

Safety data sheet

In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 2020/878

Liquid Nitrogen Fertilizers (UAN)

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SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**1.1 Product identifier**

Trade name of mixture: Liquid Nitrogen Fertilizers (UAN).

Unique formula identifier of the product according to the Regulation EU 2017/542 – **UFI:** G610-J08D-P005-R0EU

1.2 Relevant identified uses of the mixture and uses advised against**1.2.1 Uses:****Professional use**

- Professional use [SU22]: Professional use in formulation and final use (PC12).

Further customer use

- Further customer use [SU21]: further customer use as fertilizers (PC12) (only for brands UAN 28 and UAN 30).

1.2.2 Uses advised against: none.

1.3 Details of the supplier of the safety data sheet

Manufacturer: AB Achema

Full address: Jonalaukio k. 1, Jonavos sen., LT-55296

Country: Lithuania

Tel. Nr.: +370 349 56736

URL website: www.achema.lt

Person responsible for the Safety Data Sheet (with e-mail address): Mindaugas Vaidila, e-mail: m.vaidila@achema.com

1.4 Emergency telephone number

Please contact: Poison Information and Control Office in the Republic of Lithuania by phone +370 52362052 or by the Common emergency Center by 112. **Helpdesk services work:** 24 hours a day, 365 days a year.

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

Poison Control Centers in Europe are available on site <https://poisoncentres.echa.europa.eu/appointed-bodies>.

Telephone numbers of poison control centers in the European Economic Area: **IRELAND** (Dublin) +353 1 8379964; **AUSTRIA** (Vienna) +43 1 406 43 43; **BELGIUM** (Brussels) +32 70 245 245; **BULGARIA** (Sofia) +359 2 9154 409; **CZECH REPUBLIC** (Praha) +420 224 919 293; **DENMARK** (Copenhagen) 82 12 12 12; **ESTONIA** (Tallinn) 112; **GREECE** (Athens) +30 10 779 3777; **ICELAND** (Reykjavik) +354 525 111, +354 543 2222; **ITALY** (Rome) +39 06 305 4343; **LATVIA** (Riga) +371 704 2468; **MALTA** (Valletta) 2425 0000; **NORWAY** (Oslo) 22 591300; **NETHERLANDS** (Bilthoven) +31 30 274 88 88; **FRANCE** (Paris) +33 1 40 0548 48; **FINLAND** (Helsinki) +358 9 471 977; **SWEDEN** emergency cases 112; in less acute cases +46 040 456 6700 040-456 6700; **HUNGARY** (Budapest) 06 80 20 11 99; **GERMANY** (Berlin) +49 30 19240.

SECTION 2. HAZARDS IDENTIFICATION

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2.1 Classification of the substance**2.1.1 Classification according to Regulation No. 1272/2008 [CLP]:**In Lithuanian

Eye irritation Cat. 2

In English

Eye Irrit. 2, H319

2.2 Label elements**Labeling according to Regulation No. 1272/2008 [CLP]:****Hazard pictogram(s):**

(GHS07)

Signal word: WARNING**Hazard statement(s):**

H319 – Causes serious eye irritation.

Precautionary statement(s):

P102 – Keep out of reach of children;

P220 – Keep/Store away from clothing /food/drinks/animal foodstuffs/ combustible materials;

P262 – Do not get in eyes, on skin, or on clothing;

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;

P337+P313 – If eye irritation persists: Get medical advice/attention;

P301+P315 – IF SWALLOWED: Get immediate medical advice/attention;

P264 – Wash hands thoroughly after handling.

2.3 Other hazards

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

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

According to the Regulation (EC) No 1907/2006 the liquid nitrogen fertilizers (UAN) is a mixture.

3.2. Mixtures

Identification of hazardous ingredients in the mixture.

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CAS no.	EC No.	Index No. in accordance with Regulation (EB) No. 1272/2008	REACH registration no.	Mass fraction, %	IUPAC name	Classification in compliance with Regulation (EC) No. 1272/2008 (CLP)
6484-52-2	229-347-8	Not listed	01-2119490981-27-XXXX	40 ÷ 46	ammonium nitrate	Oxid. Solid Cat. 3, H272; Eye Irrit. Cat. 2, H319
57-13-6	200-315-5	Not listed	01-2119463277-33-XXXX	30 ÷ 35	urea	Does not meet classification criteria

All precautionary statements are listed in section 16.

SECTION 4. FIRST-AID MEASURES

4.1 Description of first aid measures

4.1.1 General information. Measurements which only the doctor can take: eye healing, stomach cleansing.

The material can get through: the respiratory tract, in contact with skin, eyes, ingestion.

Inhalation: does not affect respiratory tract, non-hazardous.

Skin contact: wash affected skin (body) with water; change affected clothing.

Eye contact: Immediately wash eyes with plenty of running water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Remove contact lenses if present and easy to do. Seek medical advice if irritation develops and persists.

Ingestion: do not cause vomiting, rinse mouth with water; give the affected person plenty of water or milk to drink; seek medical advice.

Individual protection measures recommended for first-aiders: Comply with general hygiene requirements. Product contact with eyes is prohibited. Avoid repeated or prolonged contact with skin or clothing. Wear protective gloves.

4.2 Most important symptoms and effects

Inhaled: There is no evidence that inhalation has adverse health effects.

Skin Contact: Prolonged contact may cause skin irritation.

Eye Contact: Eye irritation, pain.

Ingestion: none known.

Delayed effects: none known.

4.3 Indication of any immediate medical attention and special treatment needed

None.

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable: water and carbon dioxide or other fire-extinguishing media appropriate for surrounding materials.

Not suitable: do not use chemical extinguishers, water vapor.

5.2 Special hazards arising from the substance or mixture

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None.

5.3 Advice for firefighters

Personal protective equipment: isolating apparel used by fireman, use isolating personal oxygen masks. Wear protective work clothing, safety boots, protective gloves, eye, face and respiratory protective equipment according to LST EN 469.

5.4 Additional information

None.

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

6.1.1. For personnel not involved in emergency situations: Avoid contact with the product. Evacuate from the yard if it's safe. In the event of an accident, use the personal protective equipment provided in sub-section 8.2 of this SDS.

6.1.2. For the personnel involved in emergency situations: Use the personal protective equipment provided in sub-section 8.2 of this SDS. Collect as much spillage as possible with dry sand or other absorbent. Avoid contact with the product. After clothes contact with the product, remove them; wash affected area with running water.

