

SC "Achema"

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

Revision date:
2018.01.30
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SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Trade name: ammonium nitrate.

Chemical name: ammonium nitrate.

Identification number according to Regulation No. 1272/2008: not applicable.

CAS number: 6484-52-2

EC number: 229-347-8

REACH registration number: 01-2119490981-27-XXXX

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

1.2.1. Uses:

Industrial use

- Industrial use [SU8, SU9]: Production of material (continuous and periodic production), including handling, warehousing, quality control;

Professional use

- Professional use [SU3, SU10]: Professional use in formulation of mixtures, use as an intermediate product and final industrial use (PC1, PC11, PC12, PC19, PC37).

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

Further customer use

- Further customer use [SU21]: further customer use as fertilizers and matches / fireworks (PC11, PC12).

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., Ruklos sen., LT55550

Country: Lithuania

Tel. No.: + 370 349 56465

URL website: www.achema.lt

Person responsible for the Safety Data Sheet (with e-mail address): Vidas Bersėnas, v.bersenas@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.

SECTION 2. HAZARDS IDENTIFICATION

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

2.1 Classification of the substance

Classification in accordance with EC Regulation No. 1272/2008 [CLP]:

In Lithuanian

Oxidising solids Cat. 3,

Eye irritation Cat. 2

In English

Oxid. Solid 3, H272

Eye Irrit. 2, H319

2.2. Label elements

2.2.1. Labelling in accordance with EC Regulation No. 1272/2008 [CLP]:

Hazard pictogram(s):



Signal word: WARNING

Hazard statement(s):

H272 – May intensify fire; oxidiser.

H319 – Causes serious eye irritation.

Precautionary statement(s):

P210 – Keep away from heat/sparks/open flames/hot surfaces. — No smoking. Keep away from heat;

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

P221 – Take any precaution to avoid mixing with combustibles, reducing agents, acids, alkali, sulphur, chlorates, chlorides, nitrates, permanganates, powder of metals and materials containing metals as follows: copper, nickel, cobalt, zinc and their alloys;

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

P264 – Wash hands thoroughly after handling“;

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.

2.3 Other hazards

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

Other hazards: none known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

SC "Achema"

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

3.1. Substances

According to the REACH Regulation No. 1907/2006 the product is a mono-constituent

CAS Nr.	ID No. in accordance with Regulation (EB) No. 1272/2008	IUPAC name	Purity, %	EC Nr.
6484-52-2	Not listed	Ammonium nitrate	98,4 %	229-347-8
13446-18-9	Not listed	Magnesium nitrate	1,33 %	233-826-7

SECTION 4. FIRST-AID MEASURES

4.1. Description of first aid measures

4.1.1 General information

The material can get through:

4.1.2. Inhalation: Remove the victim from exposure into fresh air immediately if adverse effects (e.g. dizziness, drowsiness or respiratory irritation) occur. If not breathing, give artificial respiration or if breathing is difficult, give oxygen and seek medical advice. Seek medical advice immediately when vapours are intensively inhaled.

4.1.3. Skin contact: Wash affected skin area with plenty of water and soap for at least 15 minutes thoroughly while removing contaminated clothing and shoes. Seek medical advice if irritation develops and persists.

4.1.4. 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.

4.1.5. Ingestion: Remove the victim from exposure into fresh air immediately if adverse effects (e.g. dizziness, drowsiness or respiratory irritation) occur. If not breathing, give artificial respiration or if breathing is difficult, give oxygen and seek medical advice. Do not use mouth-to-mouth respiration. Seek medical advice immediately when vapours are intensively inhaled.

4.1.6. Individual protection measures recommended for first-aiders: use suitable personal protective equipment, mentioned in section 8. Avoid contact with eyes, skin, and clothing.

4.2 Most important symptoms and effects

Acute effects: eye irritation.

Delayed effects: none known.

4.3 Indication of any immediate medical attention and special treatment needed

Note to physician: Fire extinguishing gas or ammonium nitrate thermal decomposition products (nitrogen oxides, ammonia) can cause respiratory irritation and damage by inhalation. Pulmonary damage may not occur immediately, but after a certain period of time. Give oxygen to breath, especially when the blues around the mouth.

SECTION 5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable: If fertilizer is not directly involved in the combustion process, use any best available measures. If fertilizer is directly involved in combustion process, use large quantities of water. In the case of a small fireplace,

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

because the product is non-combustible, it can withstand burning, extinguishing with water. In the case of large fireplaces, the product is non-combustible, but can withstand combustion. Extinguish with water.

Not suitable: Do not use chemical extinguishers or chemical foam. Do not attempt to suppress the fire with steam or sand.

5.2. Special hazards arising from the substance or mixture

In case of fire, there is a potential option of explosion, especially if fertilizers are contaminated by inappropriate (incompatible) chemical substances. May be explosive in contact with flammable or organic substances and at confinement during fire. In case of fire, may produce hazardous decomposition products such as nitrogen oxides (NO, NO₂ etc.), ammonia (NH₃), amines.

5.3. Advice for firefighters

Special measures: open windows and doors, do not inhale smoke (which is toxic), stand upwind of the fire, ensure that fertilizers are not contaminated with lubricants or flammable materials. Personal protective equipment: isolating apparel used by fireman, use isolating personal oxygen masks.

5.4. Additional information

The water used for extinguishing which has been contaminated must be collected. Do not empty into drains or sewers.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For personnel not involved in emergency situations: use suitable personal protective equipment, mentioned in section 8. Avoid contact with eyes, skin, and clothing. Gathered product keep away from sources of ignition. Avoid creating dusty conditions and prevent wind dispersal.

