Safety Data Sheet

According to Regulation (EU) No 830/2015 of the Commission

Issue date	**13/07/2016**
Issue	**3**
Review date	**10/10/2017**
Review	**4**

Nitric Acid (≥ 52% and < 57%)

SECTION 1	Identification of the substance or mixture and of the company or undertaking	
1.1	**Product identifier**	
	Product commercial name	NITRIC ACID 11.5 - 12.7 % N, FERTIBERSOL - NIT
	Chemical name	Nitric acid
	Other names	
	Chemical formula	HNO3
	EU index number (Appendix 1)	007-004-00-1
	CE No	231-714-2
	CAS No.	7697-37-2
	REACH or National product registration number	01-2119487297-23-0049
1.2	**Relevant identified uses of the substance or mixture and uses advised against**	
	Identified uses	Intermediate substance, formulation and/or distribution of preparations, pH regulating agent, farming with use of drip feeds, metal surface treatment, cleaning products, processing aid in industry, regeneration of ion exchange resins, laboratory product, surface etching for concrete.
	Uses advised against	Any use not indicated in the previous section.
1.3	**Details of the supplier of the safety data sheet**	
	Company name	FERTIBERIA. S.A.
	Company address	Paseo de la Castellana, 259 D. Plantas 47 y 48 - 28046 Madrid
	Company telephone number	Central: 91.586.62.00; Aviles factory: 985.57.78.50; Puertollano factory: 926.44.93.00; Sagunto Factory: 962.69.90.04
	Company email for SDS	reachfertiberia@fertiberia.es
1.4	**Emergency telephone**	Aviles factory: 985.57.78.50; Puertollano factory: 926.44.93.00; Sagunto Factory: 962.69.90.04

Section 2	Hazards identification				
2.1	**Classification of the substance or mixture***	According to Regulation EC 1272/2008 [CLP] Corrosive for metals. Cat. 1: H290 Skin Corrosion. Cat. 1A: H314 Toxic by inhalation. Cat. 3: H331			
2.2	**Label elements**	Pictograms	Signal word	Hazard statements	Precautionary Statements
			Hazard	H290 H314 H331 EUH071	P260 P280 P303+P361+P353 P304+P340 P305+P351+P338 P310
2.3	**Other hazards**	Nitric acid does not meet with PBT or vPvB substance criteria			

*** To understand the full meaning of the hazard statements (H): see section 16**

Section 3	Composition/information on ingredients						
3.1	**Name**	**CE No.**	**CAS No.**	**% (w/w)**	**IUPAC name**	**Classification Regulation 1272/2008**	**Specific concentration limits**
	Nitric acid %...	231-714-3	7697-37-3	≥ 52% and < 57%	Nitric acid	Ox. Liq. 2 Skin Corr. 1A Metal Corr. 1 Acute Tox. 3 EUH071	Skin Corr. 1B; H314: 5 % ≤ C < 20 %
							Skin Corr. 1A; H314 Metal Corr. 1; H290 C ≥ 20 %
							Ox. Liq. 3; H272: 65 % ≤ C < 99 %
							Ox. Liq. 2; H272: C ≥ 99 %

Nitric Acid (≥ 52% and < 57%)

Section 4	First aid measures	
4.1	Description of first aid measures	
	General	Speed is essential. Immediately give first aid and seek medical advice. Make sure that showers and eyewash stations are near the workplace. First aid service providers must be adequately protected (see section 8)
	Inhalation	Remove the affected person from the contaminated area to breathe fresh air. Keep the person warm and in a half-upright position. If necessary, give artificial respiration. Mouth to mouth resuscitation may be hazardous.
	Ingestion	DO NOT induce vomiting. If the person is fully conscious: Rinse the mouth with water and give water or milk to drink. Take immediately to hospital.
	Contact with skin	Immediately remove contaminated clothing or footwear. Soak with plenty of water (for at least 15 minutes) If burns appear, seek medical attention immediately Cover the wound with sterile gauze
	Contact with eyes	Immediately flush eyes with plenty of water, keeping the eyelids well separated (minimum 15 minutes) Do not let victim rub eyes. Consult immediately with an ophthalmologist, even if there are no symptoms
4.2	Most important symptoms and effects, both acute and delayed	
		Toxic by inhalation. Highly corrosive, causes severe burns to skin and eyes. Nitric acid vapours can cause immediate irritation of the respiratory tract, pain and shortage of breath, followed by a recovery period that can last several weeks. After this period, there may be a relapse and sudden death caused by bronchopneumonia and/or pulmonary fibrosis.
4.3	Indication of any immediate medical attention and special treatment needed	
		If exposed to acid/NOx (nitrogen oxide) vapours, the affected person must remain under medical supervision for at least 48 hours in case of lung oedema during this period.

Section 5	Fire fighting measures	
5.1	Extinguishing media	
	Suitable extinguishing media	Spray water in large quantities. Carbon dioxide (CO_2) Use fire extinguishing methods that are suitable for the circumstances of the area and the surrounding environment.
	Unsuitable extinguishing media	Powder / chemical/foam extinguishers Do not attempt to put out the fire using vapour or sand
5.2	Special hazards arising from the substance or mixture	
	Special hazards	Not combustible. However, if it is in a fire, it accelerates the combustion of other flammable materials (wood, cotton. straw, etc) and causes the spread of toxic gases (NOx). If it comes into contact with normal metals (steel, galvanised aluminium, etc), it can cause corrosion and generate highly flammable hydrogen gas. It can explode on contact with a powerful reducing agent.
	Thermal decomposition or product combustion hazards	It can produce toxic nitrogen oxide fumes.
5.3	Advice for fire fighters	
	Specific fire fighting methods	Cool the containers/equipment exposed to heat with water sprays Use water sprays to disperse the fumes and protect personnel Avoid disposing of water contaminated by the fire into the environment.
	Special protective equipment for fire fighting	Do not attempt to extinguish the fire without suitable protection equipment: - Complete set of acid-resistant protective clothing - Autonomous breathing apparatus

Section 6	Accidental release measures	
6.1	Personal precautions, protective equipment and emergency procedures	
		Put on suitable protective equipment before entering the hazardous area (see section 8). Do not inhale gases or fumes Break up the cloud of gas or fumes with a water spray or other suitable solvent. Avoid direct contact with the product. Evacuate all non-essential personnel.
6.2	Environmental precautions	
		Do not allow the product to be disposed of into the environment Take precautions to prevent contamination of water courses and drains (do not discharge product directly). Inform the relevant authorities in cases of accidental contamination of water courses. Dilute product with water and neutralise the acid with products such as caustic soda or sodium carbonate, before discharging the contaminated material into treatment plants or water courses.

6.3	**Methods and material for containment and cleaning up**	
		Recovery: Stop the release Contain the product and direct it to a sealed off area Pump the product to a correctly labelled empty container Neutralisation: For small spills, dilute with large amounts of water. Work with extreme care. If necessary, contain large spills with sand or soil Neutralise any unrecoverable product with: - slaked lime. - carbonates or bicarbonates Cleaning/decontamination: Clean stained surfaces with water Neutralise contaminated soil with slaked lime and then rinse it. Never neutralise the product while it is in enclosed containers or inside a closed emergency container. Waste management/elimination Eliminate the contaminated waste in accordance with regulations currently in force
6.4	**Reference to other sections**	
		See section 8 for personal protective equipment and section 13 for the disposal of waste

Section 7	**Handling and storage**	
7.1	**Precautions for safe handling**	
		Avoid direct contact with the product. Do not inhale fumes. Ensure work place is well ventilated. Use only acid-resistant materials. When possible, use suitable pumping methods to load and unload the product. Never let water or any water-based agent enter the tanks or containers holding acid. Dilutions or neutralisations are highly exothermic: avoid splashes and work slowly. Always add acid to water, never the other way round. Do not mix with incompatible materials (see section 10.5). Do not eat, drink or smoke while working. Wash hands after use and remove contaminated clothing and protective equipment before entering the eating area.
7.2	**Conditions for safe storage, including any incompatibilities**	
		The floor must be impermeable, acid-resistant and designed so as to form a sealed tank. Corrodes concrete. Storage tanks must be earthed. Storage: In cool, well-ventilated areas Keep away from heat, sources of ignition, direct sunlight and incompatible substances (see section 10) Protect containers from corrosion and any physical damage
	Recommended packaging materials	Containers should made of stainless steel, preferably with a low carbon content, such as 304L (DIN/EN 1.4306), or plastic (PVC, PFTE).
	Incompatible materials	Common metals Carbon steel or rubber-coated steel Polypropylene
7.3	**Specific end uses**	
		See section 1.2 and appendixes 1 and 2 for exposure scenarios.
Note: stability and reactivity, see section 10		

Section 8	**Exposure controls/personal protection**								
8.1	**Control parameters**								
	Occupational exposure limit values		**Component**	**CAS**					
			Nitric acid	7697-37-2	ELV-ST (STEL): Short term: 2.6 mg/m3 and 1 ppm				
	Derived from the CSR	**DNEL**			**worker**			**consumer**	
			oral		Not applicable			Not applicable	
			inhalation	Short term long term	2.6 mg/m3 1.3 mg/m3 Systemic effects are not expected for being corrosive			1.3 mg/m3 0.65 mg/m3 Systemic effects are not expected for being corrosive	
			dermal		Local effects: Limits established in appendix VI of CLP Skin Corr. 1A ≥ 20% Skin Corr. 1B: 5 % ≤ C < 20 % Systemic effects are not expected for being corrosive			Local effects: Limits established in appendix VI of CLP Skin Corr. 1A ≥ 20% Skin Corr. 1B: 5 % ≤ C < 20 % Systemic effects are not expected for being corrosive	
		PNEC	**water**		**air**	**soil**	**microbiolo-gical**	**sediment**	**oral**
			Proposed safe pH range: 6 - 9 Studies show that the pH has more toxic effects on water organisms than the nitrate ion (algae, crustaceans and fish).		Not available	Not applicable (it dissolves and plants and micro-organisms use its nitrogen source)	Not applicable (acid)	Not applicable (acid and disociates)	Not applicable (not bioaccumulable, inorganic and soluble)
8.2	**Exposure controls**								
	Appropriate technical controls		Make sure that the workplace is well ventilated Monitor atmosphere regularly Use closed systems or covered open containers. Transport through pipes. Fill and empty barrels using automatic systems (suction pumps, etc). Use localised extractor ventilation systems when necessary. Install showers and wash basins in storage and handling areas. Install systems that avoid projections in handling and storage places.						

