SAFETY DATA SHEET

Revision date 14/03/2017 **Version** 3
Date of the previous version 05/02/2014 EN

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

1.1 Product identifier

Product Name **Nitric acid 60%**

Chemical name Nitric acid
CAS-No 7697-37-2
EC-No 231-714-2
REACH registration number 01-2119487297-23-0027
Formula HNO_3

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

Recommended Use Industrial use, Professional use. See annex for more detailed information.
Uses advised against Consumer use.

1.3 Details of the supplier of the safety data sheet

OCI Nitrogen BV
Mijnweg 1
P.O. Box 601
6160 AP Geleen, The Netherlands
Tel: +31 (0) 46 7020111
www.ocinitrogen.com

info.agro@ocinitrogen.com

1.4 Emergency telephone number

UK National Health Service (NHS) call 111 or, in life-threatening emergencies, call 999

WAL National Health Service (NHS) call 0845 46 47

IE National Poisons Information Centre
+353 1 809 2566 or +353 1 837 9964 (only for healthcare professionals)

Manufacturer: Alert & Care Centre Chemelot (Geleen, The Netherlands)
+31 46 4765555 (24/7)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification (1272/2008/EC)

Acute Inhalation Toxicity	Category 3 - H331
Skin Corrosion/Irritation	Category 1A - H314
Corrosive to Metals	Category 1 - H290

For the full text of the H-Statements mentioned in this section, see Section 16.

2.2 Label elements

Signal word
Danger

Hazard statements
H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H331 - Toxic if inhaled

EUH071 - Corrosive to the respiratory tract

Precautionary Statements
P260 - Do not breathe dust/fume/gas/mist/vapours/spray
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): 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
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

2.3 Other hazards

None known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Chemical name	EC-No	CAS-No	Weight %	Classification (1272/2008/EC)	REACH registration number
Nitric acid	231-714-2	7697-37-2	20-65	Ox. Liq. 2 H272 Met. Corr. H290 Skin Corr. 1A H314 Acute Tox. 3 H331	01-2119487297-23-0027

Concentration Limits Oxid. Liquid 2 >= 99.0%, Oxid. Liquid 3 >= 65.0% < 99.0%, Skin Corr. 1A >= 20.0%, Skin Corr. 1B >= 5.0% < 20.0%, Acute Tox. 3 >26% - <=100%, Acute Tox. 4 >13% - <=26%.

For the full text of the H-Statements mentioned in this section, see Section 16.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General Advice Immediate medical attention is required. Remove from exposure, lie down. Do not breathe vapours, mist or gas. Do not get in eyes, on skin, or on clothing. Use first aid treatment according to the nature of the injury: Flush with plenty of water or Diphotherine.

Eye Contact Get medical attention. Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes.

Skin Contact Get medical attention. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Wash contaminated clothing before re-use.

Ingestion Get medical attention. Rinse mouth thoroughly with water. Give small quantities of water to drink. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. If victim is unconscious, monitor pulse, breathing and airway.

Inhalation Get medical attention. Remove to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, (trained personnel should) give oxygen. It may be dangerous to give mouth-to-mouth resuscitation. Move to fresh air in case of accidental inhalation of vapours or decomposition products: Symptoms may be delayed.

Protection of first-aiders Use personal protective equipment. Avoid contact with skin, eyes and clothing.

4.2 Most important symptoms and effects, both acute and delayed

Main symptoms Causes severe skin burns and eye damage. Can burn mouth, throat, and stomach. Pain, blistering, Burning feeling and temporary redness.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician Treat symptomatically. Symptoms may be delayed.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing Media The product itself does not burn. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media None known.

5.2 Special hazards arising from the substance or mixture

Special Hazard Heating of containers may cause pressure rise, with risk of bursting. Thermal decomposition can lead to release of irritating and toxic gases and vapours: Nitrogen oxides (NO_x), Contact with metals may evolve flammable hydrogen gas.

5.3 Advice for firefighters

Fire fighting measures Evacuate non-essential personnel.

