

Product Safety Summary for Sulphuric Acid

SUBSTANCE NAME

Sulphuric acid

Sulfuric acid

GENERAL STATEMENT

Sulphuric Acid is a light brown liquid. It is a very strong inorganic acid and one of the oldest chemical substances produced by mankind. It has a very wide range of uses and applications in many chemical processes, in electrolytic applications, in industrial cleaning and etching applications. Apart from batteries, there are practically no consumer products with Sulphuric Acid. It is very corrosive and irritating to the skin and the eyes. This hazard property requires careful protection of industrial workers and professional users who may come into contact with it. From an environmental point of view, Sulphuric Acid is of low risk.

CHEMICAL IDENTITY

EC Name: Sulphuric acid

EC-No. : 231-639-5

CAS-No. : 7664-93-9

Molecular formula: H₂O₄S

Structural formula:



USES AND APPLICATIONS

There are many different industrial processes to produce Sulphuric Acid. They have in common that Sulphur Dioxide is oxidized and subsequently reacted to Sulphuric Acid. Sulphuric Acid is one of the most widely-used industrial chemicals. It is used as an intermediate to produce many different organic and inorganic chemicals, including fertilizers, and as a processing aid, catalyst, dehydrating agent and pH regulator in many processes. It is used in the extraction and treatment of minerals and ores and as an agent to purify and scrub liquid and gas streams in the industry. Sulphuric acid is also used in the process of surface treatments, etching, metal plating and other electrolytic processes, as well as for purification and industrial cleaning purposes. As end-use, Sulphuric Acid finds application in batteries, e.g. for automotive applications.

PHYSICAL CHEMICAL PROPERTIES

Sulphuric acid is an odorless light brown liquid at room temperature and pressure.

Melting point/range: -1.11°C to 3°C (Sulphuric Acid at 98%)

Boiling point/boiling range: 310-335°C at 1013 hPas (Sulphuric Acid at 98%)

Decomposition temperature: Not applicable

Flammability (solid, gaseous): Product is not flammable.

Ignition temperature: Not determined

Explosion limits:

Lower: Product does not present an explosion hazard.

Upper: Product does not present an explosion hazard.

Molecular weight: 98.08 g/mol

pH value: < 1, at 20°C

pKa: 1.92, at 20°C

log Pow: Not relevant for ionisable substance

Vapor pressure: 130 Pa, at 148.5 °C and <0.1Pa, at 20°C (Sulphuric Acid at 97%)

Vapor density: Not determined

Relative density: 1.8361 g/cm³, at 20 °C (Sulphuric Acid at 98%)

Solubility in/Miscibility with water: Fully miscible with water.

Dynamic viscosity: 22.5 mPa·s at 20 °C (Sulphuric Acid at 95%)

HEALTH EFFECTS

Sulphuric Acid as such is not expected to be absorbed or distributed throughout the body as the acid will rapidly dissociate. The effects of Sulphuric Acid are essentially the result of the hydrogen ion rather than the effect of the sulphate ion. Effects may be caused by pH changes or reactions of the H⁺ ion and therefore they are not necessarily specific to Sulphuric Acid. Sulphuric Acid is very corrosive and irritating to the skin and to the eyes. Due to this property, significant or prolonged exposure, specifically via oral and dermal exposure, does not occur and is not tested for animal welfare reasons. To the extent tested Sulphuric Acid is not considered to cause acute or long term health effects, other than skin and eye damage due to its corrosive and irritating properties.

EFFECT ASSESSMENT	RESULT
Acute Toxicity (oral/dermal/inhalation)	Acute toxicity is dominated by local corrosivity and irritancy in all routes of exposure. Therefore, classification of Sulphuric Acid for acute toxicity is not considered to be appropriate.
Irritation/Corrosivity (skin/eye/respiratory tract)	Sulphuric Acid is irritating and corrosive to the skin and to the eyes.
Sensitization (skin/respiratory tract)	Based on the available data Sulphuric Acid is not considered to have skin or respiratory sensitization properties.
Mutagenicity	Available in/vitro and in/vivo data indicate that Sulphuric Acid 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 other adverse reproductive effects.
Repeated Dose Exposure	The effects of Sulphuric Acid are essentially a consequence of the local corrosivity/irritancy it produces, therefore repeated or prolonged exposure is irrelevant.

