

Safety Data Sheet

According to REACH Regulation (1907/2006/EC)

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

1.1. Product identifier

Trade name: Calcium nitrate

CAS number: Calcium nitrate (anhydrous) (10124-37-5)

REACH Registration number: 01-2119495093-35-0028

Synonyms: Calcium nitrate (anhydrous) «Premium» brand, Calcium nitrate concentrated, Calcium nitrate (anhydrous), Solar-CalNit

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

Calcium nitrate concentrated, Calcium nitrate (anhydrous) – fertilizer

Calcium nitrate (anhydrous) «Premium» brand – intended for use in oil industry, building industry and other branches of industry.

Uses advised against: No.

1.3. Details of the supplier of the safety data sheet

Manufacturer:

JSC Kirovo-Chepetsky Khimichesky Kombinat

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1.4. Emergency telephone number

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+ 49 511 45 99 445 (9.00-15.00 CET)

UK National Poisons Emergency number: 0870 600 6266

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification according to REGULATION (EC) No 1272/2008 on classification, labeling and packaging (CLP):

Oxid. Solid 3 H272: May intensify fire; oxidiser.

Acute Tox. 4 H302: Harmful if swallowed.

Eye Damage 1 H318: Causes serious eye damage.

2.2. Label Elements



DANGER

Hazard statements:

H272: May intensify fire; oxidiser.

H302: Harmful if swallowed.

H318: Causes serious eye damage.

Precautionary statements:

P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P220: Keep/Store away from clothing/combustible materials.

P370+P378: In case of fire: Use water for extinction.

P264: Wash hands thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P330: Rinse mouth.

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

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if

present and easy to do. Continue rinsing.

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

P301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

2.3. Other hazards

PBT/vPvB: not relevant (inorganic)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Trade name: Calcium nitrate

Index number R. 1272/2008	EC number	CAS number	Name	Concentration (wt %)	Classification Regulation (EC) 1272/2008	Specific concentration limits and M-factor
--	233-332-1	10124-37-5	Calcium nitrate (anhydrous)	min 96	Oxid. Solid 3, H272 Acute Tox. 4, H302 Eye Damage 1, H318	--

4. FIRST AID MEASURES

4.1. Description of first aid measures:

4.1.1. General information:

In case of accident or if you feel unwell, seek medical advice immediately (show safety data sheet if possible).

4.1.2. Following inhalation:

In case of accident by inhalation: remove casualty to fresh air and keep at rest.

Get medical advice/attention if you feel unwell.

4.1.3. After skin contact:

After contact with skin, wash immediately with plenty of water and soap.

Get medical advice/attention if you feel unwell

4.1.4. Following eye contact:

In case of contact with eyes, rinse immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart. Subsequently consult an ophthalmologist.

4.1.5. After ingestion:

If accidentally swallowed rinse the mouth with plenty of water (only if the person is conscious) and obtain immediate medical attention.

Give activated carbon, in order to reduce the resorption in the gastro-enteric tract.

4.1.6. Self-protection of the first aider:

First aid assistant: Pay attention to self-protection!

4.2 Most important symptoms and effects, both acute and delayed:

Following symptoms can occur:

Eye irritation (redness).

Ingestion: abdominal pain, confusion, convulsions, dizziness, headache, nausea, unconsciousness

4.3. Indication of any immediate medical attention and special treatment needed.

Get medical advice/attention if you feel unwell

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media.

Suitable extinguishing media:

Water spray.

Extinguishing media which must not be used for safety reasons:

Dry extinguishing powder.

Foam.

Sand.

Water steam.

5.2. Special hazards arising from the substance or mixture.

Fire Hazard Class: E (non-combustible).

Enhances of other substances, keep away from combustible materials.

Hazardous thermal decomposition and combustion products oxides of nitrogen.

5.3. Advice for fire-fighters.

Wear a self-contained breathing apparatus and chemical resistant suit.

Rubber boots.

Rubber gloves.

5.4 Additional information.

No data available.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures.

Wear personal protection equipment.

Remove all sources of ignition.

Provide adequate ventilation.

Technical ventilation of workplace.

6.2. Environmental precautions.

Do not empty into drains or the aquatic environment.

6.3. Methods and material for containment and cleaning up.

Remove mechanically, placing in appropriate containers for disposal.
Ventilate affected area.

6.4. Reference to other sections.
See protective measures under point 7 and 8.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Information for safe handling:

Keep away from heat and precaution to avoid mixing with combustible materials, reducing agents, alkalies and metals. No smoking.

Only use material in places where open light, fire and other sources of ignition can be kept away.

Wear personal protection equipment.

Technical ventilation of workplace.

7.2. Conditions for safe storage, including any incompatibilities

Separated from" foodstuffs.

Store in a cool dry place.

Keep storage area clean.

Packaging materials (bags): polypropylene

7.3. Specific end use(s)

Intended for use in the agricultural sector, as a fertilizer, in oil industry, building industry and other branches of industry.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limit values: none.