	Personal protection measures		
		Eyes and face	Chemical safety glasses (EN166) or face shield
		Skin and body	Acid-resistant boots Acid resistant garments (EN 14605)
		Hands	Wear chemical resistant impermeable gloves that conform to European standard EN 374: butyl rubber, PVC, flouroelastomer, PTFE.
		Respiratory	Use suitable respiratory equipment if the exposure level exceeds or might exceed the DNEL value For short periods of exposure the following masks are recommended: EN149 type FF P3, EN 14387 type B or E model P3, EN 1827 class FMP3 (non-exhaustive list). For long periods of exposure, full masks or masks with an air supply apparatus are recommended: full masks EN 143, EN 14387, EN 12083 class P3 or class XP3, EN12941 class TH3, EN 12942 TM3, EN14593 or EN138 (non-exhaustive list).
		Thermal Hazards	The substance is not a thermal hazard, and so does not require special consideration.
	Environmental exposure controls		Use of nitric acid by industry and professionals: If spills can cause significant changes in the pH, do not allow uncontrolled spills of nitric acid solutions into waste or surface waters. Regular checks of pH values are required when discharging into open waters. In general, waste should be discharged so that it minimises any change in the pH of the surface waters where it is to be disposed of. See section 6
	Choose personal protection equipment suitable to exposure risks.		

Section 9	Physical and chemical properties	
9.1	**Information on basic physical and chemical properties**	
	Aspect	liquid
	Colour	Colourless to yellow liquid
	Odour	Acrid, acidic odour
	Odour threshold	0.70 mg/m3 (0.29 ppm)
	Molecular weight	63.01 g/mol
	pH	< 1 (undiluted)
	Boiling point	103.4 ºC (20% nitric acid); 120.4 ºC (60% nitric acid).
	Melting point	- 17 ºC (20% nitric acid); -22 ºC (60% nitric acid).
	Flash-point	not applicable
	Flammability	non flammable
	Explosive properties	Non-explosive
	Auto-ignition temperature	not applicable
	Decomposition temperature	83 ºC acid 100% NO3H
	Lower explosive limit	not applicable
	Upper explosive limit	not applicable
	Oxidising properties	Non-oxidising. (However, 100% acid: oxidising)
	Relative density	At 20 ºC: 1.1150 (20% nitric acid); 1.3667 (60% nitric acid).
	Vapour pressure at 20 ºC	0.77 Kpa at 20 ºC (60% nitric acid).
	Vapour density	2 with regard to air.
	Partition coefficient n-octanol/water	not applicable (inorganic substance)
	Solubility	at 20 ºC: 500 g/l (100% nitric acid)
	Viscosity	0.70 mPa at 25 °C (undiluted)
9.2	**Additional information**	
	Miscibility	Mixable with water in any proportion

Section 10	Stability and reactivity	
10.1	**Reactivity**	The product is stable under recommended handling and storage conditions (see section 7)
10.2	**Chemical stability**	Thermally stable in reactive terms in designed storage conditions. Slight decomposition into nitrogen oxides when coming into contact with light or organic material.
10.3	**Possibility of hazardous reactions**	Can react violently to reducing agents, strong bases, organic materials, chlorides and finely divided metals. Exothermic reaction to water.
10.4	**Conditions that must be avoided**	High temperatures, light, containment.
10.5	**Incompatible materials**	- oxidizing materials - organic matter - reducing agents - alkalis and caustic products - metal dusts - hydrogen sulphide - chlorates - carbides - non-noble metals - alcohols - flammable liquids - chromic acid
10.6	**Hazardous decomposition products**	When nitric acid is heated, nitrogen oxide is produced (NOx)

Nitric Acid (≥ 52% and < 57%)

Section 11 **Toxological information**

11.1 **Information on toxological effects**

Acute toxicity

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	OCDE 403 - -	Rat - -	Inhaled Oral Skin	LC50: > 2650 mg/m^3. Toxic by inhalation Category 3. Corrosive to the respiratory tract. Information unavailable Information unavailable

Skin corrosion or irritation

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	No studies have been carried out given that the corrosiveness of the substance is already known.		Skin	Corrosive to skin and eyes. 100% nitric acid. For diluted nitric acid: appendix VI of the CLP sets specific classification limits: Skin Corr. 1A; H314: Nitric acid ≥ 20 % Skin Corr. 1B; H314: 5 % ≤ Nitric acid < 20 %

Severe eye damage or irritation to eyes

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	No studies have been carried out given that the corrosiveness of the substance is already known.		Eye	Corrosive to skin and eyes. 100% nitric acid. For diluted nitric acid: appendix VI of the CLP sets specific classification limits: Skin Corr. 1A; H314: Nitric acid ≥ 20 % Skin Corr. 1B; H314: 5 % ≤ Nitric acid < 20 %

Respiratory or skin sensitisation

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	Not necessary because the substance is a strong acid (pH <2)		Skin	Corrosive substance, a study is not relevant in this case. Undiluted and diluted nitric acid (20-65%), the pH is strong acid

Mutagenicity in germ cells

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	Similar to OCDE 471 OCDE 473 OCDE 476 In vivo testing: Chromosomatic and micronucleic aberrations in bone marrow cells	In vitro: bacteria, mammal cells In vivo: rat and mouse bone marrow cells	in vitro: bacteria, mammal cells in vivo: bone marrow cells	Using negative results obtained from nitric acid (OCDE 471), sodium nitrate (OCDE 471, 473+ in vivo test) and potassium nitrate (OCDE 471, 473 and 476), and due to their structural similarities to nitric acid, it can be concluded that nitric acid is not expected to cause genetic toxicity.

Carcinogenicity

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	Official guides are not followed	Rat	Inhaled	Inconclusive data

Toxicity for reproduction

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	OECD 422	rat	Oral: by probe	NOAEL: 1,500 mg/Kg body weight/day No adverse effects were observed for reproduction or development. Extrapolation with nitrates has been used to study nitric acid as a result of their structural similarity. In the light of available data the classification criteria are not met.

Specific Target Organ Toxicity (STOT) - single and repeated exposure

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	-	rat	Oral Inhalation	NOAEL: 1500 mg/kg body weight/day NOAEC: 4.11 mg/m³

Aspiration hazards

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	-	-	-	See note below

The main exposure route for nitric acid is by inhalation. If inhaled, nitric acid vapours can cause immediate irritation of the respiratory tract, pain and shortage of breath, followed by a recovery period that can last several weeks. After this period, there may be a relapse and sudden death caused by bronchopneumonia and/or pulmonary fibrosis. Contact with the skin can cause burns on the skin and eyes. If swallowed, nitric acid causes burns in the digestive tract

Nitric Acid (≥ 52% and < 57%)

Section 12 Ecological information

12.1 Toxicity

Water toxicity

Component	CAS No.		Fish	Crustaceans	Algae
Nitric acid	7697-37-2	Short term	Average lethal pH (96 h): 3-3,5: Lepomis macrochirus (no official guide followed). Average lethal pH (96 h) ~ 3.7: Oncorhynchus mykiss (no official guide followed). Available studies show that it is the pH and not ion nitrate that is responsible for toxic effects in fish. This is confirmed by another study with sodium nitrate: LC50(96h)=8226 mg/l for rainbow trout.	Average lethal pH (48 h): 4,6: Ceriodaphnia dubia In the light of available data the classification criteria are not met.	Information unavailable
		Long term	Information unavailable	Information unavailable	Information unavailable

Land Toxicity

Component	CAS No.	Macroorganisms	Microorganisms	Other organisms
Nitric acid	7697-37-2	Irrelevant estimate	Information unavailable	Not applicable

Microbiological activity in waste water treatment plants

Component	CAS No.	Toxicity for aquatic microorganisms
Nitric acid	7697-37-2	Given the Ph control carried out in water treatment plants, this is not relevant.

12.2 Persistence and degradability

Component	CAS No.	Hydrolysis	Photolysis	Biodegradation
Nitric acid	7697-37-2	Not relevant for inorganic substances.		

