SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance
Substance name : Sulfuric Acid, ACS
CAS No : 7664-93-9
Product code : LC25550
Formula : H2SO4
Synonyms : battery acid / brown acid / brown oil of vitriol / dihydrogen sulfate / dipping acid / electrolyte acid / nordhausen acid / oil of vitriol / sulphuric acid
BIG no : 14049

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Industrial use
Laboratory chemical
Battery: component

1.3. Details of the supplier of the safety data sheet

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification
Skin Corr. 1A H314
Eye Dam. 1 H318
Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labelling
Hazard pictograms (GHS-US) :

Signal word (GHS-US) : Danger
Hazard statements (GHS-US) : H314 - Causes severe skin burns and eye damage
Precautionary statements (GHS-US) :
P260 - Do not breathe mist, vapours, spray
P264 - Wash exposed skin thoroughly after handling
P280 - Wear protective gloves, protective clothing, eye protection, face protection
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - IF INHALED: remove victim to fresh air and keep at rest in a position comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P363 - Wash contaminated clothing before reuse
P405 - Store locked up
P501 - Dispose of contents/container to comply with local, state and federal regulations
2.3. Other hazards

Other hazards not contributing to the classification: None.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type: Mono-constituent

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric Acid, ACS</td>
<td>(CAS No) 7664-93-9</td>
<td>96</td>
<td>Skin Corr. 1A, H314</td>
</tr>
<tr>
<td>(Main constituent)</td>
<td></td>
<td></td>
<td>Eye Dam. 1, H318</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

4.1. Description of first aid measures

First-aid measures general:

First-aid measures after inhalation:
Remove the victim into fresh air. Immediately consult a doctor/medical service.

First-aid measures after skin contact:
Wash immediately with lots of water (15 minutes)/shower. Do not apply (chemical) neutralizing agents. Remove clothing while washing. Do not remove clothing if it sticks to the skin. Cover wounds with sterile bandage. Consult a doctor/medical service. If burned surface > 10%: take victim to hospital.

First-aid measures after eye contact:
Rinse immediately with plenty of water for 15 minutes. Take victim to an ophthalmologist. Do not apply neutralizing agents.

First-aid measures after ingestion:

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation:

Symptoms/injuries after skin contact:
Caustic burns/corrosion of the skin.

Symptoms/injuries after eye contact:
Corrosion of the eye tissue. Permanent eye damage.

Symptoms/injuries after ingestion:

Chronic symptoms:

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media


5.2. Special hazards arising from the substance or mixture

Fire hazard:
DIRECT FIRE HAZARD. Non combustible. INDIRECT FIRE HAZARD. Reactions involving a fire hazard: see "Reactivity Hazard".

Explosion hazard:
INDIRECT EXPLOSION HAZARD. Reactions with explosion hazards: see "Reactivity Hazard".

Reactivity:
Violent exothermic reaction with water (moisture): release of corrosive gases/vapours. Reacts on exposure to water (moisture) with (some) metals. Release of highly flammable gases/vapours (hydrogen). On heating/burning: release of toxic and corrosive gases/vapours (sulfur oxides). Reacts violently with (some) bases: heat release resulting in increased fire or explosion risk. Reacts with many compounds e.g.: with (strong) reducers, with organic material and with combustible materials: (increased) risk of fire/explosion.
5.3. Advice for firefighters

Precautionary measures fire
Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: seal off low-lying areas. Exposure to fire/heat: have neighbourhood close doors and windows.

Firefighting instructions
Cool tanks/drums with water spray/remove them into safety. When cooling/extinguishing: no water in the substance. Dilute toxic gases with water spray.

Protection during firefighting
Heat/fire exposure: compressed air/oxygen apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
Protective equipment

Emergency procedures

6.1.2. For emergency responders
Protective equipment
Equip cleanup crew with proper protection.

Emergency procedures
Stop leak if safe to do so. Ventilate area.

