

SAFETY DATA SHEET OF SUBSTANCE
Ammonium sulphate AS21

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

1.1. PRODUCT IDENTIFIER

Trade name	Ammonium sulphate AS21
Registration name	Ammonium sulphate
Other names and synonyms	Ammonium sulphate, Sulfuric acid diammonium salt, Diammonium sulfate
CAS number	7783-20-2.
WE number	231-984-1
Registration number	01-2119455044-46-0040.

1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE AND USES ADVISED AGAINST

1. Fertilizer.
2. Intermediate product.
3. Component of extinguishing agents.
4. pH regulating agents.
5. Cosmetic ingredient.
6. Use in pharmacy.
7. Laboratory chemicals.
8. Manufacture of herbicides, insecticides and fungicides.

1.3. DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

GRUPA AZOTY S.A.

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e-mail contact of the person responsible for safety data sheet: tb@grupazoty.com

1.4 EMERGENCY TELEPHONE NUMBER

Emergency services: 112

Substantive help of GRUPA AZOTY S.A.:

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SECTION 2. HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF THE SUBSTANCE

The substance is not listed as dangerous substance according to the regulations of the European Parliament and Council Regulation (EC) No 1272/2008 of 16 December 2008 on classification, labelling and packaging of substances and mixtures, and does not meet the classification criteria as a hazardous substance under Directive 67/548/EWG and 1999/45/WE from 31.12.2008

2.2 LABEL ELEMENTS

Labelling in accordance with Decree (WE) no. 1272/ 2008

Not required.

Statements indicating the type of hazard:

Not applicable.

Precautionary statements:

(P261) - Avoid breathing dust.

(P280) - Wear protective gloves, eye protection.

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

(P305 + P351 + P338) - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and if it is easy to do.

2.3 OTHER HAZARDS

The substance does not meet the criteria for PBT or vPvB.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 SUBSTANCE

Name of substance	The content [%]	WE	CAS	Classification
				compliant with the Regulation no. 1272/2008 (CLP)
Ammonium sulphate	min 99.3	231-984-1	7783-20-2	Not listed as dangerous substance according with the European Parliament and Council Regulation (EC) No 1272/2008 of 16 12.2008.
Ammonium nitrate	max 0.4	229-347-8	6484-52-2	According with GHS: H319 Eye Irrit.2
Water	max 0.3	231-791-2	7732-18-5	Not listed as dangerous substance according with the European Parliament and Council Regulation

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SECTION 4. FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

IF INHALED

Remove victim to fresh air. If you have problems, call the doctor. After inhalation of decomposition products: Keep patient calm, remove to fresh air, seek medical attention.

IF SWALLOWED

Rinse mouth immediately and then drink plenty of water, seek medical attention

IF ON SKIN

Thoroughly wash skin with plenty of soap and water for at least 15 minutes.

IN CASE OF CONTACT WITH EYES

Remove contact lenses, if present and if it is easy to do.

Wash affected eyes for at least 15 minutes under running water with eyelids held open. Seek medical attention.

FIRST AID MEASURES

Remove contaminated clothing.

4.2 MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

After inhalation of decomposition products: Risk of pulmonary edema. Symptoms can appear later.

4.3 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

After inhalation of decomposition products: Pulmonary edema prophylaxis

SECTION 5. FIREFIGHTING MEASURES

Non-flammable substance. The following recommendations relate to the product to fire.

5.1 EXTINGUISHING MEDIA

SUITABLE EXTINGUISHING MEDIA:

Water, fire extinguishers.

UNSUITABLE EXTINGUISHING MEDIA:

None.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE

The product does not burn.

Ammonia can be emitted at temperatures over 235OC.

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5.3 ADVICE FOR FIREFIGHTERS

Avoid breathing decomposition products.

Contaminated extinguishing water should to be used in accordance with official regulations.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

6.1.1 For non-emergency personnel

Avoid contact with spilled ammonium sulphate.

6.1.2 For emergency responders

Assure sufficient ventilation, limit dusting and prevent contact with skin or eyes.

6.2 ENVIRONMENTAL PRECAUTIONS

In particular, avoid placing introducing into drains, surface water and groundwater. Shut off the source of the leak to the environment. During the purification avoid dusting.

In case of water contamination inform proper authorities.

Collect contaminated soil and use it again as a fertilizer.

6.3 METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Remove the cause of pollution, protect the site, collect the ammonium sulphate to packaging containers.

Collected ammonium sulfate is suitable for use as fertilizer.

6.4 REFERENCE TO OTHER SECTIONS

See also section 8.2 and 13.

