

Chemical Profiles

Sulfuric Acid

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What are other names or identifying information for sulfuric acid?

CAS Registry No.: 7664-93-9

Other Names: Battery acid, sulphuric acid

Main Uses: Manufacture of fertilizers and other chemicals; petroleum refining; battery component.

Appearance: Clear colourless oily liquid. Yellow to dark brown in colour when impure.

Odour: Odourless

Canadian TDG: UN1830, UN1832

What is the WHMIS classification?

According to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST), [sulfuric acid](#) can be classified as:

Acute toxicity - inhalation - Category 2



Skin corrosion/irritation - Category 1



Serious eye damage/eye irritation - Category 1



The signal word is danger.

The hazard statements are:

- Corrosive to the respiratory tract. Fatal if inhaled
- Causes severe skin burns and eye damage

CNESST comments: This product could be corrosive to metals, please contact the supplier for additional information.

Please note that this classification was retrieved from the [CNESST](#) site on February 22, 2023 and was established by CNESST personnel to the best of their knowledge based on data obtained from scientific literature and it incorporates the criteria contained in the *Hazardous Products Regulations* (SOR/2015-17). It does not replace the supplier's classification which can be found on its Safety Data Sheet.

What are the most important things to know about sulfuric acid in an emergency?

Emergency Overview: Clear colourless oily liquid. Odourless. Will not burn. VERY TOXIC. Fatal if inhaled. Can form very hazardous decomposition products. Highly Reactive. Incompatible with many common chemicals. Reacts violently with water. CORROSIVE. Causes severe skin burns and eye damage. Strong inorganic acid mists containing sulfuric acid are carcinogenic.

What are the potential health effects of sulfuric acid?

Main Routes of Exposure: Inhalation. Skin contact. Eye contact.

- **Inhalation:** Not expected to be an inhalation hazard unless heated or misted. VERY TOXIC, can cause death. Can cause severe irritation of the nose and throat. Can cause life-threatening accumulation of fluid in the lungs (pulmonary edema). Symptoms may include coughing, shortness of breath, difficult breathing and tightness in the chest. Long-term damage may result from a severe short-term exposure.
- **Skin Contact:** CORROSIVE. Contact can cause pain, redness, burns, and blistering. Permanent scarring can result. A severe exposure can cause death.
Eye Contact: CORROSIVE. Contact causes severe burns with redness, swelling, pain and blurred vision. Permanent damage including blindness can result.
- **Ingestion:** Can burn the lips, tongue, throat and stomach. Symptoms may include nausea, vomiting, stomach cramps and diarrhea. Permanent damage can result. Can cause death.
- **Effects of Long-Term (Chronic) Exposure:** At low concentrations: Can cause dry, red, cracked skin (dermatitis) following skin contact. At high concentrations: May wear away tooth enamel when breathed in. May harm the respiratory system. Can irritate and inflame the airways.
- **Carcinogenicity:** Not known to cause cancer. Strong inorganic mists containing sulfuric acid are carcinogenic to humans. Has been associated with: cancer of the larynx, lung cancer.
 - International Agency for Research on Cancer (IARC): Not specifically evaluated. (Sulfuric acid) Group 1 - Carcinogenic to humans (strong inorganic mists containing sulfuric acid).
 - American Conference for Governmental Industrial Hygienists (ACGIH): Not specifically designated. (Sulfuric acid) A2 - Suspected human carcinogen. Classification refers to sulfuric acid contained in strong inorganic acid mists.
- **Teratogenicity / Embryotoxicity:** Not known to harm the unborn child.
- **Reproductive Toxicity:** Not known to be a reproductive hazard.
- **Mutagenicity:** Not known to be a mutagen.

What are first aid measures for sulfuric acid?

Inhalation: Take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Move victim to fresh air. Keep at rest in a position comfortable for breathing. If breathing is difficult, trained personnel should administer emergency oxygen. If breathing has stopped, trained personnel should begin artificial respiration (AR). DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema may be delayed. Get medical attention as soon as possible. Treatment is urgently required. Transport to a hospital.

Skin Contact: Avoid direct contact. Wear chemical protective clothing if necessary. Quickly take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Immediately flush with gently flowing water for at least 30 minutes. DO NOT INTERRUPT FLUSHING. If it can be done safely, continue flushing during transport to hospital. Get medical attention as soon as possible. Treatment is urgently required. Transport to a hospital. Double bag, seal, label and leave contaminated clothing, shoes, and leather goods at the scene for safe disposal.

Eye Contact: Avoid direct contact. Wear chemical protective gloves if necessary. Quickly and gently blot or brush chemical off the face. Immediately flush the contaminated eye(s) with gently flowing water for at least 30 minutes, occasionally lifting the upper and lower eyelids. If a contact lens is present, DO NOT delay flushing or attempt to remove the lens. Neutral solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, continue flushing during transport to hospital. Take care not to rinse contaminated water into the unaffected eye or onto the face. Get medical attention as soon as possible. Treatment is urgently required. Transport to a hospital.

Ingestion: Have victim rinse mouth with water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Get medical attention as soon as possible. Treatment is urgently required. Transport to a hospital.

First Aid Comments: Some of the first aid procedures recommended here require advanced first aid training. All first aid procedures should be periodically reviewed by a medical professional familiar with the chemical and its conditions of use in the workplace.