6.2 Environmental precautions

Keep away from getting into a rain drainage system or trenches an/or ditches.

6.3 Methods and material for containment and cleaning up

Pump (scoop) as much as possible of the spilled substance/preparation into tight containers and eliminate the remains with dry sand. Pumped (taken away) product may be used according to its purpose again. Prevent spread fertilizer from accessing water pools.

6.4 Reference to other sections

See section 8 for personal protective equipment and section 13 for waste disposal methods.

SECTION 7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

General occupation hygiene: while spraying manually (during fertilizing process) use water-proof coat, rubber gloves, protective glasses and head protection; always spray downwind. After finish of work, wash hands with soap. Remove contaminated clothing and remove contaminated protective equipment before entering area for eating.

Storage requirements: Use with adequate ventilation. Ventilation requirements are given in sub-section 8.2.1 of this SDS. Fertilizers should be kept above the crystallization temperature, depending on the brand: UAN 28 > -16 °C, UAN 30 > -9 °C, UAN 32, > 0 °C. Liquid nitrogen fertilizers (UAN) packed in small packages should be kept in closed storehouses, protected against moisture. The product is stored in carbon steel or stainless-steel containers or in UV-stabilized PVC containers that do not react with fertilizers and do not affect their properties. Containers for keeping UAN may be produced of carbon steel, as corrosion inhibitor used in the preparation ensures anti-corrosion coefficient at least of 90 %. After emptying the containers, they must be refilled only using a gas mask of

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PS-1 category, as gas ammonia may be contained therein.

Directions for limited allowable quantities of the substance/preparation to be stored under the specified conditions: is not regulated by company. Avoid spillage and keep away from drains.

7.2 Conditions for safe storage, including any incompatibilities

In Lithuania the product must be stored in accordance with the Minister of Agriculture of the Republic of Lithuania of 2013 December 9th in order No. 3D-825 "On Approval of Rules for Technological Design of Warehouses for Mineral Fertilizers and Plant Protection Products in the UAA TPT 10: 2013" (Official Gazette, 2013, No. 128-6540), as amended and supplemented thereafter.

Incompatible products: Storage with any other chemical substances is not recommended, as possible reactions are not identified.

Requirements to packages: Transported by railway or truck tanks prepared especially for transportation of this kind of fertilizers: clean, hermetic and technically sound; packed into 1-50 dm³ polyethylene packages in compliance with applicable standardizing documents to ensure safe transportation and storage. May be packed in the customer's package, which must be clean and hermetic (carbon steel containers, tanks, barrels); must be fastened tight while carrying.

The product is not subject to restrictions in accordance with the Resolution No. 966 of the Government of the Republic of Lithuania of August 07, 2004 "On the Approval of the Listing and Classification of Criteria for the Listing and Classification of Substances, Mixtures and Preparations of Hazardous Substances in Hazardous Substances in Hazardous Substances" (Official Gazette, 2004, No. 130-4649), with all subsequent amendments and supplements) or Part 2 of Annex I to Directive 2012/18/EU.

When storing the product in Lithuania in stationary tanks with a volume of more than 50 m³, these tanks must be registered with the state register management institution in accordance with the Chief State Labor Inspector of the Republic of Lithuania of August 1, 2006 Order No 1-178 "On the Approval of the List-Classification of Potentially Dangerous Equipment to be Registered in the State Register, Indicating Their Parameters". When storing the product in other countries, the storage requirements in force in those countries must be complied with.

7.3 Specific end use(s)

Solution of UAN is widely used as a main and/or additional fertilizer for winter and summer crops, sugar beet, mangel – (wurzel), grasslands and potatoes.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Chemical, worker exposure limit value in air:

Long-term exposure limit (IPRD): 10 mg/m³ according to the product component – urea (applicable in Lithuania according to HN 23).

Short-term exposure limit (TPRD): in Lithuania, according to HN23 does not apply to the product and its components.

Limit value (NRD): Not applicable in Lithuania according to HN23 for the product and its components.

Occupational exposure limit (s) according to Directive 98/24/EC: Not applicable for the product and its ingredients.

Occupational exposure limit (s) according to Directive 2004/37/EC: Not applicable for the product and its ingredients.

Any other national occupational exposure limits: no data available.

Non-limiting value(s) (DNEL): the product does not meet the Regulation (EC) classification criteria No. 1272/2008. Therefore, no DNEL and PNEC are identified. The tables show the DNEL and PNEC values of the

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ammonium nitrate contained in the product.

Workers exposure. Ammonium nitrate information.

Exposure mode	Exposure type	Hazardous	Physicochemical property that could have the greatest negative effect
Inhalation	Systemic effect – long lasting	DNEL: 36 mg/m ³	Toxicity (ingested)
Inhalation	Systemic effect - acute	The hazard is not known	
Inhalation	Local effect – long lasting	The hazard is not known (further research is not necessary)	
Inhalation	Local effect - acute	The hazard is not known (further research is not necessary)	
Skin contact	Systemic effect – long lasting	DNEL: 5,12 mg/kg bw/day	Toxicity (ingested)
Skin contact	Systemic effect - acute	No hazard identified	
Skin contact	Local effect – long lasting	The hazard is not known (further research is not necessary)	
Skin contact	Local effect - acute	No hazard identified	
Contact via eyes	Local effect	Low hazard (limit not identified)	

Predicted inactive concentration(s) PNE. Ammonium nitrate data.