SECTION 7. HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

Ammonium sulphate must not be mixed or stored with alkaline substances.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Protect against moisture.

The substance may cake under the influence of moisture.

Ammonium sulphate should be stored in original, properly labelled packages chemicals storage, or in bulk in fertilizers store.

The maximum height for stored fertilizer is 12 layers of 50 kg bags. In case of 500 kg big-bag, maximum height is 3 layers.

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7.3 SPECIFIC END USE(S)

Not identified uses, others than in section 1.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. CONTROL PARAMETERS

Not required.

See also paragraph 15.1 pos.15

8.2. EXPOSURE CONTROLS

8.2.1 Appropriate engineering controls

In buildings located near work stations, ventilation and dust cleaning system are required.

It is required to provide hermetic sealing of the process.

Before direct contact with the substance use personal protection equipment.

8.2.2 Individual protection measures, such as personal protective equipment

a) Eye/face protection - In case of dust work use safety glasses or goggles in hermetic casing.

b) Skin protection - Hand protection

Protective gloves.

Protective clothing.

c) Respiratory protection - During work in atmosphere contaminated with ammonium sulphate dust, use P2 anti-dust masks with molecular filters. Limited time of molecular filter protective effect should be kept in mind.

d) Thermal hazards - Do not occur in normal conditions.

8.2.3 Environmental exposure controls

Quantity of the substance discharged into the environment has to be controlled to avoid exceeding specified limits specified by laws.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	Crystals, white.
ODOUR	No odour.
ODOUR THRESHOLD	None.
PH	56 (50 g/l H ₂ O, 200C).

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MELTING POINT/FREEZING POINT	Not defined. At temperature 280OC decomposition occurred.
INITIAL BOILING POINT AND BOILING RANGE	None. At a temperature of 280OC decomposition occurred.
FLASH POINT	Not applicable.
EVAPORATION RATE	The substance is a solid. None.
FLAMMABILITY (SOLID, GAS)	Non-combustible.
UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	None.
VAPOUR PRESSURE	0.000000004053 hPa w 25OC.
VAPOUR DENSITY	No data.
RELATIVE DENSITY	1,77 relative in water at 200C.
SOLUBILITY(IES)	767 g/dm ³ at 25OC aqueous solution is slightly acid (pH 5÷6).
PARTITION COEFFICIENT: N-OCTANOL/WATER	Not applicable. The substance is inorganic.
AUTO-IGNITION TEMPERATURE	The substance is a solid and self-heating of the substance up to 400OC is excluded.
DECOMPOSITION TEMPERATURE	>280OC.
VISCOSITY	Not applicable. Substance is a solid.
EXPLOSIVE PROPERTIES	There are no chemical groups associated with explosive properties present in the molecule.
OXIDISING PROPERTIES	The substance is incapable of reacting exothermically with combustible materials on the basis of the chemical structure.

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9.2. OTHER INFORMATION

SOLUBILITY	Highly soluble in water, insoluble in alcohols.
BULK DENISTY	0.86 – 0.98 kg/dm ³ .

SECTION 10. STABILITY AND REACTIVITY

10.1 REACTIVITY

The substance may react with strong oxidizers and alkalize solutions.

10.2 CHEMICAL STABILITY

In normal conditions ammonium sulphate is chemically stable.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS

None, if storage conditions are respected.

10.4 CONDITIONS TO AVOID

Avoid contact with oxidizers and alkalize solutions.
Avoid high temperature near temperature of the decomposition.

10.5 INCOMPATIBLE MATERIALS

Dump product may cause corrosion of metals.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

Avoid exceeding 235OC as it may cause a rapid decomposition with emission of ammonia and sulfur trioxide, corrosive and toxic gases.

SECTION 11. TOXICOLOGICAL INFORMATION

11. 1 INFORMATION ON TOXICOLOGICAL EFFECTS

Literature contains no reports of harmful effect of ammonium sulfate on human health.

Ammonium sulfate after being absorbed by the human body is completely dissociated into ions (NH₄⁺, SO₄²⁻). Ammonium ions are transported to the liver and there further metabolized to urea, which is excreted through the kidneys from the body. Ammonium is also an endogenous substance that serves a major role in the maintenance of the acid-base balance. Sulfate is a normal intermediate factor in the

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metabolism of endogenous sulfur compounds, and is excreted unchanged or in conjugated form in urine.

a) acute toxicity;

LD50 (oral, *rat*) = 4250 mg/kg.

LD50 (oral, *mouse*) = 3040 mg/kg.

LD50 (skin, *rat*) > 2000 mg/kg.

