SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING	
1.1. Product identifier	
Commercial product name	PULAN®
Synonyms	Ammonium saltpeter
Unique Formula Identifier (UFI)	Y8JN-010C-EGC7-FXDH
1.2. Relevant identified uses of the substance or mixture and uses advised against	
Ammonium nitrate is used: • in agriculture, as a mineral fertiliser; • as an intermediate for further synthesis; • for the production of explosives.	
1.3. Details of the supplier of the safety data sheet	
Company name	Grupa Azoty Zakłady Azotowe „Puławy” S.A.
Company address	Al. Tysiąclecia Państwa Polskiego 13; 24-110 Puławy; Poland
Company telephone number	+48 (81) 886 34 31; +48 (81) 565 30 00 fax.: +48 (81) 565 28 56
E-mail	dyspozytor.zap@grupaazoty.com
1.4. Emergency telephone number	
Company shift dispatcher: + 48 (81) 565 23 00 (24 hours/7 days a week) Emergency telephone number: 112	
SECTION 2: HAZARDS IDENTIFICATION	
2.1. Classification of the substance or mixture	
Classification according to Regulation (EC) 1272/2008	
Product classified as hazardous.	
Human health hazards	
Eye Irrit. 2	Eye irritation, category 2 — H319
Adverse physical effects	
Ox. Sol. 3	Oxidising solids, category 3 — H272
Environmental hazards	
Product is not classified as hazardous substance for environment.	
2.2. Label elements	
Hazard pictogram(s)	 **GHS03** **GHS07**

Signal Word	**Warning**
Hazard statement(s)	**H272:** May intensify fire; oxidizer. **H319:** Causes serious eye irritation.
Precautionary statement(s)	**P210:** Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. **P220:** Keep away from clothing and other combustible materials. **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.

2.3. Other hazards

The criteria accepted for persistent substances with bioaccumulative and toxic potential (Persistent, Bioaccumulative, Toxic – PBT) or very persistent and very bioaccumulative substances (very Persistent very Bioaccumulative - vPvB) are not applicable to the substances contained in the mixture.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Not relevant.

3.2. Mixtures

Product identifier	PULAN®

Classification in accordance with Regulation (EC) 1272/2008

Chemical name	Concentration	EC Number	CAS Number	REACH registration number	Classification	Hazard statement
Ammonium nitrate (V)	≥ 98%	229-347-8	6484-52-2	01-2119490981-27-0025	Oxid. Solid 3 Eye Irrit. 2	H272 H319
Magnesium nitrate (V)	≤ 2%	233-826-7	10377-60-3	01-2119491164-38-0008	Oxid. Solid 3	H272

Full text of Hazard statements mentioned in this Section are listed in Section 16. For more details see Section 16.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General	Provide sufficient general and local ventilation. Installation of safety showers and eyewash stations is recommended at workplace.

Inhalation	Remove victim from the area of exposure to fresh air. Obtain medical attention if symptoms of poisoning occur.
Ingestion	If swallowed, give plenty of water to drink. Do not induce vomiting. Ingestion of small amounts of ammonium nitrate usually does not cause intoxication. Ingestion of large amount of the product may cause gastro - intestinal disturbances and methemoglobin creation. In some cases low blood pressure is also observed. Obtain medical attention.
Skin contact	Take off contaminated clothing. Wash contaminated skin with plenty of water. Get medical advice if symptoms of irritation occur.
Eye contact	Immediately flush eyes with plenty of water for about 15 minutes. Avoid strong water stream due to the risk of mechanical damage to cornea. Obtain ophthalmologists' assistance.

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

The mixture irritates eyes, dusts may cause respiratory tract irritation and result in skin redness. In the event of intake by ingestion, methemoglobinemia may occur with the following symptoms: headache, pressure drop, cardiac arrhythmias, dyspnoea and weakness. When 15% of haemoglobin converts to methemoglobin, cyanosis may occur.

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

Medical personnel ought to diagnose and possibly introduce treatment for methemoglobinemia.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media	Not flammable. Use large amounts of water if involved in fire.
Unsuitable extinguishing media	Do not use foam and dry chemical extinguishers.