6.1.2. For the personnel involved in emergency situations: avoid substance contact. Avoid generation of dusts. Avoid inhalation of dusts. Use suitable personal protective equipment, mentioned in Section 8.

6.2. Environmental precautions

Prevent the material from contact with soil, entering surface water or sanitary sewer system. Do not discharge directly to a water source. If accidental spillage or washings enter drains or watercourses contact local authority.

6.3. Methods and material for containment and cleaning up

6.3.1. Containment. Protective barriers from the ground, sand. In the event of precipitation, cover the sewage systems.

6.3.2. Cleaning up. Disperse a small amount of product, vacuum it or soak it into properly labeled waste or waste containers, large bags. The place where the product was poured should then be washed with plenty of water. Do not pick up fertilizer using sawdust or other combustible materials. Dispose of large quantities of product, vacuumed or soaked in properly labeled waste or waste containers, large batches. If possible, waste should be recycled. Wash contaminated area with plenty of water. If the fertilizer enters the water body, inform the local state authority about this. Do not pick up fertilizer using sawdust or other combustible materials.

6.3.3. Other information. None.

6.4. Reference to other sections

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

SECTION 7. HANDLING AND STORAGE

7.1. Precautions for safe handling

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

Protective measures. Avoid contact with eyes, skin, and clothing. Use suitable personal protective equipment; wear goggles, gloves, working boots.

Fire prevention measures. Use with adequate ventilation. Local exhaust ventilation should be provided. Avoid contact with eyes, skin and clothing. Avoid creating dusty conditions and prevent wind dispersal. Keep product away from sources of ignition. Avoid contamination by any source including metals, dust and organic materials. Keep product away from moisture.

Aerosol and dust prevention measures. Use adequate ventilation. A local exhaust ventilation system must be used. When wind blowing, do not let dust build up and spread.

Environmental precautions. Do not allow to enter surface water or groundwater or sewage system.

Recommendations concerning good general hygiene practices at the work place. Do not eat, drink or smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2. Conditions for safe storage, including any incompatibilities

Packed and bulk Ammonium Nitrate may be stored indoor, covered, dry, clean and ventilated warehouses. Recommended temperature in warehouses should be exposed not higher than 30 °C, and air humidity, not higher than 50 %. The storehouse premises must be single-floor, without cellar or basement. Storehouse sections, where Ammonium Nitrate is stored, must be emptied and properly cleaned at least once in a year.

Packed Ammonium Nitrate may be stored in open storage sites only when it is protected from direct sunrays, atmosphere precipitation (rain, snow, bag should not stand in a water and water cannot aggregate on the bag), moisture. Big bags and packages of Ammonium Nitrate must be wrapped with water-proof membrane. Ammonium Nitrate cannot be kept in the temperature above 30 °C. Ammonium Nitrate in bulk cannot be stored outside.

Bulk Ammonium Nitrate in farms may be stored in silos or closed bunkers in accordance with the requirements of the Guidelines for the storage, handling and transportation of bulk mineral fertilizers (2007) and the Guidelines for the Safe Farm Handling (2012) issued by the European Fertilizer requirements.

Big bags of Ammonium Nitrate are stored in vertical position, stowed on pallets without any peered nails, screws, wooden chips or other sharp items that can damage big bags.

Ammonium Nitrate storage area at manufacturer and in port should be inaccessible to unauthorized personnel. Warnings “Entry by permit only”, “No smoking” and other safety requirements for storage of Ammonium Nitrate must be posted in prominent locations of storage area.

Strictly forbidden to smoke at storage area of Ammonium Nitrate, prohibits open heating and light sources. Product must be kept separately from heating sources or flame, stored away from moisture, flammable material, reducing agent, acid, alkali, sulphur, chlorate, chloride of lime, chromate, nitrite, permanganate, metals powder (especially, zinc), materials that have cuprum, nickel, cobalt or alloys of above mentioned metals in it, sulphide, superphosphate.

Avoid Ammonium Nitrate storage in hot places or sunshine, tare damage, moisture, pollution with incompatible material (fertilizers, which possess elemental sulphur, urea, NPK, NP and NK urea basis), grease, and flammable material.

To be ensured that farms that use this fertilizer do not store it together with hay, straw, grain, diesel, grease.

If Urea and Ammonium Nitrate are stored in the same warehouse, contact between these 2 substances should be avoided at any time, also in the event of fire.

There should be a sufficient distance between bulk product piles, in order to prevent the contamination with other substances.

For repacking Ammonium Nitrate at the port, port’s building floor must be of non-combustible materials, without bituminous connections and transitions. There shall be no internal holes, grooves or channels.

Product, packed into 500 kg big bags and stored in piles, cannot be stowed atop one another in more than 4 rows. During transportation of product packed in 500 kg big bags, short storage (up to 9 days) is permitted by stowing bags atop one another in 10 rows.

Product, packed into 600 kg big bags and stored in piles, cannot be stowed atop one another in more than 3 rows. During transportation of product packed in 600 kg big bags, short storage (up to 9 days) is permitted by stowing

SC “Achema” Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

bags atop one another in 8 rows.

Product, packed into 1000 kg big bags and stored in piles, cannot be stowed atop one another in more than 2 rows. During transportation of product packed in 1000 kg big bags, short storage (up to 9 days) is permitted by stowing bags atop one another in 5 rows.