DN(M)ELs for general population:

Exposure pattern	Route	DNEL/DMEL	(Corrected) dose descriptor	Most sensitive endpoint
Long-term - systemic effects	Dermal (mg/kg bw/day)	8,33	NOAEL: 999.60 mg/kg bw/day (based on AF of 120)	repeated dose toxicity
	Inhalation (mg/m ³)	29	NOAEC: 870 mg/m ³ (based on AF	repeated dose

			of 30)	toxicity
	Oral (mg/kg bw/day)	8,33	NOAEL: 999.60 mg/kg bw/day (based on AF of 120)	repeated dose toxicity

DN(M)EL for workers :

Exposure pattern	Route	DNEL/DMEL	(Corrected) dose descriptor	Most sensitive endpoint
Long-term - systemic effects	Dermal (mg/kg bw/day)	13,9	NOAEL: 1000.8 mg/kg bw/day (based on AF of 72)	repeated dose toxicity
	Inhalation (mg/m ³)	98,0	NOAEC: 1764.0 mg/m ³ (based on AF of 18)	repeated dose toxicity

PNEC		Assessment factor	Remarks/Justification
PNEC aqua (freshwater): (mg/l)	0,45	1000	Extrapolation method: assessment factor
PNEC aqua (marine water): (mg/l)	0,045	10000	Extrapolation method: assessment factor
PNEC aqua (intermittent releases): (mg/l)	4,5	100	Extrapolation method: assessment factor
PNEC sewage treatment plant (mg/l)	18	10	Extrapolation method: assessment factor

8.2. Exposure controls

Avoid contamination by combustible materials, reducing agents and keep away from heat. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Personal protective equipments:

Eyes: safety goggles

Hands: rubber gloves

Other: normal working clothes

Respiratory system: -

Leakage of product should be cleaned up promptly and placed in a clean labelled container for safe disposal.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance (physical state and colour):	Solid, granulated Color: white, from white to grayish-yellow
Odour:	Odorless
Odour threshold:	Not determined.
pH:	6.0 (5% solution)

Melting point/freezing point:	c.a. 560 °C (Calcium nitrate)
Initial boiling point and boiling range:	No data available
Flash point:	No data available
Flammability (solid, gas):	No data available
Explosive properties:	Non explosive
Oxidising properties:	Oxidizer
Vapour pressure:	No data available
Relative density:	2.5 (Calcium nitrate)
Solubility:	In water: 120 g/100 cm ³ (at 20 °C)
Partition coefficient: n-octanol/water:	No data available
Viscosity:	No data available
Vapour density:	No data available
Evaporation rate:	No data available
<u>9.2. Other information</u>	
No data available	
10. STABILITY AND REACTIVITY	
<u>10.1. Reactivity</u>	
See section 10.5	

10.2. Chemical stability

Stable under recommended storage and handling conditions.

10.3. Possibility of hazardous reactions

As the solid calcium nitrate is decomposes on heat and enhances combustion of other substances, it has potential explosion hazard under fire conditions when severely confined and/or contaminated with combustible materials.

10.4. Conditions to avoid

Pollution by incompatible substances.
Atmosphere influence.
Heat sources
Welding of the equipment contaminated.

10.5. Incompatible materials

Combustible materials and reducing agents.

10.6. Hazardous decomposition products

Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects:

There is not any relevant information for the product and only a few data available for calcium nitrate as substance, but the toxicological data for other nitrates can be used as read across value (RA: read across)

11.2. acute effects (acute toxicity, irritation and corrosivity):

11.2.1. LD50 oral

calcium nitrate tetrahydrate :
>300 <2000 mg/kg bw (rat)

Harmful if swallowed.

11.2.2. LD50 dermal

Nitcal/K (potassium pentacalcium nitrate

	decahydrate): > 2000 mg/kg bw (rat)												
11.2.4. Skin corrosion /irritation	Ammonium nitrate not irritating												
11.2.5. Serious eye damage/irritation	calcium nitrate tetrahydrate : Eyes - Severe irritant (rabbit, 24-72 h, 3 d) Causes serious eye damage.												
<u>11.3. Sensitisation:</u>													
Respiratory sensitisation: No data available Skin sensitisation: Not sensitizing (OECD 429, with sodium nitrate)													
<u>11.4. Repeated dose toxicity:</u>													
Nitcal/K (potassium pentacalcium nitrate decahydrate): Repeated dose toxicity (oral): rat, NOAEL = 150 mg/kg Repeated dose toxicity (inhalation) No data available Repeated dose toxicity (dermal): No data available													
<u>11.5 CMR effects (carcinogenity, mutagenicity and toxicity for reproduction):</u>													
Carcinogenicity: No data available Mutagenicity: CN-Nitcal shows no mutagenic effect Reproductive toxicity: <table><tr><td>Product / ingredient name</td><td>General toxicity</td><td>Reproduction/developmental toxicity</td><td>Species</td><td>Actual dose</td><td>Exposure</td></tr><tr><td>Potassium nitrate:</td><td>1500 mg/kg</td><td>1500 mg/kg</td><td>Rat</td><td>Oral: 1500 mg/kg</td><td>53 days</td></tr></table> Reproductive toxicity, effects on or via lactation: No data available.		Product / ingredient name	General toxicity	Reproduction/developmental toxicity	Species	Actual dose	Exposure	Potassium nitrate:	1500 mg/kg	1500 mg/kg	Rat	Oral: 1500 mg/kg	53 days
Product / ingredient name	General toxicity	Reproduction/developmental toxicity	Species	Actual dose	Exposure								
Potassium nitrate:	1500 mg/kg	1500 mg/kg	Rat	Oral: 1500 mg/kg	53 days								
<u>11.6. Aspiration hazard:</u>													