Special protective equipment for fire-fighters Wear self-contained breathing apparatus and protective suit.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Evacuate non-essential personnel. Avoid contact with skin, eyes and clothing. Avoid breathing vapours or mists. Do not touch or walk through spilled material. In case of insufficient ventilation, wear suitable respiratory equipment.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Prevent entry into waterways, sewers, basements or confined areas. Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and material for containment and cleaning up

The product should not be allowed to enter drains, water courses or the soil. The spilled material may be neutralized with sodium carbonate, sodium bicarbonate or calcium hydroxide. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections

See sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Avoid breathing vapours or mists. Contact lenses should not be worn when working with this product. Wash hands thoroughly after handling. Do not eat, drink and smoke in work areas; wash hands after use; remove contaminated clothing and protective equipment before entering eating areas. See annex for more detailed information.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Keep in properly labelled containers. Keep container tightly closed. Keep in a dry, cool and well-ventilated place Store locked up. Keep away from direct sunlight, Incompatible Materials: Steel, copper, Aluminium, Alkalis.
Packaging: corrosive resistant stainless steel, Glass, PVC, PTFE .

7.3 Specific end use(s)

Exposure scenario See annex.

Other information Not available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Chemical name	European Union	The United Kingdom	France	Spain	Germany
Nitric acid	STEL: 1 ppm STEL: 2.6 mg/m³	STEL: 1 ppm STEL: 2.6 mg/m³	STEL: 1 ppm STEL: 2.6 mg/m³	VLA-EC: 1 ppm VLA-EC: 2.6 mg/m³	STEL: 1 ppm STEL: 2.6 mg/m³

Chemical name	Italy	Portugal	Netherlands	Denmark	Poland
Nitric acid	STEL: 1 ppm SETL: 2.6 mg/m³		STEL: 1.3 mg/m³	STEL: 5 mg/m³ TWA: 10 mg/m³	NDSCh: 2.6 mg/m³ NDS: 1.4 mg/m³

Chemical name	Belgium	Sweden	Hungary	Finland	Czech Republic
Nitric acid	STEL: 2.6 mg/m³	STEL: 13 mg/m³ TWA: 5 mg/m³	STEL: 2.6 mg/m³	TWA: 0.5 ppm TWA: 1.3 mg/m³ STEL: 1 ppm STEL: 2.6 mg/m³	

Recommended monitoring procedures No information available.

Derived No Effect Level (DNEL)

Chemical name	Long-term exposure - Local effects - Inhalation	Long-term exposure - Local effects - Dermal	Acute / short-term exposure - Local effects - Inhalation	Acute / short-term exposure - Local effects - Dermal
Nitric acid	2.6 mg/m³ (worker) 1.3 mg/m³ (gen. population)			

Predicted No Effect Concentration (PNEC) No information available.

8.2 Exposure controls

Appropriate Engineering Controls Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Additional advice: Portable Diphoterine eyewashers. See annex for more detailed information.

Individual protection measures, such as personal protective equipment

Eye Protection Tightly fitting safety goggles.

Hand Protection Protective gloves: (EN 374), Fluorinated rubber FKM, Viton®, 0,4mm >8h . Polychloropyrene (CR) , Butyl rubber, Polyvinylchloride (PVC), 0,5mm >=2h. Unsuitable materials: Nitrile rubber, Natural Rubber.

Skin and body protection Wear suitable protective clothing: Chemical resistant apron, Boots.

Respiratory Protection Wear respiratory protection: Wear a positive-pressure supplied-air respirator or Full face mask.

Recommended Filter Type NO- P3, Color code: White - Blue.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke when using this product.