Height of bulk or bagged product piles should be in the way, that the distance from the top of the piles to eaves, balks and lamp holder would remain at least 1 m. Size of piles depends on warehouse layout, but piles should be stacked with at least 1 m around each one for a vehicle to approach if discharge is required in case of emergency. For the reason to work loading and unloading equipment in warehouse without interference, the distance between Ammonium Nitrate piles must be left not less than 3 m.

Ammonium nitrate is packed in bags at max 50 °C, therefore ammonium nitrate could be delivered with higher than temperature of atmosphere.

Ammonium Nitrate can maintain fire or oxidize, has high detonation resistance. This resistance gets lower depending on defile and/or high temperature.

Ammonium Nitrate in contact with alkali materials, emits ammonia. If Ammonium Nitrate is strongly heated, nitrogen oxides and oxygen are emitted. Decomposition in enclosed utensil can merge to explosion.

Bulk Ammonium Nitrate loading to the vessel and at a loading time in the event of danger the rain begins, must be closed the vessel's hold and suspended the loading.

According to Regulation (EU) No 98/2013 economic operators are required to report, to the national contact point designated by their Member State, details about any behavior that they find suspicious (not only the examples above) and that may be of importance to prevent misuse of explosives precursors. Operators should also report disappearances and thefts that are significant and/or unusual during the course of their business or that cannot be easily explained.

Suitable packaging materials. Stainless steel (304). Non suitable packaging materials: Zinc, Copper.

Requirements for storage.

At a time in warehouse are allowed to hold a maximum of 1249 tons of ammonium nitrate. Larger quantities of ammonium nitrate can be stored in facilities according to Lithuanian law or Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances. At a time in warehouse are allowed to hold from 1250 to 5000 t, if the object stored under the classification of ammonium nitrate correspond to the amount of lower-tier requirements. At a time in warehouse are allowed to hold from 5000 t and more, if the object stored under the classification of ammonium nitrate correspond to the amount of higher-tier requirements.

For storage of packed Ammonium Nitrate in open warehouses or sheds, there can not be more than 700 tons in pile and pile area can not be larger than 300 m². The anti-fire space between piles must be left not less than 6 m.

Exporting product to other countries, allowed storage quantity, heaps and piles size of Ammonium Nitrate must comply with the local country requirements.

Additional information on storage conditions. Product packaging must be protected against damage.

Note: See section 10 for information on product stability and reactivity.

Ammonium nitrate registration in the REACH documentation, which is not mentioned in sub-clause 1.2.1 of this Safety Data Sheet and for which exposure scenarios are not included in this Safety Data Sheet, are listed below:

7.3 Specific final uses

Industrial use

1. Sampling, loading, filling, reloading, unloading, packing (loading / unloading) in devices that are adapted and not fitted.
2. Storage.
3. Material reloading into small containers (dedicated lines for filling, including weighing).
4. Quality control.
5. Use of ammonium nitrate in the manufacture of adhesives, sealants, explosives, fertilizers and water treatment chemicals.
6. Seed treatment or coating with fertilizers containing ammonium nitrate.

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

7. Use of ammonium nitrate for the synthesis of other substances.

Professional use

- 8. Spraying.
- 9. Non-industrial spraying of liquid fertilizers in open areas.
- 10. The introduction of liquid fertilizers into the soil.
- 11. The introduction in open spaces.
- 12. The introduction of liquid fertilizers in greenhouses into the soil.
- 13. Use of liquid fertilizers in greenhouses (non-industrial spraying).

Further customer use

- 14. Field fertilization.
- 15. Use of fertilizers indoors.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Regulated occupational exposure limit values: none.

Maximum allowable value for long-term exposure (IPRD): none.

Maximum allowable value for short-term exposure (TPRD): none.

Non-limiting value (s) (DNEL):

The assessment of the safe use of the substance was carried out in a qualitative way. The main toxic effect of this substance is eye irritation, for which the DNEL can not be determined, since the critical dosage is unknown. Since the minimal known systemic effects have been determined using a high amount of substance that is never exposed to human exposure (see DNEL), quantitative exposure assessment is not necessary.

The physicochemical properties of the DNEL product, which could have the greatest negative effect, are provided.

Workers exposure

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	
Inhalation	Local effect – acute	The hazard is not known	
Dermal	Systemic effect – long lasting	DNEL: 5,12 mg/kg bw/day	Toxicity ingested
Dermal	Systemic effect – acute	No hazard identified	
Dermal	Local effect – long lasting	The hazard is not known	
Dermal	Local effect – acute	No hazard identified	
If in eyes	Local effect	Low hazard	

Predicted inactive concentration(s) PNEC

Section	Hazardous	Comments / Grounds
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.
See water		No effect was observed in all eco-toxicity studies with the highest

Ammonium nitrate

		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.
Freshwater 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 ecotoxicity 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.
See 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 ecotoxicity 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). No data on ecotoxicity 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 water bodies is not necessary and PNEC values are not derived.
Air		No data available: It is proposed that the PNEC value should not be set.
Food chain	No bioaccumulation potential	According to Regulation (EC) No. hazard statements H373, H372, H360, H361 and H362 are excluded from the scope of Regulation (EC) No 1272/2008. The substance is highly water soluble and is therefore believed to have a low bioaccumulation 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.

8.2. Exposure controls

8.2.1. Appropriate engineering controls: use of adequate ventilation is good industrial practice. Prevent from accumulation of non-allowed concentrations of gases. Avoid concentrating on unauthorized dust concentrations. In addition to the places where the product is stored or recycled, have a shower. Use other good manufacturing practice experience.

