SIGMA-ALDRICH

Material Safety Data Sheet

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Version 2.110

Section 1 - Product and Company Information

Product Name Sulfuric acid, 99.999% (purity based on trace metals)
Product Number 339741
Brand Aldrich Chemical

Company Sigma-Aldrich
Address 3050 Spruce Street
City, State, Zip, Country SAINT LOUIS, MO 63103 US
Technical Phone: 800-325-5832 **Emergency Phone:** 314-776-6555
Fax: 800-325-5052

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
SULFURIC ACID, >= 51%	7664-93-9	No	231-639-5	016-020-00-8

Formula H2SO4
Synonyms Acide sulfurique (French), Acido solforico (Italian), Battery acid, BOV, Dihydrogen sulfate, Dipping acid, Electrolyte acid, Mattling acid, Oil of vitriol, Schwefelsaeureloesungen (German), Strong inorganic acid mists containing sulfuric acid, Sulfuric acid (ACGIH:OSHA), Sulphuric acid, Vitriol Brown Oil, Zwavelzuuroplossingen (Dutch)

Section 3 - Hazards Identification

Emergency Overview
Corrosive.
Causes severe burns.

HMIS Rating
Health: 3* Flammability: 0 Reactivity: 2

NFPA Rating
Health: 3 Flammability: 0 Reactivity: 2

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

Inhalation Exposure
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

Eye Exposure
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

Conditions of Flammability
Strong dehydrating agent which may cause ignition of finely divided materials on contact.

Autoignition Temp: N/A

Firefighting
Protective Equipment
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s)
Emits toxic fumes under fire conditions. Contact with other material may cause fire.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area.

Procedure(s) of Personal Precaution(s)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up
Absorb on sand or vermiculite and place in closed containers for disposal.

Section 7 - Handling and Storage

Handling
User Exposure
Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

Storage
Suitable
Keep tightly closed.
Incompatible Materials
Do not allow contact with water

Section 8 - Exposure Controls / PPE

Engineering Controls
Safety shower and eye bath. Use only in a chemical fume hood.

Personal Protective Equipment
Respiratory
Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK - P3 (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand
Compatible chemical-resistant gloves.
Eye
Chemical safety goggles.

Other
Faceshield (8-inch minimum).

General Hygiene Measures
Wash contaminated clothing before reuse.Discard contaminated shoes.Wash thoroughly after handling.

Exposure Limits

Country	Type	Value
Poland	NDS	1 MG/M3
Poland	NDSCh	3 MG/M3
Poland	NDSP	-

Exposure Limits, RTECS

Country	Source	Type	Value
USA	ACGIH	STEL	3 MG/M3
USA	ACGIH	TWA	0.2 MG/M3
USA	MSHA Standard-air	TWA	1 MG/M3
USA	OSHA.	PEL	8H TWA 1 MG/M3
New Zealand	OEL		
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	1 MG/M3

Section 9 - Physical/Chemical Properties

Appearance
Physical State
Liquid

Molecular Weight 98.08 AMU

Property	Value	At Temperature or Pressure	Other
pH	1.2		Concentration: 5 g/l
BP/BP Range	290 °C	760 mmHg	
MP/MP Range	N/A		
Freezing Point	3 °C		
Vapor Pressure	1 mmHg	145.8 °C	
Vapor Density	< 0.3 g/l	25 °C	
Saturated Vapor Conc.	N/A		
SG/Density	1.84 g/cm3		
Bulk Density	N/A		
Odor Threshold	N/A		
Volatile%	N/A		
VOC Content	N/A		
Water Content	N/A		
Solvent Content	N/A		
Evaporation Rate	N/A		
Viscosity	21 Pas	25 °C	
Surface Tension	55.1 mN/m	20 °C	
Partition Coefficient	N/A		
Decomposition Temp.	N/A		
Flash Point °F	N/A		
Flash Point °C	N/A		

Explosion Limits N/A

Flammability N/A
Autoignition Temp N/A

Solubility
Solubility in Water: Soluble.

N/A = not available

Section 10 - Stability and Reactivity

Stability
Stable
Stable.
Conditions to Avoid
Moisture.
Materials to Avoid
Bases, Halides, Organic materials, Incompatible with carbides, chlorates, fulminates, nitrates, picrates, cyanides, alkali halides, zinc iodide, permanganates, hydrogen peroxide, azides, perchlorates, nitromethane, phosphorous, and nitrites. Violent reaction with: cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, and phosphorous(III) oxide, Finely powdered metals.

Hazardous Decomposition Products
Hazardous Decomposition Products
Sulfur oxides, Hydrogen sulfide gas

Hazardous Polymerization
Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure
Skin Contact
Causes severe burns.
Skin Absorption
May be harmful if absorbed through the skin.
Eye Contact
Causes severe burns.
Inhalation
Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion
May be harmful if swallowed.

Target Organ(s) or System(s)
Teeth. Lungs.

Signs and Symptoms of Exposure
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.Inhalation may result in spasm, inflammation and edema of the larynxand bronchi, chemical pneumonitis, and pulmonary edema.Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure may cause: Pulmonary edema. Effects may be delayed.To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: WS5600000

Toxicity Data

Oral - Rat: 2140 mg/kg (LD50)

Inhalation - Rat: 510 mg/m3 (LC50)

Inhalation - Mouse: 320 mg/m3 (LC50)

Inhalation - Guinea pig: 18 mg/m3 (LC50)
Remarks: Lungs, Thorax, or Respiration:Other changes.

Irritation Data

Eyes - Rabbit: 0.25 mg
Remarks: Severe irritation effect

Eyes - Rabbit: 5 mg 30S
Remarks: Rinsed

Chronic Exposure- Carcinogen
Result: The International Agency for Research on Cancer (IARC) has determined that occupational exposure to strong inorganic-acid mists containing sulfuric acid is carcinogenic to humans (group 1).

IARC Carcinogen List
Rating
Group 1

NTP Carcinogen List
Rating
Known to be carcinogenic.

ACGIH Carcinogen List
Rating
A2

Chronic Exposure- Teratogen

Species	*Dose*	*Route of Application*	*Exposure Time*
Rabbit	20 MG/M3/7H	Inhalation	(6-18D PREG)

Result: Specific Developmental Abnormalities: Musculoskeletal system.

Chronic Exposure- Mutagen

Species	*Dose*	*Cell Type*	*Mutation test*
Hamster	4 MMOL/L	ovary	Cytogenetic analysis

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material.
Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Sulfuric acid [with more than 51 percent acid]
UN#: 1830
Class: 8
Packing Group: Packing Group II
Hazard Label: Corrosive
PIH: Not PIH

IATA
Proper Shipping Name: Sulphuric acid
IATA UN Number: 1830
Hazard Class: 8
Packing Group: II

Section 15 - Regulatory Information

EU Directives Classification
Symbol of Danger: C
Indication of Danger
Corrosive.
Risk Statements **R:** 35
Causes severe burns.
Safety Statements **S:** 26 30 45
In case of contact with eyes, rinse immediately with plenty of water and seek medical adviceNever add water to this product.In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Classification and Label Text
Indication of Danger
Corrosive.
Risk Statements
Causes severe burns.
Safety Statements
In case of contact with eyes, rinse immediately with plenty of water and seek medical adviceNever add water to this product.
Wear suitable protective clothing, gloves, and eye/face protectionIn case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

United States Regulatory Information
SARA Listed: No

TSCA Inventory Item: Yes

Canada Regulatory Information
WHMIS Classification
This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

Disclaimer
For R&D use only. Not for drug, household or other uses.

Warranty
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.