon as entering the body is distributed widely as nitrate, which is an essential element to organisms and its fate in the human body is regulated. The H⁺ ions (if present at low concentration) will also be internally buffered/regulated.</p> <p>NOAEL: 1500 mg/kg/day (subacute: rats)</p> <p>Inhalation: A reliable NOAEC for repeated dose inhalation was not identified for nitric acid based on available information. Nitric acid decomposes to nitrogen dioxide (NO₂) so exposure to nitric acid includes co-exposure to NO₂. The majority of the studies used one dose level and therefore a definitive and reliable nitric acid NOAEC could not be determined.</p> <p>NOAEC: 4.11 mg/m³ (subchronic: rats)</p> <p>Dermal: According to the REACH Regulation, only one route of exposure should be tested for repeated dose toxicity (column 2 adaptation, annex VIII, section 8.6.1). Therefore, it is not necessary to perform a repeated dose toxicity study via the dermal route of exposure.</p>
Mutagenicity	Under the conditions of the bacterial reverse mutation assay realized by BASF in 1989 (similar to OECD 471), nitric acid was not mutagenic.

Toxicity endpoints	Outcome of the effects assessment
Carcinogenicity	Inconclusive data
Fertility, reproductive and developmental toxicity	No adverse effects were seen on reproduction/developmental according to OECD 422 (oral gavage on rats) on potassium nitrate up to a dose –NOAEL of 1500 mg/kg bw/day
Likely routes of exposure	The most likely route of exposure to nitric acid is via inhalation. If inhaled Nitric acid fumes may cause immediate irritation of the respiratory tract, pain, and dyspnea which are followed by a period of recovery that may last several weeks. After this time, a relapse may occur with death caused by bronchopneumonia and/or pulmonary fibrosis. Via dermal contact, nitric acid causes skin and eye burns. Via ingestion, nitric acid causes burns of the digestive tract.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

12.1.1 Acute/Prolonged toxicity to fish / fresh water

Median lethal pH (96h) 3-3.5 for *Lepomis macrochirus*.

Median lethal pH (96h) ca. 3.7 for *Oncorhynchus mykiss*.

12.1.2 Acute/Prolonged toxicity to aquatic invertebrates / fresh water

48-hour LC50 (combined analyses) on *ceriodaphnia dubia* : pH 4.4 – 4.7.

12.1.3 Acute/Prolonged toxicity to aquatic plants / sea water

NOEC = 6.75 mmol/l (10 days).

12.1.4 Toxicity to micro-organisms e.g. bacteria

EC50 > 1.000 mg/l (3 hours) (method OECD, Guideline 209).

12.1.5 Chronic toxicity to fish

NOEC: 268 mg nitrate/liter (30 days exposure).

NOEC: 157 mg nitrate/liter (32 days exposure).

12.1.6 Eco toxicological estimation

Acute toxicity to aquatic organisms: Toxicity effect is due to low pH level.

12.2 Persistence and degradability

Not relevant for inorganic substances

12.3 Bioaccumulative potential

Not relevant for inorganic substances

12.4 Mobility in soil

Fully soluble – no absorption in the soil.

12.5 Results of PBT and vPvB assessment

Not relevant for inorganic substances

12.6 Endocrine-disrupting properties

No available information.

12.7 Other information

No other information identified

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of in accordance with local regulations. Solutions with low pH-value must be neutralized before discharge.

Neutralize with the following product(s): Soda ash; Calcium hydroxide.

European waste code: 06 01 05 (nitric acid and nitrous acid).

Contaminated packaging: Empty remaining contents. Dispose of contents/ container to an approved waste disposal plant.

14. TRANSPORT INFORMATION

14.1 Classification

International regulations

UN number: 2031 - NITRIC ACID

Land transport (ADR/RID)

Class: 8

Hazard identification number: 80

Tunnel restriction code: LQ22 (E2)

Packaging group: II

Label: 8 (up to 65% conc.)

Instruction for movable tanks/liquid freights: T8 / TP2

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Inland waterway transport (AND(R))

Class: 8

Classification code: C1

Packaging group: II

Label: 8 (up to 65% conc.)