8.2.2. Individual protection measures, such as personal protective equipment: The personal protective equipment must be used in accordance with good work-hygiene practices and must be used in conjunction with other control measures, including technical controls, ventilation and isolation. Additional good practices that can be carried out following a REACH risk assessment may include: appropriate restrictions; reducing the number of unprotected staff; isolation process; effective extraction, removal of contaminants; general ventilation in good level; manual work reduction; avoiding contact with contaminated tools and objects; regular cleaning of equipment and workstation; management / supervision by verifying the correct use of RMMs in compliance with OCs; staff training on good practice; personal hygiene.

8.2.2.1. Eye (face) protection: chemical protective safety goggles (EN 166) or face shield (EN 166).

8.2.2.2. Skin protection

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

Hand protection: adequate protection gloves according EN 388. When choosing gloves, it must be ensured that they are made of suitable materials, are of sufficient thickness and not less than the required penetration resistance. When finished, the gloves must be cleaned and washed before they are washed off. Sufficient attention should be given to hand skin care. Skin protective creams from ammonium nitrate not sufficiently protect hands. The inside of the gloves should not contain powders which can cause hand skin allergies.

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. >8 hours (breakthrough time):

- natural rubber NR (or natural latex) at least 0.5 mm thick;
- polychloroprene CR at least 0.5 mm thick;
- nitrile rubber or nitrile latex NBR at least 0.35 mm thick;
- butyl rubber at least 0.5 mm thick;
- fluorocarbon rubber - FKM, at least 0.4 mm thick;
- polyvinyl chloride - PVC, at least 0.5 mm thick.

Please note that the penetration time of the glove material in this section has been set at 22 ° C. When using a higher temperature product, the resistance of the glove material can be reduced, therefore in such cases the permitted gloves should be shortened. If you have any questions about the suitability of the gloves, please contact the manufacturers / suppliers of gloves.

Other protective equipment: Wear working boots, depending on the risk, wear full body work clothing or suitable chemical resistant work suit.

8.2.2.3. Respiratory protection: In the event of an accident (for example, accidentally pouring the product), wear mask. Do not use the same mask for longer than allowed by the duration of use. Wear dust protection mask P3, EN 149.

8.2.2.4. Thermal protection: not necessary.

Hygiene measures: do not eat, drink or smoke while using the product. Strictly keep the product out of the skin, eyes or clothing. Keep away from food, drink and animal feed. Wash your hands every time you finish working with the product, and at the end of the day. After the work is done, take a shower. Remove contaminated clothing immediately. Do not breathe dust, vapors or aerosols.

8.2.3. Environmental exposure controls: ammonium nitrate washings in Lithuania must be disposed of in accordance with the Lithuanian Republic Law on Waste Management, in other countries – in accordance with national legislation.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance: white granules at a temperature of 20 °C and a pressure of 101.3 kPa. Justification: The result of the registration of ammonium nitrate in the REACH documentation is summarized on the basis of data from three directories: The CRC Handbook of Chemistry and Physics (80th ed.), The Merck Index (12th ed.), Sax's Dangerous Properties of Industrial Materials (9th. ed.).

Granulomere:

- between 1 mm and 4 mm, not less than 97%;
- between 2 mm and 4 mm, not less than 88%;
- smaller than 2 mm, not more than 5%;
- less than 1 mm, not more than 1,5%;
- more than 6 mm, not more than 0,0%.

b) Odor: odorless.

c) The appearance of a smell: none.

d) pH-value: not less than 5,0 (10% ammonium nitrate water solution).

e) Melting/Freezing temperature: 169,9 °C at a pressure of 101,3 kPa. Justification: The result of the registration of ammonium nitrate in the REACH documentation is summarized on the basis of data from these directories: The

Ammonium nitrate

CRC Handbook of Chemistry and Physics (80th ed.), The Merck Index (12th ed.), Sax's Dangerous Properties of Industrial Materials (9th. ed.). Ammonium nitrate starts to decompose at 210 °C.

f) Primary boiling temperature and interval of boiling temperature: Based on column 2 of Annex VII to the REACH Regulation, no clarification is given: it is not necessary to determine because the substance breaks down to a boiling point.

g) Flash-point: Based on column 2 of Annex VII to the REACH Regulation, no clarification is provided: ammonium nitrate is a solid material which decomposes below the melting point, so it is technically impossible to determine the flash point.

h) Speed of vaporization: Not applicable to solids.

i) Flammability: Nonflammable. Justification: Based on column 2 of Annex VII to the REACH Regulation according to the molecular structure and experience of ammonium nitrate using this material, ammonium nitrate is not flammable in contact with a source of ignition, water or air.

j) Limit values of flammability or explosion: ammonium nitrate fertilizers covered by UN No. 2067, does not have explosive properties.

k) Vapor pressure: According to section 1 of Annex XI to the REACH Regulation does not apply on a scientific basis. Justification. Based on the fact that ammonium nitrate is a solid which has a melting point high (169.6 °C) and decomposes at 210 °C, the ammonium nitrate registration in the REACH documentation concludes that the ammonium nitrate vapor pressure at ambient temperature is very low and not detectable.

i) Vapor density: Not applicable to solids.

m) Relative density: 1.72 g/cm³ at 20 °C. Justification. The result of the registration of ammonium nitrate in the REACH documentation is summarized on the basis of data from these directories: The CRC Handbook of Chemistry and Physics (80th ed.), The Merck Index (12th ed.), Sax's Dangerous Properties of Industrial Materials (9th. ed.).

n) Solubility: Highly soluble in water: 1198 g/l at 0 °C; 1497 g/l at 10 °C; 1872 g/l at 20 °C. When dissolving ammonium nitrate, the temperature of the solution decreases significantly, therefore, in order to accelerate the dissolution of the ammonium nitrate, the solution must be warmed up.