12.3 Bioaccumulative potential

Component	CAS No.	Octanol-water partition coefficient (Kow)	Bioconcentration factor (BCF)	Comments
Nitric acid	7697-37-2	Not relevant for inorganic substances.		

12.4 Mobility in soil

Component	CAS No.	Result
Nitric acid	7697-37-2	Information unavailable

12.5 Results of PBT and vPvB assessment

Not applicable to inorganic substances

12.6 Other adverse effects

The danger of nitric acid is mostly caused by increased H^+ ion (pH) concentration liberated from disociation. The increase of nitrate concentrations has slight effects.

Section 13 Disposal considerations

13.1 Waste treatment methods

Carefully neutralise with lime or carbonates.
Eliminate in accordance with local regulations.
The packaging used is exclusive to containing this product. After use, completely empty it and store in an authorised location.

Nitric Acid (≥ 52% and < 57%)

Section 14	Transport Information							
14.1 - 14.6	Regulatory Information	UN Number	Proper shipping name	Class	Packing group	Label	Environmental hazards	Special precautions for users
	ADR/RID	2031	NITRIC ACID, except for red fuming nitric acid with at least 65% nitric acid content	8	II		NO	Hazard 80 Identification Number Tunnel Code (E) See ADR/RID
	ADNR							See ADN
	IMDG							See IMDG emergency procedures (FEm). F-A, S-B
	OACI							See ICAO regulation for quantity limitation
14.7	***Bulk transport in accordance with appendix II of the MARPOL Convention and the IBC Code: "*** Nitric acid (less than 70%); TYPE OF BOAT: 2; POLLUTION CATEGORY: Y."							

Section 15	Regulatory information
15.1	**Safety, health and environmental regulations and legislation specific for the substance or mixture**
	Regulation 2003/2003 (fertilisers) Regulation 1907/2006 (REACH) Regulation 1272/2008 (CLP) Royal Decree 656/2017 (Storage of Chemical Products) ITC-MIE-APQ 006, 007 and 010 R.D. 374/2001 (Chemical agents) R.D. 506/2013 (fertilizers) R.D. 261/96 on protection of water from nitrates (Directive 91/676/EC) Law 22/2011, on waste and contaminated soil
15.2	**Chemical Safety Assessment**
	Chemical Safety Assessment for nitric acid

Section 16	Other information	
	Hazard statements	H290: May be corrosive to metals. H314: Causes severe skin burns and eye damage. H331: Toxic by inhalation EUH071: Corrosive to the respiratory tract.
	Precautionary statements	P102 - Keep out of reach of children. P234 - Keep only in original container. P260 - Do not breathe fumes. P264 - Wash hands thoroughly after handling. P271 - Use only outdoors or in a well-ventilated area. P280 - Wear protective gloves/clothing/glasses/face protection. P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 - IF IN EYES: Rinse continuously 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. P363 - Wash contaminated clothing before reuse. P390 - Absorb spillage to prevent material damage. P403+P233 - Store in a well ventilated place. Keep container tightly closed. P405 - Store locked up. P406 - Store in corrosive resistant/... container with a resistant inner liner. (AISI 304L) P501 - Dispose of contents/container by authorised manager.
	Bibliographical references and data sources	Nitric acid chemical safety assessment
	Abbreviations and acronyms	ELV-DE: Environmental limit value (daily exposure) ELV-ST Environmental limit value (short term) NOAEL: No observable adverse effect level LD50: Lethal dose 50% LC50: Lethal concentration 50% DNEL: Derived no effect level PNEC: Predicted no effect concentration LOEC: Lowest observed effect concentration NOEC: No observed effect concentration NOAEC: No observed adverse effect concentration
	Adequate training for workers	Obligatory training in occupational risk prevention
	Date of prior SDS	Version 3 dated 13.07.16
	Modifications made to present revision	Include the phrase H331. Section 14.7 and 15. Exposure scenarios updated.
	The exposure scenarios are attached as appendixes.	

The information contained in this Safety Data Sheet is given in good faith. It is accurate to the best of our knowledge and belief and represents the most up to date information about the product at the time of publication. The information given in this data sheet does not constitute or replace the user's own assessment of workplace risks as required by other health and safety legislation.

Safety Data Sheet Appendices
Exposure Scenario 1

1	**Title of Exposure Scenario (ES)**
	Production **Production of nitric acid at concentrations below 70%: (Continuous synthesis and batch), including handling, storage and quality control.**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 1
	PROC 1/2/3/4/8a/8b/9/15 ERC 1
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Production of substances (ERC 1)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Use in enclosed processes, no likelihood of exposure (PROC 1) 2. Use in closed, continuous processes with occasional controlled exposure (PROC 2) 3. Use in closed batch processes (synthesis or formulation) (PROC 3) 4. Use in batch and other processes (synthesis) where opportunity for exposure arises (PROC 4) 5. Transfer of substances or preparations (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 6. Transfer of substances or preparations from/to vessels/large containers at dedicated facilities (PROC8b) 7. Transfer of substances or preparations into small containers (dedicated filling line, including weighing) (PROC 9) 8. Use as laboratory reagent (PROC 15)
2.1	**Contributing scenario (1) controlling environmental exposure for production of nitric acid at concentrations below 70% (ES1)**

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2,2	**Contributing scenario (2) controlling worker exposure for the production of nitric acid at concentrations below 70%**

Section 2.2 describes the potential exposure of workers due to the production of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/8a/8b/9/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3

Nitric Acid (≥ 52% and < 57%)	
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.
3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH. Measures not subject to art. 37 (4) REACH**
• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes. • Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.). • Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you) • Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers. • Do not store at temperatures near freezing point. • Local or general ventilation is not necessary, but is a good practice.	

Safety Data Sheet Appendices
Exposure Scenario 2

1	**Title of Exposure Scenario (ES)**
	Formulation and repackaging. **Formulation of mixtures using nitric acid in concentrations below 70%.**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 2
	PC12, PC14, PC15, PC35 * PROC 1/2/3/4/5/8a/8b/9/15 ERC 2
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Formulation of/into preparations (ERC 2)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Production of chemical products or refinery in closed processes in which there is no likelihood of exposure or in processes under equivalent containment conditions. (PROC 1) 2. Production of chemical products or refinery in closed and continuous processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 2) 3. Production or formulation in the chemical industry in closed batch processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 3) 4. Production of chemical products in which exposure can occur. (PROC 4) 5. Mixing or blending in batch processes. (PROC 5) 6. Transfer of substances or preparations (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 7. Transfer of substances or preparations (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 8. Transfer of substances or preparations into small containers (dedicated filling line, including weighing) (PROC 9) 9. Use as laboratory reagent (PROC 15)
	* Agency Guidance Document, Chapter R.12: PC 12 (Fertilizers)/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))
2.1	**Contributory scenario (1) that controls environmental exposure for the formulation and repackaging of nitric acid at concentrations below 70% (ES1)**

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2.2	**Contributory scenario (2) that controls worker exposure for the formulation and repackaging of nitric acid at concentrations below 70%**

Section 2.2 describes the potential exposure of workers due to the formuation and repackaging of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/5/8a/8b/9/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Nitric Acid (≥ 52% and < 57%)	
Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.

3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH.** **Measures not subject to art. 37 (4) REACH**

• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes.
• Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.).
• Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you)
• Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers.
• Do not store at temperatures near freezing point.
• Local or general ventilation is not necessary, but is a good practice.

Safety Data Sheet Appendices
Exposure Scenario 3

1	**Title of Exposure Scenario (ES)**
	Use at industrial sites. **Use of nitric acid at a concentration below 70% at industrial sites as an intermediate.**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 3
	SU 0, SU 8, SU 9 PC 19 PROC 1/2/3/4/5/8a/8b/9/15 ERC 6a
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Use of intermediate (ERC 6a)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Production of chemical products or refinery in closed processes in which there is no likelihood of exposure or in processes under equivalent containment conditions. (PROC 1) 2. Production of chemical products or refinery in closed and continuous processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 2) 3. Production or formulation in the chemical industry in closed batch processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 3) 4. Production of chemical products in which exposure can occur. (PROC 4) 5. Mixing or blending in batch processes. (PROC 5) 6. Transfer of substances or preparations (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 7. Transfer of substances or preparations (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 9. Transfer of substances or preparations into small containers (dedicated filling line, including weighing) (PROC 9) 10. Use as laboratory reagent (PROC 15)
	* Agency Guidance Document, Chapter R.12: Use descriptor systems: SU 8 (Manufacture of bulk, large scale chemicals (including petroleum products)/SU 9 (Manufacture of fine chemicals) PC 19 (Intermediate)

Nitric Acid (≥ 52% and < 57%)

2.1	Contributory scenario (1) that controls environmental exposure for the industrial use as of nitric acid as an intermediate at concentrations below 70% (ES 3)

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2,2	Contributory scenario (2) that controls worker exposure for the intermediate use of nitric acid at an industrial site at concentrations below 70%

Section 2.2 describes the potential exposure of workers due to the intermediate use at an industrial site of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/5/8a/8b/9/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.

3	Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH. Measures not subject to art. 37 (4) REACH

• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes.
• Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.).
• Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you)
• Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers.
• Do not store at temperatures near freezing point.
• Local or general ventilation is not necessary, but is a good practice.