What are fire hazards and extinguishing media for sulfuric acid?

Flammable Properties: Does not burn.

Suitable Extinguishing Media: Not combustible. Use extinguishing agent suitable for surrounding fire. ONLY Use water to keep non-leaking, fire-exposed containers cool.

Unsuitable Extinguishing Media: DO NOT use water or water-based extinguishing agents.

Specific Hazards Arising from the Chemical: Contact with water causes violent frothing and spattering. Reacts with metals to produce highly flammable hydrogen gas. Closed containers may rupture violently when heated releasing contents. In a fire, the following hazardous materials may be generated: corrosive sulfur oxides.

What are the stability and reactivity hazards of sulfuric acid?

- **Chemical Stability:** Normally stable.
 - **Conditions to Avoid:** Water, moisture or humidity.
 - **Incompatible Materials:** Highly reactive. Reacts violently with: many chemicals, including, water. Corrosive to: aluminum alloys, carbon steel, and other metals.
 - **Hazardous Decomposition Products:** None known.
 - **Possibility of Hazardous Reactions:** None known.
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What are unintentional release measures for sulfuric acid?

Personal Precautions: Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Do not touch damaged containers or spilled product unless wearing appropriate protective equipment. Remove or isolate incompatible materials as well as other hazardous materials.

Methods for Containment and Clean-up: Small spills or leaks: contain and soak up spill with absorbent that does not react with spilled product. Place used absorbent into suitable, covered, labelled containers for disposal. Large spills or leaks: contain and soak up spill with absorbent that does not react with spilled product. Dike spilled product to prevent runoff. Remove or recover liquid using pumps or vacuum equipment. Place used absorbent into suitable, covered, labelled containers for disposal. Store recovered product in suitable containers that are: corrosion-resistant. Contaminated absorbent poses the same hazard as the spilled product.

Other Information: Large spills: contact supplier, local fire and emergency services for help. Report spills to local health, safety and environmental authorities, as required.

What handling and storage practices should be used when working with sulfuric acid?

Handling: Avoid generating vapours or mists. Immediately report leaks, spills, or failures of the safety equipment (e.g., ventilation system). Prevent unintentional contact with incompatible chemicals. Never add water to a corrosive. Always add corrosives slowly to COLD water. If the product is transferred to another container, ensure the new container is suitable for the product. Never reuse empty containers, even if they appear to be clean.

Storage: Store in an area that is: cool, dry, out of direct sunlight and away from heat and ignition sources, separate from incompatible materials. Avoid bulk storage indoors. Regularly inspect for physical changes or signs of crystallization, damage or leaks.

What is the American Conference of Governmental Industrial Hygienists (ACGIH®) recommended exposure limit for sulfuric acid?

ACGIH® TLV® - TWA: 0.2 mg/m³ (T) A2(M)

Exposure Guideline Comments: TLV® = Threshold Limit Value. TWA = Time-Weighted Average. T = Thoracic particulate matter. Sulfuric acid itself has not been evaluated for carcinogenicity. (M) ACGIH has evaluated strong inorganic mists containing sulfuric acid. This classification is A2 - Suspected human carcinogen.

Adapted from: 2022 TLVs® and BEIs® - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH)

NOTE: In many (but not all) Canadian jurisdictions, the exposure limits are similar to the ACGIH® TLVs®. Since legislation varies by jurisdiction, contact your local jurisdiction for exact details. A list is available in the OSH Answers on [Canadian Governmental Occupational Health & Safety Departments](#).

A list of which acts and regulations that cover [exposure limits to chemical and biological agents](#) is available on our website. Please note that while you can see the list of legislation for free, you will need a subscription to view the actual documentation.

What are the engineering controls for sulfuric acid?

Engineering Controls: Use a local exhaust ventilation and enclosure, if necessary, to control amount in the air. Use stringent control measures such as process enclosure to prevent product release into the workplace. Use a corrosion-resistant exhaust ventilation system separate from other ventilation systems.

What Personal Protective Equipment (PPE) is needed when working with sulfuric acid?

Eye/Face Protection: Wear chemical safety goggles and face shield when contact is possible.

Skin Protection: Wear chemical protective clothing e.g. gloves, aprons, boots. [Suitable materials](#) (sulfuric acid 30-70%) include: butyl rubber, natural rubber, neoprene rubber, polyvinyl chloride (PVC), Viton®, Viton®/butyl rubber, AlphaTec® (02-100, 4000, EVO, VPS), Kemblok®, Silver Shield® - PE/EVAL/PE, Saranex®™, Chemprotex® 300, ChemMAX® 3, Tychem® 6000.

Respiratory Protection:

Up to 15 mg/m³:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*; or Any powered, air-purifying respirator with acid gas cartridge(s) in combination with a high-efficiency particulate filter*.

(APF = 50) Any chemical cartridge respirator with a full facepiece and acid gas cartridge(s) in combination with an N100, R100, or P100 filter; or Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having an N100, R100, or P100 filter; or Any self-contained breathing apparatus with a full facepiece; or Any supplied-air respirator with a full facepiece.

*Causes eye irritation or damage; eye protection needed.

APF = Assigned Protection Factor

Recommendations apply only to National Institute for Occupational Safety and Health (NIOSH) approved respirators. Refer to the [NIOSH Pocket Guide to Chemical Hazards](#) for more information.

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