

Product Safety Summary for Ammonium Sulphate

SUBSTANCE NAME

Ammonium Sulphate
Ammonium sulfate
Ammoniumsulfat
Diammonium sulphate
Di-ammonium sulfate
Sulfuric acid di-ammonium salt
Sulfuric acid di-ammonium salt (1:2)
Mascagnite

GENERAL STATEMENT

Ammonium Sulphate is a white odorless solid product. It is mainly used for fertilizer applications, but it has various other uses in the chemical and pharmaceutical industry as well as for insecticides, herbicides, fungicides and flame retardants. Consumer applications are such that consumer exposure will typically be infrequent, for brief periods and to small quantities or low concentrations. Ammonium Sulphate is not known to cause adverse human health or environmental effects and it is not classified as a dangerous product. The usual general precautionary measures to prevent worker and environmental exposure to chemicals should also be taken when handling Ammonium Sulphate in industrial uses. No other specific risk management measures are required.

CHEMICAL IDENTITY

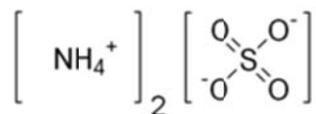
EC Name: ammonium sulphate

EC-No. : 231-984-1

CAS-No. : 7783-20-2

Molecular formula: H₃N.1/2H₂O₄S

Structural formula:



USES AND APPLICATIONS

Ammonium Sulphate is obtained by neutralization of sulphuric acid and/or oleum with ammonia. Ammonium Sulphate can also be obtained in the caprolactam manufacturing process. The primary application of Ammonium Sulphate is as a fertilizer. Besides that, it is used in a variety of applications. It is used as a pH-corrective agent and as chemical intermediate in a range of chemical manufacturing processes. It finds also

application in insecticides, herbicides and fungicides, as an ingredient in pharmaceutical and cosmetic products, as well as in flame retardants and as laboratory chemicals. Although the substance may be contained in certain products for professional or consumer use, Ammonium Sulphate is mainly applied in pure or more concentrated form in products for industrial use.

PHYSICAL CHEMICAL PROPERTIES

Ammonium Sulphate is a white odorless crystalline solid at room temperature and pressure.

Melting point/range: >280 °C

Boiling point/boiling range: Not applicable, as the substance decomposes before boiling

Decomposition temperature: 280 °C

Flammability (solid, gaseous): Product is not flammable. It does not release flammable gases in contact with water.

Ignition temperature: Not determined

Explosion limits:

Lower: Not determined

Upper: Not determined

Molecular weight: 132.1395 g/mol

pH value: 5-6

log Pow: Not applicable

Vapor pressure: 4.053E-9 hPa at 25 °C

Relative density: 1.77 g/cm³ at 25 °C

Dissociation constant: Not applicable, as the substance is a salt

Solubility in/Miscibility with water: 767 g/l (at 20 °C)

HEALTH EFFECTS

Ammonium Sulphate is not classified as a hazardous substance. Its acute toxicity is low via all exposure routes. Studies have not shown long term effects or CMR properties. Ammonium Sulphate has neither irritant nor sensitizing properties. If it is taken up in the body via ingestion or inhalation, then it dissociates in the ammonium and sulphate ions (NH₄⁺, SO₄²⁻). Ammonium is an endogenous substance that serves a major role in the maintenance of the acid-base balance. Sulphate is a normal intermediate in the metabolism of endogenous sulphur compounds and is excreted unchanged or in conjugated form in urine. Inhalation of ammonium in dust form should be avoided.

EFFECT ASSESSMENT	RESULT
Acute Toxicity (oral/dermal/inhalation)	Ammonium Sulphate is of low acute toxicity via oral, skin and inhalation routes of exposure.
Irritation/Corrosivity	Ammonium Sulphate is not irritating to the skin or to the eyes.