6.2. Environmental precautions
Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up
For containment

Methods for cleaning up
Take up liquid spill into inert absorbent material, e.g.: dry sand/earth/vermiculite. Scoop absorbed substance into closing containers. Carefully collect the spill/leftovers. Damaged/cooled tanks must be emptied. See "Material-handling" for suitable container materials. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

6.4. Reference to other sections
No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Precautions for safe handling
Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Keep the substance free from contamination. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Never add water to this product. Never dilute by pouring water to the acid. Always add the acid to the water. Keep away from naked flames/heat. Observe very strict hygiene - avoid contact. Keep container tightly closed. Measure the concentration in the air regularly. Carry operations in the open/under local exhaust/ventilation or with respiratory protection.

Hygiene measures
Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities
Incompatible products
Strong bases. metals. combustible materials.

Heat and ignition sources
KEEP SUBSTANCE AWAY FROM: heat sources.

Prohibitions on mixed storage

Storage area
Store in a dry area. Ventilation at floor level. Keep locked up. Provide for a tub to collect spills. Unauthorized persons are not admitted. Meet the legal requirements.

Special rules on packaging
SPECIAL REQUIREMENTS: closing. dry. clean. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.
Packaging materials: SUITABLE MATERIAL: stainless steel, carbon steel, polyethylene, polypropylene, glass, stoneware/porcelain. MATERIAL TO AVOID: monel steel, lead, copper, zinc.

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Sulfuric Acid, ACS (7664-93-9)</th>
<th>ACGIH ACGIH TWA (mg/m³)</th>
<th>0.2 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA OSHA PEL (TWA) (mg/m³)</td>
<td>1 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

Materials for protective clothing: GIVE EXCELLENT RESISTANCE: butyl rubber, polyethylene, tetrafluoroethylene. GIVE LESS RESISTANCE: neoprene, PVC, viton. GIVE POOR RESISTANCE: natural rubber, nitrile rubber, PVA.

Hand protection: Gloves.

Eye protection: Face shield.

Skin and body protection: Corrosion-proof clothing.

Respiratory protection: Gas mask with filter type E at conc. in air > exposure limit.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Liquid

Appearance: Liquid.

Molecular mass: 98.08 g/mol

Colour: Pure substance: colourless; Unpurified: yellow to brown

Odour: Almost odourless

Odour threshold: > 1 mg/m³

pH: No data available

Relative evaporation rate (butylacetate=1): No data available

Melting point: 10 °C

Freezing point: No data available

Boiling point: 288 °C

Flash point: Not applicable

Auto-ignition temperature: No data available

Decomposition temperature: > 340 °C

Flammability (solid, gas): No data available

Vapour pressure: < 1.0 hPa

Relative vapour density at 20 °C: 3.4

Relative density: 1.8

Density: 1840 kg/m³

Solubility: Exothermically soluble in water. Soluble in ethanol.

Water: Complete

Log Pow: -2.20 (Estimated value)

Log Kow: No data available

Viscosity, kinematic: No data available

Viscosity, dynamic: No data available

Explosive properties: No data available.

Oxidising properties: No data available.

Explosive limits: No data available.

9.2. Other information

VOC content: Not applicable
Other properties: Gas/vapour heavier than air at 20°C. Clear. Hygroscopic. Slightly volatile. Substance has acid reaction.

SECTION 10: Stability and reactivity

10.1. Reactivity
Violent exothermic reaction with water (moisture): release of corrosive gases/vapours. Reacts on exposure to water (moisture) with (some) metals: release of highly flammable gases/vapours (hydrogen). On heating/burning: release of toxic and corrosive gases/vapours (sulphur oxides). Reacts violently with (some) bases: heat release resulting in increased fire or explosion risk. Reacts with many compounds e.g.: with (strong) reducers, with organic material and with combustible materials: (increased) risk of fire/explosion.

10.2. Chemical stability
Unstable on exposure to moisture.

10.3. Possibility of hazardous reactions
Reacts violently with water. Reacts violently with (some) bases: release of heat.

10.4. Conditions to avoid
Incompatible materials. Moisture.

10.5. Incompatible materials

10.6. Hazardous decomposition products
Sulfur compounds.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity: Not classified

Sulfuric Acid, ACS (\textsuperscript{7664-93-9})

\textbf{LD50 oral rat} \quad 2140 mg/kg bodyweight (Rat; Experimental value)

Skin corrosion/irritation: Causes severe skin burns and eye damage.

Serious eye damage/irritation: Causes serious eye damage.