5.2. Special hazards arising from the substance or mixture

For more details see item 2.1.

5.3. Advice for firefighters

Wear full chemical resistant protective clothing and positive pressure, self contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Suitable protective equipment	Depending on exposure route use: • protective glasses (according to EN 166 standard); • dust masks (according to EN 149 standard); • protective gloves (according to EN 374 and EN 388 standard); • protective goggles (according to EN 166 standard).

Emergency procedures	In case of high concentration of ammonium nitrate dusts evacuate the area of exposure.
For emergency responders	
Wear protective clothing, dust masks, protective gloves, protective goggles.	
6.2. Environmental precautions	
Avoid contamination of watercourses and drains with large amount of ammonium nitrate.	
6.3. Methods and material for containment and cleaning up	
Recommendations for preventing the spread of the spill and its elimination	Small spill and leak: Vacuum or sweep up material. Large spill and leak: Vacuum or sweep up material. Rinse affected area with large amounts of water. Reuse collected ammonium nitrate as a fertiliser or give it away for further disposal.
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	
Avoid inhalation of dust. Handle with care in accordance with good industrial hygiene and safety practice. Use personal protective equipment. Ensure proper cleanness of transport means. In order to prevent humidification avoid product exposure to atmospheric conditions and work in dry, clean and well – ventilated areas. Avoid open flame and high temperatures.	
7.2. Conditions for safe storage, including any incompatibilities	
Ammonium nitrate should only be stored in its original packaging, in clean, dry and ventilated buildings, protected from the ground side from moisture penetration. Store PULAN® on a substrate made of non-flammable materials, without channels, holes and depressions where the molten saltpetre could be trapped. Ammonium nitrate can be stored in stable piles with a total weight not exceeding 300t of the product. The stacks should be separated from each other, walls, roof, heat sources (eg lamps and electrical appliances, heating installations) by a minimum distance of 1 m. Moreover, each stack should be able to access vehicles intended to transport the fertiliser in case of emergency. Fertilisers in packages not exceeding 50 kg should be stored in stacks that have no more than twelve layers, or two pallets in 30 kg unit packages (consisting of 8 layers each), separated by an appropriate partition to prevent the pallet from sliding, mechanical damage to the packages, ensuring even pressure on the load. It is permissible to store 3 layers of flexible packaging with fertilizer of a big-bag type weighing not more than 600 kg for a short period of time - up to 6 months, observing all conditions specified in the Safety Data Sheet. After this time, change the load by limiting the number of big-bag layers to 2 pieces. Repack the fertiliser in the damaged packaging, and it is imperative to collect the spills into a clean bag and separate from the pile. Do not store ammonium nitrate together with the materials listed in 10.5.	

It is allowed to store nitrate fertilizers, such as: ammonium nitrate, nitro-chalk, calcium nitrate, potassium nitrate, sodium nitrate, fertilizers based on ammonium nitrate with a total nitrogen content above 28% next to each other in one storage room.

The access to all storage rooms, both inside and outside, must be restricted only to the authorised persons.

In an ammonium nitrate storage area, smoking, welding, and open flame are prohibited. Protect from direct sunlight, and from heating above 30°C.

Note: See section 9 for physical and chemical properties.

7.3. Specific end use(s)

See the attached exposure scenarios for more details.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Indicative occupational exposure limit values	Not established
Biological limit values	Not established

Ammonium nitrate DNEL (for workers)

Chronic toxicity; systemic effects	Exposure route: dermal	DNEL: 5.12 mg/kg bw/day
Chronic toxicity; systemic effects	Exposure route: inhalation	DNEL: 36 mg/m^3

Ammonium nitrate PNEC

STP	18 mg/l

8.2. Exposure controls

See the attached exposure scenarios for more details.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state	Solid
Colour	White or cream
Odour	None
Melting point/freezing point	Ammonium nitrate: 169.6°C (p = 1013 hPa)
Boiling point or initial boiling point and boiling range	Decomposes at 210°C
Flammability	Mixture is non – flammable; may intensify fire and oxidation