Safety Data Sheet Appendices
Exposure Scenario 4

1	**Title of Exposure Scenario (ES)**
	Use at industrial sites. **Use of nitric acid at concentrations below 70% at industrial sites as an aid in reactive processes (cleaning agent, pH regulator, waste gas treatment, regeneration of ion exchange resins, metal treatment, plastic treatment, surface treatment product, water treatment).**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 2
	SU0, SU 2a, SU 4, SU 6a, SU8, SU9, SU 12, SU 14, SU 15, SU 16, SU 19, SU 23 * PC0, PC14, PC15, PC20, PC35, PC37 * PROC 1/2/3/4/5/7/8a/8b/9/10/13/15 ERC 4/6b
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Use of non-reactive processing aids at industrial sites (not part of articles) (ERC 4) 2. Use of reactive processing aids at industrial sites (not part of articles) (ERC 6b)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Production of chemical products or refinery in closed processes in which there is no likelihood of exposure or in processes under equivalent containment conditions. (PROC 1) 2. Production of chemical products or refinery in closed and continuous processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 2) 3. Production or formulation in the chemical industry in closed batch processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 3) 4. Production of chemical products in which exposure can occur. (PROC 4) 5. Mixing or blending in batch processes. (PROC 5) 6. Industrial spraying. (PROC 7) 7. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 8. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 9. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9) 10. Roller application or brushing (PROC 10) 11. Treatment of articles by dipping and pouring (PROC 13) 12. Use as laboratory reagent (PROC 15)
	* Agency Guidance Document, Chapter R.12: Use descriptor systems: SU 0 (C21-Production of basic pharmaceutical products, nuclear fuel cycle)/SU 2a (Mining, (without offshore industries))/SU 4 (Manufacture of food products)/SU 6a (Manufacture of wood and wood products)/SU 8 (Manufacture of bulk, large scale chemicals (including petroleum products))/SU 9 (Manufacture of fine chemicals)/SU 12 (Manufacture of plastics products, including compounding and conversion)/SU 14 (Manufacture of basic metals, including alloys)/SU 15 (Manufacture of fabricated metal products, except machinery and equipment)/SU 16 (Manufacture of computer, electronic and optical products, electrical equipment)/SU 19 (Building and construction work)/SU 23 (Electricity, steam, gas water supply and sewage treatment) PC 0 (UCN code: A052 50 ion exchanger)/PC 14 (Metal surface treatment products, including galvanic and electroplating products)/PC 15 (Non-metal-surface treatment products)/PC 20 (Products such as ph-regulators, flocculants, precipitants, neutralization agents, other un-specific)/PC 21 (Laboratory Chemicals)/PC 35 (Washing and Cleaning Products (including solvent based products))/PC 37 (Water treatment chemicals)
2.1	**Contributory scenario (1) that controls environmental exposure for the industrial use of nitric acid as an aid in reactive processes at concentrations below 70% (ES3)**

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2,2	**Contributory scenario (2) that controls worker exposure for the industrial use of nitric acid as an aid in reactive processes at concentrations below 70%**

Section 2.2 describes the potential exposure of workers due to the production of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/5/7/8a/8b/9/10/13/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.

Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.

3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH.**

• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes.
• Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.).
• Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you)
• Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers.
• Do not store at temperatures near freezing point.
• Local or general ventilation is not necessary, but is a good practice.

Safety Data Sheet Appendices
Exposure Scenario 5

1	**Title of Exposure Scenario (ES)**
	Generalized use by professional workers. **Use of nitric acid at concentrations below 70%: (outdoors and indoors, in open systems as cleaning agent, pH regulator, metal treatment)**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 2
	SU 1, SU 2a, SU 4, SU 6a, SU 12, SU 14, SU 15, SU 16, SU 19, SU 23 * PC12, PC14, PC15, PC20, PC35 * PROC 5/8a/8b/9/10/11/13/15/19 ERC 8b/8e
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Wide dispersive indoor use of reactive substances in open systems (ERC 8b) 2. Wide dispersive outdoor use of reactive substances in open systems (ERC 8e)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Mixing or blending in batch processes (multistage and/or significant contact) (PROC 5) 2. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 3. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 4. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9) 5. Roller application or brushing (PROC 10) 6. Non industrial spraying (PROC 11) 7. Treatment of articles by dipping and pouring (PROC 13) 8. Use as laboratory reagent (PROC 15) 9. Hand mixing with intimate contact (only PPE available) (PROC 19)
	* Agency Guidance Document, Chapter R.12: Use descriptor systems: SU 1 (Agriculture, forestry, fishery)/SU 2a (Mining, (without offshore industries))/SU 4 (Manufacture of food products)/SU 6a (Manufacture of wood and wood products)/SU 12 (Manufacture of plastics products, including compounding and conversion)/SU 14 (Manufacture of basic metals, including alloys)/SU 15 (Manufacture of fabricated metal products, except machinery and equipment)/SU 16 (Manufacture of computer, electronic and optical products, electrical equipment)/SU 19 (Building and construction work)/SU 23 (Electricity, steam, gas water supply and sewage treatment) PC 12 (Fertilisers)/PC 14 (Metal surface treatment products, including galvanic and electroplating products)/PC 15 (Non-metal surface treatment products)/PC 20 (Products such as ph-regulators, flocculants, precipitants, neutralization agents, other un-specific)/PC 21 (Laboratory Chemicals)/PC 35 (Washing and Cleaning Products (including solvent based products))

2.1 Contributing scenario (1) controlling environmental exposure for use of nitric acid by professionals (ES3) at concentrations below 70% (ES 3)

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2,2 Contributing scenario (2) controlling worker exposure for professional use of nitric acid at concentrations below 70%

Section 2.2 describes the potential exposure of workers due to the production of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 5/8a/8b/ 9/10/11/13/15/19) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.

Nitric Acid (≥ 52% and < 57%)	
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.
3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH.**
• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes. • Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.). • Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you) • Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers. • Do not store at temperatures near freezing point. • Local or general ventilation is not necessary, but is a good practice.	

Safety Data Sheet

According to Regulation (EU) No 830/2015 of the Commission

Issue date	**13/07/2016**
Issue	**3**
Review date	**10/10/2017**
Review	**4**

Nitric Acid (≥ 57% and < 62%)

SECTION 1	Identification of the substance or mixture and of the company or undertaking	
1.1	**Product identifier**	
	Product commercial name	NITRIC ACID 12.7 - 13.7 % N, FERTIBERSOL - NIT
	Chemical name	Nitric acid
	Other names	
	Chemical formula	HNO3
	EU index number (Appendix 1)	007-004-00-1
	CE No	231-714-2
	CAS No.	7697-37-2
	REACH or National product registration number	01-2119487297-23-0049
1.2	**Relevant identified uses of the substance or mixture and uses advised against**	
	Identified uses	Intermediate substance, formulation and/or distribution of preparations, pH regulating agent, farming with use of drip feeds, metal surface treatment, cleaning products, processing aid in industry, regeneration of ion exchange resins, laboratory product, surface etching for concrete.
	Uses advised against	Any use not indicated in the previous section.
1.3	**Details of the supplier of the safety data sheet**	
	Company name	FERTIBERIA. S.A.
	Company address	Paseo de la Castellana, 259 D. Plantas 47 y 48 - 28046 Madrid
	Company telephone number	Central: 91.586.62.00; Aviles factory: 985.57.78.50; Puertollano factory: 926.44.93.00; Sagunto Factory: 962.69.90.04
	Company email for SDS	reachfertiberia@fertiberia.es
1.4	**Emergency telephone**	Aviles factory: 985.57.78.50; Puertollano factory: 926.44.93.00; Sagunto Factory: 962.69.90.04

Section 2	Hazards identification				
2.1	**Classification of the substance or mixture***	According to Regulation EC 1272/2008 [CLP] Corrosive for metals. Cat. 1: H290 Skin Corrosion. Cat. 1A: H314 Toxic by inhalation. Cat. 3: H331			
2.2	**Label elements**	Pictograms	Signal word	Hazard statements	Precautionary Statements
			Hazard	H290 H314 H331 EUH071	P260 P280 P303+P361+P353 P304+P340 P305+P351+P338 P310
2.3	**Other hazards**	Nitric acid does not meet with PBT or vPvB substance criteria			

*** To understand the full meaning of the hazard statements (H): see section 16**

Section 3	Composition/information on ingredients						
3.1	**Name**	**CE No.**	**CAS No.**	**% (w/w)**	**IUPAC name**	**Classification Regulation 1272/2008**	**Specific concentration limits**
	Nitric acid %...	231-714-3	7697-37-3	≥ 57% and < 62%	Nitric acid	Ox. Liq. 2 Skin Corr. 1A Metal Corr. 1 Acute Tox. 3 EUH071	Skin Corr. 1B; H314: 5 % ≤ C < 20 %
							Skin Corr. 1A; H314 Metal Corr. 1; H290 C ≥ 20 %
							Ox. Liq. 3; H272: 65 % ≤ C < 99 %
							Ox. Liq. 2; H272: C ≥ 99 %

Nitric Acid (≥ 57% and < 62%)