LD50 (skin, *mouse*) > 2000 mg/kg.

The acute inhalation toxicity of ammonium sulfate aerosols (average diameter 1-3 μm) is very low with 8-h LC50 values of greater than 900 mg/ml for guinea pigs. Rats were exposed repeatedly for 8 h/d to 1000 - 1200 mg/ml (average diameter 2-3 μm) without mortality.

Clinical signs after oral exposure included staggering, prostration, apathy, and labored and irregular breathing immediately after dosing at doses near to or exceeding the LD50 value.

b) corrosive / irritating to the skin;

Substance is not classified as corrosive or irritant to the skin.

c) serious eye damage / eye irritation;

The substance does not cause damage to eyesight, but the effects observed were similar to those observed with the control compound, talcum. Slight swelling and conjunctival redness goes up after 8 days.

d) sensitization by inhalation or skin;

In humans, inhalation of 0.1-0.5 mg ammonium sulfate/m³ as an aerosol during the 2-4 hours have not caused problems with breathing. With higher concentrations of ammonium sulphate 1 mg/m³ after a careful examination revealed a decrease in respiratory function.

e) mutagenic effect on germ cells;

Ammonium sulfate was not mutagenic in mammalian cells (HPRT) with and without metabolic activation systems.

It did not induce chromosomal aberrations in mammalian or human cell cultures.

f) carcinogenicity;

In small doses, the substance does not exhibit carcinogenic properties. Similarly to other salts, high doses of ammonium sulfate may have the capability of tumor promotion in the rat stomach; it is, however, much less potent than sodium chloride when tested under identical conditions.

NOAEL (oral, *rat*) = 256 mg/kg body weight/day

g) reproductive toxicity;

There are no valid studies available on the effects of ammonium sulfate on fertility and development. Based on data from a similar ammonium compound (diammonium phosphate), that ammonium ions up to the dose tested have no negative effects on fertility.

NOAEL(oral, *rat*) = 1500 mg/kg body weight/day

However, given that existing studies have not confirmed the negative effect of ammonium sulfate on the reproduction, it should be assumed that prolonged administration of dangerous toxic doses can cause reproductive toxicity.

h) action of target organ toxicity - single exposure;

No information on human is available.

NOAEL(oral, *rat*) = 256 mg/kg body weight.

i) action of target organ toxicity - repeated exposure;

No information on human is available.

NOAEC(inhalation, *rat*) = 300 mg/m³.

j) an aspiration hazard;

No data.

Likely routes of exposure and delayed, direct and chronic effects of short-and long-term exposure

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a) for workers

Short-term exposure and local effects; Acute and short-term DNELs were not calculated as they are the calculations of long-term DNEL.

Therefore the following DNEL(s) for local effects and short term exposure were not determined:

- Dermal DNEL for acute / short-term exposure - systemic effects,
- Inhalation DNEL for acute / short-term exposure - systemic effects,
- Dermal DNEL for acute / short-term exposure - local effects,
- Inhalation DNEL for acute / short-term exposure - local effects.

No local dermal or irritating effects were observed in repeated dose studies.

Therefore the following DNEL(s) for local effects and long term- exposure were not determined:

- Dermal DNEL for long-term exposure - local effects,
- Inhalation DNEL for long-term exposure - local effects.

Long-term exposure - systemic effects:

- dermal:

DNEL (for workers) = 42,667 mg/kg body weight/day.

NOAEL(for workers) = 512,004 mg/kg body weight/day (on the basis of assessment factor of 12).

- inhalation:

DNEL (for workers) = 11,167 mg/m³.

NOAEL(for workers) = 201,006 mg/m³ (on the basis of assessment factor of 18).

b) for the general population

Short-term exposure and local effects; Acute and short-term DNELs were not calculated as they are the calculations of long-term DNEL.

Ammonium sulfate does not cause allergic reactions, therefore the following DNEL(s) for local effects and short term exposure were not determined:

- Dermal DNEL for acute / short-term exposure - systemic effects,
- Inhalation DNEL for acute / short-term exposure - systemic effects,
- Dermal DNEL for acute / short-term exposure - local effects,
- Inhalation DNEL for acute / short-term exposure - local effects.

Long-term exposure and local effects; No local dermal or irritating effects were observed in repeated dose studies.

Therefore the following DNEL(s) for local effects and long- term exposure were not determined:

- Dermal DNEL for long-term exposure - local effects,
- Inhalation DNEL for long-term exposure - local effects.

Long-term exposure - systemic effects:

- oral:

DNEL (for population) = 6,400 mg/kg body weight/day.