o) Partition coefficient: n-octanol/water: Based on column 2 of Annex VII to the REACH Regulation, no clarification is provided: ammonium nitrate is a solid material.

p) Auto ignition temperature: The registration of ammonium nitrate in the REACH documentation states that, based on the structure of ammonium nitrate, transport information, it is considered that ammonium nitrate is not a self-heating substance. Justification: Ammonium nitrate is not a group that reacts with airborne oxygen. It is also based on the fact that materials at a temperature lower than their melting point is usually not self-heating, followed by self-ignition. Ammonium nitrate is widely used, but there is no evidence that it is characterized by spontaneous combustion. The material is not classified as a self-sustaining ADR. According to Section 1 of Annex XI to the REACH Regulation, studies are omitted through scientific justification.

q) Decomposition temperature: > 210 °C.

r) Viscosity: According to Chapter 2 of Annex XI to the REACH Regulation, studies are omitted because it is technically impossible to carry out the study. Ammonium nitrate is a solid state of the aggregate, and the test must be carried out with liquid.

s) Explosive properties: ammonium nitrate fertilizers covered by UN No. 2067, does not have explosive properties. Ammonium nitrate registration according to the REACH dossier states: experience shows that in order to increase the risk of explosion due to ammonium nitrate, the following factors must be considered: storage of material in large quantities, contamination of any substance (including metals, acids, organic matter) and / or heating (also under fire). Ammonium nitrate fertilizers are specially formulated for high density, high purity, to minimize the risk of explosion.

t) Oxidizing properties: has oxidizing properties. Justification. The result of the registration of ammonium nitrate in the REACH dossier is derived from the ADR. When transporting ammonium nitrate (UN No. 2067), it is considered an oxidizing substance. UN 2067 transport classification: hazard class 5.1, packing group III. The oxidizing properties of ammonium nitrate depend on the granulomere composition of the product.

9.2 Other information

None.

Ammonium nitrate

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

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

10.2. Chemical stability

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

10.3. Possibility of hazardous reactions

The product may explode if it is contaminated or mixed with the following materials: alkaline metals, aluminum (powder), ammonia, flammable materials, potassium, organic materials, reducers, water, alkylesters, aluminum chloride, antimony (powder), antimony trisulphate, barium nitrile, calcium chloride, carbide, chlorate, chlorine, cyan guanidine, dinitrotoluene, iron (III) chloride, formamide, urea, wood flour, potassium permanganate, carbon, hydrocarbonates, copper-iron (II) sulphide, copper oxide, metal powders, mineral oil, sodium hypochlorite, sodium nitrate, sodium perchlorate, oils, rust, sulfur, trinitroanizole, trinitrotoluene, waxes, sugar.

The product may explode if it is contaminated or blended with these chemical mixtures: 1) aluminum powder + calcium nitrate + formamide; 2) ammonium salts + acids; 3) acetic anhydride + nitric acid; 4) potassium + ammonium sulphate; 5) metal oxides + carbon; 6) superphosphate + organic matter + heat.

Explosion hazards can be caused by heating the product. The heated product breaks down.

The product may react dangerously in contact with ammonium dichromate, acetic acid (if heated additionally), potassium dichromate, metal nitrite, sodium chloride, phosphorus (even if it is low in quantity).

10.4. Conditions to avoid

When heated above 210 °C, nitrogen oxides and oxygen are released. In a closed burst, the fragmentation can go into explosion. Decomposition products: In contact with alkaline substances (e.g. lime) releases ammonia.

10.5. Incompatible materials

Combustible, oxidizing, reducing materials, strong acids and bases, sulphur, chlorates, chlorides, chromates, nitrites, permanganates, metal powder (especially zinc), substances containing copper, nickel, cobalt, zinc and their alloys substances, fertilizers containing sulphur, urea, NPK, NP and NK fertilizers. And other materials listed in section 10.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. In case of fire, nitrogen oxides (NO_x).

SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity:

Human information: no available data.

Effects on animals:

	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

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

Acute inhalation toxicity (vapour)	LC50: > 88,8 mg/kg bw	Rats	Negative effects have not been established	Direct ATE Validation for Trusted Data
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Other information: data not available.

Assessment/Classification: according to available data, the classification criterion does not match.

Skin irritation or/and sensitization: Not irritating. The product does not meet the criteria for classification in accordance with Regulation (EC) No. 1272/2008. Justification. Studies on rabbits (OECD 404 assay) showed no signs of skin irritation after exposure to 72 h (source: ammonium nitrate registration in REACH dossier).

Serious eye damage / irritation: Irritates eyes. In accordance with Regulation (EC) No 1272/2008 is classified as eye irritation cat. 2. Justification. Studies on rabbits (OECD 405 analytical method) have shown that ammonium nitrate is irritating to the eye (source: ammonium nitrate registration in REACH dossier).

Sensitizing of the airways or skin: have no sensitizing effects. In compliance with Regulation No. 1272/2008 preparation is not classified as sensitizing. Justification. Studies conducted with ammonium nitrate are not available. Investigations performed on a substance of similar structure - nitric acid ammonium calcium salt (calcium nitrate double salt) (OECD 429 analysis method) showed that this substance does not have a sensitizing effect. Based on this result, it has been found from the REACH documentation for registration of ammonium nitrate that ammonium nitrate has no sensitizing effect.

Mutagenicity: The product does not meet the criteria for classification in accordance with Regulation (EC) No. 1272/2008 (OECD 471, 473, experiments performed on structure-like compounds with nitric acid ammonium calcium salt; OECD 476, tests performed on a structurally similar compound – potassium nitrate) (source: ammonium nitrate registration in REACH dossier).