Section 4	First aid measures	
4.1	Description of first aid measures	
	General	Speed is essential. Immediately give first aid and seek medical advice. Make sure that showers and eyewash stations are near the workplace. First aid service providers must be adequately protected (see section 8)
	Inhalation	Remove the affected person from the contaminated area to breathe fresh air. Keep the person warm and in a half-upright position. If necessary, give artificial respiration. Mouth to mouth resuscitation may be hazardous.
	Ingestion	DO NOT induce vomiting. If the person is fully conscious: Rinse the mouth with water and give water or milk to drink. Take immediately to hospital.
	Contact with skin	Immediately remove contaminated clothing or footwear. Soak with plenty of water (for at least 15 minutes) If burns appear, seek medical attention immediately Cover the wound with sterile gauze
	Contact with eyes	Immediately flush eyes with plenty of water, keeping the eyelids well separated (minimum 15 minutes) Do not let victim rub eyes. Consult immediately with an ophthalmologist, even if there are no symptoms
4.2	Most important symptoms and effects, both acute and delayed	
		Toxic by inhalation. Highly corrosive, causes severe burns to skin and eyes. Nitric acid vapours can cause immediate irritation of the respiratory tract, pain and shortage of breath, followed by a recovery period that can last several weeks. After this period, there may be a relapse and sudden death caused by bronchopneumonia and/or pulmonary fibrosis.
4.3	Indication of any immediate medical attention and special treatment needed	
		If exposed to acid/NOx (nitrogen oxide) vapours, the affected person must remain under medical supervision for at least 48 hours in case of lung oedema during this period.

Section 5	Fire fighting measures	
5.1	Extinguishing media	
	Suitable extinguishing media	Spray water in large quantities. Carbon dioxide (CO_2) Use fire extinguishing methods that are suitable for the circumstances of the area and the surrounding environment.
	Unsuitable extinguishing media	Powder / chemical/foam extinguishers Do not attempt to put out the fire using vapour or sand
5.2	Special hazards arising from the substance or mixture	
	Special hazards	Not combustible. However, if it is in a fire, it accelerates the combustion of other flammable materials (wood, cotton. straw, etc) and causes the spread of toxic gases (NOx). If it comes into contact with normal metals (steel, galvanised aluminium, etc), it can cause corrosion and generate highly flammable hydrogen gas. It can explode on contact with a powerful reducing agent.
	Thermal decomposition or product combustion hazards	It can produce toxic nitrogen oxide fumes.
5.3	Advice for fire fighters	
	Specific fire fighting methods	Cool the containers/equipment exposed to heat with water sprays Use water sprays to disperse the fumes and protect personnel Avoid disposing of water contaminated by the fire into the environment.
	Special protective equipment for fire fighting	Do not attempt to extinguish the fire without suitable protection equipment: - Complete set of acid-resistant protective clothing - Autonomous breathing apparatus

Section 6	Accidental release measures	
6.1	Personal precautions, protective equipment and emergency procedures	
		Put on suitable protective equipment before entering the hazardous area (see section 8). Do not inhale gases or fumes Break up the cloud of gas or fumes with a water spray or other suitable solvent. Avoid direct contact with the product. Evacuate all non-essential personnel.
6.2	Environmental precautions	
		Do not allow the product to be disposed of into the environment Take precautions to prevent contamination of water courses and drains (do not discharge product directly). Inform the relevant authorities in cases of accidental contamination of water courses. Dilute product with water and neutralise the acid with products such as caustic soda or sodium carbonate, before discharging the contaminated material into treatment plants or water courses.

6.3	**Methods and material for containment and cleaning up**	
		Recovery: Stop the release Contain the product and direct it to a sealed off area Pump the product to a correctly labelled empty container Neutralisation: For small spills, dilute with large amounts of water. Work with extreme care. If necessary, contain large spills with sand or soil Neutralise any unrecoverable product with: - slaked lime. - carbonates or bicarbonates Cleaning/decontamination: Clean stained surfaces with water Neutralise contaminated soil with slaked lime and then rinse it. Never neutralise the product while it is in enclosed containers or inside a closed emergency container. Waste management/elimination Eliminate the contaminated waste in accordance with regulations currently in force
6.4	**Reference to other sections**	
		See section 8 for personal protective equipment and section 13 for the disposal of waste

Section 7	**Handling and storage**	
7.1	**Precautions for safe handling**	
		Avoid direct contact with the product. Do not inhale fumes. Ensure work place is well ventilated. Use only acid-resistant materials. When possible, use suitable pumping methods to load and unload the product. Never let water or any water-based agent enter the tanks or containers holding acid. Dilutions or neutralisations are highly exothermic: avoid splashes and work slowly. Always add acid to water, never the other way round. Do not mix with incompatible materials (see section 10.5). Do not eat, drink or smoke while working. Wash hands after use and remove contaminated clothing and protective equipment before entering the eating area.
7.2	**Conditions for safe storage, including any incompatibilities**	
		The floor must be impermeable, acid-resistant and designed so as to form a sealed tank. Corrodes concrete. Storage tanks must be earthed. Storage: In cool, well-ventilated areas Keep away from heat, sources of ignition, direct sunlight and incompatible substances (see section 10) Protect containers from corrosion and any physical damage
	Recommended packaging materials	Containers should made of stainless steel, preferably with a low carbon content, such as 304L (DIN/EN 1.4306), or plastic (PVC, PFTE).
	Incompatible materials	Common metals Carbon steel or rubber-coated steel Polypropylene
7.3	**Specific end uses**	
		See section 1.2 and appendixes 1 and 2 for exposure scenarios.
Note: stability and reactivity, see section 10		

Section 8	**Exposure controls/personal protection**									
8.1	**Control parameters**									
	Occupational exposure limit values		**Component**	**CAS**						
			Nitric acid	7697-37-2	ELV-ST (STEL): Short term: 2.6 mg/m3 and 1 ppm					
	Derived from the CSR				**worker**			**consumer**		
		DNEL	**oral**		Not applicable			Not applicable		
			inhalation	Short term long term	2.6 mg/m3 1.3 mg/m3 Systemic effects are not expected for being corrosive			1.3 mg/m3 0.65 mg/m3 Systemic effects are not expected for being corrosive		
			dermal		Local effects: Limits established in appendix VI of CLP Skin Corr. 1A: ≥ 20% Skin Corr. 1B: 5 % ≤ C < 20 % Systemic effects are not expected for being corrosive			Local effects: Limits established in appendix VI of CLP Skin Corr. 1A: ≥ 20% Skin Corr. 1B: 5 % ≤ C < 20 % Systemic effects are not expected for being corrosive		
		PNEC	**water**		**air**	**soil**	**microbiolo-gical**	**sediment**		**oral**
			Proposed safe pH range: 6 - 9 Studies show that the pH has more toxic effects on water organisms than the nitrate ion (algae, crustaceans and fish).		Not available	Not applicable (it dissolves and plants and micro-organisms use its nitrogen source)	Not applicable (acid)	Not applicable (acid and disociates)		Not applicable (not bioaccumulable, inorganic and soluble)
8.2	**Exposure controls**									
	Appropriate technical controls		Make sure that the workplace is well ventilated Monitor atmosphere regularly Use closed systems or covered open containers. Transport through pipes. Fill and empty barrels using automatic systems (suction pumps, etc). Use localised extractor ventilation systems when necessary. Install showers and wash basins in storage and handling areas. Install systems that avoid projections in handling and storage places.							

	Personal protection measures		
		Eyes and face	Chemical safety glasses (EN166) or face shield
		Skin and body	Acid-resistant boots Acid resistant garments (EN 14605)
		Hands	Wear chemical resistant impermeable gloves that conform to European standard EN 374: butyl rubber, PVC, flouroelastomer, PTFE.
		Respiratory	Use suitable respiratory equipment if the exposure level exceeds or might exceed the DNEL value For short periods of exposure the following masks are recommended: EN149 type FF P3, EN 14387 type B or E model P3, EN 1827 class FMP3 (non-exhaustive list). For long periods of exposure, full masks or masks with an air supply apparatus are recommended: full masks EN 143, EN 14387, EN 12083 class P3 or class XP3, EN12941 class TH3, EN 12942 TM3, EN14593 or EN138 (non-exhaustive list).
		Thermal Hazards	The substance is not a thermal hazard, and so does not require special consideration.
	Environmental exposure controls		Use of nitric acid by industry and professionals: If spills can cause significant changes in the pH, do not allow uncontrolled spills of nitric acid solutions into waste or surface waters. Regular checks of pH values are required when discharging into open waters. In general, waste should be discharged so that it minimises any change in the pH of the surface waters where it is to be disposed of. See section 6
	Choose personal protection equipment suitable to exposure risks.		