No data available

12. ECOLOGICAL INFORMATION

12.1. Toxicity

There is not any relevant information for the product and calcium nitrate as substance, but the toxicological data for other nitrates can be used as read across value (RA: read across)

Acute toxicity to fish

LC50

Potassium sodium nitrate:
Species: *Fish Oncorhynchus mykiss*
98,9 mg/L (96 h) (freshwater)

Potassium nitrate
Species: *Fish Poecilia reticulata*
1378 mg/L (96 h) (freshwater)

Chronic toxicity to fish

NOEC

No data available

Acute toxicity to crustaceans

EC50

Potassium nitrate
Species: *Daphnia*
> 490 mg/L (300 mg NO₃/L) (48 h) (Freshwater)

Chronic toxicity to crustaceans

NOEC

No data available

Acute toxicity to algae and other aquatic plants

LC50

Potassium nitrate:
Species: Aquatic plants
> 1700 mg/L (10 days) (saltwater)

Toxicity data on soil micro- and macro-organisms and other environmentally relevant organisms, such as

birds, bees and plants	
No data available	
<u>12.2. Persistence and degradability</u>	
Readily biodegradable	Readily biodegradable in plants and soils.
Other relevant information	In aqueous solution, the substance is dissociated
<u>12.3. Bioaccumulative potential</u>	
Experimental BCF	Not applicable (low bioaccumulation potential)
Log Pow	Not applicable (inorganic)
<u>12.4. Mobility in soil</u>	
This product may move with surface or groundwater flows because its water solubility is: > 10 000 mg/l	
<u>12.5. Results of PBT and vPvB assessment</u>	
PBT/vPvB: Not relevant (inorganic)	
<u>12.6. Other adverse effects</u>	
No data available	
13. DISPOSAL CONSIDERATIONS	
<u>13.1. Waste treatment methods</u>	
Waste disposal according to official state regulations	
14. TRANSPORT INFORMATION	

<u>14.1 IMDG (sea)</u>	
14.1.1 UN number:	1454
14.1.2 class:	5.1
14.1.3 proper shipping name:	CALCIUM NITRATE
14.1.4 packing group:	III
14.1.5. Environmental hazards:	The substance is ecologically safe. As to the influence on sea environment cargo is related to harmless pollutants.
<u>14.2 ADR (road)/RID (rail)</u>	
14.2.1 UN number:	1454
14.2.2 class:	5.1
14.2.3 proper shipping name:	CALCIUM NITRATE
14.2.4 packing group:	III
14.2.5. Environmental hazards:	Not a hazardous material with respect to these transportation regulations.
<u>14.3 ICAO/IATA (air)</u>	
14.3.1 UN number:	1454
14.3.2 class:	5.1
14.3.3 proper shipping name:	CALCIUM NITRATE
14.3.4 packing group:	III

14.3.5. Environmental hazards:	Not a hazardous material with respect to these transportation regulations.
<u>14.6. Special precautions for user</u>	
Not relevant	
<u>14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</u>	
Not relevant	
14.8. Transport according to IMSBC:	
See sections 5, 10.	
15. REGULATORY INFORMATION	
<u>15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture</u>	
EU Regulation 2003/2003 Annex V of MARPOL 73/78 The International Maritime Solid Bulk Cargoes (IMSBC) Code and Supplement	
<u>15.2. Chemical safety assessment</u>	
Chemical Safety Assessment has been carried out for the substance: Calcium nitrate	
16. OTHER INFORMATION	
Indication of changes: Section 2.1: Classification per Directive 67/548/EEC deleted as no longer applicable, effective 1 June 2015. Section 3: Classification per Directive 67/548/EEC deleted as no longer applicable, effective 1 June 2015. Section 16: Classification per Directive 67/548/EEC deleted as no longer applicable, effective 1 June 2015.	
Abbreviations: DNEL: derived no effect level PNEC: predicted no effect concentration	

EXPOSURE ASSESSMENT

Under the REACH Regulation a chemical safety assessment (CSA) for the whole life-cycle of a substance is required. The CSA describes how the manufacturer controls, or recommends downstream users to control, exposures of humans and the environment.

Human exposure assessment

Calcium nitrate (anhydrous) is classified as oxidizer (R8 according to 67/548/EEC and H272 according to CLP), acute harmful via the oral route (R22 according to 67/548/EEC and H302 according to CLP) and damaging to eyes only under CLP (H318 according to CLP). Exposure to this form of calcium nitrate is not relevant for any of the described exposure scenarios. Calcium nitrate tetrahydrate (and/or water solution) is considered to be the relevant form for the exposure scenarios described in this report. This substance is classified acute harmful via the oral route (R22 according to 67/548/EEC and H302 according to CLP) and damaging to eyes (H318 according to CLP, R41 according to 67/548/EEC).