Marine transport (IMDG)
 Class: 8
 Subsidiary risk: 5.1
 Packaging group: II
 EmS number: F-A, S-B
 Label: 8
 Marine pollutant: Not a marine pollutant

Air transport (ICAO/IATA)
 Class: 8;
 Subsidiary risk: 5.1
 Packaging group: II
 Passenger aircraft: FORBIDDEN
 Labelling: Corrosive + Oxidizing

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

Ship type: 2
 Pollution category: Y

15. REGULATORY INFORMATION

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

Category	Quantity 1	Quantity 2
H2, ACUTE TOXIC	50 t	200 t

Other regulations : Regulation (EU) 2019/1148 of the European Parliament and of the Council on the marketing and use of explosives precursors:

Annex I : Acquisition, possession or use by the general public / consumer use is restricted.

15.1 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

16. OTHER INFORMATION

16.1 Hazard Statement

H314: Causes severe skin burns and eye damage.

H331: Toxic if inhaled.

Additional labelling requirements (CLP supplemental hazard statement):

H290: May be corrosive to metals.

EUH071: Corrosive to the respiratory tract.

Another information: Provide adequate information, instructions and training of the operators. Make regular training of all staff members in the scope of transport (acc. ADR, chapter 1.3).

16.2 Revision

Changes have been made to Section 1; 2.3; 3.1; section 11; section 12.

Literature references:

Disclaimer: This sheet complements the technical sheets but does not replace them. The information given is based on our knowledge of the product, at the time of publication and is given in good faith. In addition, the attention of the user is drawn to the possible risk incurred by using the product for any other use than that for which it was intended.

In no way does this exempt the user from knowing and applying all the regulations controlling his activity. He alone will take on the responsibility for taking the precautions involved when using the product.

The aim of all the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products.

This information must not be considered exhaustive. It does not exempt the user from his responsibility to ensure that other obligations than those mentioned could apply relating to the storage and use of the product.

ANNEX IES: EXPOSURE SCENARIO

1. Short title of exposure scenario 1	
Manufacturing of the substance <70% (continuous and batch synthesis), including handling, storage and quality control	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
Product category (PC)	PC14, PC15, PC19, PC20, PC21, PC33, PC35
Process category (PROC)	PROC 1: Use in closed process, no likelihood of exposure. PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 3: Use in closed batch process (synthesis or formulation). PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non- dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities. PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15: Use as laboratory reagent.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 1 Manufacture of substances
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day (all worker activities combined)
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Liquid
Concentration of substance in mixture	Aqueous solutions contain more than 70% nitric acid.
3.3 Other relevant operational conditions	
Based on the information retrieved, the maximum duration considered for this exposure scenario is a working shift of maximum 8h/day, although workers are not permanently subject to actual or potential exposure during the entirely working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	

Organisational measures	Minimise the number of staff in the working area. Minimise manual activities. Train employees how to safely handle the substance, incl. how to use personal protection equipment. Regularly clean up the working area. Have supervision in place to regularly check that the conditions of use are followed by the workers. Ensure that all equipment is well maintained. Ascertain that personal protection equipment is available and used according to the instructions. Ensure that eyewash stations and safety showers are available in the working area.
Technical measures	Under standard operating conditions the substance is rigorously contained by technical means in the working area. The activities take place in a standardized way, under controlled conditions with dedicated equipment. In case a certain amount of the substance is not contained, a worker is not exposed to the substance as the use takes place in a fume hood or as the worker wears personal protective equipment and uses local exhaust ventilation. Formation of aerosols/mists/splashes is prevented. <ul style="list-style-type: none"> • Suitable material: The recommended material for tanks, vessels and accessories is low carbon austenitic stainless steel. • Unsuitable materials: Do not use any metal, carbon steel or polypropylene • Ventilation conditions in the working area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use indoor local exhaust ventilation when vapour/mist/spray of nitric acid could be present in the air within the breathing zone of a worker. • Storage conditions: Store in a well-ventilated place (preferably outside). In an area equipped with acid resistant flooring. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other ignition sources. • Gas monitoring: Use stationary and/or portable NOx monitors in the working place, monitoring normal NOx levels at well below 2.6 mg/m3
Respiratory protection	Respiratory protection is required is required to usual works. (except in close system) Generally masks 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.
4.2 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 NO _x .
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The neutralised 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.
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure – qualitative estimation	
Workers (oral)	No significant oral exposure due to good hygiene practice.
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.
5.2. 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	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.