Section	Hazardous	Comments
Fresh water		No effect was observed in all eco-toxicity studies with the highest recommended concentration of ammonium nitrate (nominal 100 mg / l). Therefore, on the basis of the ECHA document "Guidance on information requirements and chemical safety assessment. Part B: Hazard Assessment", assessment of the impact of water bodies is not necessary and PNEC values are not derived.
Sea water		No effect was observed in all eco-toxicity studies with the highest recommended concentration of ammonium nitrate (nominal 100 mg / l). Therefore, on the basis of the ECHA document "Guidance on information requirements and chemical safety assessment. Part B: Hazard Assessment", assessment of the impact of water bodies is not necessary and PNEC values are not derived.
Fresh water sediment		No effect was observed in all eco-toxicity studies with the highest recommended concentration of ammonium nitrate (nominal 100 mg / l). No data on eco toxicity in sediment organisms. In addition, it is considered that such data are not necessary. Therefore, on the basis of the ECHA document "Guidance on information requirements and chemical safety assessment. Part B: Hazard Assessment ", assessment of the impact of water bodies is not necessary and PNEC values are not derived.
Sea water sediment	There is no probability of sediment exposure	No effect was observed in all eco-toxicity studies with the highest recommended concentration of ammonium nitrate (nominal 100 mg / l). No data on eco toxicity in sediment organisms. In addition, it is considered that such data are not necessary. Therefore, on the basis of the ECHA document "Guidance on information requirements and chemical safety assessment. Part B: Hazard Assessment ", assessment of the impact of water bodies is not necessary and PNEC values are not derived.
Microorganisms in sewage treatment system	PNEC STP: 18 mg/l	Exposure factor: 10 Extrapolation method: exposure factor Available test data with sodium nitrate, which is similar in structure to ammonium nitrate, EC50> 1000 mg / l and NOx 180 mg / l. An assessment factor of 10 was used in accordance with the ECHA Guideline on Information Requirements and Chemical Safety Assessment. Section R.10
Soil		No effect was observed in all eco-toxicity studies with the highest recommended concentration of ammonium nitrate (nominal 100 mg / l).

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		No data on eco toxicity to soil. In addition, it is considered that such data are not necessary. Therefore, on the basis of the ECHA document "Guidance on information requirements and chemical safety assessment. Part B: Hazard Assessment", assessment of the impact of soil bodies is not necessary and PNEC values are not derived.
Air		PNEC (air) was not determined because there is no data that can determine it. Furthermore there are no demands in regulations to determine PNEC (air).
Food chain	No bioaccumulation potential	According to ammonium nitrate regulation (EB) No. 1272/2008 hazard statements H373, H372, H360, H361 and H362 are excluded. The substance is extremely water soluble and is thus believed to have low bio accumulation potential. Therefore, on the basis of the ECHA document "Guidance on information requirements and chemical safety assessment Part B.7", exposure assessment for the food chain is not necessary and the values for PNEC in the mouth are not derived.

No additional material measurements / monitoring are required during product manufacture, storage, and product use. The product must be manufactured and used in a professional manner by the Minister of Social Security and Labor of the Republic of Lithuania and the Minister of Health of 2001 July 24 order No. 97/406 "On Approval of Regulations for the Protection of Workers from Chemical Agents at Work and for the Protection of Workers against the Exposure to Carcinogens and Mutagens at Work" (Official Gazette, 2001, No. 65-2396), as subsequently amended.

8.2 Exposure controls

8.2.1 Appropriate engineering controls: Adequate natural ventilation of good quality must be provided in the storing premises of the product, which would change the air in the premises at least once an hour during non-working hours. Mechanical ventilation must be switched on during operation. Its intensity is calculated taking into account that the amount of harmful substances in the indoor air during operation is not exceeded. When vehicles with internal combustion engines are used for loading, it is necessary to take this into account when calculating the ventilation of the premises.

8.2.2. Individual protection measures:

8.2.2.1 Eye (face) protection: To ensure protection of eyes wear chemical resistant hermetic safety goggles or face protection shield according to LST EN ISO 16321-1 and LST EN ISO 16321-3 when using fertilizers.

8.2.2.2 Skin protection

Hand protection: adequate protection gloves according to EN 420, EN ISO 21420 due to chemical protection, EN 388 due to mechanical protection. Protective gloves must be made of one of the materials listed in the table, at least as specified, for penetration of thickness and resistance.

Glove material	Glove thickness, mm	Penetration time, min*
Butyl rubber - butyl	0.50	> 480
Nitrile rubber/Nitrile latex	0.35	> 480
Fluorocarbon rubber	n.m. 0.40	> 480
Polychloroprene	n.m. 0.50	> 480
Natural rubber/Natural latex	0.50	> 480
Polyvinyl chloride	0.50	> 480

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

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

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Skin protection creams do not adequately protect from the product.

Please note that the penetration time of the glove material in this section has been set at 22 °C and using pure ammonium nitrate. When using a product that is a mixture of chemicals at normal temperature, above 22 °C, or using mixtures with other chemicals or solutions, the glove material may be less resistant and therefore the permitted shelf life of the gloves must be shortened in such cases. We recommend that when you start using a new type or other manufacturer's gloves, make sure that they are chemically and mechanically resistant to working conditions. If you have any questions about the suitability of the gloves, please contact the manufacturers / suppliers of gloves.

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

Before using the gloves, please always make sure there are no tears, cracks, or other defects.

When the work is finished, the gloves must be cleaned and washed thoroughly before they are dry. After work, care must be taken to the hand skin.

Other protection: wear working clothes according EN ISO 13688 and EN ISO 13034, wear special working boots according to EN ISO 20345. After finishing work wash your hands with soap and change clothes.

8.2.2.3. Respiratory protection: not necessary.

8.2.2.4. Thermal protection: not necessary.

8.2.3 Environmental exposure controls: do not flush into surface water or sanitary sewer system.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

(a) Appearance: liquid without any sediment at 20 °C and a pressure of 1013 hPa.

(b) Color: colourless or brownish.

(c) Odor: mild ammonia odour could be felt.

(d) Melting and solidifying temperature:

Not higher than -16 °C (UAN 28);

Not higher than -9 °C (UAN 30);

Not higher than 0 °C (UAN 32).

(e) Boiling point or initial boiling point and boiling range: 107°C.

(f) Flammability: nonflammable.

(g) Upper and lower explosion limits: non explosive.

(h) Flash-point: for non-flammable liquids, the flash point is not specified according to column 2 of Annex VII of the REACH Regulation.

(i) Auto ignition temperature: In accordance with REACH Annex XI, testing may be omitted if testing does not appear scientifically necessary. Liquid nitrogen fertilizers have no explosive properties. However, Liquid nitrogen fertilizers do not contain groups that may react with oxygen and therefore will not auto-ignite at temperatures between room temperature and melting point. Therefore, a study is not considered necessary.

(j) Decomposition temperature: not applicable for the product.

(k) pH: 6,5 ÷ 7,5.

(l) Kinematic viscosity:

3.06 mPa·s (at 20°C), 2.08 mPa·s (at 40°C) (UAN 28);

3.95 mPa·s (at 20°C), 2.57 mPa·s (at 40°C) (UAN 30);

5.26 mPa·s (at 20°C), 3.36 mPa·s (at 40°C) (UAN 32).

Vapor density: for non-flammable liquids this parameter is not determined.

(m) Solubility: fully soluble in water.