Lower and upper explosion limits	Not relevant (mixture is not explosive)
Flash point	Not relevant (mixture is non – flammable)
Auto-ignition temperature	Not relevant (mixture is non – flammable)
Decomposition temperature	≥ 210°C
pH	≥ 4.5 (10% aqueous solution)
Kinematic viscosity	Not relevant (solid mixture)
Solubility	Ammonium nitrate: > 100 g/l at 20°C
Partition coefficient: n-octanol/ water (Log Ko/w)	Not relevant (inorganic mixture)
Vapour pressure	No data
Density and/or relative density	1.72 at 20°C (water = 1)
Relative vapour density	Not relevant
Particle characteristics	95% of the product is in the form of granules measuring 1.0 - 4.0 mm. A maximum of 3% of the product is in the form of granules measuring less than 0.5 mm.
9.2. Other information	
Information with regard to physical hazard classes	
Ammonium nitrate is characterized with oxidizing properties. Incapable of detonation according to a test performed in accordance with Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules for making EU fertiliser products available on the market. Substance resistance to detonation transfer is reduced in presence of impurities and/or at high temperature. Heating in enclosed space, especially in presence of materials mentioned in item 10.5. may cause violent uncontrolled reaction or explosion.	
Other safety characteristics	
Solubility in organic solvents: Good solubility in pyridine, methanol, liquid ammonia. Limited solubility is observed in solvents such as: ethanol, acetone.	
SECTION 10: STABILITY AND REACTIVITY	
10.1. Reactivity	
Ammonium nitrate is unsteady material on heating to high temperature (see item 5.2.). Ammonium nitrate is characterized with oxidizing properties and therefore reacts violently with combustible and/or reducing agents (see item 10.5). Aqueous solutions of ammonium nitrate are known to act like a weak acids.	
10.2. Chemical stability	
Product is stable under normal conditions.	
10.3. Possibility of hazardous reactions	

Reacts violently with combustible materials and/or reducing agents (see item 10.5.).

10.4. Conditions to avoid

Open flame, heating above melting point (see item 9.1.), exposure to atmospheric conditions (see item 7.2.), contact with incompatible materials (see item 10.5.).

10.5. Incompatible materials

Do not store ammonium nitrate with fertilisers other than these specified in point 7.2. and avoid allowing ammonium nitrate to get in contact with materials that may react with it, or are combustible, that is, e.g., pesticides, disinfectants, herbicides, flammable materials, chlorates, hypochlorites, chlorinated organic compounds, bleaches, chromates, organic peroxides, organic compounds, alkalis, acids, sulfur, powdered metals (zinc, copper and copper alloys), organic materials such as hay, straw, oils, greases, grains, and animal fodder.

10.6. Hazardous decomposition products

Toxic nitrogen oxides (NO_x) and ammonia (NH_3).

SECTION 11: TOXICOLOGICAL INFORMATION

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

<table>
<tr><td>Acute toxicity</td><td>
<table>
<tr><th>Ingredient name</th><th>Route</th><th>Specie(s)</th><th>Result</th></tr>
<tr><td rowspan="3">Ammonium nitrate (100%)</td><td>Inhalation (30 min.)</td><td>-</td><td>Not relevant</td></tr>
<tr><td>Ingestion</td><td>rat</td><td>LD_{50}: 2950 mg/kg</td></tr>
<tr><td>Skin contact</td><td>rat</td><td>LD_{50}: >5000 mg/kg</td></tr>
</table>
</td></tr>
<tr><td>Skin corrosion/irritation</td><td>There is no evidence of skin irritation. Prolonged contact may cause skin redness.</td></tr>
<tr><td>Serious eye damage/irritation</td><td>The mixture causes eye irritation.</td></tr>
<tr><td>Respiratory or skin sensitisation</td><td>There is no evidence for skin or respiratory tract sensitization. No classification.</td></tr>
<tr><td>Germ cell mutagenicity</td><td>There is no evidence for genotoxicity. No classification.</td></tr>
<tr><td>Carcinogenicity</td><td>There is no evidence for carcinogenicity. No classification.</td></tr>
<tr><td>Reproductive toxicity</td><td>There is no evidence for reproductive toxicity. No classification.</td></tr>
<tr><td>STOT (Specific target organ Toxicity) - single exposure</td><td>Not classified.</td></tr>
<tr><td>STOT-repeated exposure</td><td>Not classified.</td></tr>
<tr><td>Aspiration hazard</td><td>There is no evidence for aspiration hazards.</td></tr>
</table>