1. Short title of exposure scenario 2	
Formulation or re-packing - Formulation of mixtures using Nitric acid < 70%	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
Product category (PC)	PC 12: Fertilisers PC 14: Metal surface treatment products, including galvanic and electroplating products PC 15: Non-metal-surface treatment products PC 35: Washing and cleaning products (including solvent based products)
Process category (PROC)	PROC 1: Use in closed process, no likelihood of exposure. PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 3: Use in closed batch process (synthesis or formulation). PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC 15: Use as laboratory reagent.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 2 Formulation of preparations
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 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 70% nitric acid.
3.3 Other relevant operational conditions	
Based on the information retrieved, the maximum duration considered for this exposure scenario is a working shift of maximum 8h/day, although workers are not permanently subject to actual or potential exposure during the entirely working shift.	

4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	Minimise the number of staff in the working area. Minimise manual activities. Train employees how to safely handle the substance, incl. how to use personal protection equipment. Regularly clean up the working area. Have supervision in place to regularly check that the conditions of use are followed by the workers. Ensure that all equipment is well maintained. Ascertain that personal protection equipment is available and used according to the instructions. Ensure that eyewash stations and safety showers are available in the working area.
Technical measures	<p>Under standard operating conditions the substance is rigorously contained by technical means in the working area. The activities take place in a standardized way, under controlled conditions with dedicated equipment. In case a certain amount of the substance is not contained, a worker is not exposed to the substance as the use takes place in a fume hood or as the worker wears personal protective equipment and uses local exhaust ventilation. Formation of aerosols/mists/splashes is prevented.</p> <ul style="list-style-type: none"> • Suitable material: The recommended material for tanks, vessels and accessories is low carbon austenitic stainless steel. • Unsuitable materials: Do not use any metal, carbon steel or polypropylene • Ventilation conditions in the working area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use indoor local exhaust ventilation when vapour/mist/spray of nitric acid could be present in the air within the breathing zone of a worker. • Storage conditions: Store in a well-ventilated place (preferably outside). In an area equipped with acid resistant flooring. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other ignition sources. • Gas monitoring: Use stationary and/or portable NOx monitors in the working place, monitoring normal NOx levels at well below 2.6 mg/m3
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.
4.2 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.
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The neutralised 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.
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	No significant oral exposure due to good hygiene practice.
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.
5.2. 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	Nitric acid is highly soluble and in air will react into NOx. These NOx 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 3	
Use of Nitric acid < 70% at industrial site as intermediate	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 0: Other: nuclear fuel cycle
Product category (PC)	PC 19: Intermediate
Process category (PROC)	PROC 1: Use in closed process, no likelihood of exposure. PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 3: Use in closed batch process (synthesis or formulation). PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC 15: Use as laboratory reagent.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 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 70% nitric acid.
3.3 Other relevant operational conditions	
Based on the information retrieved, the maximum duration considered for this exposure scenario is a working shift of maximum 8h/day, although workers are not permanently subject to actual or potential exposure during the entirely working shift.	
4. Risk Management Measures	

4.1 RMMs related to workers

Organisational measures	Minimise the number of staff in the working area. Minimise manual activities. Train employees how to safely handle the substance, incl. how to use personal protection equipment. Regularly clean up the working area. Have supervision in place to regularly check that the conditions of use are followed by the workers. Ensure that all equipment is well maintained. Ascertain that personal protection equipment is available and used according to the instructions. Ensure that eyewash stations and safety showers are available in the working area.
Technical measures	Under standard operating conditions the substance is rigorously contained by technical means in the working area. The activities take place in a standardized way, under controlled conditions with dedicated equipment. In case a certain amount of the substance is not contained, a worker is not exposed to the substance as the use takes place in a fume hood or as the worker wears personal protective equipment and uses local exhaust ventilation. Formation of aerosols/mists/splashes is prevented. <ul style="list-style-type: none"> • Suitable material: The recommended material for tanks, vessels and accessories is low carbon austenitic stainless steel. • Unsuitable materials: Do not use any metal, carbon steel or polypropylene • Ventilation conditions in the working area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use indoor local exhaust ventilation when vapour/mist/spray of nitric acid could be present in the air within the breathing zone of a worker. • Storage conditions: Store in a well-ventilated place (preferably outside). In an area equipped with acid resistant flooring. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other ignition sources. • Gas monitoring: Use stationary and/or portable NOx monitors in the working place, monitoring normal NOx levels at well below 2.6 mg/m³
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.
4.2 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 NO _x .
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The neutralised 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.
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	No significant oral exposure due to good hygiene practice.
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.
5.2. 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	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.