(n) Partition coefficient: n-octanol/water: not determined for liquid fertilizer solutions.

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(o) **Vapor pressure:** 480 Pa.

(p) **Density and / or relative density:**

1.265 ÷ 1.292 kg / m³ at 20 °C (UAN 28);

1.285 ÷ 1.315 kg / m³ at 20 °C (UAN 30);

1.305 ÷ 1.325 kg / m³ at 20 °C (UAN 32).

(q) **Relative vapor density:** not determined for liquid fertilizer solutions.

(r) **Granulomere:** the product is a liquid and therefore not applicable.

9.2 Other information

Of all kinds of urea and ammonium nitrate in the weight ratio of 0.73 ÷ 0.83 during the manufacturing process is added to 150 ÷ 300 ppm (0.015 to 0.03%) of corrosion inhibitor. Portion of corrosion inhibitor after dispensing process decreases. The inhibitor is made of organic acids.

Product brand	Amount of nitrogen, % by mass				Crystallization
	N (total), %	N-NH ₃	N-NO ₃	N-NH ₂	
UAN 28	28.0 ± 2.0	7.0 ± 2.0	7.0 ± 2.0	14.0 ± 2.0	Not higher than -16 °C
UAN 30	30.0 ± 2.0	7.5 ± 2.0	7.5 ± 2.0	15.0 ± 2.0	Not higher than -9 °C
UAN 32	32.0 ± 2.0	8.0 ± 2.0	8.0 ± 2.0	16.0 ± 2.0	Not higher than 0 °C

SECTION 10. STABILITY AND REACTIVITY**10.1 Reactivity**

Stable under regular conditions.

10.2 Chemical stability

Stable under regular conditions, does not have cumulative properties, does not form any toxic compounds with other substances contained in the air or drainage waters.

10.3 Possibility of hazardous reactions

Possible dangerous reactions with other chemicals are unknown; do not mix with other substances. After refreezing, the properties are not changed.

Need for and the presence of stabilizers: not necessary.

10.4 Conditions to avoid

Possible dangerous reactions with other chemicals are unknown; do not mix with other substances. Store below the crystallization temperature to avoid package damages.

10.5 Incompatible materials

None without changing the physical state of the substance.

10.6 Hazardous decomposition products

None without changing the physical state of the substance.

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SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity: does not fulfill the classification criteria according to Regulation (EC) No. 1272/2008.

Product Ingredient Details:

- Ammonium nitrate. Based on the available data, ammonium nitrate does not meet this hazard criteria in accordance with Regulation (EC) No 1272/2008. The effects of ammonium nitrate on animals are presented in the table.

	Exposure dose / concentration	Routes	Method	Symptoms / delayed effects	Notes
Acute oral toxicity	LD50: 2950 mg/kg bw	Female/Male rats	OECD 401	Negative effects have not been established	Direct ATE Validation for Trusted Data
Acute dermal toxicity	LD50: > 5000 mg/kg bw	Female/Male rats	OECD 402	Negative effects have not been established	Direct ATE Validation for Trusted Data
Acute inhalation toxicity (vapour)	LC50: > 88,8 mg/kg bw	Rats		Negative effects have not been established	Direct ATE Validation for Trusted Data

- Urea. According to the available data, urea does not meet this classification criteria according to Regulation (EC) No 1272/2008. The effects of urea on animals are shown in the table.

	Exposure dose / concentration	Routes	Method	Symptoms / delayed effects	Notes
Acute oral toxicity	LD50: 14300 mg/kg bw (male) LD50: 15000 mg/kg bw (female)	Rats	OECD 423	Negative effects have not been established	Direct ATE Validation for Trusted Data
Acute dermal toxicity	Data not available				
Acute inhalation toxicity (vapour)	Data not available				

Skin irritation or/and sensitization: According to all available data, product does not fulfill the classification criteria according to Regulation (EC) No. 1272/2008. Not irritating. No sensitizing effect to skin known.

Product Ingredient Details:

- Ammonium nitrate. Based on the available data, ammonium nitrate does not meet this classification criteria in accordance with Regulation (EC) No 1272/2008. Studies on rabbits (OECD 404 analytical method) showed no evidence of skin irritation after 72 h (source: ammonium nitrate registration dossier under REACH).

- Urea. Based on the available data, urea does not meet this classification criteria according to Regulation (EC) No 1272/2008. Studies on rats have shown that urea is non-irritating to the skin. Based on these results, urea was interpreted as non-irritating to skin and humans (source: urea registration dossier under REACH).

Serious eye damage/irritation: the product according to Regulation (EC) No. 1272/2008 is classified as eye irritating Cat.2.

Product Ingredient Details:

- Ammonium nitrate. Based on the available data, ammonium nitrate in accordance with Regulation (EC) No 1272/2008 is classified as eye irritation Cat.2. Studies on rabbits (OECD 405 analytical method) have shown that ammonium nitrate is an eye irritant (source: REACH registration dossier for ammonium nitrate).

- Urea. Studies on rats have shown that urea is easily irritating to the eyes. Based on medical data collected by urea

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manufacturers on urea-related incidents, it has been interpreted that urea is not classified as an eye irritant to humans (source: urea registration dossier under REACH).

Sensitizing of the airways or skin: Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No. 1272/2008. Not sensitizing. In skin contact after rinsing with water no remaining health impacts are identified.

Product Ingredient Details:

- Ammonium nitrate. Does not have a sensitizing effect. Does not meet this classification criteria according to Regulation (EC) No. 1272/2008. Justification. Studies with ammonium nitrate are not available. Studies with a similarly structured substance, the ammonium calcium salt of nitric acid (double salt of calcium nitrate) (OECD 429 method of analysis), have shown that this substance does not have a sensitizing effect. Based on this result, the dossier for the registration of ammonium nitrate under REACH concluded that ammonium nitrate also did not have a sensitizing effect.

- Urea. No relevant information available (source: REACH registration dossier for urea). According to the available data, urea does not meet the criteria for classification under Regulation (EC) No 1272/2008.

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

Product Ingredient Details:

- Ammonium nitrate. Not mutagenic, does not meet the criteria for classification according to Regulation (EC) No. 1272/2008 (based on OECD 471, 473 studies with ammonium nitrate and structurally similar ammonium calcium salt and OECD 476 study with potassium nitrate) (source: REACH registration dossier for ammonium nitrate).