Carcinogenicity: The product does not meet the criteria for classification in accordance with Regulation (EC) No. 1272/2008. Not carcinogenic (OECD 453, experiments performed on structure-like compound with ammonium sulfate) (source: ammonium nitrate registration in REACH dossier).

Reproductive toxicity: The product does not meet the criteria for classification in accordance with Regulation (EC) No. 1272/2008 (studies were carried out using OECD 422 method with a structurally similar substance - potassium nitrate). Studies result: oral 28-day NOAEL ≥ 1500 mg/kg bw/day (source: ammonium nitrate registration in REACH dossier).

Specific toxicity for particular organ (STOT) (one time effect): The product does not meet the criteria for classification in accordance with Regulation (EC) No. 1272/2008.

Specific toxicity for particular organ (STOT) (repeated effect): The product does not meet the criteria for classification in accordance with Regulation (EC) No. 1272/2008.

Aspiration hazard: none.

SECTION 12. ECOLOGICAL INFORMATION

12.1 Toxicity

Fish (short-term): 48-h LC₅₀: 447 mg/l (no guideline followed).

Fish (long-term): no data.

Daphnia magna (short-term): 48-h EC₅₀: 490 mg/l (no guideline followed, with potassium nitrate).

Daphnia magna (long-term): no data.

Algae: 10-d EC₅₀: > 1700 mg/l (seawater, no guideline followed, performed with potassium nitrate).

Inhibition of microbial activity: 3-h EC₅₀: >1000 mg/l, NOEC: 180 mg/l (OECD 209, with sodium nitrate).

12.2 Persistence and degradability

Biodegradation: standard test is not applicable as the substance is inorganic. In addition, in the anaerobic transformation of ammonium, one group of bacteria oxidizes ammonium to nitrite while another group oxidizes nitrite into nitrate. The average biodegradation rate in wastewater plant at 20 °C is 52 g N/kg dissolved solid/day. Nitrate degradation is fastest in anaerobic conditions. In the anaerobic transformation of nitrate into N₂, N₂O and

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

NH₃, the biodegradation rate in wastewater plant at 20 °C is 70 g N/kg dissolved solid/day.

Hydrolysis: no hydrolysable group is present, will completely dissociate into ions.

12.3 Bioaccumulative potential

Octanol- water partition coefficient (K_{ow}): not relevant as the substance is inorganic, but considered to be low (based on high water solubility).

Bioconcentration factor (BCF): low potential for bioaccumulation (based on substance properties).

12.4 Mobility in soil

Adsorption coefficient: low potential for adsorption (based on substance properties).

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 ammonium nitrate is inorganic.

12.6 Other adverse effects

There is no information concerning other adverse effects on the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

13.1.1. Product / package disposal.

Ammonium nitrate waste according to Regulation (EU) No. 1357/2014 are classified as hazardous waste by HP 2 “Oxidising” hazard statement code H 272 “May increase fire, oxidizing agent”, HP 4 “Irritating – irritating to the skin and damaging the eyes” and HP 15 “Wastes that may contain some preceded by a hazardous property in which the primary waste was not directly labelled with danger phrase EUH044 “May explode if heated by a tight seal”. Ammonium nitrate waste in Lithuania must be managed in accordance with the Law on Waste Management in the Republic of Lithuania, in other countries, in accordance with the requirements of national legislation. Unpolluted ammonium nitrate waste can be used as bulk or liquid fertilizer (after dissolving in water) or to be handed over to waste management companies.

Waste of outer packaging of polypropylene that is not contaminated with ammonium nitrate or other materials according to Regulation (EU) No. 1357/2014 are classified as non-hazardous waste.

Ammonium nitrate waste inner packaging of polyethylene in accordance with Regulation (EU) No. 1357/2014 is classified as hazardous waste. The codes assigned to these wastes depend on the amount of residual ammonium nitrate remaining in the packaging waste. Waste of inner packaging of polyethylene containing up to 20% ammonium nitrate is assigned the codes HP 2 “Oxidising” Hazard Statement code H 272 “May increase fire, oxidizer” and HP 15 “Wastes that can have any of the following hazardous properties listed above: generates no primary waste directly” hazard statement EUH044 “May explode if heated in a sealed container”. Waste from ammonium nitrate packaging must be handed over to waste management companies. These waste in Lithuania must be handled in accordance with the Law on Packaging and Packaging Waste Management of the Republic of Lithuania, applicable waste management regulations, in other countries – in compliance with the requirements of national legislation.

Do not remove label, prepared according to Regulation (EC) No. 1272/2008, until package is thoroughly cleaned.

13.1.2. Waste disposal information.

Physical and chemical properties of the product are listed in Section 9.

13.1.3. Information related to sewage disposal.

It must be ensured that ammonium nitrate waste does not enter the sewage.

13.1.4. Other waste disposal guidelines.

All the fertilizer residues must be removed from the bag by gentle shaking.

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

SECTION 14. TRANSPORT INFORMATION

14.1. UN Number

2067

14.2. Proper shipping name

Ammonium nitrate, A1.

14.3. Transport hazard classes

5.1.

14.4. Packaging group

III

14.5. Other information

None.

14.6. Special precautions for users

None.

14.7. Transport in bulk according to Annex II of Marpol 73/78 and the IBC Code

Not applicable.