Respiratory or skin sensitisation: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Additionnal information: Strong inorganic acid mists containing sulfuric acid are carcinogenic to humans

IARC group: 1 - Carcinogenic to humans

National Toxicology Program (NTP) Status: 2 - Known Human Carcinogens

Reproductive toxicity: Not classified

Specific target organ toxicity (single exposure): Not classified

Specific target organ toxicity (repeated exposure): Not classified

Aspiration hazard: Not classified


Symptoms/injuries after skin contact: Caustic burns/corrosion of the skin.

Symptoms/injuries after eye contact: Corrosion of the eye tissue. Permanent eye damage.


SECTION 12: Ecological information

12.1. Toxicity

Ecology - general: Classification concerning the environment: not applicable.

Ecology - air: Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).

11/05/2014 EN (English)
Sulfuric Acid, ACS
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Ecology - water:

<table>
<thead>
<tr>
<th>Sulfuric Acid, ACS (7664-93-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fishes 1</td>
</tr>
<tr>
<td>42 mg/l (96 h; Gambusia affinis)</td>
</tr>
<tr>
<td>EC50 Daphnia 1</td>
</tr>
<tr>
<td>29 mg/l (24 h; Daphnia magna)</td>
</tr>
<tr>
<td>LC50 fish 2</td>
</tr>
<tr>
<td>49 mg/l (48 h; Lepomis macrochirus)</td>
</tr>
<tr>
<td>TLM fish 1</td>
</tr>
<tr>
<td>42 mg/l (96 h; Gambusia affinis)</td>
</tr>
<tr>
<td>Threshold limit other aquatic organisms 1</td>
</tr>
<tr>
<td>6900 mg/l (24 h; Pseudomonas fluorescens)</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>Sulfuric Acid, ACS (7664-93-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
</tr>
<tr>
<td>Biodegradability: not applicable.</td>
</tr>
<tr>
<td>Biochemical oxygen demand (BOD)</td>
</tr>
<tr>
<td>Not applicable</td>
</tr>
<tr>
<td>Chemical oxygen demand (COD)</td>
</tr>
<tr>
<td>Not applicable</td>
</tr>
<tr>
<td>ThOD</td>
</tr>
<tr>
<td>Not applicable</td>
</tr>
<tr>
<td>BOD (% of ThOD)</td>
</tr>
<tr>
<td>Not applicable</td>
</tr>
</tbody>
</table>

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Sulfuric Acid, ACS (7664-93-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
</tr>
<tr>
<td>-2.20 (Estimated value)</td>
</tr>
<tr>
<td>Bioaccumulative potential</td>
</tr>
<tr>
<td>Bioaccumulation: not applicable.</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
Effect on ozone layer:

13. Disposal considerations

13.1. Waste treatment methods

<table>
<thead>
<tr>
<th>Waste disposal recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle/reuse. Remove for physico-chemical/biological treatment. Remove to an authorized dump (Class I). Treat using the best available techniques before discharge into drains or the aquatic environment. Use appropriate containment to avoid environmental contamination.</td>
</tr>
</tbody>
</table>

Additional information:
LWCA (the Netherlands): KGA category 01. Hazardous waste according to Directive 2008/98/EC.

Ecology - waste materials:
Avoid release to the environment.

14. Transport information

In accordance with DOT

<table>
<thead>
<tr>
<th>Transport document description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1830 Sulfuric acid with more than 51 percent acid, 8, II</td>
</tr>
<tr>
<td>UN-No.(DOT)</td>
</tr>
<tr>
<td>UN1830</td>
</tr>
<tr>
<td>DOT Proper Shipping Name</td>
</tr>
<tr>
<td>Sulfuric acid with more than 51 percent acid</td>
</tr>
<tr>
<td>Department of Transportation (DOT) Hazard Classes</td>
</tr>
<tr>
<td>8 - Class 8 - Corrosive material 49 CFR 173.136</td>
</tr>
<tr>
<td>Hazard labels (DOT)</td>
</tr>
<tr>
<td>8 - Corrosive</td>
</tr>
</tbody>
</table>
**Sulfuric Acid, ACS**