Environmental exposure controls The product should not be allowed to enter drains, water courses or the soil.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state @20°C	
Appearance	fluid
Colour	Colourless / Brown
Odour	Pungent
Odour threshold	0.75 - 2.5 ppm
pH	< 1
Melting/freezing point	-35 to -18 °C
Boiling point/boiling range	104 - 122 °C
Flash point	Not applicable
Evaporation rate	No information available
Flammability (solid, gas)	Not flammable
Flammability Limits in Air	Not applicable
Vapour pressure	9.4-9.5 hPa, 55%-70% (@20 °C)
Vapour density	2.2 (air = 1)
Relative density	1.35 (water = 1)
Solubility	
Water solubility	Soluble, (Completely miscible)
Partition coefficient (n-octanol/water)	No information available
Autoignition temperature	Not applicable
Decomposition temperature	>200 °C
Viscosity, dynamic	0.75 mPa.s (@ 25°C) 100%
Explosive properties	No information available
Oxidising properties	See section 3.2

9.2 Other information

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Corrosive to Metals.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

The product reacts with metals with evolution of highly flammable hydrogen. Reacts with water: (exothermic reaction). Risk of explosion in confined areas and in contact with incompatible materials.

10.4 Conditions to avoid

Keep away from heat and sources of ignition.

10.5 Incompatible materials

Alkalis, Combustible materials, Organic materials, Alcohols, organic solvents, Ketones, Aldehydes, Amines, Strong alkalis, Halogens, Polypropylene and Carbon steel. Contact with metals may evolve flammable hydrogen gas. May intensify fire; oxidiser.

10.6 Hazardous decomposition products

Hydrogen gas, Nitrogen oxides (NO_x), Carbon oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute Toxicity

Ingestion Causes burns of the upper digestive and respiratory tracts by strong corrosion.

Skin Contact Corrosive to skin. Corrosive to eyes.

Inhalation Toxic if inhaled.

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Nitric acid			> 2.65 mg/L (Rat) 4h

Skin Corrosion/Irritation Corrosive to skin. Causes severe skin burns and eye damage.

Serious eye damage/irritation Corrosive to eyes. Causes severe damage to eyes.

Respiratory or skin sensitisation Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity Not known to cause heritable genetic damage.

Carcinogenicity Contains no ingredient listed as a carcinogen.

Reproductive Toxicity Not known to cause birth defects or have a deleterious effect on a developing fetus. Not known to adversely affect reproductive functions and organs.

STOT-single exposure Corrosive to respiratory system.

STOT-repeated exposure Based on available data, the classification criteria are not met.

Aspiration Hazard Based on available data, the classification criteria are not met.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Based on available data, the classification criteria are not met.
May cause adverse effects in the aquatic environment due to changes in pH.

Chemical name	Toxicity to Algae	Toxicity to Fish	Toxicity to Micro-organisms	Toxicity to daphnia and other aquatic invertebrates
Nitric acid		Median lethal pH (96h) 3-3.5 (Lepomis macrochirus) Median lethal pH (96h) ca. 3.7 (Oncorhynchus mykiss)		Median lethal pH (48h) 4.4-4.7 (Ceriodaphnia dubia)

12.2 Persistence and degradability

Readily biodegradable.

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT). This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

12.6 Other adverse effects

May cause adverse effects in the aquatic environment due to changes in pH.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste from residues / unused products Dispose of in accordance with local regulations.

Contaminated Packaging Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: TRANSPORT INFORMATION

According to: ADR, RID, ADN, IMDG, IATA/ICAO.

14.1 UN number

UN 2031

14.2 UN proper shipping name

NITRIC ACID

14.3 Transport hazard class(es)

8

14.4 Packing group

II

14.5 Environmental hazards

Not applicable.

14.6 Special precautions for user

See transport regulations for UN number specific special precautions.
Inland waterway transport (ADN) PP 81: Shelf life Plastic container.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

See section 17, IBC Code.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Restrictions on use	Dangerous substance category per Seveso Directive (2012/18/EU): H2. Quantity 1: 50t, Quantity 2: 200t.
Other Regulations	Regulation (EC) No. 98/2013 on the marketing and use of explosives precursors: Annex 1.

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance. See annex for more detailed information.