Symptoms related to the physical, chemical and toxicological characteristics	
Inhalation	Inhalation of the product dusts may cause respiratory tract irritation.
Ingestion	Ingestion of large amount of the product may cause gastro-intestinal disturbances leading to vomiting, diarrhea, methemoglobin creation possibly resulting in cyanosis.
Skin contact	Prolonged contact may cause skin redness.
Eye contact	Contact with eye may cause eye irritation.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

The mixture irritates eyes, dusts may cause respiratory tract irritation and result in skin redness. In the event of intake by ingestion, methemoglobinemia may occur with the following symptoms: headache, pressure drop, cardiac arrhythmias, dyspnoea and weakness. When 15% of haemoglobin converts to methemoglobin, cyanosis may occur.

11.2. Information on other hazards

Endocrine disrupting properties

No data.

Other information

No data.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Short-term (acute) toxicity:

Ingredient name	Test	Result
Ammonium nitrate (100%)	Fish	LC_{50} (48 h): 447 mg/l
Potassium nitrate (100%)	Aquatic invertebrates	EC_{50} (48 h): 490 mg/l

Toxicity to algae:

Ingredient name	Test	Result
Potassium nitrate (100%)	Algae	EC_{50}: 1700 mg/l

Toxicity to aquatic microorganism:

Ingredient name	Test	Result
Sodium nitrate (100%)	Aquatic micro - organisms	EC_{50}: 1000 mg/l

12.2. Persistence and degradability	
Biodegradability in case of inorganic chemicals is not required to Regulation (EC) 1907/2006.	
12.3. Bioaccumulative potential	
Bioaccumulation does not occur in case of ammonium nitrate.	
12.4. Mobility in soil	
Based on physico-chemical properties, ammonium nitrate is predicted to have a high mobility in soil.	
12.5. Results of PBT and vPvB assessment	
PBT and vPvB assessment is not relevant and it is not required for the substances of inorganic type.	
12.6. Endocrine disrupting properties	
No data.	
12.7. Other adverse effects	
Ammonium nitrate is not listed in the Regulation (EC) 1005/2009 as the substance potentially depleting the ozone layer.	
SECTION 13: DISPOSAL CONSIDERATIONS	
13.1. Waste treatment methods	
Waste treatment methods	Reuse as a mineral fertiliser or give it away for further disposal. Avoid disposal into drains and sewers.
Package waste disposal	Dispose in accordance with national and local environmental regulations. Empty containers must be handed over to a licensed waste disposal contractor (package waste code 15 01 02).
Waste code	02 01 09 - Agrochemical waste other than those mentioned in 02 01 08.
Special precautions	See Section 7 for more details.
Relevant Community provisions	The disposal of this product and its packaging after use must conform to the requirements of environment protection and regulations referring to waste disposal as well as the requirements of local authorities.
SECTION 14: TRANSPORT INFORMATION	
14.1. UN number or ID number	
UN number: 2067	
14.2. UN proper shipping name	
Ammonium nitrate based fertiliser.	
14.3. Transport hazard class(es)	
5.1.	