**Safety Data Sheet**

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<table>
<thead>
<tr>
<th>Packing group (DOT)</th>
<th>II - Medium Danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT Special Provisions (49 CFR 172.102)</td>
<td>A3 - For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packagings. A7 - Steel packagings must be corrosion-resistant or have protection against corrosion. B3 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks and DOT 57 portable tanks are not authorized. B83 - Bottom outlets are prohibited on tank car tanks transporting sulfuric acid in concentrations over 65.25 percent. B84 - Packagings must be protected with non-metallic linings impervious to the lading or have a suitable corrosion allowance for sulfuric acid or spent sulfuric acid in concentration up to 65.25 percent. IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized. N34 - Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material. T8 - 4 178.274(d)(2) Normal............. Prohibited</td>
</tr>
<tr>
<td>DOT Packaging Exceptions (49 CFR 173.xxx)</td>
<td>154</td>
</tr>
<tr>
<td>DOT Packaging Non Bulk (49 CFR 173.xxx)</td>
<td>202</td>
</tr>
<tr>
<td>DOT Packaging Bulk (49 CFR 173.xxx)</td>
<td>242</td>
</tr>
<tr>
<td>DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)</td>
<td>1 L</td>
</tr>
<tr>
<td>DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)</td>
<td>30 L</td>
</tr>
<tr>
<td>DOT Vessel Stowage Location</td>
<td>C - The material must be stowed “on deck only” on a cargo vessel and on a passenger vessel.</td>
</tr>
<tr>
<td>DOT Vessel Stowage Other</td>
<td>14 - For metal drums, stowage permitted under deck on cargo vessels</td>
</tr>
</tbody>
</table>

**Additional information**

Other information : No supplementary information available.

**ADR**

Transport document description : UN 1830 Sulphuric acid, 8, II, (E)

Packing group (ADR) : II

Class (ADR) : 8 - Corrosive substances

Hazard identification number (Kemler No.) : 80

Classification code (ADR) : C1

Danger labels (ADR) : 8 - Corrosive substances

Orange plates : 80 1830

Tunnel restriction code : E

**Transport by sea**

UN-No. (IMDG) : 1830

Class (IMDG) : 8 - Corrosive substances

EmS-No. (1) : F-A
Sulfuric Acid, ACS
Safety Data Sheet

SECTION 15: Regulatory information

15.1. US Federal regulations

<table>
<thead>
<tr>
<th>sulfuric acid, ACS (7664-93-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
<tr>
<td>Listed on United States SARA Section 313</td>
</tr>
<tr>
<td>RQ (Reportable quantity, section 304 of EPA's List of Lists) : 1000 lb</td>
</tr>
<tr>
<td>SARA Section 302 Threshold Planning Quantity (TPQ) : 1000 lb</td>
</tr>
<tr>
<td>SARA Section 311/312 Hazard Classes : Immediate (acute) health hazard</td>
</tr>
</tbody>
</table>

15.2. International regulations

CANADA

<table>
<thead>
<tr>
<th>sulfuric acid, ACS (7664-93-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHMIS Classification : Class E - Corrosive Material</td>
</tr>
</tbody>
</table>

EU-Regulations

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Skin Corr. 1A H314
Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC or 1999/45/EC
C; R35
Full text of R-phrases: see section 16

15.2.2. National regulations

<table>
<thead>
<tr>
<th>sulfuric acid, ACS (7664-93-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on IARC (International Agency for Research on Cancer)</td>
</tr>
<tr>
<td>Listed as carcinogen on NTP (National Toxicology Program)</td>
</tr>
</tbody>
</table>

15.3. US State regulations

No additional information available

SECTION 16: Other information

Revision date : 11/01/2014

Full text of H-phrases: see section 16:

| Eye Dam. 1 | Serious eye damage/eye irritation, Category 1 |
| Skin Corr. 1A | Skin corrosion/irritation, Category 1A |
| H314 | Causes severe skin burns and eye damage |
| H318 | Causes serious eye damage |

NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.

NFPA specific hazard : W - Unusual reactivity with water. This indicates a potential hazard using water to fight a fire involving this material. When a compound is both water-reactive and an oxidizer, the W/bar symbol should go in this quadrant and the OX warning is placed immediately below the NFPA diamond.
Sulfuric Acid, ACS
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HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability : 0 Minimal Hazard
Physical : 2 Moderate Hazard
Personal Protection : H

SDS US (GHS HazCom 2012)

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.