SECTION 15. REGULATORY INFORMATION

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

EU legislation:

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization 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 (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH);
- Commission Regulation (EC) No 552/2009 of 22 June 2009 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as regards Annex XVII;
- REGULATION (EC) No 1272/2008 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;
- Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC;
- Regulation (EU) No 98/2013 of the European Parliament and of the Council of 15 January 2013 on the marketing and use of explosives precursors;
- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

- 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).

Domestic 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 Carcinogens and Mutagens Impacts”;
- Applicable Procedure of Safety Data Sheet Requirements and Supply thereof to Professional Users;
- Applicable Rules on Labeling of Items (Products) to be Sold in Lithuania and Referring Price thereof;
- Applicable Rules on Waste Disposal;
- The product is not subject to requirements according to the Government Resolution No. 966 of the Government of the Republic of Lithuania of 2004.08.17 „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).

Additional information about the relevant Community provisions on safety, health and the environment for the product:

The product is a dangerous substance, which is subject to the Government of the Republic Regulation No. 18.08.2004. 966 “On the Approval of the Listing and Attribution Criteria of Materials, Mixtures or Preparations of Hazardous Substances in Hazardous Substances” (Official Gazette, 2004, No. 130-4649), as amended, and supplemented and Annex I, Part 2 of Directive 2012/18/EU.

Product Restrictions on Regulation (EU) No.98/2013: Ammonium nitrate is indicated in Regulation (EU) No. In Annex II to Regulation (EC) No 98/2013, economic operators selling, using, and protecting ammonium nitrate must, in accordance with Regulation (EU) No 98/2013 to report suspicious transaction of this substance, material disappearances and theft or theft or loss of theft to a national contact point in the Member State in which the suspicious transaction occurred.

15.2 Chemical safety assessment

In accordance with REACH Article 14, a Chemical Safety Assessment has been carried out for this substance. See Annex.

SECTION 16. OTHER INFORMATION

Revision date: 2018.01.30

Version: 6.0

Revision No. 0

Issuing date: 2018.01.30

i) A clear evidence of added, deleted or modified information:

According to Commission Regulation (EU) 2015/830 a new document form was altered, changed and supplemented safety, health and environmental regulations:

- section 1: product using information was modified, emergency number was modified;
- section 4: supplemented by initial protective measures;

SC “Achema” Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

- section 5: fire prevention measures;
- section 6: revised accidental release measures;
- section 7: revised product storage conditions;
- section 8: recorded DNEL, PNEC data, new requirements for personal protective equipment;
- section 9: physicochemical properties corrected according to urea registration under the REACH dossier data;
- section 10: stability and reactivity properties;
- section 11: introduced additional toxicological data under the REACH dossier;
- section 12: ecological information;
- section 15: introduced Regulation data.

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

ATE - acute toxicity estimate;
ADR – European Agreement on Dangerous Goods by Road;
IATA – International Air Transport Organization;
IMO – International Marine Organization;
RID – Regulations Concerning the International Carriage of Dangerous Goods by Rail;
SMGS – International Agreement on Carriage of Loads by Rail;
CLP – Classification, Labeling and Packaging Regulation; Regulation (EC) No 1272/2008;
CAS – Chemical Abstracts Service;
DNEL – Derived No-Effect value;
EC No. – EINECS or ELINCS numbers;
EU – European Union;
ECHA – European Chemicals Agency;
EINECS – European List of Existing Commercial Chemical Substances;
ELINCS – European Register of Substances;
Eye Irrit. 2 – eye irritating 2 category;
UN – United Nations;
C_{ow} – octanol-water partition coefficient;
LD₅₀ – Lethal dose for 50% of tested population;
LC₅₀ – Lethal concentration of 50% of tested population;
HS – Hygiene Standard;
IMSBC – International Code for the Carriage of Dangerous Goods by Sea;
Oxid. Solid 3 – oxidizing solids, 3 category;
PBT – Persistent, Bio accumulative, Toxic;
PNEC(s) – Forecast(-s) no effect(-s) concentration(-s);
SDS – Safety Data Sheet;
vPvB – very Persistent, very Bio accumulative.

(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);
- 2) ECHA Guidance on information requirements and chemical safety assessment. Part B: Hazard Assessment (2011) (Guidance on Information Requirements and Chemical Safety Assessment, Part B);
- 3) ECHA Guidance on information requirements and chemical safety assessment. Section R.10. (2011) (Guidance on information requirements and chemical safety assessment, Chapter R.10);
- 4) European Fertilizer Manufacturers Association (Fertilizers Europe) released Guidance for the storage, handling and transportation of solid mineral fertilizers);
- 5) European Fertilizer Manufacturers Association (Fertilizers Europe) released Guidance for safe and secure storage of fertilizers on farms“ (2012);
- 6) EN 149 “Respiratory protective devices. Filtering half masks to protect against particles. Requirements, testing,

SC “Achema” Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

- marking“;
- 7) EN 166 “Safety glasses“;
 - 8) EN 388 “Protective gloves against mechanical risks“.
 - 9) The CRC Handbook of Chemistry and Physics (80th ed.);
 - 10) The Merck Index (12th ed.);
 - 11) Sax's Dangerous Properties of Industrial Materials (9th. ed.);
 - 12) AB „Achema“ standard IST 156667399-28 “Ammonium nitrate”.