As the acute oral route is not considered a relevant exposure route in the exposure scenarios described, no peak exposure possible via this route, and the substance did not show any systemic effects in the repeated dose studies a quantitative assessment for systemic toxicity is not considered relevant for this substance. No adverse systemic effects were observed in a subacute toxicity study for an analogue (potassium-pentacalcium-nitrate decahydrate (Nitcal-K), tested up to 1000 mg/kg bw/day) which was also classified as acute harmful via the oral route. As no effects were noted at high levels that humans are normally not exposed to a quantitative assessment is not considered necessary. DNELs, however are derived for systemic toxicity for workers and the general population but are not assessed against exposure estimates.

A qualitative assessment has been performed for the leading toxicological effect being a local endpoint (eye irritation/corrosion). For this endpoint no dose-effect response curve can be determined and therefore a DNEL cannot be derived.

Environmental exposure assessment

An environmental exposure and risk assessment has not been performed. All nitrates show a low or negligible toxicity to vertebrates, invertebrates and algae. Although results of the studies and publications are sometimes expressed as being > 100 mg/L, lowest measured value without effects is 490 mg/L (study with invertebrates on potassium nitrate).

The substance does not hydrolyze nor is there evidence for photodegradation. In aqueous solution, it is completely dissociated into nitrate (NO₃⁻) and the corresponding cation. Due to the inorganic nature of the substance standard biodegradation testing systems are not applicable.

Nitrification and de-nitrification processes occur naturally in streams and rivers, as well as in many secondary sewage treatment processes. Based on the high water solubility and the ionic nature, the substance is not expected to adsorb or bioaccumulate to a significant extent. Based on the physico-chemical properties, water is expected to be the main target compartment.

Nitrate substances are known to play an important role in the nutrient enrichment of surface waters, commonly called eutrophication. Eutrophication waters are characterized by an elevated nutrient concentrations, which stimulate the growth of certain algal species, favoring simple algae and plankton growths. The oxygen concentration in water will generally decrease influencing other lives, such as most fish species leading to a negative effect on the biodiversity of the ecosystem. As eutrophication is a common effect due to an excess in nitrate in the environment, the problem is covered in European Regulations.

The Directive 2000/60 of the European parliament and of the council of 23 October 2000 establishing a framework for Community action in the field of water policy and the Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources are both important European Regulations regulating the emission and concentration of nitrate substances in the environment.

The Nitrates Directive (1991) aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming

practices. The Nitrates Directive has close links with other EU policies concerning water, air, climate change and agriculture, and its implementation yields benefits in all these areas:

- Reducing nitrates is an integral part of the Water Framework Directive (2000), which establishes a comprehensive, cross-border approach to water protection organised around river basin districts (RBDs), with the aim of achieving good status for European bodies of water by 2015.

- The new Groundwater Directive (2006) confirms that nitrate concentrations must not exceed the trigger value of 50mg/l. Several Member States have set their own tighter limits, in order to reach good status.

- Air and soil quality: livestock management and farming cause, among other things, emissions of ammonia (NH₃), which have an impact on human health and on the environment, as they contribute to the acidification

process in soil, eutrophication of waters and ground-level ozone pollution, together with other pollutants (sulphur dioxide, nitrogen oxides, volatile organic compounds). The full implementation of the Nitrates Directive is expected to contribute to the reduction of ammonia emissions by 14% on 2000 levels by 2020, as measures limiting, for example, amounts of fertiliser applied, have a positive impact on both nitrate losses towards waters and ammonia emissions into the air.

- Climate change: All activities related to livestock and fertiliser management release nitrous oxide (N₂O) and methane (CH₄), greenhouse gasses with a global warming potential 310 and 21 times higher than CO₂ respectively. If fully implemented, the Nitrates Directive could cut N₂O emissions by 6% on 2000 levels by 2020, for example, and contribute to climate change mitigation.

- The common agricultural policy (CAP) backs up the Nitrates Directive through direct support and rural development measures. For example, several Member States have included nutrient management measures, such as wider buffer strips around water courses, among the agri-environmental initiatives for which farmers can receive payments. Direct support is subject to cross-compliance with EU environmental legislation, including the Nitrates Directive.

- The Urban Wastewater Directive (1991) sets standards for the collection and treatment of wastewater from homes and some industrial sectors.

Because of the low toxicity of calcium nitrate towards aquatic organisms and regulation within several European/National Laws an environmental exposure and risk assessment for this substance is not considered necessary.

Calcium nitrate is mainly used in fertilizers, but besides that is also a constituent in several preparations. The qualitative assessment will focus on the manufacturing of fertilizers, use by professionals and consumers. Furthermore, the non-fertilizer uses will also be assessed. In table 1 the uses that have been further assessed are summarized.