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H272 - May intensify fire; oxidiser
H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H331 - Toxic if inhaled
EUH071 - Corrosive to the respiratory tract

Abbreviations and acronyms

STOT: Specific Target Organ Toxicity
PBT: Persistent, Bioaccumulative, Toxic
vPvB: very Persistent and very Bioaccumulating
ADR: Accord européen relatif au transport international des marchandises Dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
EC: European Commission
RID: Règlement concernant le transport international ferroviaire des marchandises dangereuses (Regulations for the International Transport of Dangerous Goods by Rail)
ADN: Accord européen relatif au transport international des marchandises Dangereuses par voies de Navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)
ICAO: International Civil Aviation Organization
REACH: Registration, Evaluation, Authorisation and Restriction of Chemical substances
ES: Exposure Scenario
DNEL: Derived No Effect Level
PNEC: Predicted No Effect Concentration

Revision note

Format updated in compliance with European REACH and CLP regulations. Classification (1272/2008/EC).

Training Advice

Workers must be trained in the proper use and handling of this product as required under applicable regulations.

SDS No.

OC00019

Disclaimer

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 a 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 process, unless specified in the text

1. EXPOSURE SCENARIO

Exposure scenario **1**
Title **Manufacturing**

Use descriptor

Process categories

PROC1 - Use in closed process, no likelihood of exposure
PROC2 - Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC3 - Use in closed batch process (synthesis or formulation); Industrial setting
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a - Transfer of substance or mixture (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 mixture into small containers (dedicated filling line, including weighing)
PROC15 - Use as laboratory reagent

Environmental release categories ERC1 - Manufacture of substances

2. CONDITIONS OF USE AFFECTING EXPOSURE

Product characteristics

Physical state @20°C Liquid, Aqueous solution.
Concentration of substance in product 60%.

Frequency and duration of use ≤ 8 hours/day.
Contributing scenarios

Control of environmental exposure	
Environmental Release Category	ERC1 - Manufacture of substances
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Control of environmental exposure	Not required

Control of worker exposure	
Process category	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - 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) PROC15 - Use as laboratory reagent
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Technical conditions and measures at process level (source) to prevent release	Containment: 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. 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. 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). 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.
Conditions and Measures Related to Personal Protection, Hygiene, and Health Evaluation	General: Work under a high standard of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the working area. Respiratory protection: In case there is any risk of inhalation exposure to the substance, always wear a full face mask with an acid gas cartridge or wear a supplied air respirator/helmet/suit. Potential inhalation exposure to the substance must be kept to a minimum. The smallest amount inhaled may already have (acute and/or delayed) effects on the respiratory tract. Dermal and eye protection: In case there is any risk of dermal exposure (via contaminated equipment), always wear suitable acid resistant protective clothing in the working area and wear acid resistant gloves conforming to EN374 (and chemical safety goggles/full-face shield conforming to EN166).Potential dermal exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance may already cause severe burns and/or eye damage. When aerosols/mists of nitric acid can be formed, wear a suitable acid resistant chemical safety suit with a supplied air respirator/helmet/suit. Suitable material: butyl/fluorinated rubber.

3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

Environment Exposure Estimation	
Environment Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

Health Exposure Estimation	
Health Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

4. GUIDANCE TO DOWNSTREAM USER FOR EVALUATING EMPLOYEE WHETHER HE WORKS INSIDE THE BOUNDARIES SET BY THE ES

Environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed.

Control of worker exposure

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

Guidance to check compliance with the exposure scenario

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. For scaling see ECETOC TRA, ART, STOFFENMANAGER, EUSES.

1. EXPOSURE SCENARIO

Exposure scenario **2**
Title **Formulation [mixing] of preparations and/or re-packaging**

Use descriptor

Product category
PC12 - Fertilisers
PC14 - Metal surface treatment products, including galvanic and electroplating products
PC15 - Non-metal-surface treatment products
PC35 - Washing and cleaning products (including solvent based products)

Process categories
PROC1 - Use in closed process, no likelihood of exposure
PROC2 - Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC3 - Use in closed batch process (synthesis or formulation); Industrial setting
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact)
PROC8a - Transfer of substance or mixture (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 mixture into small containers (dedicated filling line, including weighing)
PROC15 - Use as laboratory reagent

Environmental release categories ERC2 - Formulation of mixtures

2. CONDITIONS OF USE AFFECTING EXPOSURE

Product characteristics
Physical state @20°C Liquid, Aqueous solution.
Concentration of substance in product 60%.