1. Short title of exposure scenario 4	
<p>Use of Nitric acid < 70% at industrial site as reactive processing aid (Cleaning agent, pH regulator, waste gas treatment, ion exchange resins regeneration, metal treatment, plastic treatment, surface treatment product, water treatment)</p>	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	<p>SU 12: Manufacture of plastics products, including compounding and conversion</p> <p>SU 14: Manufacture of basic metals, including alloys</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>SU 16: Manufacture of computer, electronic and optical products, electrical equipment</p> <p>SU 19: Building and construction work</p> <p>SU 23: Electricity, steam, gas water supply and sewage treatment</p> <p>SU 2a: Mining (without offshore industries)</p> <p>SU 4: Manufacture of food products</p> <p>SU 6a: Manufacture of wood and wood products</p> <p>SU 0: Other: C21-Manufacture of basic pharmaceutical products, nuclear fuel cycle</p> <p>SU 8: Manufacture of bulk, large scale chemicals (including petroleum products)</p> <p>SU 9: Manufacture of fine chemicals</p>
Product category (PC)	<p>PC 0: Other: UCN code : A052 50 ion exchanger</p> <p>PC 14: Metal surface treatment products, including galvanic and electroplating products</p> <p>PC 15: Non-metal-surface treatment products</p> <p>PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents</p> <p>PC 35: Washing and cleaning products (including solvent based products)</p> <p>PC 37: Water treatment chemicals</p>

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 15: Use as laboratory reagent</p>
Article category (AC)	Not applicable
Environmental release category (ERC)	<p>ERC 6b: Industrial use of reactive processing aids</p> <p>ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles</p>
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 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 70% nitric acid.
3.3 Other relevant operational conditions	
Based on the information retrieved, the maximum duration considered for this exposure scenario is a working shift of maximum 8h/day, although workers are not permanently subject to actual or potential exposure during the entirely working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	

Organisational measures	Minimise the number of staff in the working area. Minimise manual activities. Train employees how to safely handle the substance, incl. how to use personal protection equipment. Regularly clean up the working area. Have supervision in place to regularly check that the conditions of use are followed by the workers. Ensure that all equipment is well maintained. Ascertain that personal protection equipment is available and used according to the instructions. Ensure that eyewash stations and safety showers are available in the working area.
Technical measures	Under standard operating conditions the substance is rigorously contained by technical means in the working area. The activities take place in a standardized way, under controlled conditions with dedicated equipment. In case a certain amount of the substance is not contained, a worker is not exposed to the substance as the use takes place in a fume hood or as the worker wears personal protective equipment and uses local exhaust ventilation. Formation of aerosols/mists/splashes is prevented. <ul style="list-style-type: none"> • Suitable material: The recommended material for tanks, vessels and accessories is low carbon austenitic stainless steel. • Unsuitable materials: Do not use any metal, carbon steel or polypropylene • Ventilation conditions in the working area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use indoor local exhaust ventilation when vapour/mist/spray of nitric acid could be present in the air within the breathing zone of a worker. • Storage conditions: Store in a well-ventilated place (preferably outside). In an area equipped with acid resistant flooring. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other ignition sources. • Gas monitoring: Use stationary and/or portable NOx monitors in the working place, monitoring normal NOx levels at well below 2.6 mg/m³
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.
4.2 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 NO _x .
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The neutralised 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.
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	No significant oral exposure due to good hygiene practice.
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.
5.2. 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	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.

1. Short title of exposure scenario 5	
Use of Nitric acid < 70% by professional worker (outdoor and indoor of reactive substances in open systems as cleaning agent, pH regulator, metal treatment)	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	<p>SU 12: Manufacture of plastics products, including compounding and conversion</p> <p>SU 14: Manufacture of basic metals, including alloys</p> <p>SU 15: Manufacture of fabricated metal products, except machinery and equipment</p> <p>SU 16: Manufacture of computer, electronic and optical products, electrical equipment</p> <p>SU 19: Building and construction work</p> <p>SU 23: Electricity, steam, gas water supply and sewage treatment</p> <p>SU 2a: Mining (without offshore industries)</p> <p>SU 4: Manufacture of food products</p> <p>SU 6a: Manufacture of wood and wood products</p> <p>SU 1: Agriculture, forestry and fishing</p>
Product category (PC)	<p>PC 14: Metal surface treatment products, including galvanic and electroplating products</p> <p>PC 15: Non-metal-surface treatment products</p> <p>PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents</p> <p>PC 35: Washing and cleaning products (including solvent based products)</p> <p>PC 12: Fertilisers</p>
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 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)	ERC 8e: Wide dispersive outdoor use of reactive substances in open systems ERC 8b: Wide dispersive indoor use of reactive substances in open systems.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 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 70% nitric acid.
3.3 Other relevant operational conditions	
Based on the information retrieved, the maximum duration considered for this exposure scenario is a working shift of maximum 8h/day, although workers are not permanently subject to actual or potential exposure during the entirely working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	