Table 1. Short description of all identified uses for CaN with their use descriptors and life cycle stage

Number (IU)	Short description of identified use	Product Category (PC)	Life Cycle Stage(s) covered by the IU						Sector of use (SU)	Process Category (Proc)	Article Category (AC)	Environmental Release Category (ERC)
			Manufacture	Formulation	End Use			Service Life (for article)				
					Industrial	Professional	Consumer					
1	Manufacturing of the substance, including handling, storage and q control.	-	X						SU3, SU8, SU9	PROC1, PROC2, PROC3, PROC8b, PROC14, PROC15	-	ERC1
2	Distribution, storage and q control. Industrial setting.	-			X				SU3	PROC1, PROC2, PROC8a, PROC8b, PROC9, PROC15	-	ERC2
3	Formulation of mixtures and solutions of substance	PC0(K35000), PC4, PC9a, PC11, PC12, PC14, PC16, PC20, PC21, PC34, PC35, PC37, PC39		X					SU3, SU10	PROC3, PROC4, PROC5, PROC14	-	ERC2

Number (IU)	Short description of identified use	Product Category (PC)	Life Cycle Stage(s) covered by the IU						Sector of use (SU)	Process Category (Proc)	Article Category (AC)	Environmental Release Category (ERC)
			Manufacture	Formulation	End Use			Service Life (for article)				
					Industrial	Professional	Consumer					
4	Use as intermediate or chemical agent to synthesise other substances	PC19			X				SU3	PROC1, PROC2, PROC3, PROC4	-	ERC6A, ERC6B
5	Industrial use of construction chemicals	PC20			X				SU3	PROC8b	-	ERC4, ERC5
6	Industrial use in laboratories	PC21			X				SU3	PROC15	-	ERC6b
7	Industrial use as corrosion protection agent	PC14			X				SU3	PROC13	-	ERC5
8	Industrial use in heat transfer fluids	PC16			X				SU3	PROC2	-	ERC6b, ERC7
9	Industrial use for waste water treatment	PC37, PC20			X				SU3	PROC2, PROC3	-	ERC6b

Number (IU)	Short description of identified use	Product Category (PC)	Life Cycle Stage(s) covered by the IU						Sector of use (SU)	Process Category (Proc)	Article Category (AC)	Environmental Release Category (ERC)
			Manufacture	Formulation	End Use			Service Life (for article)				
					Industrial	Professional	Consumer					
10	Industrial use as processing aid	PC20, PC9a			X				SU3	PROC1, PROC2, PROC4, PROC7, PROC8b, PROC10, PROC13	-	ERC4, ERC5, ERC6a, ERC6b, ERC6d
11	Industrial use in textiles	PC34			X				SU3	PROC13	-	ERC4, ERC5
12	Distribution, storage in professional setting.	-				X			SU22	PROC1, PROC2, PROC8a, PROC8b, PROC9	-	ERC8b
13	Professional use of fertilizers containing CaN	PC12				X			SU22	PROC2, PROC5, PROC8a, PROC8b, PROC9	-	ERC8B, ERC8E, ERC9b

Number (IU)	Short description of identified use	Product Category (PC)	Life Cycle Stage(s) covered by the IU						Sector of use (SU)	Process Category (Proc)	Article Category (AC)	Environmental Release Category (ERC)
			Manufacture	Formulation	End Use			Service Life (for article)				
					Industrial	Professional	Consumer					
14	Professional use in construction materials	PC20				X			SU22	PROC8a	-	ERC8c
15	Professional use in laboratories	PC21				X			SU22	PROC15	-	ERC8b
16	Professional use as corrosion protection agent	PC14				X			SU22	PROC13	-	ERC8c
17	Professional use of substance as a heat transfer fluid	PC16				X			SU22	PROC1, PROC2, PROC9, PROC20	-	ERC9a
18	Professional use as deicing product	PC4				X			SU22	PROC8a	-	ERC8d
19	Professional use in cleaning products	PC35				X			SU22	PROC8a, PROC10	-	ERC8a

Number (IU)	Short description of identified use	Product Category (PC)	Life Cycle Stage(s) covered by the IU						Sector of use (SU)	Process Category (Proc)	Article Category (AC)	Environmental Release Category (ERC)
			Manufacture	Formulation	End Use			Service Life (for article)				
					Industrial	Professional	Consumer					
20	Consumer use of fertilizers	PC12					X		SU21	-	-	ERC8B, ERC8e
21	Consumer use of construction chemicals	-					X	X	SU21	-	AC4	ERC10a
22	Consumer use of deicing products	PC4					X		SU21	-	-	ERC8d
23	Consumer use of cleaning products	PC35					X		SU21	-	-	ERC8a, ERC8b
24	Consumer use of cosmetics	PC39					X		SU21	-	-	ERC8a

Table 1, as it is proposed above, contains the identified uses. It also contains all the information necessary for a Tier 1 exposure assessment with ECETOC TRA (workers and consumers). However, as explained in the introduction a qualitative assessment will be performed for man, as the leading effect is eye irritation/corrosion from which no dose-response curve can be established and a DNEL cannot be set. Normally the information from table 1 is used to derive a table listing the target group template needed to build the exposure scenarios based on the Tier 1 method: for worker (PROC driver of Tier 1 exposure estimate) and for consumer (PC or AC driver of Tier 1 exposure estimate). In this table IUs with the same driver of exposure/release would be grouped. However, as in this case a qualitative assessment will be done the reported uses will be grouped into the main sector of uses as the applicable RMMs will be comparable for all processes within a specific sector. The following exposure scenarios will be described:

Table 2. Overview on exposure scenarios and corresponding use descriptors

Exposure scenario	Short description of ES	Linked to IU	PC	SU	PROC	AC	ERC
ES1	manufacturing	1	-	3, 8, 9	1, 2, 3, 8b, 14, 15	-	1
ES2	industrial use including distribution and other activities related to the processes in industrial settings	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 19	0(K35000), 4, 9a, 11, 12, 14, 16, 20, 21, 34, 35, 37, 39	3, 10	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15	-	2, 4, 5, 6a, 6b, 6d, 7
ES3	professional end use	12, 13, 14, 15, 16, 17, 18, 19	4, 12, 14, 16, 20, 21, 35	22	1, 2, 5, 8a, 8b, 9, 10, 13, 15, 20	-	8a, 8b, 8c, 8d, 8e, 9a, 9b
ES4	consumer end use	20, 21, 22, 23, 24	4, 12, 35, 39	21	-	4	8a, 8b, 8d, 8e, 10a

1. Manufacturing of the substance

1.1. Exposure scenario

1.1.1. Description of activities and processes covered in the exposure scenario.

Manufacturing of the substance: SU8, PROC1/2/3/8b/14/15, ERC1

1.1.2. Control of workers exposure

Table 3. Worst case operational conditions and risk management measures

Frequency and duration of use			
	Value	Unit	Remarks
Duration of worker exposure	> 4	hours/day	
Product characteristics			
Physical state of the substance/product	Solid	solid/liquid	Product can be solid or liquid (water solution)
Volatility of the substance/product	low	hPa	volatility of the substance
Relative molecular weight of the substance	164.08		Needed to calculate from ppm to mg/m ³
Concentration of substance in product	-	%	Not relevant
Operational conditions not accessible for risk management			
Is the activity performed inside or outside?	Inside		
Conditions and measures at process level (source) to prevent/limit release/exposure			
Conditions and measures related to control of dispersion towards the worker			
Is local exhaust ventilation needed?	No		
Conditions and measures related to personal protective equipment and hygiene			
Is respiratory protection needed?	No		
Is skin protection needed?	No		

Calcium nitrate, the hydrated form and/or water solution relevant for this scenario, is classified R22 (acute harmful via oral route) and R41 (corrosive to eyes) according to 67/548 EEC and is classified H302 and H318 according to CLP. Exposure of the eye to dust or splashes at concentrations leading to irritation/corrosion during manufacturing of calcium nitrate can occur. The oral route is not considered relevant for this scenario, as under normal operating conditions workers will not be exposed via this route.

1.1.3. Risk management measures

The risk management measures related to workers can be found in Table 4. Because calcium nitrate is irritating/corrosive to eyes, the risk management measures for human health aim to avoid direct contact with the substance. According to table E.3-1 of the ECHA guidance part E classification with R22/H302 does not trigger additional risk management measures.

Table 4. Risk management measures related to workers at industrial sites

Information type	Data field	Explanation
Containment and local exhaust ventilation		
Containment plus good work practice required	Containment as appropriate	
Local exhaust ventilation required plus good work practise	Good standard of general ventilation	

Information type	Data field	Explanation
Personal protective equipment (PPE)		
Type of PPE (gloves, respirator, face-shield etc)	Chemical goggles	To reduce exposure of the eye to a negligible level
Other risk management measures related to workers		
	Minimise number of staff exposed	
	Segregation of the emitting process	
	Effective contaminant extraction	
	Minimisation of manual phases	
	Avoidance of contact with contaminated tools and objects	
	Regular cleaning of equipment and work area	
	Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed	
	Training for staff on good practice	
	Good standard of personal hygiene	

Additional good practices (Operational Conditions and Risk Management Measures) beyond the REACH Chemical Safety Assessment established within Chemical Industry are also advised and communicated through Safety Data Sheets but are not necessarily required to control risk as laid out above.

1.2. Exposure estimation

Not performed, qualitative assessment.

2. Industrial use of calcium nitrate for formulation of preparations, intermediate use and end-use in industrial settings, including distribution and other activities related to the processes in industrial settings

2.1. Exposure scenario

2.1.1. Description of activities and processes covered in the exposure scenario.

Industrial use of calcium nitrate for formulation of preparations, intermediate use and end-use in industrial settings: SU3/10, PC0(K35000)/4/9a/11/12/14/16/20/21/34/35/37/39, PROC1/2/3/4/5/7/8a/8b/9/10/13/14/15, ERC2/4/5/6a/6b/6d/7

2.1.2. Control of workers exposure

Table 5. Worst case operational conditions and risk management measures

Frequency and duration of use			
	Value	Unit	Remarks
Duration of worker exposure	> 4	hours/day	
Product characteristics			
Physical state of the substance/product	Solid/liq uid	solid/liqui d	product can be solid or liquid (water solution)
Volatility of the substance/product	low	hPa	volatility of the substance
Relative molecular weight of the substance	164.08		Needed to calculate from ppm to mg/m ³
Concentration of substance in product	>25	%	Substance as such/in mixture at different concentrations
Operational conditions not accessible for risk management			
Is the activity performed inside or outside?	Inside		
Conditions and measures at process level (source) to prevent/limit release/exposure			
Conditions and measures related to control of dispersion towards the worker			
Is local exhaust ventilation needed?	No		
Conditions and measures related to personal protective equipment and hygiene			
Is respiratory protection needed?	No		
Is skin protection needed?	No		

Calcium nitrate, the hydrated form and/or water solution relevant for this scenario, is classified R22 (acute harmful via oral route) and R41 (corrosive to eyes) according to 67/548 EEC and is classified H302 and H318 according to CLP. Exposure of the eye to dust/splashes at concentrations leading to irritation/corrosion during industrial use of calcium nitrate can occur. The oral route is not considered relevant for this scenario, as under normal operating conditions workers will not be exposed via this route.