- Urea. Based on the results of the Ames study performed so far with different concentrations of urea (negative results), it has been interpreted that urea is not mutagenic (source: urea registration dossier under REACH). According to the available data, urea does not meet the criteria for classification under Regulation (EC) No 1272/2008.

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

Product Ingredient Details:

- Ammonium nitrate. Non-carcinogenic, does not meet this classification criteria according to Regulation (EC) No. 1272/2008 (studies performed according to OECD 453 method with nitrates) (source: dossier for registration of ammonium nitrate under REACH).

- Urea. Does not meet the criteria (Ames test negative) (source: urea registration dossier under REACH). According to the available data, urea does not meet the criteria for classification under Regulation (EC) No 1272/2008.

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

Product Ingredient Details:

- Ammonium nitrate. Reproductive toxicity is not appropriate; ammonium nitrate does not meet this classification criteria according to Regulation (EC) No. 1272/2008 (studies performed according to OECD Method 422 with a structurally similar substance - potassium nitrate). The result is a NOAEL $\geq$ 1500 mg / kg / day after ingestion over 28 days (source: ammonium nitrate registration dossier under REACH).

- Urea. Based on available data, urea does not meet the criteria for classification as toxic for reproduction according to Regulation (EC) No. 1272/2008 (Ames test negative) (source: REACH registration dossier for urea).

Specific target organs of toxicity (STOT) (unique exposure): Based on available data, the product does not meet

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the criteria for classification according to Regulation (EC) No. 1272/2008.

Product Ingredient Details:

- Ammonium nitrate. Ammonium nitrate does not meet this classification criteria according to Regulation (EC) No. 1272/2008 (source: dossier for registration of ammonium nitrate under REACH).
- Urea. According to the available data, urea does not meet the criteria for classification under Regulation (EC) No 1272/2008 (source: urea registration dossier under REACH).

Specific target organs of toxicity (STOT) (repeated exposure): Based on available data, the product does not meet the criteria for classification according to Regulation (EC) No. 1272/2008.

- Ammonium nitrate. Ammonium nitrate does not meet this classification criteria according to Regulation (EC) No. 1272/2008 (source: dossier for registration of ammonium nitrate under REACH).
- Urea. According to the available data, urea does not meet the criteria for classification under Regulation (EC) No 1272/2008 (source: urea registration dossier under REACH).

Aspiration hazard: none.

11.2. Information on the other hazards

11.2.1. Endocrine disrupting properties: Missing data.

11.2.2. Other information: None.

SECTION 12. ECOLOGICAL INFORMATION**12.1 Toxicity**

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

12.2 Persistence and degradability

Persistence and degradability (biodegradation) in the environment: Decomposes in nitrate, ammoniacal and amidic nitrogen during the biodegradation, which are plant nutrients.

12.3 Bio accumulative potential

Ammonium nitrate and urea do not have any bio accumulative properties; do not form any toxic compounds with other substances presented in the air or drainage waters.

12.4 Mobility in soil

Mobility: well-soluble in water; NO₃ ion is extremely mobile; NH₄ cation is absorbed in soil.

12.5 Results of PBT and vPvB assessment

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

12.6 Endocrine disrupting properties:

No data available.

12.7 Other side effects:

Undetermined.

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

Waste from residues. Product waste according to Regulation (EU) No. 1357/2014 are classified as hazardous waste under the code **HP 4** "Irritant - irritating to skin and injuries to eyes". Product waste in Lithuania must be managed in accordance with the Law on Waste Management of the Republic of Lithuania, in other countries - in accordance with the requirements of national legislation. Product waste must be handed over to waste management companies. The final product waste code is assigned by the waste manager / holder. Do not empty into drains or the environment without contaminating product residues.

Package waste disposal. After UAN fertilizers discharge, the railway and truck tanks are further used for UAN fertilizers transportation. The solution, after railway and truck tanks inside water washing must be handed over to waste management companies.

SECTION 14. TRANSPORT INFORMATION**14.1 UN Number or ID Number**

Not available because the product is not subject to ADR requirements.

14.2 UN proper shipping name

Not available because the product is not subject to ADR requirements.

14.3 Transportation hazard classes

Not available because the product is not subject to ADR requirements.

14.4 Packaging group

Not available because the product is not subject to ADR requirements.

14.5. Environmental hazards

The product is not classified as hazardous substance according to the Orange Book and International Transport Codes RID (Railway), ADR (Road) and IMDG (sea transport).

14.6. Special precautions for users

Do not transport the product together with incompatible materials.

14.7. Transportation of bulk cargoes by sea in accordance with IMO measures

The product may be transported unpackaged according to the 1973 The International Convention for the Prevention of Pollution from Ships, as amended by the 1978 Convention; Protocol (MARPOL) and the International Code for the Construction and Equipment of Ships Carrying Bulk Hazardous Substances (IBC Code). The name of the product, in accordance with the IBC Code, to be used in the vessel's documents, is "Urea / Ammonium Nitrate Solution". Pollution category – Z. Hazard – P (product included in the IBC Code due to its risk of contamination). Required type of vessel – 3 (2.1.2.3).

SECTION 15. REGULATORY INFORMATION**15.1 Safety, health and environmental regulation/legislation specific for the substance or mixture**

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EU legislation:

- Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC;
- Commission Regulation No. (EU) 2020/878 amending Regulation of the European Parliament and of the Council Annex II to Regulation (EC) No. 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) (published in Official Journal of the European Union L 203 of 26 June 2020);
- Commission Regulation No. (EU) 2017/542 of 22nd of March 2017 amending Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labeling and packaging of substances and mixtures by adding an Annex on harmonized information on emergency health emergencies with subsequent amendments and supplements;
- Commission Regulation (EU) No 552/2009 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards Annex XVII (published in the Official Journal of the European Union L164 of 22 June 2009);
- REGULATION (EC) No 1272/2008 2006 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives (published in the Official Journal of the European Union L365 of 19 December 2014);
- Regulation (EU) 2019/1148 of the European Parliament and of the Council 20th of June 2019 on trade in and use of explosives precursors and amending Regulation (EC) No. 1907/2006 and repealing Regulation (EU) No. 98/2013 (published in the Official Journal of the European Union L 186/1, 2019) as subsequently amended and supplemented;
- Regulation (EU) 2019/1009 of the European Parliament and of the Council of 2019 June 5 laying down rules for the supply of EU fertilizing products to the market and amending Regulation (EC) No. 1069/2009 and (EC) no. 1107/2009 and repealing Regulation (EC) No. 2003/2003 (published in the Official Journal of the European Union No. L 170, 25 June 2019) with all subsequent amendments and supplements;
- The International Rule for Transport of Dangerous Substances by Railway (RID);
- The International Maritime Dangerous Goods (IMDG);
- International Convention for the Prevention of Pollution from Ships (MARPOL 73/78);
- The International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code) (the IBC Code).