(skin/eye/respiratory tract)	
Sensitization (skin/respiratory tract)	Based on the available data Ammonium Sulphate is not considered to have skin or respiratory sensitization properties.
Mutagenicity	Available in/vitro and in/vivo data indicate that Ammonium Sulphate does not cause mutagenic effects.
Carcinogenicity	No evidence of a carcinogenic potential was observed in carcinogenicity studies addressing oral exposure.
Reproductive Toxicity	Studies have not shown any fertility and teratogenicity effects. Therefore Ammonium Sulphate is not considered as toxic for reproductivity.
Repeated Dose Exposure	There is no information related to repeated exposure via the inhalation route. The information on repeated exposure via the oral and dermal route suggests that there is no marked repeated dose toxicity.

ENVIRONMENTAL EFFECTS

In aqueous solution, ammonium salts are completely dissociated into the ammonium ion and the corresponding anion, in this case the sulphate ion. Un-ionized ammonia (NH₃) exists in the aquatic environment and the fraction of un-ionized ammonia steeply increases with elevated pH value or temperature. It is well known that toxicity to aquatic organisms has been attributed to un-ionized ammonia species, and NH₄⁺ species is considered to be non- or significantly less-toxic. Therefore toxicity values for ammonium salts (such as: ammonium -sulphates, phosphates, carbonates, chlorides or nitrates), where the major toxic component is ammonia, can be considered as equivalent.

EFFECT ASSESSMENT	RESULT
Aquatic Toxicity	Ammonium Sulphate is almost totally dissociated in ammonium and sulphate ions in water. Depending on the pH of the water the ammonium- ion is in equilibrium with some unionized ammonia. The concentration of free ammonia is generally low. Therefore the overall aquatic toxicity of Ammonium Sulphate is also low.

FATE AND BEHAVIOR	RESULT
Biodegradation	Biodegradation criteria do not apply due to the inorganic nature of Ammonium Sulphate and its presence in the environment in ionic form.
Bioaccumulation potential	Bioaccumulation is not expected due to the high water

	solubility and the ionic nature of Ammonium Sulphate.
PBT/vPvB conclusion	Ammonium Sulphate does not meet the criteria for PBT and vPvB classification.

EXPOSURE

Human Health

Exposure can occur either in Ammonium Sulphate manufacturing facilities, by other industrial users of Ammonium Sulphate or by professional users. Based on its physical properties, ingestion or skin contact are the most likely routes of exposure. Of all uses of Ammonium Sulphate the uses in insecticides, herbicides and fertilizers are probably the only ones that may cause some degree of exposure to the general population. However, in these applications the general population is only exposed to Ammonium Sulphate in diluted form. Consumer applications are such that consumer exposure will typically be infrequent, for brief periods or in small quantities. Therefore the use of Ammonium Sulphate by the consumer is not considered to pose a health risk.

Environment

Ammonium Sulphate occurs in the environment only in its dissociated form, i.e. as ammonium and sulphate ions. Therefore there is no environmental exposure to Ammonium Sulphate itself. The ammonium ion is in equilibrium with non-ionized ammonia, which itself is a harmful substance. However, under typical environmental conditions, the concentration of non-ionized ammonia is so low that it poses no risk. Therefore, all uses of Ammonium Sulphate are considered to be safe for the environment.

RISK MANAGEMENT RECOMMENDATIONS

Ammonium Sulphate is not known to cause adverse human health or environmental effects. However it is a good practice to train personnel that handle the substance and to protect workers who may be exposed to Ammonium Sulphate by taking the usual precautionary measures to protect against chemical exposure. Therefore protective clothing, gloves and safety glasses with side shields should be worn when handling Ammonium Sulphate. It is recommended to prevent the formation of dust, to avoid contact with eyes, skin and clothing. Good ventilation at the workplace should be provided and local suction extraction should be installed if dust formation cannot be avoided. Respiratory protection should be worn if local extraction is absent or insufficient. Soiled and contaminated clothing should be removed. Ammonium Sulphate should be kept away from foodstuffs, beverages and feed. Workers should not eat, drink, smoke or sniff while working with the product and they should wash their hands before breaks and at the end of work. Ammonium Sulphate should be stored in dry conditions and away from water, alkaline substances, nitrites and nitrates. For environmental protection in case of accidental release: do not allow product to reach sewage system or any water course. Retain and dispose of contaminated wash water.