NOAEL(for population) = 256,0 mg/kg body weight/day (on the basis of assessment factor of 40).

- dermal:

DNEL (for population) = 12,8 mg/kg body weight/day.

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NOAEL(for population) = 512,0 mg/kg body weight/day (on the basis of assessment factor of 40).

- inhalation:

DNEL (for population) = 1,667 mg/m³.

NOAEL(for population) = 100,020 mg/m³ (on the basis of assessment factor of 60).

SECTION 12. ECOLOGICAL INFORMATION

12.1 TOXICITY

In aqueous solution, ammonium salts are completely dissociated into NH₄⁺ and a corresponding anion.

This equilibrium depends on temperature, pH and ionic strength of the water in the environment.

Toxicity of ammonium sulphate are mainly ammony because of toxicity of ammonium sulphate are similar to those for other substances containing ammonium ion.

In high concentrations toxic effect to fish occur.

With a high degree of probability it is not harmful to algae, plankton and aquatic invertebrates.

EC10 (30 d) (*Lepomis macrochirus*) = 5.29 mg/l

EC50 (5 d) (*Chlorella vulgaris*) = 1 605 mg/l

LC50 (14 D) (*Eisenia fetida*) = 201 mg/kg

LC50 (10 D) (*Ambystoma gracile larvae*) > 995 mg/l

Ammonium sulphate is toxic to soil bacteria in the case of calcium deficiency and in concentrations highly exceeding the recommended dose.

12.2 PERSISTENCE AND DEGRADABILITY

In aqueous solution ammonium sulphate can be spread with the separation of ammonia.

Stable substance.

Due to the rapid degradation of ionization does not undergo by photolysis in water or soil.

12.3 BIOACCUMULATIVE POTENTIAL

Based on high water solubility and the ionic nature, ammonium sulfate is not expected to adsorb or bioaccumulate to a significant extent. Bioaccumulation is not expected.

12.4 MOBILITY IN SOIL

Based on the physicochemical properties of ammonium sulphate very high mobility in aquatic environment can be expected.

Based on high water solubility, a low geoaccumulation potential and high mobility in soil is to be expected. However, due to ion-ion interactions it is to be expected that mobility in soil is significantly reduced.

Ammonium sulphate will not volatilize from soil.

12.5 RESULTS OF PBT AND VPVB ASSESSMENT

The PBT and vPvB criteria of Annex XIII to the Regulation do not apply to inorganic substances.

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12.6 OTHER ADVERSE EFFECTS

In the chemical safety assessment performed according to Article 14(3) in connection with Annex I section 1 and 3 (Human Health Hazard Assessment and Environmental Hazard Assessment, respectively) as well as section 4 (PBT/ vPvB Assessment) no hazard was identified. Therefore according to REACH Annex I (5.0) an exposure estimation is not necessary. Consequently all identified uses of the substance are assessed as safe for human health and the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 WASTE TREATMENT METHODS

Appropriate methods of disposal and contaminated packaging in accordance with the applicable laws. Protect the area against pronouncement of the waste. Land contaminated with the substance, the water containing substance and other materials used to absorb the substance after the accident or incident, should be packed into containers and protected and delivered for disposal in accordance with applicable laws and regulations. Waste uncontaminated with other chemicals can be reused as fertilizer.

In accordance with the legal provisions that are specified in section 15.1.

SECTION 14. TRENSPORT INFORMATION

Ammonium sulphate is not subject to the provisions for the carriage of dangerous goods ADR/RID and IMO-IMDG.

14.1 UN NUMBER (ONZ NUMBER)

Not applicable.

14.2 UN PROPER SHIPPING NAME

Not applicable.

14.3 TRANSPORT HAZARD CLASS(ES)

Not applicable.

14.4 PACKING GROUP

Not applicable.

14.5 ENVIRONMENTAL HAZARDS

Not applicable.

14.6 SPECIAL PRECAUTIONS FOR USER

The substance makes corrosion of metals.

14.7 TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL 73/78 AND THE IBC CODE

Not applicable.

OTHER INFORMATION

LABELLING

RID, ADR: Not applicable.

IMGD: Not applicable.

ICAO/ IATA: Not applicable.

CLASSIFICATION CODE (ADR/RID): Not applicable.