Frequency and duration of use ≤ 8 hours/day.
Contributing scenarios

Control of environmental exposure	
Environmental Release Category	ERC2 - Formulation of mixtures
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Control of environmental exposure	Not required

Control of worker exposure	
Process category	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - 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) PROC15 - Use as laboratory reagent
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Technical conditions and measures at process level (source) to prevent release	Containment: 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. 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. 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.
Conditions and Measures Related to Personal Protection, Hygiene, and Health Evaluation	General: Work under a high standard of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the working area. Respiratory protection: In case there is any risk of inhalation exposure to the substance, always wear a full face mask with an acid gas cartridge or wear a supplied air respirator/helmet/suit. Potential inhalation exposure to the substance must be kept to a minimum. The smallest amount inhaled may already have (acute and/or delayed) effects on the respiratory tract. Dermal and eye protection: In case there is any risk of dermal exposure (via contaminated equipment), always wear suitable acid resistant protective clothing in the working area and wear acid resistant gloves conforming to EN374 (and chemical safety goggles/full-face shield conforming to EN166).Potential dermal exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance may already cause severe burns and/or eye damage. When aerosols/mists of nitric acid can be formed, wear a suitable acid resistant chemical safety suit with a supplied air respirator/helmet/suit. Suitable material: butyl/fluorinated rubber.

3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

Environment Exposure Estimation	
Environment Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

Health Exposure Estimation	
Health Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

4. GUIDANCE TO DOWNSTREAM USER FOR EVALUATING EMPLOYEE WHETHER HE WORKS INSIDE THE BOUNDARIES SET BY THE ES

Environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed.

Control of worker exposure

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

Guidance to check compliance with the exposure scenario

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. For scaling see ECETOC TRA, ART, STOFFENMANAGER, EUSES.

1. EXPOSURE SCENARIO

Exposure scenario **3**
Title **Industrial use, Use as an intermediate.**

Use descriptor

Sector of use
SU8 - Manufacture of bulk, large scale chemicals (including petroleum products)
SU9 - Manufacture of fine chemicals
SU0 - Other

Product category
PC19 - Intermediates

Process categories
PROC1 - Use in closed process, no likelihood of exposure
PROC2 - Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC3 - Use in closed batch process (synthesis or formulation); Industrial setting
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact)
PROC8a - Transfer of substance or mixture (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 mixture into small containers (dedicated filling line, including weighing)
PROC15 - Use as laboratory reagent

Environmental release categories
ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

2. CONDITIONS OF USE AFFECTING EXPOSURE

Product characteristics
Physical state @20°C Liquid, Aqueous solution.
Concentration of substance in product 60%.

Frequency and duration of use ≤ 8 hours/day.
Contributing scenarios

Control of environmental exposure	
Environmental Release Category	ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Control of environmental exposure	Not required

Control of worker exposure	
Process category	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - 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) PROC15 - Use as laboratory reagent
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Technical conditions and measures at	Containment: Under standard operating conditions the substance is rigorously contained by

process level (source) to prevent release	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. 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. 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.
Conditions and Measures Related to Personal Protection, Hygiene, and Health Evaluation	General: Work under a high standard of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the working area. Respiratory protection: In case there is any risk of inhalation exposure to the substance, always wear a full face mask with an acid gas cartridge or wear a supplied air respirator/helmet/suit. Potential inhalation exposure to the substance must be kept to a minimum. The smallest amount inhaled may already have (acute and/or delayed) effects on the respiratory tract. Dermal and eye protection: In case there is any risk of dermal exposure (via contaminated equipment), always wear suitable acid resistant protective clothing in the working area and wear acid resistant gloves conforming to EN374 (and chemical safety goggles/full-face shield conforming to EN166).Potential dermal exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance may already cause severe burns and/or eye damage. When aerosols/mists of nitric acid can be formed, wear a suitable acid resistant chemical safety suit with a supplied air respirator/helmet/suit. Suitable material: butyl/fluorinated rubber.

3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

Environment Exposure Estimation	
Environment Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

Health Exposure Estimation	
Health Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

4. GUIDANCE TO DOWNSTREAM USER FOR EVALUATING EMPLOYEE WHETHER HE WORKS INSIDE THE BOUNDARIES SET BY THE ES

Environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed.