14.4. Packing group	
III	
14.5. Environmental hazards	
Not applicable.	
14.6. Special precautions for user	
Follow rules and guidelines of the traffic code.	
14.7. Maritime transport in bulk according to IMO instruments	
Product name	Not applicable.
Ship type	Not applicable.
Pollution Category	Not applicable.
SECTION 15: REGULATORY INFORMATION	
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture	
Authorisation	
Material is not subject to authorization according to Annex XIV of Regulation (EC) No. 1907/2006.	
Restrictions	
Ammonium nitrate is subject to following restrictions on the manufacture, placing on the market and use according to Annex XVII of EC Regulation No. 1907/2006: Shall not be placed on the market for the first time after 27 June 2010 as a substance, or in mixtures that contain more than 28% by weight of nitrogen in relation to ammonium nitrate, for use as a solid fertiliser, straight or compound, unless the fertiliser complies with the technical provisions for ammonium nitrate fertilisers of high nitrogen content set out in Annex III to Regulation (EC) No 2003/2003 of the European Parliament and of the Council.	
Other UE regulations	
Ammonium nitrate is listed in Part 1 of Annex I to the Regulation (EU) 2012/18 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 (also known as the Seveso III Directive). Ammonium nitrate is listed in Annex I to the Regulation (EU) 2019/1148 on the marketing and use of explosives precursors. Acquisition, introduction, possession or use by the general public is restricted. Any suspicious transactions and significant disappearances and thefts must be reported to the National Contact Point within 24 hours of considering or detection.	
15.2. Chemical safety assessment	
Grupa Azoty Zakłady Azotowe „Puławy" S.A. prepared a relevant chemical safety assessment for ammonium nitrate.	
SECTION 16: OTHER INFORMATION	
Changes made	SECTION 1, SECTION 9, SECTION 11 SECTION 12.

Legend to abbreviations and acronyms:

Index number – is the nine-digit code that is assigned to chemical substances in part 3 of Annex VI (EC) 1272/2008.

EC number - is the seven-digit code that is assigned to chemical substances that are commercially available within the European Union.

CAS number - unique numerical identifier assigned by the Chemical Abstracts Service to every chemical substance.

DNEL - is the level of exposure to a substance above which humans should not be exposed.

PNEC - is the concentration below which exposure to a substance is not expected to cause adverse effects for environmental.

LC_{50} - in toxicology, the median lethal dose, LD_{50} (abbreviation for "Lethal Dose, 50%"), LC_{50} (Lethal Concentration, 50%) of a toxic substance or radiation is the dose required to kill half the members of a tested population after a specified test duration.

LD_{50} - in toxicology, lethal dose (LD) is an indication of the lethality of a given chemical substance. It represents the amount of a material, which results in death of 50% of a group of test animals.

EC_{50} - effective concentration of a toxic substance at 50% mortality rate of the affected community being observed

Log $K_{O/W}$ - is defined as the ratio of the molar concentrations of a chemical in n-octanol and water, in dilute solution.

$K_{O/C}$ – is defined as the ratio of the molar concentrations of a chemical in organic carbon and water.

References	Chemical Safety Reports for ammonium nitrate and as well for magnesium nitrate were applied during MSDS preparation. Ostra methemoglobinemia – przyczyny, objawy i leczenie /Acute methemoglobinemia – causes, symptoms and medical treatment/ - Tomasz Janus, Jacek Piechock, Anna Janus, /Anestezjologia i Ratownictwo Anaesthesiology and Medical Rescue/ 2015; 9: 327-333
Instruction	Personnel involved in dealing with the substance should be trained and work according to relevant HSE guidelines. Drivers who are responsible for transportation of the substance should be professionally trained in requirements of ADR.

Hazard statements referred to under headings 2 – 15

H272: May intensify fire; oxidizer.

H319: Causes serious eye irritation.

NOTE:

The information in this Safety Data Sheet is given in good faith and belief in its accuracy based on our knowledge of the substance/mixture concerned at the date of publication. It does not imply the acceptance of any legal liability or just responsibility whatsoever by the Company for the consequences of its use or misuse in any particular circumstances.

Annexes:

Exposure scenario No 1: MANUFACTURE OF AMMONIUM NITRATE *including safe handling, storage and quality control.*

Exposure scenario No 2: FORMULATION OF CHEMICALS AND FERTILISERS.
Exposure scenario No 3: INDUSTRIAL AND PROFESSIONAL APPLICATIONS OF AMONIUM NITRATE.