2.1.3. Risk management measures

The risk management measures related to workers can be found in Table 6. Because calcium nitrate is irritating/corrosive to eyes, the risk management measures for human health aim to avoid direct contact with the substance. According to table E.3-1 of the ECHA guidance part E classification with R22/H302 does not trigger additional risk management measures.

Table 6. Risk management measures related to workers at industrial sites

Information type	Data field	Explanation
Containment and local exhaust ventilation		
Containment plus good work practice required	Containment as	

Information type	Data field	Explanation
	appropriate	
Local exhaust ventilation required plus good work practise	Good standard of general ventilation	
Personal protective equipment (PPE)		
Type of PPE (gloves, respirator, face-shield etc)	Chemical goggles	To reduce exposure of the eye to a negligible level
Other risk management measures related to workers		
	Minimise number of staff exposed	
	Segregation of the emitting process	
	Effective contaminant extraction	
	Minimisation of manual phases	
	Avoidance of contact with contaminated tools and objects	
	Regular cleaning of equipment and work area	
	Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed	
	Training for staff on good practice	
	Good standard of personal hygiene	
	Product/substance Safety Data Sheet	

Additional good practices (Operational Conditions and Risk Management Measures) beyond the REACH Chemical Safety Assessment established within Chemical Industry are also advised and communicated through Safety Data Sheets but are not necessarily required to control risk as laid out above.

3. Professional end-use of calcium nitrate

3.1. Exposure scenario

3.1.1. Description of activities and processes covered in the exposure scenario.

Professional end-use of calcium nitrate: SU22, PC4/12/14/16/20/21/35, PROC1/2/5/8a/8b/9/10/13/15/20, ERC8a/8b/8c/8d/8e/9a/9b

3.1.2. Control of workers exposure

Table 8. Worst case operational conditions and risk management measures

Frequency and duration of use			
	Value	Unit	Remarks
Duration of worker exposure	> 4	hours/day	
Product characteristics			
Physical state of the substance/product	Solid/liquid	solid/liquid	Product can be solid or liquid (water solution)
Volatility of the substance/product	low	hPa	volatility of the substance
Relative molecular weight of the substance	164.08		Needed to calculate from ppm to mg/m ³
Concentration of substance in product	>25	%	Calcium nitrate can occur in different concentrations in the endproducts
Operational conditions not accessible for risk management			
Is the activity performed inside or outside?	Inside/outside		
Conditions and measures at process level (source) to prevent/limit release/exposure			
Conditions and measures related to control of dispersion towards the worker			
Is local exhaust ventilation needed?	No		
Conditions and measures related to personal protective equipment and hygiene			
Is respiratory protection needed?	No		
Is skin protection needed?	No		

Calcium nitrate, the hydrated form relevant for this scenario, is classified R22 (acute harmful via oral route) and R41 (corrosive to eyes) according to 67/548 EEC and is classified H302 and H318 according to CLP. Exposure of the eye to dust/splashes at concentrations leading to irritation/corrosion during professional use of calcium nitrate can occur. However, it has to be noted that the endproducts are further diluted which can lead to levels at which no eye irritation will occur. The oral route is not considered relevant for this scenario, as under normal operating conditions workers will not be exposed via this route.

3.1.3. Risk management measures related to professionals

Because calcium nitrate is irritating/corrosive to eyes, the risk management measures for human health should focus on the prevention of direct contact with the substance. Product related design measures preventing direct eye contact with calcium nitrate and preventing formation of dust and splashes are more important in addition to the personal protective equipment measures. According to table E.3-1 of the ECHA guidance part E classification with R22/H302 does not trigger additional risk management measures.

Product related operational measures are required. These include specific dispensers and pumps etc specifically designed to prevent splashes/spills/exposure to occur.

Table 9 gives an overview of the personal protective equipment recommendations. The degree of restriction depends on the concentration of calcium nitrate in the preparation.

Table 9. Risk management measures related to workers in professional settings

Information type	Data field	Explanation
Containment and local exhaust ventilation		
Containment plus good work practice required	Containment as appropriate	
Local exhaust ventilation required plus good work practise	Good standard of general ventilation	
Personal protective equipment (PPE)		
Type of PPE (gloves, respirator, face-shield etc)	Chemical goggles	To reduce exposure of the eye to a negligible level
Other risk management measures related to workers		
	Minimise number of staff exposed	
	Segregation of the emitting process	
	Effective contaminant extraction	
	Minimisation of manual phases	
	Avoidance of contact with contaminated tools and objects	
	Regular cleaning of equipment and work area	
	Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed	
	Training for staff on	

Information type	Data field	Explanation
	good practice	
	Good standard of personal hygiene	
	Product/substance Safety Data Sheet	

Additional good practices (Operational Conditions and Risk Management Measures) beyond the REACH Chemical Safety Assessment established within Chemical Industry are also advised and communicated through Safety Data Sheets but are not necessarily required to control risk as laid out above.