Organisational measures	Minimise the number of staff in the working area. Minimise manual activities. Train employees how to safely handle the substance, incl. how to use personal protection equipment. Regularly clean up the working area. Have supervision in place to regularly check that the conditions of use are followed by the workers. Ensure that all equipment is well maintained. Ascertain that personal protection equipment is available and used according to the instructions. Ensure that eyewash stations and safety showers are available in the working area.
Technical measures	Under standard operating conditions the substance is rigorously contained by technical means in the working area. The activities take place in a standardized way, under controlled conditions with dedicated equipment. In case a certain amount of the substance is not contained, a worker is not exposed to the substance as the use takes place in a fume hood or as the worker wears personal protective equipment and uses local exhaust ventilation. Formation of aerosols/mists/splashes is prevented. <ul style="list-style-type: none"> • Suitable material: The recommended material for tanks, vessels and accessories is low carbon austenitic stainless steel. • Unsuitable materials: Do not use any metal, carbon steel or polypropylene • Ventilation conditions in the working area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use indoor local exhaust ventilation when vapour/mist/spray of nitric acid could be present in the air within the breathing zone of a worker. • Storage conditions: Store in a well-ventilated place (preferably outside). In an area equipped with acid resistant flooring. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other ignition sources. • Gas monitoring: Use stationary and/or portable NOx monitors in the working place, monitoring normal NOx levels at well below 2.6 mg/m³
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.
4.2 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 NO _x .
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The neutralised 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.
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	No significant oral exposure due to good hygiene practice.
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.
5.2. 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	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.

1. Short title of exposure scenario 6	
Consumer use of Nitric acid containing (cleaning) agents < 3%	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	Not applicable
Product category (PC)	PC 3: Air care products PC 12: Fertilisers PC 31: Polishes and wax blends PC 35: Washing and cleaning products (including solvent based products)
Process category (PROC)	Not applicable
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 8e: Wide dispersive outdoor use of reactive substances in open systems ERC 8b: Wide dispersive indoor use of reactive substances in open systems.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 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 70% nitric acid.
3.3 Other relevant operational conditions	
Based on the information retrieved, the maximum duration considered for this exposure scenario is a working shift of maximum 8h/day, although workers are not permanently subject to actual or potential exposure during the entirely working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	

Organisational measures	Minimise the number of staff in the working area. Minimise manual activities. Train employees how to safely handle the substance, incl. how to use personal protection equipment. Regularly clean up the working area. Have supervision in place to regularly check that the conditions of use are followed by the workers. Ensure that all equipment is well maintained. Ascertain that personal protection equipment is available and used according to the instructions. Ensure that eyewash stations and safety showers are available in the working area.
Technical measures	Under standard operating conditions the substance is rigorously contained by technical means in the working area. The activities take place in a standardized way, under controlled conditions with dedicated equipment. In case a certain amount of the substance is not contained, a worker is not exposed to the substance as the use takes place in a fume hood or as the worker wears personal protective equipment and uses local exhaust ventilation. Formation of aerosols/mists/splashes is prevented. <ul style="list-style-type: none"> • Suitable material: The recommended material for tanks, vessels and accessories is low carbon austenitic stainless steel. • Unsuitable materials: Do not use any metal, carbon steel or polypropylene • Ventilation conditions in the working area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use indoor local exhaust ventilation when vapour/mist/spray of nitric acid could be present in the air within the breathing zone of a worker. • Storage conditions: Store in a well-ventilated place (preferably outside). In an area equipped with acid resistant flooring. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other ignition sources. • Gas monitoring: Use stationary and/or portable NOx monitors in the working place, monitoring normal NOx levels at well below 2.6 mg/m³
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.
4.2 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 NO _x .
4.3 Waste related measures	
Type of waste	Liquid waste. Packaging material
Disposal technique	The neutralised 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.
5. Prediction of exposure resulting from the conditions described above and the substance properties.	
5.1. Human exposure	
Workers (oral)	No significant oral exposure due to good hygiene practice.
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.
5.2. 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	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.