Control of worker exposure

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

Guidance to check compliance with the exposure scenario

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. For scaling see ECETOC TRA, ART, STOFFENMANAGER, EUSES.

1. EXPOSURE SCENARIO

Exposure scenario **4**
Title **Industrial use, Industrial cleaning.**

Use descriptor

Sector of use
SU2a - Mining, (without offshore industries)
SU4 - Manufacture of food products
SU6a - Manufacture of wood and wood products
SU8 - Manufacture of bulk, large scale chemicals (including petroleum products)
SU9 - Manufacture of fine chemicals
SU10 - Formulation [mixing] of preparations and/or re-packaging
SU12 - Manufacture of plastics products, including compounding and conversion
SU14 - Manufacture of basic metals, including alloys
SU15 - Manufacture of fabricated metal products, except machinery and equipment
SU16 - Manufacture of computer, electronic and optical products, electrical equipment
SU19 - Building and construction work
SU23 - Recycling

Product category
PC0 - Other Products
PC14 - Metal surface treatment products, including galvanic and electroplating products
PC15 - Non-metal-surface treatment products
PC20 - Products such as pH-regulators, flocculants, precipitants, neutralization agents, other unspecific
PC35 - Washing and cleaning products (including solvent based products)
PC37 - Water treatment chemicals

Process categories
PROC1 - Use in closed process, no likelihood of exposure
PROC2 - Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC3 - Use in closed batch process (synthesis or formulation); Industrial setting
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact)
PROC7 - Industrial spraying
PROC8a - Transfer of substance or mixture (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 mixture into small containers (dedicated filling line, including weighing)
PROC10 - Roller application or brushing
PROC13 - Treatment of articles by dipping and pouring
PROC15 - Use as laboratory reagent

Environmental release categories
ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
ERC6b - Industrial use of reactive processing aids

2. CONDITIONS OF USE AFFECTING EXPOSURE

Product characteristics
Physical state @20°C Liquid, Aqueous solution.
Concentration of substance in product 60%.

Frequency and duration of use ≤ 8 hours/day.
Contributing scenarios

Control of environmental exposure	
Environmental Release Category	ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

	ERC6b - Industrial use of reactive processing aids
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Control of environmental exposure	Not required

Control of worker exposure	
Process category	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact) PROC7 - Industrial spraying PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - 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) PROC10 - Roller application or brushing PROC13 - Treatment of articles by dipping and pouring PROC15 - Use as laboratory reagent
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Technical conditions and measures at process level (source) to prevent release	Containment: 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. 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. 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.
Conditions and Measures Related to Personal Protection, Hygiene, and Health Evaluation	General: Work under a high standard of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the working area. Respiratory protection: In case there is any risk of inhalation exposure to the substance, always wear a full face mask with an acid gas cartridge or wear a supplied air respirator/helmet/suit. Potential inhalation exposure to the substance must be kept to a minimum. The smallest amount inhaled may already have (acute and/or delayed) effects on the respiratory tract. Dermal and eye protection: In case there is any risk of dermal exposure (via contaminated equipment), always wear suitable acid resistant protective clothing in the working area and wear acid resistant gloves conforming to EN374 (and chemical safety goggles/full-face shield conforming to EN166).Potential dermal exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance may already cause severe burns and/or eye damage. When aerosols/mists of nitric acid can be formed, wear a suitable acid resistant chemical safety suit with a supplied air respirator/helmet/suit. Suitable material: butyl/fluorinated rubber.

3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

Environment Exposure Estimation	
Environment Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

Health Exposure Estimation	
Health Exposure Estimation	Not available Quantitative exposure and risk assessment not available

4. GUIDANCE TO DOWNSTREAM USER FOR EVALUATING EMPLOYEE WHETHER HE

WORKS INSIDE THE BOUNDARIES SET BY THE ES

Environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed.

Control of worker exposure

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

Guidance to check compliance with the exposure scenario

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. For scaling see ECETOC TRA, ART, STOFFENMANAGER, EUSES.