ENVIRONMENTAL EFFECTS

Sulphuric Acid is a strong inorganic acid. It is fully miscible with water and it dissociates readily in water to hydrogen ions and sulphate ions at environmentally relevant pH. Both ions are ubiquitous in the environment and, as such, not toxic. The hydrogen ion contributes to the pH of the local environment. The sulphate ion is incorporated into the various mineral species present in the environment. The total dissociation of Sulphuric Acid at environmental pH implies that it will not, per se, adsorb onto particulates or accumulate in living tissues. Sulphuric Acid has no potential to persist.

EFFECT ASSESSMENT	RESULT
Aquatic Toxicity	Aquatic toxic effects seem to be entirely dependent on pH and not specific to Sulphuric Acid.

FATE AND BEHAVIOR	RESULT
Biodegradation	Biodegradation criteria do not apply to inorganic substances like Sulphuric Acid.
Bioaccumulation potential	Sulphuric Acid dissociates readily in water to non-bioaccumulative ions and it is totally miscible with water, therefore, bioaccumulation of Sulphuric Acid is not expected.
PBT/vPvB conclusion	Sulphuric acid has no potential to persist and therefore does not meet the PBT and vPvB criteria.

EXPOSURE

Human Health

The majority of uses of Sulphuric Acid involve chemical conversion, such that the sulphuric acid molecule hardly ever remains in downstreams and in end-use products. In the environment, Sulphuric Acid dissociates, therefore, consumer exposure through contact with products or through environmental exposure is negligible. Human exposure may only occur in industrial or professional use due to the use of Sulphuric Acid as raw material or reactant, or in all levels derived from the production, use, maintenance and recycling of batteries containing Sulphuric Acid. The corrosive nature of Sulphuric Acid dictates very rigorous avoidance of human contact with the product, which severely limits the overall exposure.

Environment

The uses of Sulphuric Acid are manifold, therefore, there are many potential sources for local or dispersive environmental exposure originated from the manufacturing or use of Sulphuric Acid. Besides, there may be environmental exposure due to other processes where Sulphuric Acid could be generated, such as processes of combustion of fossil fuels. However, apart from unintentional accidental releases, environmental exposure to Sulphuric Acid is in general low, mainly due to the fact that Sulphuric Acid readily dissociates in the environment.

RISK MANAGEMENT RECOMMENDATIONS

The corrosive nature of sulphuric acid is the main risk that needs to be managed. Industrial workers and professional users need to be rigorously protected against skin and eye contact and inhalation of fumes. Consumers do not normally come in contact with Sulphuric Acid. Personnel handling Sulphuric Acid must be trained and protected by taking precautionary measures to protect against chemical exposure. Therefore protective clothing, gloves and tightly sealed chemical goggles should be worn when handling it. Good ventilation at the workplace should be provided and local mechanical suction extraction should be installed if the release of fumes or aerosols cannot be avoided.

Sulphuric acid should only be handled in areas where safety showers are present. Soiled and contaminated clothing should be removed immediately. Sulphuric Acid should be kept away from foodstuffs, beverages and feed. Workers should not eat, drink, smoke or sniff while working with the product, and hands should be washed before breaks and at the end of work. Sulphuric Acid should be stored in dry conditions and away from alkaline substances. 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.

Sulphuric Acid is on the OECD list of High Production Volume (HPV) chemicals.

Sulphuric Acid is listed in the following Chemical Inventories: TSCA, EINECS, Canadian DSL, IECSC, PICCS, KECl, AICS, ENCS and NZIoC.

REGULATORY INFORMATION/CLASSIFICATION AND LABELING

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

Skin/Eye (Corrosion/irritation): Skin Corrosive Cat.1A; H314 Causes severe skin burns and eye damage

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

Pictogram: #



Signal word: Danger

Hazard statements: H314: Causes severe skin burns and eye damage.

CONTACT INFORMATION WITHIN COMPANY

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

Company: UBE Industries, Ltd.

Department: Industrial Chemicals Business Unit

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

Town/Country: Japan

Postal code: 105-8449

E-mail: ube-basic@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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