MANUFACTURE OF AMMONIUM NITRATE *including safe handling, storage and quality control*	
1. Sector of use (SU)	
Not applicable.	
2. Process category (PROC)	
PROC 1: Use in closed process, no likelihood of exposure. PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 3: Use in closed batch process (synthesis or formulation). PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 8a: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC 8b: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). PROC 14: Production of mixtures or articles by tabletting, compression, extrusion, pelletisaton. PROC 15: Use as laboratory reagent.	
3. Product category (PC)	
Not applicable.	
4. Environmental release category (ERC)	
ERC 1: Manufacture of substances.	
5. Processes and activities covered by the exposure scenario	
The exposure scenario describes conditions relating to substance manufacture *(including: safe handling, loading/unloading, quality control - sampling, testing, filling, dosing, repair and maintenance work, cleaning, etc.)* mainly in a continuous closed system. Tasks and activities related to this are carried out by employees inside the premises in strictly industrial mode.	
6. Product characteristics	
Physical state of the substance/product	Solid
Volatility of the substance/product	Low
Concentration of substance in product	Not applicable
7. Amounts used	
> 2.8 tons/day – > 1000 tons/year in situ.	
8. Frequency and duration of use/exposure	
> 4 hours per day.	
9. Technical conditions and measures to prevent or avoid human exposure	

Production processes should be conducted under full (rigorous) control. Production processes should be carried out using fully enclosed and fully automated equipment. General room ventilation is required.	
10. Conditions and measures related to personal protection, hygiene and health evaluation	
Eye protection	If there is a possibility of contact with liquid product, use tightly fitting chemical resistant protective goggles compliant with the EN 166 standard.
Skin and body protection	Use protective clothing acc. to PN-EN ISO 13688-12.
Hand protection	Chemical-resistant protective gloves compliant with the EN 374 and EN 388 standards.
Respiratory protection	In case of exposure to dust, use dust masks (compliant with the EN 149 standard).
Other recommended protection measures	Use an integrated risk management system at the facility.
11. Frequency and duration of environmental release	
Exposure assessment and risk characterization for the environment are not required.	
12. Technical conditions and measures to reduce or avoid environmental release	
The Exposure Scenario describes tasks and activities performed in a closed system. It is assumed that exposure is sporadic and completely controlled. To avoid an uncontrolled release of substances, all process equipment should be regularly inspected and maintained.	
13. Conditions and measures related to municipal sewage treatment plant	
Average effluent flow rate	2000 m^3/day (assumed value)
Average receiving river flow rate	≥ 18000 m^3/day (assumed value)
Efficiency of STP	approx. 95%
14. Conditions and measures related to waste management	
The sludge from the water (sewage) treatment process should be collected on site (at the plant) then sent for further treatment in a disposal/recovery process.	
15. Exposure estimation	

Route of exposure	Type of effects	Conclusions regarding risks
Inhalation	Long-term systemic effects	DNEL (Derived No Effect Level) = 36 mg/m^3
	Acute systemic effects	No risk has been identified
	Long-term local effects	Exposure unknown (no further information)

		Acute local effects	Exposure unknown (no further information)
	Dermal	Long-term systemic effects	DNEL (Derived No Effect Level) = 5.12 mg/kg bodyweight/day
		Acute systemic effects	No risk has been identified
		Long-term local effects	Exposure unknown (no further information)
		Acute local effects	No risk has been identified
	Eye contact	Local effects	Low risk (threshold not specified)

FORMULATION OF CHEMICALS AND FERTILISERS
1. Sector of use (SU)
Not applicable.
2. Process category (PROC)
PROC 2: Use in closed, continuous process with occasional controlled exposure. PROC 3: Use in closed batch process (synthesis or formulation). PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises. PROC 5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact). PROC 8a: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC 8b: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). PROC 13: Treatment of articles by dipping and pouring. PROC 14: Production of mixtures or articles by tabletting, compression, extrusion, pelletisaton. PROC 15: Use as laboratory reagent.
3. Product category (PC)
PC 1: Adhesives, sealants. PC 9a: Coatings and paints, thinners, paint removers. PC 11: Explosives. PC 12: Fertilisers. PC 14: Metal surface treatment products. PC 19: Intermediates. PC 20: Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents. PC 35: Washing and cleaning products. PC 37: Water treatment chemicals. P15900: Process regulator.
4. Environmental release category (ERC)
ERC 2: Formulation of mixtures.
5. Processes and activities covered by the exposure scenario
The exposure scenario describes conditions relating to formulation of chemicals and fertilisers *(including: safe handling, loading/unloading, quality control - sampling, testing, filling, dosing, repair and maintenance work, cleaning, etc.)* mainly in a continuous closed system. Tasks and activities related to this are carried out by employees inside the premises in strictly industrial mode.
6. Product characteristics