Section 9	**Physical and chemical properties**	
9.1	**Information on basic physical and chemical properties**	
	Aspect	liquid
	Colour	Colourless to yellow liquid
	Odour	Acrid, acidic odour
	Odour threshold	0.70 mg/m3 (0.29 ppm)
	Molecular weight	63.01 g/mol
	pH	< 1 (undiluted)
	Boiling point	103.4 ºC (20% nitric acid); 120.4 ºC (60% nitric acid).
	Melting point	- 17 ºC (20% nitric acid); -22 ºC (60% nitric acid).
	Flash-point	not applicable
	Flammability	non flammable
	Explosive properties	Non-explosive
	Auto-ignition temperature	not applicable
	Decomposition temperature	83 ºC acid 100% NO3H
	Lower explosive limit	not applicable
	Upper explosive limit	not applicable
	Oxidising properties	Non-oxidising. (However, 100% acid: oxidising)
	Relative density	At 20 ºC: 1.1150 (20% nitric acid); 1.3667 (60% nitric acid).
	Vapour pressure at 20 ºC	0.77 Kpa at 20 ºC (60% nitric acid).
	Vapour density	2 with regard to air.
	Partition coefficient n-octanol/water	not applicable (inorganic substance)
	Solubility	at 20 ºC: 500 g/l (100% nitric acid)
	Viscosity	0.70 mPa at 25 °C (undiluted)
9.2	**Additional information**	
	Miscibility	Mixable with water in any proportion

Section 10	**Stability and reactivity**	
10.1	**Reactivity**	The product is stable under recommended handling and storage conditions (see section 7)
10.2	**Chemical stability**	Thermally stable in reactive terms in designed storage conditions. Slight decomposition into nitrogen oxides when coming into contact with light or organic material.
10.3	**Possibility of hazardous reactions**	Can react violently to reducing agents, strong bases, organic materials, chlorides and finely divided metals. Exothermic reaction to water.
10.4	**Conditions that must be avoided**	High temperatures, light, containment.
10.5	**Incompatible materials**	- oxidizing materials - organic matter - reducing agents - alkalis and caustic products - metal dusts - hydrogen sulphide - chlorates - carbides - non-noble metals - alcohols - flammable liquids - chromic acid
10.6	**Hazardous decomposition products**	When nitric acid is heated, nitrogen oxide is produced (NOx)

Nitric Acid (≥ 57% and < 62%)

Section 11 **Toxological information**

11.1 **Information on toxological effects**

Acute toxicity

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	OCDE 403 - -	Rat - -	Inhaled Oral Skin	LC50: > 2650 mg/m^3. Toxic by inhalation Category 3. Corrosive to the respiratory tract. Information unavailable Information unavailable

Skin corrosion or irritation

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	No studies have been carried out given that the corrosiveness of the substance is already known.		Skin	Corrosive to skin and eyes. 100% nitric acid. For diluted nitric acid: appendix VI of the CLP sets specific classification limits: Skin Corr. 1A; H314: Nitric acid ≥ 20 % Skin Corr. 1B; H314: 5 % ≤ Nitric acid < 20 %

Severe eye damage or irritation to eyes

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	No studies have been carried out given that the corrosiveness of the substance is already known.		Eye	Corrosive to skin and eyes. 100% nitric acid. For diluted nitric acid: appendix VI of the CLP sets specific classification limits: Skin Corr. 1A; H314: Nitric acid ≥ 20 % Skin Corr. 1B; H314: 5 % ≤ Nitric acid < 20 %

Respiratory or skin sensitisation

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	Not necessary because the substance is a strong acid (pH <2)		Skin	Corrosive substance, a study is not relevant in this case. Undiluted and diluted nitric acid (20-65%), the pH is strong acid

Mutagenicity in germ cells

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	Similar to OCDE 471 OCDE 473 OCDE 476 In vivo testing: Chromosomatic and micronucleic aberrations in bone marrow cells	In vitro: bacteria, mammal cells In vivo: rat and mouse bone marrow cells	in vitro: bacteria, mammal cells in vivo: bone marrow cells	Using negative results obtained from nitric acid (OCDE 471), sodium nitrate (OCDE 471, 473+ in vivo test) and potassium nitrate (OCDE 471, 473 and 476), and due to their structural similarities to nitric acid, it can be concluded that nitric acid is not expected to cause genetic toxicity.

Carcinogenicity

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	Official guides are not followed	Rat	Inhaled	Inconclusive data

Toxicity for reproduction

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	OECD 422	rat	Oral: by probe	NOAEL: 1,500 mg/Kg body weight/day No adverse effects were observed for reproduction or development. Extrapolation with nitrates has been used to study nitric acid as a result of their structural similarity. In the light of available data the classification criteria are not met.

Specific Target Organ Toxicity (STOT) - single and repeated exposure

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	-	rat	Oral Inhalation	NOAEL: 1500 mg/kg body weight/day NOAEC: 4.11 mg/m³

Aspiration hazards

Component	CAS No.	Method	Species	Via	Result
Nitric acid	7697-37-2	-	-	-	See note below

The main exposure route for nitric acid is by inhalation. If inhaled, nitric acid vapours can cause immediate irritation of the respiratory tract, pain and shortage of breath, followed by a recovery period that can last several weeks. After this period, there may be a relapse and sudden death caused by bronchopneumonia and/or pulmonary fibrosis. Contact with the skin can cause burns on the skin and eyes. If swallowed, nitric acid causes burns in the digestive tract

Nitric Acid (≥ 57% and < 62%)

Section 12 Ecological information

12.1 Toxicity

Water toxicity

Component	CAS No.		Fish	Crustaceans	Algae
Nitric acid	7697-37-2	Short term	Average lethal pH (96 h): 3-3,5: Lepomis macrochirus (no official guide followed). Average lethal pH (96 h) ~ 3.7: Oncorhynchus mykiss (no official guide followed). Available studies show that it is the pH and not ion nitrate that is responsible for toxic effects in fish. This is confirmed by another study with sodium nitrate: LC50(96h)=8226 mg/l for rainbow trout.	Average lethal pH (48 h): 4,6: Ceriodaphnia dubia In the light of available data the classification criteria are not met.	Information unavailable
		Long term	Information unavailable	Information unavailable	Information unavailable

Land Toxicity

Component	CAS No.	Macroorganisms	Microorganisms	Other organisms
Nitric acid	7697-37-2	Irrelevant estimate	Information unavailable	Not applicable

Microbiological activity in waste water treatment plants

Component	CAS No.	Toxicity for aquatic microorganisms
Nitric acid	7697-37-2	Given the Ph control carried out in water treatment plants, this is not relevant.

12.2 Persistence and degradability

Component	CAS No.	Hydrolysis	Photolysis	Biodegradation
Nitric acid	7697-37-2	Not relevant for inorganic substances.		

12.3 Bioaccumulative potential

Component	CAS No.	Octanol-water partition coefficient (Kow)	Bioconcentration factor (BCF)	Comments
Nitric acid	7697-37-2	Not relevant for inorganic substances.		

12.4 Mobility in soil

Component	CAS No.	Result
Nitric acid	7697-37-2	Information unavailable

12.5 Results of PBT and vPvB assessment

Not applicable to inorganic substances

12.6 Other adverse effects

The danger of nitric acid is mostly caused by increased H^+ ion (pH) concentration liberated from disociation. The increase of nitrate concentrations has slight effects.

Section 13 Disposal considerations

13.1 Waste treatment methods

Carefully neutralise with lime or carbonates.
Eliminate in accordance with local regulations.
The packaging used is exclusive to containing this product. After use, completely empty it and store in an authorised location.

Nitric Acid (≥ 57% and < 62%)

Section 14	Transport Information							
14.1 - 14.6	Regulatory Information	UN Number	Proper shipping name	Class	Packing group	Label	Environmental hazards	Special precautions for users
	ADR/RID	2031	NITRIC ACID, except for red fuming nitric acid with at least 65% nitric acid content	8	II		NO	Hazard 80 Identification Number Tunnel Code (E) See ADR/RID
	ADNR							See ADN
	IMDG							See IMDG emergency procedures (FEm). F-A, S-B
	OACI							See ICAO regulation for quantity limitation
14.7	***Bulk transport in accordance with appendix II of the MARPOL Convention and the IBC Code: "*** Nitric acid (less than 70%); TYPE OF BOAT: 2; POLLUTION CATEGORY: Y."							

Section 15	Regulatory information
15.1	**Safety, health and environmental regulations and legislation specific for the substance or mixture**
	Regulation 2003/2003 (fertilisers) Regulation 1907/2006 (REACH) Regulation 1272/2008 (CLP) Royal Decree 656/2017 (Storage of Chemical Products) ITC-MIE-APQ 006, 007 and 010 R.D. 374/2001 (Chemical agents) R.D. 506/2013 (fertilizers) R.D. 261/96 on protection of water from nitrates (Directive 91/676/EC) Law 22/2011, on waste and contaminated soil
15.2	**Chemical Safety Assessment**
	Chemical Safety Assessment for nitric acid

Section 16	Other information	
	Hazard statements	H290: May be corrosive to metals. H314: Causes severe skin burns and eye damage. H331: Toxic by inhalation EUH071: Corrosive to the respiratory tract.
	Precautionary statements	P102 - Keep out of reach of children. P234 - Keep only in original container. P260 - Do not breathe fumes. P264 - Wash hands thoroughly after handling. P271 - Use only outdoors or in a well-ventilated area. P280 - Wear protective gloves/clothing/glasses/face protection. P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 - IF IN EYES: Rinse continuously 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. P363 - Wash contaminated clothing before reuse. P390 - Absorb spillage to prevent material damage. P403+P233 - Store in a well ventilated place. Keep container tightly closed. P405 - Store locked up. P406 - Store in corrosive resistant/... container with a resistant inner liner. (AISI 304L) P501 - Dispose of contents/container by authorised manager.
	Bibliographical references and data sources	Nitric acid chemical safety assessment
	Abbreviations and acronyms	ELV-DE: Environmental limit value (daily exposure) ELV-ST Environmental limit value (short term) NOAEL: No observable adverse effect level LD50: Lethal dose 50% LC50: Lethal concentration 50% DNEL: Derived no effect level PNEC: Predicted no effect concentration LOEC: Lowest observed effect concentration NOEC: No observed effect concentration NOAEC: No observed adverse effect concentration
	Adequate training for workers	Obligatory training in occupational risk prevention
	Date of prior SDS	Version 3 dated 13.07.16
	Modifications made to present revision	Include the phrase H331. Section 14.7 and 15. Exposure scenarios updated.
	The exposure scenarios are attached as appendixes.	