National Legislation (Lithuania):

- Applicable Law on Waste Disposal of the Republic of Lithuania;
- Applicable Law on Package and Package Waste Handling of the Republic of Lithuania;
- HN23 Maximum Allowable Concentrations of Hazardous Chemical Substances and Preparations in Working Environment. General Requirements;
- HN36 Banned and Restricted Substances;
- Applicable Regulations for Workers "Protection against the Impact of Chemical Factors" and Regulations for Workers "Protection against Carcinogenous and Mutagenous Impacts";
- Applicable Procedure of Safety Data Sheet Requirements and Supply thereof to Professional Users;

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- Applicable Rules on Waste Disposal;
- Minister of Agriculture of the Republic of Lithuania 2013 December 9th order No. 3D-825 “On Approval of Rules for Technological Design of Warehouses for Mineral Fertilizers and Plant Protection Products in the UAA TPT 10: 2013” (Official Gazette, 2013, No. 128-6540, TAR identification code 1132330ISAK003D-825), including all subsequent amendments and supplements.
- Minister of Social Security and Labor of the Republic of Lithuania and Minister of Health of 2001 July 24 order No. 97/406 “On Approval of Provisions for the Protection of Workers from Chemical Agents at Work and the Protection of Workers from the Effects of Carcinogens and Mutagens at Work” (Official Gazette, 2001, No. 65-2396, TAR identification code 1012230ISAK0097 / 406), as subsequently amended.
- Chief State Labor Inspector of the Republic of Lithuania in 2006 August 1 Order No. 1-178 “On the Approval of the List-Classification of Potentially Dangerous Equipment to be Registered in the State Register, Indicating Their Parameters”.
- LST EN 149 “Respiratory protective devices. Filtering half masks for protection against particles. Requirements, testing, marking”;
- LST EN 388 “Protective gloves against mechanical hazards”;
- LST EN 405:2002+A1:2009 “Respiratory protective equipment. Valves with filter valves for protection against gas or gas and particles. Requirements, testing, marking”;
- LST EN 420 “Protective gloves. General requirements and testing methods”;
- LST EN 469 “Protective clothing for firefighters. Performance requirements for firefighting protective clothing”;
- LST EN 13034 “Protective clothing against liquid chemicals. Requirements for the use of short-term protective clothing against liquid chemicals” (equipment type 6 and PB [6]);
- LST EN ISO 13688 “Protective clothing. General requirements (ISO 13688: 2013)”;
- LST EN 14387 “Respiratory protective devices. Gas filters and composite filters. Requirements, testing, marking”;
- LST EN ISO 16321-1 „Eye and face protection equipment for work”. Part 1. General requirements (ISO 16321-1:2021)“;
- LST EN ISO 16321-3 „Eye and face protection equipment for work”. Part 3. Additional requirements for mesh guards (ISO 16321-3:2021)“;
- LST EN ISO 20345 “Personal protective equipment. Safe footwear (ISO 20345: 2011)”.

Additional information about the corresponding Community provisions of safety, health and the environment for the product:

The product is not subject to requirements according to the Government Resolution No. 966 of the Government of the Republic of Lithuania of 2004.08.07 „On Approval of the Description of the List and Attribution Criteria for List of Materials, Mixtures or Preparations of Hazardous Substances in the Hazardous Objects“ (Official Gazette, 2004, No. 130-4649) with all subsequent amendments and supplements).

Product Restrictions on Regulation (EU) No. 2019/1148: The product is a subject to restrictions in accordance with Regulation (EU) No. 2019/1148. All suspicious transactions and significant disappearances and thefts should be reported to the relevant national contact point. See: https://home-affairs.ec.europa.eu/policies/internal-security/counter-terrorism-and-radicalisation/protection/legislation-chemicals-used-home-made-explosives_en (only for **UAN 28** and **UAN 30**);

The acquisition, importation, holding or use of this product by the general public is restricted by Regulation (EU) 2019/1148. All suspicious transactions and significant disappearances and thefts should be reported to the relevant national contact point. See: https://home-affairs.ec.europa.eu/policies/internal-security/counter-terrorism-and-radicalisation/protection/legislation-chemicals-used-home-made-explosives_en (only for **UAN 32**).

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15.2 Chemical safety assessment

In accordance with Regulation (EU) No 1907/2006 (REACH) Article 14, a Chemical Safety Assessment has been carried out for this substance. See Annex.

SECTION 16. OTHER INFORMATION

Revision date: 2026.02.28

Version: 14.0

Revision No. 0

Issuing date: 2026.02.28

(i) A clear evidence of added, deleted or modified information: The following changes were made to the safety data sheet as compared to the previous version:

- The headline: Revision date, version number and issuing date of this safety data sheet has been changed;
- sub-section 1.3: Company's address has been changed;
- sub-section 1.4: A cell phone number that is no longer in use has been removed, and the listed website has been updated;
- section 16: revision date, version number and issuing date of this safety data sheet has been changed.

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

ATE – acute toxicity estimate;

ADR – European Agreement on Dangerous Goods by Road;

C&L – Classification and Labelling;

CLP – Classification, Labelling and Packaging Regulation; Regulation (EC) No 1272/2008;

CAS – Chemical Abstracts Service;

CSR – Chemical safety report;

DNEL – Derived No-Effect value;

EC No. – EINECS or ELINCS numbers;

EU – European Union;

EC – European Commission;

ECHA – European Chemicals Agency;

EC No. – EINECS or ELINCS number;

EINECS – European List of Existing Commercial Chemical Substances;

ELINCS – European Register of Substances;

Eye Irrit. 2 – Eye irritating category 2;

GHS – Globally harmonized system;

HS – Hygiene Standard;

IBC Code – The International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk.

IMDG – International Maritime Dangerous Goods;

IMSBC – International Code for the Carriage of Dangerous Goods by Sea;

IUCLID – International Database of General Information on Chemicals;

IUPAC – International Union of Pure and Applied Chemistry;

IST – Company Standards.