Physical state of the substance/product	Solid
Volatility of the substance/product	Low
Concentration of substance in product	Not applicable
7. Amounts used	
> 2.8 tons/day -> 1000 tons/year in situ.	
8. Frequency and duration of use/exposure	
> 4 hours per day.	
9. Technical conditions and measures to prevent or avoid human exposure	
Production processes should be conducted under full (rigorous) control. Production processes should be carried out using fully enclosed and fully automated equipment. General room ventilation is required.	
10. Conditions and measures related to personal protection, hygiene and health evaluation	
Eye protection	If there is a possibility of contact with liquid product, use tightly fitting chemical resistant protective goggles compliant with the EN 166 standard.
Skin and body protection	Use protective clothing acc. to PN-EN ISO 13688-12.
Hand protection	Chemical-resistant protective gloves compliant with the EN 374 and EN 388 standards.
Respiratory protection	In case of exposure to dust, use dust masks (compliant with the EN 149 standard).
Other recommended protection measures	Use an integrated risk management system at the facility.
11. Frequency and duration of environmental release	
Exposure assessment and risk characterization for the environment are not required.	
12. Technical conditions and measures to reduce or avoid environmental release	
The Exposure Scenario describes tasks and activities performed in a closed system. It is assumed that exposure is sporadic and completely controlled. To avoid an uncontrolled release of substances, all process equipment should be regularly inspected and maintained.	
13. Conditions and measures related to municipal sewage treatment plant	
Average effluent flow rate	2000 m^3/day (assumed value)
Average receiving river flow rate	≥ 18000 m^3/day (assumed value)
Efficiency of STP	approx. 95%
14. Conditions and measures related to waste management	
The sludge from the water (sewage) treatment process should be collected on site (at the plant) then sent for further treatment in a disposal/recovery process.	

15. Exposure estimation

Route of exposure	Type of effects	Conclusions regarding risks
Inhalation	Long-term systemic effects	DNEL (Derived No Effect Level) = 36 mg/m³
	Acute systemic effects	No risk has been identified
	Long-term local effects	Exposure unknown (no further information)
	Acute local effects	Exposure unknown (no further information)
Dermal	Long-term systemic effects	DNEL (Derived No Effect Level) = 5.12 mg/kg bodyweight/day
	Acute systemic effects	No risk has been identified
	Long-term local effects	Exposure unknown (no further information)
	Acute local effects	No risk has been identified
Eye contact	Local effects	Low risk (threshold not specified)

INDUSTRIAL AND PROFESSIONAL APPLICATIONS OF AMONIUM NITRATE
1. Sector of use (SU)
SU 1: Agriculture, forestry, fishery.
SU 2a: Mining (without offshore industries).
SU 4: Manufacture of food products.
SU 6a: Manufacture of wood and wood products.
SU 8: Manufacture of bulk, large scale chemicals (including petroleum products).
SU 9: Manufacture of fine chemicals.
SU 10: Formulations [mixing] of mixtures and/or re-packaging (excluding alloys).
SU 12: Manufacture of plastics products, including compounding and conversion.
SU 15: Manufacture of fabricated metal products, except machinery and equipment.
SU 19: Building and construction work.
SU 23: Electricity, steam, gas, water supply and sewage treatment.
2. Process category (PROC)
PROC 1: Use in closed process, no likelihood of exposure.
PROC 2: Use in closed, continuous process with occasional controlled exposure.
PROC 3: Use in closed batch process (synthesis or formulation).
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises.
PROC 5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact).
PROC 7: Industrial spraying.
PROC 8a: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
PROC 8b: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at dedicated facilities.
PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing).
PROC 10: Roller application or brushing.
PROC 11: Non industrial spraying.
PROC 13: Treatment of articles by dipping and pouring.
PROC 14: Production of mixtures or articles by tabletting, compression, extrusion, pelletisaton.
PROC 15: Use as laboratory reagent.
PROC 19: Hand-mixing with intimate contact and only PPE available.
3. Product category (PC)
PC 1: Adhesives, sealants.
PC 9a: Coatings and paints, thinners, paint removers.
PC 11: Explosives.
PC 12: Fertilisers.