The information contained in this Safety Data Sheet is given in good faith. It is accurate to the best of our knowledge and belief and represents the most up to date information about the product at the time of publication. The information given in this data sheet does not constitute or replace the user's own assessment of workplace risks as required by other health and safety legislation.

Safety Data Sheet Appendices
Exposure Scenario 1

1	**Title of Exposure Scenario (ES)**
	Production **Production of nitric acid at concentrations below 70%: (Continuous synthesis and batch), including handling, storage and quality control.**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 1
	PROC 1/2/3/4/8a/8b/9/15 ERC 1
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Production of substances (ERC 1)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Use in enclosed processes, no likelihood of exposure (PROC 1) 2. Use in closed, continuous processes with occasional controlled exposure (PROC 2) 3. Use in closed batch processes (synthesis or formulation) (PROC 3) 4. Use in batch and other processes (synthesis) where opportunity for exposure arises (PROC 4) 5. Transfer of substances or preparations (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 6. Transfer of substances or preparations from/to vessels/large containers at dedicated facilities (PROC8b) 7. Transfer of substances or preparations into small containers (dedicated filling line, including weighing) (PROC 9) 8. Use as laboratory reagent (PROC 15)
2.1	**Contributing scenario (1) controlling environmental exposure for production of nitric acid at concentrations below 70% (ES1)**

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2,2	**Contributing scenario (2) controlling worker exposure for the production of nitric acid at concentrations below 70%**

Section 2.2 describes the potential exposure of workers due to the production of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/8a/8b/9/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3

Nitric Acid (≥ 57% and < 62%)	
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.
3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH. Measures not subject to art. 37 (4) REACH**
• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes. • Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.). • Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you) • Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers. • Do not store at temperatures near freezing point. • Local or general ventilation is not necessary, but is a good practice.	

Safety Data Sheet Appendices
Exposure Scenario 2

1	**Title of Exposure Scenario (ES)**
	Formulation and repackaging. **Formulation of mixtures using nitric acid in concentrations below 70%.**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 2
	PC12, PC14, PC15, PC35 * PROC 1/2/3/4/5/8a/8b/9/15 ERC 2
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Formulation of/into preparations (ERC 2)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Production of chemical products or refinery in closed processes in which there is no likelihood of exposure or in processes under equivalent containment conditions. (PROC 1) 2. Production of chemical products or refinery in closed and continuous processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 2) 3. Production or formulation in the chemical industry in closed batch processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 3) 4. Production of chemical products in which exposure can occur. (PROC 4) 5. Mixing or blending in batch processes. (PROC 5) 6. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 7. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 8. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9) 9. Use as laboratory reagent (PROC 15)
	* Agency Guidance Document, Chapter R.12: PC 12 (Fertilizers)/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))
2.1	**Contributory scenario (1) that controls environmental exposure for the formulation and repackaging of nitric acid at concentrations below 70% (ES1)**

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wáter in wastewater treatment plants (STP) or in other applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2.2	**Contributory scenario (2) that controls worker exposure for the formulation and repackaging of nitric acid at concentrations below 70%**

Section 2.2 describes the potential exposure of workers due to the formuation and repackaging of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/5/8a/8b/9/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Nitric Acid (≥ 57% and < 62%)	
Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.

3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH.** **Measures not subject to art. 37 (4) REACH**

• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes.
• Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.).
• Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you)
• Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers.
• Do not store at temperatures near freezing point.
• Local or general ventilation is not necessary, but is a good practice.

Safety Data Sheet Appendices
Exposure Scenario 3

1	**Title of Exposure Scenario (ES)**
	Use at industrial sites. **Use of nitric acid at a concentration below 70% at industrial sites as an intermediate.**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 3
	SU 0, SU 8, SU 9 PC 19 PROC 1/2/3/4/5/8a/8b/9/15 ERC 6a
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Use of intermediate (ERC 6a)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Production of chemical products or refinery in closed processes in which there is no likelihood of exposure or in processes under equivalent containment conditions. (PROC 1) 2. Production of chemical products or refinery in closed and continuous processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 2) 3. Production or formulation in the chemical industry in closed batch processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 3) 4. Production of chemical products in which exposure can occur. (PROC 4) 5. Mixing or blending in batch processes. (PROC 5) 6. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 7. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 9. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9) 10. Use as laboratory reagent (PROC 15)
	* Agency Guidance Document, Chapter R.12: Use descriptor systems: SU 8 (Manufacture of bulk, large scale chemicals (including petroleum products)/SU 9 (Manufacture of fine chemicals) PC 19 (Intermediate)

Nitric Acid (≥ 57% and < 62%)

2.1	Contributory scenario (1) that controls environmental exposure for the industrial use as of nitric acid as an intermediate at concentrations below 70% (ES 3)

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2,2	Contributory scenario (2) that controls worker exposure for the intermediate use of nitric acid at an industrial site at concentrations below 70%

Section 2.2 describes the potential exposure of workers due to the intermediate use at an industrial site of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/5/8a/8b/9/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.

3	Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH. Measures not subject to art. 37 (4) REACH

• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes.
• Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.).
• Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you)
• Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers.
• Do not store at temperatures near freezing point.
• Local or general ventilation is not necessary, but is a good practice.

Safety Data Sheet Appendices
Exposure Scenario 4

1	**Title of Exposure Scenario (ES)**
	Use at industrial sites. **Use of nitric acid at concentrations below 70% at industrial sites as an aid in reactive processes (cleaning agent, pH regulator, waste gas treatment, regeneration of ion exchange resins, metal treatment, plastic treatment, surface treatment product, water treatment).**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 2
	SU0, SU 2a, SU 4, SU 6a, SU8, SU9, SU 12, SU 14, SU 15, SU 16, SU 19, SU 23 * PC0, PC14, PC15, PC20, PC35, PC37 * PROC 1/2/3/4/5/7/8a/8b/9/10/13/15 ERC 4/6b
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Use of non-reactive processing aids at industrial sites (not part of articles) (ERC 4) 2. Use of reactive processing aids at industrial sites (not part of articles) (ERC 6b)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Production of chemical products or refinery in closed processes in which there is no likelihood of exposure or in processes under equivalent containment conditions. (PROC 1) 2. Production of chemical products or refinery in closed and continuous processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 2) 3. Production or formulation in the chemical industry in closed batch processes with occasional controlled exposure or in processes whose containment conditions are equivalent. (PROC 3) 4. Production of chemical products in which exposure can occur. (PROC 4) 5. Mixing or blending in batch processes. (PROC 5) 6. Industrial spraying. (PROC 7) 7. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 8. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 9. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9) 10. Roller application or brushing (PROC 10) 11. Treatment of articles by dipping and pouring (PROC 13) 12. Use as laboratory reagent (PROC 15)
	* Agency Guidance Document, Chapter R.12: Use descriptor systems: SU 0 (C21-Production of basic pharmaceutical products, nuclear fuel cycle)/SU 2a (Mining, (without offshore industries))/SU 4 (Manufacture of food products)/SU 6a (Manufacture of wood and wood products)/SU 8 (Manufacture of bulk, large scale chemicals (including petroleum products))/SU 9 (Manufacture of fine chemicals)/SU 12 (Manufacture of plastics products, including compounding and conversion)/SU 14 (Manufacture of basic metals, including alloys)/SU 15 (Manufacture of fabricated metal products, except machinery and equipment)/SU 16 (Manufacture of computer, electronic and optical products, electrical equipment)/SU 19 (Building and construction work)/SU 23 (Electricity, steam, gas water supply and sewage treatment) PC 0 (UCN code: A052 50 ion exchanger)/PC 14 (Metal surface treatment products, including galvanic and electroplating products)/PC 15 (Non-metal-surface treatment products)/PC 20 (Products such as ph-regulators, flocculants, precipitants, neutralization agents, other un-specific)/PC 21 (Laboratory Chemicals)/PC 35 (Washing and Cleaning Products (including solvent based products))/PC 37 (Water treatment chemicals)
2.1	**Contributory scenario (1) that controls environmental exposure for the industrial use of nitric acid as an aid in reactive processes at concentrations below 70% (ES3)**

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2.2	**Contributory scenario (2) that controls worker exposure for the industrial use of nitric acid as an aid in reactive processes at concentrations below 70%**

Section 2.2 describes the potential exposure of workers due to the production of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 1/2/3/4/5/7/8a/8b/9/10/13/15) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.