UN – United Nations;

Cow – octanol-water partition coefficient;

LC50 – Lethal concentration of 50% of tested population;

LD50 – Lethal dose for 50% of tested population;

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LR – The main registrator;
 LT – Lithuanian;
 MARPOL 73/78 – International Convention for the Prevention of Pollution from Ships;
 OJ – Official Gazette;
 Oxid. Solid 3 – oxidizing solids, Cat.3;
 PBT – Persistent, Bio accumulative, Toxic;
 PEC – Predicted environmental concentration;
 PNEC(s) – Forecast(-s) no effect(-s) concentration(-s);
 PPE – Personal protective equipment;
 REACH – Registration, Evaluation, Authorization and Restrictions;
 RID – Regulations Concerning the International Carriage of Dangerous Goods by Rail;
 RV – Limit value in working environment;
 RVP – Risk management measures;
 SCBA – Self-contained breathing apparatus;
 SDS – Safety Data Sheet;
 SIEF – Chemical Substance Information Exchange Forum;
 STOT – Specific target organ toxicity;
 (STOT) RE – Repeated exposure;
 (STOT) SE – One-time effects;
 SVHC – Severely critical substance;
 (Q)SAR – Relationship between (quantitative) structure and properties;
 vPvB – very Persistent, very Bio accumulative;
 Explanation of use sectors (SU):
 SU21 – Private households (= general public = consumers).
 SU22 – Public sector (administration, education, entertainment, services, crafts).
 Explanation of product categories (PC):
 PC12 – Fertilizers.

(iii) Bibliography:

- 1) Registration of Ammonium Nitrate under the REACH dossier, published on the website of the European Chemicals Agency (data downloaded as of January 1, 2018);
 European Fertilizer Manufacturers Association (Fertilizers Europe) released Guidance for the storage, handling and transportation of solid mineral fertilizers);
- 2) ECHA Guidance on Information Requirements and Chemical Safety Assessment. Part B: Hazard assessment;
- 3) ECHA Guidance on information requirements and Chemical Safety Assessment, Chapter R.10);
- 4) European Fertilizer Manufacturers Association (Fertilizers Europe) released Guidance for UN transport classification of ammonium nitrate based substances (2011);
- 5) <http://gestis-en.itrust.de/nxt/gateway.dll?f=templates&fn=default.htm&vid=gestiseng:sdbeng>.

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

Classification in accordance with Regulation (EC) No. 1272/2008	Classification procedure
Eye irritating Cat.2, H319	The product has been classified by the manufacturer after evaluation in the context of Regulation (EC) No. 1272/2008 for the classification of the hazard class or differentiation referred to in paragraphs 2 to 5 of Annex I in order to determine the hazards associated with the mixture. The product is classified as eye irritation Cat.2 as it contains more ammonium nitrate than the general concentration limit for

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	classification in Category 2 laid down in table 3.3.3 of Annex I to Regulation (EC) No 1272/2008 and equal to 10%.
The product is not classified as oxidizing solid Cat.3, H272	The product is not classified as oxidising according to the Guidelines for the Classification of Substances of Ammonium Nitrate under UN Fertilizers Europe (2011), which states that mixtures containing ammonium nitrate with ammonium nitrate content not exceeding 80% are not classified as oxidizing.

(v) Relevant precautionary phrases:

H272 – May intensify fire; oxidizer;

H319 – Causes serious eye irritation;

P102 – Keep out of reach of children;

P220 – Keep/Store away from clothing/reducing agents/acids/alkali/sulphur/chlorates/chlorides/nitrates/permanates/powder of metals and materials containing metals as follows: copper, nickel, cobalt, zinc and their alloys/combustible materials;

P262 – Do not get in eyes, on skin, or on clothing;

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;

P337+P313 – If eye irritation persists: Get medical advice/attention;

P301+P315 – IF SWALLOWED: Get immediate medical advice/attention;

P264 – Wash hands thoroughly after handling.

(vi) Training Advice: To ensure the protection of people and the environment, people who manufacture, handle and use this product must be trained to work with hazardous substances, hazardous materials, nitrogen fertilizers with sulphur properties, have adequate hygiene skills, first aid principles and information on emergency procedures. This safety data sheet must be made available to those working with the product. Persons must be instructed before working with the product. Employees involved in the sale of a product or the provision of free samples should be made aware that the product brand UAN 32 is a precursor to restricted uses in accordance with Regulation (EU) 2019/1148, product brands UAN 28, UAN 30 and UAN 32 are regulated by the explosives predecessors in accordance with Regulation (EU) 2019/1148 and shall have received instructions regarding the obligations imposed in accordance with articles 5 to 9 of this regulation.

Additional information presented on the package (container) label of chemical substance:

Visual sign No. 3 "Keeps all the features unfreezed" in compliance with LST EN ISO 780.

UAN 32: "Keeping at lower than 0° C may freeze".

UAN 30: "Keeping at lower than -9° C may freeze".

UAN 28: "Keeping at lower than -16° C may freeze".

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

This version replaces all previous documents.

SC “Achema”



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ANNEX

Exposure scenarios of liquid nitrogen fertilizers (UAN):

- 1 Exposure scenario (1): Professional use in formulation of preparations and end-use;**
- 2 Exposure scenario (2): Consumer end-use of fertilizers.**

1. Exposure scenario (1)	
Professional use in formulation of preparations and end-use	
Use descriptors related to the life cycle stage	SU22 PC12 PROC1/2/8a/8b/9/11/15/19 ERC8b/8e
Name of contributing environmental scenario and corresponding ERC	1. Wide dispersive indoor use of reactive substances in open systems (ERC8b) 2. Wide dispersive outdoor use of reactive substances in open systems (ERC8e)
List of names of contributing worker scenarios and corresponding PROC	1. Use in closed process, no likelihood of exposure (PROC1) 2. Use in closed, continuous process with occasional controlled exposure (PROC2) 3. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a) 4. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) 5. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9) 6. Non industrial spraying (PROC11) 7. Use as laboratory reagent (PROC15) 8. Hand-mixing with intimate contact and only PPE available (PROC19)
2.1 Contributing scenario (1) controlling environmental exposure	
Wide dispersive indoor use of reactive substances in open systems (ERC8b) and wide dispersive outdoor use of reactive substances in open systems (ERC8e). An environmental assessment has not been performed as the substance does not meet the criteria for being classified as dangerous for the environment.	
2.2 Contributing scenario (2) controlling worker exposure for professional use in formulation of preparations and end-use	
All Process Categories are covered by this contributing scenario as all Operational Conditions (OCs) and	