PC 14: Metal surface treatment products.

PC 19: Intermediates.

PC 35: Washing and cleaning products.

PC 37: Water treatment chemicals.

P15900: Process regulator.

4. Environmental release category (ERC)

ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates).

ERC 6b: Use of reactive processing aid at industrial site (no inclusion into or onto article).

ERC 8b: Wide dispersive indoor use of reactive processing aids in open systems.

ERC 8e: Wide dispersive outdoor use of reactive processing aids in open systems.

5. Processes and activities covered by the exposure scenario

The exposure scenario describes conditions associated with the use of ammonium nitrate as a *substance, intermediate, or in the form of mixtures*.

Industrial processes that use ammonium nitrate as a substance/intermediate are carried out in large production installations. Due to the large size of the installations, the process equipment is usually located outdoors. Some processes can be carried out indoors. Processes are continuous or periodic, carried out in closed systems. Manual operations are activities related to maintenance and repairs, or to the sampling needed for controlling the production process. Loading/unloading usually takes place in an open area.

Typical activities related to professional use of ammonium nitrate, in which worker's exposure may occur, include: contact with devices containing ammonium nitrate, transfer of the substance to containers, mixing or use of products containing ammonium nitrate (e.g. fertilisers), including spraying.

6. Product characteristics

Physical state of the substance/product	Solid
Volatility of the substance/product	Low
Concentration of substance in product	≥ 25%

7. Amounts used

> 2.8 tons/day – > 1000 tons/year in situ.

8. Frequency and duration of use/exposure

Duration of workers' exposure: > 4 hours/day.

Frequency of exposure: ≤ 240 days/year.

9. Technical conditions and measures to prevent or avoid human exposure

Workers' contact with the substance is usually very limited, as most operations are remotely controlled. Potential exposure should be minimized by the use of personal protective equipment. General room ventilation is required.

10. Conditions and measures related to personal protection, hygiene and health evaluation:

Eye protection	If there is a possibility of contact with liquid product, use tightly fitting

	chemical resistant protective goggles compliant with the EN 166 standard.
Skin and body protection	Use protective clothing acc. to PN-EN ISO 13688-12.
Hand protection	Chemical-resistant protective gloves compliant with the EN 374 and EN 388 standards.
Respiratory protection	In case of exposure to dust, use dust masks (compliant with the EN 149 standard).
Other recommended protection measures	Use an integrated risk management system at the facility.

11. Frequency and duration of environmental release

Estimation of substance emissions has not been made.

12. Technical conditions and measures to reduce or avoid environmental release

It is necessary for the technological process to be planned in such a way so that all emissions are minimized. To avoid uncontrolled substance release, all technological devices should be monitored on a regular basis and regularly maintained.

13. Conditions and measures related to municipal sewage treatment plant

Average effluent flow rate	2000 m^3/day (assumed value)
Average receiving river flow rate	≥ 18000 m^3/day (assumed value)
Efficiency of STP	approx. 95%
Additional information	Where there is no access to urban sewage treatment plants, it is recommended that wastewater be biologically treated, before being dumped into the environment.

14. Conditions and measures related to waste management

The sludge from the water (sewage) treatment process should be collected on site (at the plant) then sent for further treatment in a disposal/recovery process.

15. Exposure estimation

Route of exposure	Type of effects	Conclusions regarding risks
Inhalation	Long-term systemic effects	DNEL (Derived No Effect Level) = 36 mg/m^3
	Acute systemic effects	No risk has been identified
	Long-term local effects	Exposure unknown (no further information)
	Acute local effects	Exposure unknown (no further information)

	Dermal	Long-term systemic effects	DNEL (Derived No Effect Level) = 5.12 mg/kg bodyweight/day
		Acute systemic effects	No risk has been identified
		Long-term local effects	Exposure unknown (no further information)
		Acute local effects	No risk has been identified
	Eye contact	Local effects	Low risk (threshold not specified)