STATE AGENCY REVIEW

This substance has been registered under REACH (EC) No. 1907/2006.

Ammonium Sulphate is included in the OECD list of High Production Volume (HPV) chemicals.

Ammonium Sulphate is listed in the following Chemical Inventories: TSCA, EINECS, ENCS, AICS, Canadian DSL, KECI, PICCS, IECSC, and NZIoC.

REGULATORY INFORMATION/CLASSIFICATION AND LABELING

Classification of the substance according to REGULATION (EC) No 1272/2008:

Not classified.

Labeling according to REGULATION (EC) No 1272/2008:

Pictogram: 111~

Signal word: 111~

Hazard statements: 111~

CONTACT INFORMATION WITHIN COMPANY

For further information on this substance or product safety summaries in general, please contact:

Company: UBE Industries, Ltd.

Department: Caprolactam Business Unit

Address: Seavans North Bldg., 1-2-1 Shibaura, Minato-ku, Tokyo

Town/Country: Japan

Postal code: 105-8449

E-mail: ube-cpl@ube-ind.co.jp

Additional information can be found at:

<http://www.ube.co.jp>

GLOSSARY

Acute toxicity	Harmful effect resulting from a single or short term exposure to a substance.
AICS	Australian Inventory of Chemical Substances.
Biodegradation	Decomposition or breakdown of a substance under natural conditions (actions of micro-organisms etc).
Bioaccumulation	Progressive accumulation in living organisms of a chemical substance present in the environment.
Canadian DSL	Domestic Substances List of Canada.
Carcinogenicity	Substance effects causing cancer.
CAS	Chemical Abstracts Service (division of the American Chemical Society).

Chronic toxicity	Harmful effect after repeated exposures or long term exposure to a substance.
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Existing Notified Chemical Substances (Japan).
Flash point	The lowest temperature at which vapor of the substance may form an ignitable mixture with air.
Genotoxicity	Substance effect that causes damage to genes, including mutagenicity and clastogenicity.
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
HPV	High Production Volume Chemicals.
Hydrolyze	Undergo hydrolysis; decompose by reacting with water.
IECSC	Inventory of Existing Chemical Substances Produced or Imported in China.
Intermediate	Substance that is manufactured for and consumed in or used for chemical processing in order to be transformed into another substance.
KECI	Korean Existing Chemical Inventory.
Monomer	Means a substance which is capable of forming covalent bonds with a sequence of additional like or unlike molecules under the conditions of the relevant polymer-forming reaction used for the particular process.
Mutagenicity	Substance effect that cause mutation on genes.
NZIoC	New Zealand Inventory of Chemicals
PBT	Persistent, bioaccumulative, toxic chemical.
Persistence	Refers to the length of time a compound stays in the environment, once introduced.
PICCS	Philippine Inventory of Chemicals and Chemical Substances.
Risk Management Measures	Engineering controls, conditions and protective equipment needed to be implemented to ensure that the risks to human health and the environment are adequately controlled.
REACH (EC) No. 1907/2006	European Commission Regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals.
REGULATION (EC) No 1272/2008	European Commission Regulation on Classification, Labeling and Packaging of Substances and Mixtures.
Reproductive toxicity	Including teratogenicity, embryotoxicity and harmful effects on fertility.



Sensitizing	Allergenic.
Sediment	Topsoil, sand and minerals washed from land into water forming in the end a layer at the bottom of rivers and sea.
TSCA	Toxic Substance Control Act (USA).
Vapor pressure	A measure of a substance's property to evaporate.
vPvB	Very persistent, very bio-accumulative.

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