(iv) Relevant precautionary phrases:

- H272 – May intensify fire; oxidizer;
H319 – Causes serious eye irritation;
H360 – May damage fertility or the unborn child;
H361 – Suspected of damaging fertility or the unborn child;
H362 – May cause harm to breast-fed children;
H372 – Causes damage to organs through prolonged or repeated exposure *exposure cause the hazard*;
H373 – May cause damage to organs through prolonged or repeated exposure *exposure cause the hazard*;
P210 – Keep away from heat/sparks/open flames/hot surfaces. No smoking;
P220 – Keep/Store away from clothing/reducing agents/acids/alkali/sulphur/chlorates/chlorides/nitrates/permanganates/powder of metals and materials containing metals as follows: copper, nickel, cobalt, zinc and their alloys/combustible materials;
P221 – Take any precaution to avoid mixing with combustibles, reducing agents, acids, alkali, sulphur, chlorates, chlorides, nitrates, permanganates, powder of metals and materials containing metals as follows: copper, nickel, cobalt, zinc and their alloys;
P370+P378 – In case of fire: Use water for extinction;
P264 – Wash hands thoroughly after handling;
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.

(v) Training Advice:

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

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.

Release info: This version replaces all previous documents.

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

ANNEX

Exposure scenarios:

- 1 Exposure scenario (1): Manufacturing of the substance including handling, storage and quality controls;**
- 2 Exposure scenario (2): Industrial use for formulation of preparations/articles, intermediate use and end-use in industrial settings;**
- 3 Exposure scenario (3): Professional use in formulation of preparations and end-use;**
- 4 Exposure scenario (4): Consumer end-use of fertilizers and matches/fireworks.**

1. Exposure scenario (1)	
Manufacturing of the substance including handling, storage and quality controls	
Use descriptors related to the life cycle stage	SU8/9 PROC1/2/3/8a/8b/9/14/15 ERC1
Name of contributing environmental scenario (1) and corresponding ERC	1. Manufacturing of substances (ERC1)
List of names of contributing worker scenarios (2) and corresponding PROC	1. Use in closed process, no likelihood of exposure (PROC1) 2. Manufacturing in a closed continuous process, with occasional exposure (PROC2) 3. Use in closed batch process (synthesis or formulation) (PROC3) 4. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a) 5. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) 6. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9) 7. Production of preparations* or articles by tableting, compression, extrusion, pelletisation (PROC14) 8. Use as laboratory reagent (PROC15)
2.1 Contributing scenario (1) controlling environmental exposure	
Environmental release during manufacturing ERC1 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 manufacturing of the substance including handling, storage and quality controls	
All Process Categories are covered by this contributing scenario as all Operational Conditions (OCs) and	

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

Risk Management Measures (RMMs) are identical. PROC1/2/3/8a/8b/9/14/15	
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
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
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
Organisational 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	Not applicable

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

supervision). Those measures need to be reported in particular for demonstrating strictly controlled conditions (to justify exposure based waiving).	
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. Chemical 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:	
<ul style="list-style-type: none"> - 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 followed; - Training staff on good practice; - Good standard of personal hygiene. 	

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

1. Exposure scenario (2)	
Industrial use for formulation of preparations/articles, intermediate use and end-use in industrial settings.	
Use descriptors related to the life cycle stage	SU3/10 PC1/11/12/19/37 PROC1/2/3/5/8a/8b/9/13/15 ERC2/6a
Name of contributing environmental scenario (1) and corresponding ERC	1. Formulation of preparations (ERC2) 2. Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a)
List of names of contributing worker scenarios (2) 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. Use in closed batch process (synthesis or formulation) (PROC3) 4. Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5) 5. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a) 6. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) 7. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9) 8. Treatment of articles by dipping and pouring (PROC13) 9. Use as laboratory reagent (PROC15)
2.1 Contributing scenario (1) controlling environmental exposure	
Formulation of preparations (ERC2) and industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a) 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 industrial use for formulation of preparations/articles, intermediate use and end-use in industrial settings.	
All Process Categories are covered by this contributing scenario as all Operational Conditions (OCs) and Risk Management Measures (RMMs) are identical. PROC1/2/3/5/8a/8b/9/13/15	
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	Solid, low dustiness Liquid

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

design affecting exposure	
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
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	<ol style="list-style-type: none"> 1. Containment as appropriate 2. Good standard of general ventilation
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

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

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. Chemical 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:	
<ul style="list-style-type: none"> - 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 followed; - Training staff on good practice; - Good standard of personal hygiene; 	
1. Exposure scenario (3)	
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

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

Name of contributing environmental scenario (1) and corresponding ERC	ERC8b/8e 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 (2) 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 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	

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

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	<ol style="list-style-type: none"> 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
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)	<ol style="list-style-type: none"> 1. Chemical goggles

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

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:	
<ul style="list-style-type: none"> - 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 followed; - Training staff on good practice; - Good standard of personal hygiene; 	

1. Exposure scenario (4)	
Consumer end-use of fertilizers and matches/fireworks	
Use descriptors related to the life cycle stage	SU21 PC11/12 ERC8b/8e/10a
Name of contributing environmental scenario (1) 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-	1. Explosives (PC11)

SC “Achema”
Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

product categories if applicable	2. 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 and matches/fireworks	
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). No exposure is expected from the use of matches/fireworks (PC11).	
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 duration and frequency of the event (see Guidance Chapter R.15);	Not applicable
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	1. If $\geq 10\%$ of ammonium nitrate: Use chemical goggles 2. If $< 10\%$ of ammonium nitrate: no personal protection needed

SC “Achema”

Safety data sheet



In accordance with Regulation (EC) 1907/2006 (REACH), Annex II with all subsequent amendments and supplements and EC Regulation No. 830/2015

Ammonium nitrate

relevant) and advise how long the protective equipment can be used before replacement (if relevant).	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 chemical goggles If $< 10\%$ ammonium nitrate: No personal protection needed	

The end of Safety Data Sheet.