Nitric Acid (≥ 57% and < 62%)	
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.
3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH.**
• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes. • Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.). • Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you) • Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers. • Do not store at temperatures near freezing point. • Local or general ventilation is not necessary, but is a good practice.	

Safety Data Sheet Appendices
Exposure Scenario 5

1	**Title of Exposure Scenario (ES)**
	Generalized use by professional workers. **Use of nitric acid at concentrations below 70%: (outdoors and indoors, in open systems as cleaning agent, pH regulator, metal treatment)**
2	**Description of activities or processes covered by the exposure scenario**
	List of all the use descriptors related to ES 2
	SU 1, SU 2a, SU 4, SU 6a, SU 12, SU 14, SU 15, SU 16, SU 19, SU 23 * PC12, PC14, PC15, PC20, PC35 * PROC 5/8a/8b/9/10/11/13/15/19 ERC 8b/8e
	Name/s of contributing scenario/s related to the environment and their corresponding Environmental Release Class (ERC)
	1. Wide dispersive indoor use of reactive substances in open systems (ERC 8b) 2. Wide dispersive outdoor use of reactive substances in open systems (ERC 8e)
	Name/s of contributing scenario/s for the worker and their corresponding Process Category (PROC)
	1. Mixing or blending in batch processes (multistage and/or significant contact) (PROC 5) 2. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) 3. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) 4. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9) 5. Roller application or brushing (PROC 10) 6. Non industrial spraying (PROC 11) 7. Treatment of articles by dipping and pouring (PROC 13) 8. Use as laboratory reagent (PROC 15) 9. Hand mixing with intimate contact (only PPE available) (PROC 19)
	* Agency Guidance Document, Chapter R.12: Use descriptor systems: SU 1 (Agriculture, forestry, fishery)/SU 2a (Mining, (without offshore industries))/SU 4 (Manufacture of food products)/SU 6a (Manufacture of wood and wood products)/SU 12 (Manufacture of plastics products, including compounding and conversion)/SU 14 (Manufacture of basic metals, including alloys)/SU 15 (Manufacture of fabricated metal products, except machinery and equipment)/SU 16 (Manufacture of computer, electronic and optical products, electrical equipment)/SU 19 (Building and construction work)/SU 23 (Electricity, steam, gas water supply and sewage treatment) PC 12 (Fertilisers)/PC 14 (Metal surface treatment products, including galvanic and electroplating products)/PC 15 (Non-metal surface treatment products)/PC 20 (Products such as ph-regulators, flocculants, precipitants, neutralization agents, other un-specific)/PC 21 (Laboratory Chemicals)/PC 35 (Washing and Cleaning Products (including solvent based products))
2.1	**Contributing scenario (1) controlling environmental exposure for use of nitric acid by professionals (ES3) at concentrations below 70% (ES 3)**

Exposure assessment and risk characterization are not necessary.

It is not considered necessary to carry out the exposure assessment and the risk characterization for the environment.
The environmental fate of nitric acid is well known: Nitric acid will dissociate progressively as the pH changes.
HNO3 = H + + NO 3 - (pKa = -1.4)
The natural pH can vary significantly between different aquatic ecosystems, which in turn may vary. The change of pH due to the anthropic addition of nitric acid is influenced by the buffer capacity of the receiving water. The acid can affect the level of pH of the water, which implies the toxic effects observed for aquatic organisms.
Organisms can adapt to specific conditions: Based on OECD guidelines for toxicity testing taxonomic groups, i.e. algae, crustaceans (daphnids) and fish, it communicates that a 6-9 pH range is well tolerated by a variety of aquatic organisms.
Therefore, the main effect on organisms/ecosystems is due to possible pH changes related to the discharge of nitric acid.
As a direct consequence, only the local scale will be addressed, since it is expected that any effect can be neutralized on a regional or continental scale.
Due to its very high solubility in water, nitric acid will predominantly be found in water. Exposure in water is evaluated, including the wastewater treatment plants (STP) or the applicable water treatment plants.
No significant emissions or exposure to air are expected, as nitric acid reacts rapidly converting to NOx. No exposure or significant pollutant emissions are expected to the terrestrial environment. The route of application of sludge emission to agricultural soils is not relevant, since the sorption of nitric acid will not occur in the STPs/WWTPs.
This approach is similar to the approach documented in the EU RAR on NaOH (2007). The risk assessment for the environment is only relevant to the aquatic environment, where applicable, including STP/WWTP, as NaOH emissions in the different stages of the life cycle (production and use) are mainly applied to (waste) in the water. The aquatic effect and risk assessment
was only treated on organisms/ecosystems due to possible pH changes related to OH discharges, since the toxicity of the Na + ion is expected to be negligible compared to the (potential) effect of pH. On the other hand, as far as the use of fertilizers is concerned, the following conclusions about exposure can be drawn: When nitric acid is used in fertilizers, nitric acid is immediately mixed with the other NPK salts (main components of fertilizers). As a result, only nitric acid residues can be found in the fertilizer and a quantitative evaluation is not necessary.

2,2	**Contributing scenario (2) controlling worker exposure for professional use of nitric acid at concentrations below 70%**

Section 2.2 describes the potential exposure of workers due to the production of nitric acid at concentrations below 70%.

All the relevant processes for the contributing scenarios identified by the PROC codes in point 1 of this scenario (PROC 5/8a/8b/ 9/10/11/13/15/19) have the same operating conditions and risk management measures for personnel. Consequently they are all covered by just one contributing scenario (2).

The routes of exposure considered relevant for workers during this use are inhalation, dermal and ocular. Oral exposure is impossible. The quantification of the risk carried out for all of them has been the qualitative assessment and the conclusion is as follows:

"Taking into account the operating conditions and risk management measures (when there is a possibility of exposure), it is considered that the risk of causing effects is controlled. Potential exposure to the substance is kept to a minimum."

Product characteristics	Liquid, concentration < 70% nitric acid.
Quantities used	Not relevant
Frequency and duration of use or exposure	Duration of activities in the work area is: ≤8 hours/day.

Nitric Acid (≥ 57% and < 62%)	
Organizational and technical measures and conditions	• Containment: Under standard operating conditions, the substance is rigorously contained by technical means in the work area. The activities are carried out in a standardized manner, under controlled conditions in specialized equipment. If a certain amount of substance is not contained, the worker is not exposed however to the substance since it is carried out in an extractor hood or when the worker wears personal protective equipment and uses local exhaust ventilation. The forming of aerosols/mists/splashes is prevented. • Organizational measures: Minimize the number of employees in the work area. Minimize manual activities. Train employees in the safe handling of the substance, including how to use personal protective equipment. Clean the work area regularly. Have supervision to check periodically that the conditions of use are followed by the workers. Make sure that all equipment is well maintained. Ensure that personal protection equipment is available and used in accordance with the instructions. Make sure eyewash stations and safety showers are available in the work area. • Appropriate material: The recommended material for tanks, containers and accessories is austenitic stainless steels with low carbon content. • Inappropriate materials: Do not use any metal, carbon steel or polypropylene. • Ventilation conditions in the work area: Use only outdoors or in a well-ventilated area (approximately 5 air changes per hour) • Local exhaust ventilation: Use local exhaust ventilation when vapor/mist/nitric acid aerosol may be present in the air within a worker's breathing zone. • Storage conditions: Store in a well-ventilated area (preferably outdoors). In an place equipped with acid resistant floor. Protect from sunlight. Keep containers tightly closed. Keep away from combustible materials, heat, hot surfaces, sparks, open flames and other sources of ignition. • Gas monitoring: Use stationary and/or portable NOx monitors in the workplace, monitoring normal NOx levels well below 2.6 mg/m3
Conditions and measures for personal protection, hygiene and health evaluation	• General: Work under a high level of personal hygiene. Wash hands and face before breaks. Do not eat, drink or smoke in the work area. • Respiratory protection: If there is a risk of exposure to the substance by inhalation, always wear a full-face mask with an acid gas cartridge or use a supplied air respirator/helmet/suit. Potential exposure to the substance by inhalation must be kept to a minimum. The smallest amount inhaled can have (acute and/or delayed) effects on the respiratory tract. • Dermal and eye protection: If this is a risk of dermal exposuren (through contaminated equipment), always wear suitable acid resistant protective clothing in the work area and acid resistant gloves according to EN374 (and protective goggles in accordance with EN166). Potential exposure to the substance must be kept to a minimum. The smallest amount of an aqueous solution of the substance can already cause severe burns and/or eye damage. • When nitric acid aerosols/mists can be formed, wear a suitable acid-resistant chemical protection suit with a supplied air respirator/helmet/suit. • Appropriate material: Butyl/fluorinated rubber.
3	**Good practice advice in addition to that included in the Chemical Safety Assessment (CSA) required by REACH.**
• Use closed or automated systems or close any open containers (with panels, etc) to prevent fumes, sprays or possible irritating splashes. • Transport through pipes, and fill and empty barrels using automatic systems (suction pumps, etc.). • Use pliers or gripper arms with long bars for manual use to prevent direct contact and exposure to splashes (do not handle products close to you) • Store in cool, clean well ventilated areas, keep away from alkaline products and metals. Do not store in direct sunlight Do not stack containers. • Do not store at temperatures near freezing point. • Local or general ventilation is not necessary, but is a good practice.	