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Risk Management Measures (RMMs) are identical. PROC1/2/8a/8b/9/11/15/19	
Product characteristic	
Product related conditions, e.g. the concentration of the substance in a mixture, the physical state of that mixture (solid, liquid; if solid: level of dustiness), package design affecting exposure	Solid, low dustiness Liquid, >25% substance in the product
Amounts used	
Amounts used at a workplace (per task or per shift); note: sometimes this information is not needed for assessment of worker's exposure	Not applicable
Frequency and duration of use/exposure	
Duration per task/activity (e.g. hours per shift) and frequency (e.g. single events or repeated) of exposure	More than 4 hours per day
Human factors not influenced by risk management	
Particular conditions of use, e.g. body parts potentially exposed as a result of the nature of the activity	Not applicable
Other given operational conditions affecting workers exposure	
Other given operational conditions: e.g. technology or process techniques determining the initial release of substance from process into workers' environment; room volume, whether the work is carried out outdoors/indoors, process conditions related to temperature and pressure.	Indoors or outdoors
Technical conditions and measures at process level (source) to prevent release	
Process design aiming to prevent releases and hence exposure of workers; this in particular includes conditions ensuring rigorous containment; performance of containment to be specified (e.g. by quantification of residual losses or exposure)	Not applicable
Technical conditions and measures to control dispersion from source towards the worker	
Engineering controls, e.g. exhaust ventilation, general ventilation; specify effectiveness of measure	1. Containment as appropriate 2. Good standard of general ventilation 3. Avoid splashing. Use specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur

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Organizational measures to prevent /limit releases, dispersion and exposure	
Specific organizational measures or measures needed to support the functioning of particular technical measures (e.g. training and supervision). Those measures need to be reported in particular for demonstrating strictly controlled conditions (to justify exposure based waiving).	Not applicable.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection, e.g. wearing of gloves, face protection, full body dermal protection, goggles, respirator; specify effectiveness of measure; specify the suitable material for the PPE (where relevant) and advise how long the protective equipment can be used before replacement (if relevant)	1. Protecting goggles
3. Exposure information and reference to its source	
Information for contributing scenario (1)	
An environmental assessment has not been performed as the substance does not meet the criteria for being classified as dangerous for the environment.	
Information for contributing scenario (2)	
A qualitative approach was used to conclude safe use for workers. The leading toxicological effect is eye irritation (local endpoint), for which no DNEL can be derived as no dose-response information is available. As minimal systemic effects were only noted at such high levels of substance that humans are normally not exposed to (see DNELs), a quantitative assessment is not considered necessary.	
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.	
5. Additional good practice advice beyond the REACH CSA	
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. Such as: - Containment as appropriate; - Minimize number of staff exposed; - Segregation of the emitting process; - Effective contaminant extraction; - Good standard of general ventilation; - Minimization 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 RMMs in place are being used correctly and OCs	

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followed; - Training staff on good practice; - Good standard of personal hygiene.	
2. Exposure scenario (2)	
Consumer end-use of fertilizers	
Use descriptors related to the life cycle stage	SU21 PC12 ERC8b/8e/10a
Name of contributing environmental scenario and corresponding ERC	1. Wide dispersive indoor use of reactive substances in open systems (ERC8b) 2. Wide dispersive outdoor use of reactive substances in open systems (ERC8e) 3. Wide dispersive outdoor use of long-life articles and materials with low release (ERC10a)
List of names of contributing consumer scenarios (2) and corresponding PC and sub-product categories if applicable	1. Fertilizers (PC12)
2.1 Contributing scenario (1) controlling environmental exposure	
Wide dispersive indoor use of reactive substances in open systems (ERC8b), wide dispersive outdoor use of reactive substances in open systems (ERC8e) and wide dispersive outdoor use of long-life articles and materials with low release (ERC10a). An environmental assessment has not been performed as the substance does not meet the criteria for being classified as dangerous for the environment.	
2.2 Contributing scenario (2) consumer end-use of fertilizers	
All Product Categories are covered by this contributing scenario as all Operational Conditions (OCs) and Risk Management Measures (RMMs) are identical. Exposure to eye irritating dilutions can occur during consumer use of fertilizers (PC12).	
Product characteristic	
Product related conditions, e.g. the concentration of the substance in a mixture, the physical state of that mixture (solid, liquid; if solid: level of dustiness), package design affecting exposure	Solid, low dustiness. Liquid Products containing $\geq 10\%$ and $< 10\%$.
Amounts used	
Amounts used per event	Not applicable
Frequency and duration of use/exposure	
Duration of exposure per event and frequency of events; please note: Tier 1 exposure assessment usually refers to external event exposure, without taking into account the	Not applicable

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duration and frequency of the event (see Guidance Chapter R.15);	
Human factors not influenced by risk management	
Particular conditions of use, e.g. body parts potentially exposed; population potentially exposed (adults, children)	Not applicable
Other given operational conditions affecting workers exposure	
Other operational conditions e.g. room volume, air exchange rate, outdoor or indoor use	Indoors or outdoors
Conditions and measures related to information and behavioral advice to consumers	
Safety advice to be communicated to consumers in order to control exposure, e.g. technical instruction, behavioral advice;	Avoid splashing
Conditions and measures related to personal protection and hygiene	
Personal protection, e.g. wearing of gloves, face protection, full body dermal protection, goggles, respirator; specify effectiveness of measure; specify the suitable material for the PPE (where relevant) and advise how long the protective equipment can be used before replacement (if relevant).	1. If $\geq 10\%$ of ammonium nitrate: Use chemical goggles 2. If $< 10\%$ of ammonium nitrate: no personal protection needed 3. Instructions addressed to the consumer via product labeling
3.Exposure information and reference to its source	
Information for contributing scenario (1)	
An environmental assessment has not been performed as the substance does not meet the criteria for being classified as dangerous for the environment.	
Information for contributing scenario (2)	
A qualitative approach was used to conclude safe use for consumers. The leading toxicological effect is eye irritation (local endpoint), for which no DNEL can be derived as no dose-response information is available. As minimal systemic effects were only noted at such high levels of substance that humans are normally not exposed to (see DNELs), a quantitative assessment is not considered necessary.	
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES	
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers/consumers for use of fertilizers: If $\geq 10\%$ ammonium nitrate: Use protecting goggles; If $< 10\%$ ammonium nitrate: No personal protection needed.	

The end of Safety Data Sheet.