3.2. Exposure estimation

Not performed, qualitative assessment.

4. Consumer end-use of fertilizers and other products

4.1. Exposure scenario

4.1.1. Description of activities and processes covered in the exposure scenario.

Consumer end-use of fertilizers and other products: SU21, PC4/12/35/39, ERC8a/8b/8d/8e/10a

4.1.2. Control of consumers exposure

Table 10. Risk management measures related to consumers' use

Information type	Data field	Explanation
Personal protective equipment (PPE) required under regular conditions of consumer use		
Type of PPE (gloves, etc)	goggles	To reduce exposure of the eye to a negligible level
Instructions addressed to consumers		
	Product labelling	

Calcium nitrate, the hydrated form relevant for this scenario, is classified R22 (acute harmful via oral route) and R41 (corrosive to eyes) according to 67/548 EEC and is classified H302 and H318 according to CLP. Exposure of the eye to dust/splashes at concentrations leading to irritation during consumer use of calcium nitrate can occur. However, it has to be noted that the endproducts are further diluted which can lead to levels at which no

eye irritation will occur. The oral route is not considered relevant for this scenario, as during normal use consumers will not be exposed via this route.

Exposure to eye irritating dilutions of calcium nitrate can occur during consumer use of fertilizers and the other products. No exposure to the substance is expected from the use of construction chemicals. Consumer use of cosmetics is exempted from the REACH Regulation. It is assumed that during normal use exposure will only occur incidentally. Furthermore, it is assumed that existing controls (i.e. personal protective equipment based on classification and labelling with R41 and H318) are applied for these exposure situations.

4.2. Exposure estimation

Not performed, qualitative assessment.

RISK CHARACTERISATION

1. Manufacturing of the substance

1.1. Human health

1.1.1. Workers

Exposure of the eye to dust/splashes at concentrations leading to irritation during manufacturing of calcium nitrate can occur. When existing controls (i.e. engineering controls and personal protective equipment based on classification and labelling with R41 and H318) are applied the substance is of no concern for workers.

1.1.2. Consumers

Not relevant.

1.1.3. Indirect exposure of humans via the environment

Not relevant as no environmental assessment was done and the leading effect is eye irritation/corrosion which should not be considered relevant for the route man exposed via the environment.

1.2. Environment

An environmental assessment has not been performed.

2. Industrial use of calcium nitrate for formulation of preparations, intermediate use and end-use in industrial settings, including distribution and other activities related to the processes in industrial settings

2.1. Human health

2.1.1. Workers

Exposure of the eye to dust/splashes at concentrations leading to irritation/corrosion during industrial processes and use in industrial settings of calcium nitrate can occur. When existing controls (i.e. engineering controls and personal protective equipment based on classification and labelling with R41 and H318) are applied the substance is of no concern for workers.

The reaction mass containing 5-20% nitric acid is corrosive. When existing controls (i.e. engineering controls and personal protective equipment based on classification and labelling with H314) are applied the substance is of no concern for workers.

2.1.2. Consumers

Not relevant.

2.1.3. Indirect exposure of humans via the environment

Not relevant as no environmental assessment was done and the leading effect is eye irritation/corrosion which should not be considered relevant for the route man exposed via the environment.

2.2. Environment

An environmental assessment has not been performed.

3. Professional end-use of calcium nitrate

3.1. Human health

3.1.1. Workers

Exposure of the eye to dust/splashes at concentrations leading to irritation/corrosion during professional use of calcium nitrate can occur. When existing controls (i.e. engineering controls and personal protective equipment based on classification and labelling with R41 and H318) are applied the substance is of no concern for workers.

3.1.2. Consumers

Not relevant.

3.1.3. Indirect exposure of humans via the environment

Not relevant as no environmental assessment was done and the leading effect is eye irritation/corrosion which should not be considered relevant for the route man exposed via the environment.

3.2. Environment

An environmental assessment has not been performed.

4. Consumer end-use of fertilizers and other products

4.1. Human health

4.1.1. Workers

Not relevant.

4.1.2. Consumers

Exposure to eye irritating/corrosive dilutions of calcium nitrate can occur during consumer use of fertilizers and other products. It is assumed that during normal use exposure will only occur incidentally. Furthermore, it is assumed that existing controls (i.e. personal protective equipment based on classification and labelling with R41 and H318) are applied for these exposure situations. Therefore, it is concluded that calcium nitrate is of no concern for consumers with regard to eye irritation/corrosion for all scenarios described.

4.1.3. Indirect exposure of humans via the environment

Not relevant as no environmental assessment was done and the leading effect is eye irritation/corrosion which should not be considered relevant for the route man exposed via the environment.

4.2. Environment

An environmental assessment has not been performed.

5. Overall exposure (combined for all relevant emission/release sources)

5.1. Human health (combined for all exposure routes)

Not relevant.

5.2. Environment (combined for all emission sources)

Not relevant.