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TANK CODE / detailed ADR requirements: Not applicable

SECTION 15. REGULATORY INFORMATION

15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE

- Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
- Legislation of 25 February 2011 on chemicals and their mixtures (Dz. U. no. 63, pos. 322 with later changes).
- Legislation of 27 April 2011 – Environmental Law (Dz. U. no. 62, pos. 627 with later changes)
- Legislation of 27 April 2001 on waste (Dz. U. no. 62, pos. 628 with later changes)
- Regulation of the Minister of Health of 22 May 2012 on the way of labelling places, pipelines and containers as well as tanks that are used for storing or containing dangerous substances or dangerous mixtures (Dz. U. no. 101, pos. 601).
- Regulation of the Minister of Health of 20 April 2012 on labelling of the packagings of dangerous substances and dangerous mixtures as well as certain mixtures (Dz. U. no. 79, pos. 445).
- Legislation of 19 August 2011 on the transport of dangerous goods (Dz. U. no. 227, pos. 1367 with later changes).
- Regulation (WE) 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/EWG and 1999/45/WE, and amending Regulation (WE) No 1907/2006.
- Regulation of the Minister of Work and Pensions of 29 November 2002 on the highest acceptable concentration and intensity of factors harmful to health in working environment (Dz. U. no. 217, pos. 1833 with later changes)
- Legislation of 11 May 2001 on packagings and packaging waste (Dz. U. no. 63, pos. 638 with later changes).

15.2 CHEMICAL SAFETY ASSESSMENT

Rating was made in the Chemical Safety Report submitted to ECHA in the joint registration of No: 01-2119455044-46-0040.

SECTION 16. OTHER INFORMATION

AN EXPLANATION AND INDICATION OF WHERE CHANGES HAVE BEEN MADE TO THE PREVIOUS VERSION OF SAFETY DATA SHEET

The safety data sheet has been adjusted to the requirements of the regulations of the Commission Regulation (EU) No. 453/2010.

Changes: section 1.3 and 1.4.

A KEY OR LEGEND TO ABBREVIATIONS AND ACRONYMS USED IN THE SAFETY DATA SHEET

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- **DNEL** – Derived No Effect Level [mg/kg, mg/l] in which no harmful changes are observed.
- **PNEC** – Predicted No Effect Concentration(s) [mg/kg, mg/l].
- **NDS**- Weighted average value, the concentration of toxic chemical or intensity of other harmful factor whose influence on a worker for 8 hours a day and average weekly working time that is defined in a labour code, through his activity period, should not cause negative changes in his health as well as in the health of his future generations.
- **NDSch**- an intermediate value of accurate concentration, toxic chemical that should not cause negative changes in worker's health, if they occur in working environment for not longer than 15 minutes and not often than twice a shift at a time interval not shorter than 1 hour.
- **NDSP**- the concentration of toxic chemical that cannot be exceeded in working environment at no time because of the threat of worker's life.
- **CSR** - Chemical Safety Report.
- **EC50** – effective concentration 50%.
- **LC 50** - Lethal Concentration 50 %
- **LD50** - Lethal Dose 50%
- **NOAEL** - The highest dose of substance, in which no harmful change is detected while doing research.
- **NOAEC** - The highest concentration of substance, in which no harmful change is detected while doing research.
- **PBT** - Persistent, Bioaccumulative and Toxic substance.
- **REACH** - Registration, Evaluation and Authorisation of Chemicals.
- **ECHA** – European Chemicals Agency.
- **vPvB** - Very Persistent and Very Bioaccumulative.
- **HPRT** – Hypoxanthine–guanine phosphoribosyl transferase, an enzyme taking part in the metabolism of purins.

KEY LITERATURE REFERENCES AND SOURCES FOR DATA

This information is based on our current knowledge.

Its purpose is to describe the product only in reference to health, safety and environmental protection requirements.

- Chemical Safety Report submitted to ECHA as part of a joint registration number: 01-2119455044-46-0040
- Information from ECHA website <http://echa.europa.eu>
- Physicochemical tutorial

OTHER INFORMATION

Process Engineer - phone +4814 637 38 75, fax +4814 637 35 66

LIST OF RELEVANT PHRASES, HAZARD STATEMENTS, SAFETY PHRASES AND/OR PRECAUTIONARY STATEMENTS

Full sound of phrases are specified in sections 2-15.

ADVICE ON ANY TRAINING APPROPRIATE FOR WORKERS TO ENSURE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Before working with the product worker should be familiar with safety rules for handling the substance as well as the safety data sheet of substance below.

END OF SAFETY DATA SHEET

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SAFETY DATA SHEET OF SUBSTANCE

Ammonium sulphate AS21

Created by:

Technologist

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Verified by:

Head of Technology Supervision and Development

.....

Head of Safety and Environmental Protection

.....

Commandant of Factory Fire Brigade

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Head of Supervision Exploitation of Production Assets

.....

Approved by:

Director of the Centre:

.....

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Director of the Centre:

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