

Sulfuric Acid

Safe Handling Guideline

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URL: <http://www-group.slac.stanford.edu/esh/eshmanual/references/chemsafetyGuideSulfuricAcid.pdf>

Synonyms

Battery acid, hydrogen sulfate, oil of vitriol, sulfuric acid (aqueous)

Reactivity and Physical Concerns

Incompatible with organic materials, chlorates, carbides, fulminates, water, powdered metals; reacts violently with water with evolution of heat; corrosive to metals. Not combustible. Concentrated sulfuric acid is a strong oxidant and reacts violently with combustible and reducing materials. The substance is a strong acid: it reacts violently with bases and is corrosive to most common metals, forming a flammable/explosive hydrogen gas. Sulfuric acid reacts violently with water and organic materials with evolution of heat. Upon heating, irritating or toxic fumes (or gases) (sulfur oxides) are formed.

Exposure Hazards

Routes of Exposure

Inhalation, ingestion, skin contact, eye contact

Sulfuric acid causes irritation to the eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatitis; dental erosion; eye, skin burns; dermatitis. The substance is very corrosive to the eyes, the skin, and the respiratory tract and attacks the enamel of the teeth. Inhalation may result in a burning sensation, sore throat, cough, labored breathing, shortness of breath, and lung edema. Symptoms may be delayed. Skin contact may result in redness, pain, blisters, and serious skin burns. Eye contact may result in redness, pain, and severe deep burns. Corrosive on ingestion and may result in abdominal pain, burning sensation, shock, or collapse.

Chronic Exposure

Lungs may be affected by repeated or prolonged exposure to an aerosol of this substance. There is a risk of tooth erosion upon repeated or prolonged exposure to an aerosol of this substance. Strong inorganic acid mists containing this substance are carcinogenic to humans.

First Aid

If inhaled move victim to fresh air, rest and maintain a half-upright position. Use artificial respiration if indicated, obtain medical attention immediately. **If skin contact** occurs remove contaminated clothes, rinse skin with plenty of water or shower. Obtain medical attention immediately. **If eye contact** occurs, first rinse with plenty of water for 15minutes. Obtain medical attention immediately. **If ingested** rinse mouth. **Do not induce vomiting.** Obtain medical attention immediately. (See [Chemical Safety: Accidental Exposure Requirements](#) [SLAC-I-730-0A09S-041].)

Exposure Limits

- Permissible exposure limit: 1 mg/m³ (OSHA TWA)
- NIOSH recommended exposure limit: 1 mg/m³ (TWA)
- Immediately dangerous to life and health: 15 ppm

Exposure Controls

Engineering Controls

Prevent generation of mists. Avoid all contact. Local exhaust ventilation or breathing protection is required. Secondary containment of all storage and use is required.

Administrative Controls

Procedures should be developed for the safe use and handling of sulfuric acid in all applications. ESHQ can provide information and guidance. Depending upon quantities, certain regulatory permits and/or registrations may be required. Personnel working with the materials must receive detailed training on the hazards, safe use, and emergency procedures

Personal Protective Equipment

Avoid all contact with substance. Contact lenses should not be worn while working with this substance. Prevent skin/eye contact through the use of impervious gloves, clothing, boots, apron, and eye goggles or full face shield. If the airborne exposure limit may be exceeded and engineering controls are not feasible, wear appropriate respiratory protection.

Disposal

Material is disposed of as hazardous waste. Contact the Waste Management Group for specific disposal requirements and procedures. Containers and other materials that are contaminated with sulfuric acid must also be treated as hazardous waste.

Medical Monitoring (if applicable)

Workers should receive pre-employment and periodical medical exam. The pre-employment exam should be particularly directed at the detection of chronic respiratory, GI, or nervous diseases and any eye and skin diseases. Periodic exam should take place at frequent intervals and should include a check on the condition of the teeth.

Emergency Response

In the event of a spill that poses a threat to health and/or the environment, immediately evacuate the area and call 911. Then call SLAC Site Security (ext. 5555 or 650-926-5555 from a cell phone) and notify your supervisor.

For other spills, notify your supervisor then SLAC Site Security; these may be cleaned up with appropriate spill response supplies by trained personnel who have been authorized via work planning and control. (See [Spills: Response, Cleanup, and Reporting Procedure](#) [SLAC-I-750-0A16C-006].)

Standards and Regulations

- OSHA. PEL: [29 CFR 1910.1000 Table Z-1](#); Respiratory Protection: [29 CFR 1910.134](#)
- EPA. Release: [40 CFR 355.40](#); Waste: [40 CFR 261.21-261.24](#)
- *California Fire Code*, Chapters 27 through 41 ([24 CCR Part 9](#))

Other References

- NLM. [TOXNET: Toxicology Data Network](#)
- NIOSH. *NIOSH Pocket Guide to Chemical Hazards* (NIOSH 2005-151), "[Sulfuric Acid](#)"
- NIOSH, International Chemical Safety Card: Sulfuric Acid ([ICSC 0362](#))