1. EXPOSURE SCENARIO

Exposure scenario **5**
Title **Professional use, Professional cleaning.**

Use descriptor

Sector of use
SU1 - Agriculture, forestry, fishery
SU2a - Mining, (without offshore industries)
SU4 - Manufacture of food products
SU6a - Manufacture of wood and wood products
SU12 - Manufacture of plastics products, including compounding and conversion
SU14 - Manufacture of basic metals, including alloys
SU15 - Manufacture of fabricated metal products, except machinery and equipment
SU16 - Manufacture of computer, electronic and optical products, electrical equipment
SU19 - Building and construction work
SU23 - Recycling

Product category
PC12 - Fertilisers
PC14 - Metal surface treatment products, including galvanic and electroplating products
PC15 - Non-metal-surface treatment products
PC20 - Products such as pH-regulators, flocculants, precipitants, neutralization agents, other unspecific
PC35 - Washing and cleaning products (including solvent based products)

Process categories
PROC1 - Use in closed process, no likelihood of exposure
PROC2 - Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC3 - Use in closed batch process (synthesis or formulation); Industrial setting
PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact)
PROC8a - Transfer of substance or mixture (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 mixture into small containers (dedicated filling line, including weighing)
PROC10 - Roller application or brushing
PROC11 - Non industrial spraying
PROC13 - Treatment of articles by dipping and pouring
PROC15 - Use as laboratory reagent
PROC19 - Hand-mixing with intimate contact and only PPE available

Environmental release categories
ERC8b - Wide dispersive indoor use of reactive substances in open systems
ERC8e - Wide dispersive outdoor use of reactive substances in open systems

2. CONDITIONS OF USE AFFECTING EXPOSURE

Product characteristics
Physical state @20°C Liquid, Aqueous solution.
Concentration of substance in product 60%.

Frequency and duration of use ≤ 8 hours/day.
Contributing scenarios

Control of environmental exposure	
Environmental Release Category	ERC8b - Wide dispersive indoor use of reactive substances in open systems ERC8e - Wide dispersive outdoor use of reactive substances in open systems
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Control of environmental exposure	Not required

Control of worker exposure	
Process category	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC5 - Mixing or blending in batch processes for formulation of mixtures and articles (multi-stage and/or significant contact) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - 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) PROC10 - Roller application or brushing PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring PROC15 - Use as laboratory reagent PROC19 - Hand-mixing with intimate contact and only PPE available
Product characteristics	Liquid
Frequency and duration of use	≤ 8 hours/day
Technical conditions and measures at process level (source) to prevent release	Containment: 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. 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. 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.
Conditions and Measures Related to Personal Protection, Hygiene, and Health Evaluation	General: Work under a high standard of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the working area. Respiratory protection: In case there is any risk of inhalation exposure to the substance, always wear a full face mask with an acid gas cartridge or wear a supplied air respirator/helmet/suit. Potential inhalation exposure to the substance must be kept to a minimum. The smallest amount inhaled may already have (acute and/or delayed) effects on the respiratory tract. Dermal and eye protection: In case there is any risk of dermal exposure (via contaminated equipment), always wear suitable acid resistant protective clothing in the working area and wear acid resistant gloves conforming to EN374 (and chemical safety goggles/full-face shield conforming to EN166).Potential dermal exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance may already cause severe burns and/or eye damage. When aerosols/mists of nitric acid can be formed, wear a suitable acid resistant chemical safety suit with a supplied air respirator/helmet/suit. Suitable material: butyl/fluorinated rubber.

3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

Environment Exposure Estimation	
Environment Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

Health Exposure Estimation	
Health Exposure Estimation	Not determined Quantitative exposure and risk assessment not available

4. GUIDANCE TO DOWNSTREAM USER FOR EVALUATING EMPLOYEE WHETHER HE WORKS INSIDE THE BOUNDARIES SET BY THE ES

Environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed.

Control of worker exposure

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented.

Guidance to check compliance with the exposure scenario

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. For scaling see ECETOC TRA, ART, STOFFENMANAGER, EUSES.