

Material Safety Data Sheet

Product Group: Sulfuric Acid %98

1. Identification of the substance / preparation and of the company / undertaking

Product name Sulfuric Acid 98%

Symbol(s) H₂SO₄

Synonyms% Sulphuric Acid, Oil of Vitriol, Battery Acid, Hydrogen Sulphate.

Producer/Distributor **Chemical Chain Co. (Zanjireh Shimi Co.)**
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 Tel.: +98 21 887 99 199
 Fax.: +98 21 888 80 381
 email: info@golghah.com
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Identification of product Oily liquid

Use Chemical applications

Emergency phone number Local emergency center (Iran): 115
 or +98 21 887 98 459

2. Composition* / Information on ingredients

Substance name	Value(s)	CAS No. / HS Code	R-Phrase(s)	S-Phrase(s)
Sulfuric Acid	98.0%	7664-93-9 / 28070010	R23/25, R36/37/38, R35, R41, R48, R49	S1/2, S21, S23, S24/25, S26, S27, S28, S29, S30, S36/37/39, S41, S45, S46/62/64, S50
Other	%2			

* For additional information on composition and technical specification, refer to our product catalogue.

3. Hazards identification

Sulfuric acid (98% solution) is classified as hazardous and specified in the NOHSC of Designated Hazardous Substances [NOHSC:1005(1999)].

NOHSC National Occupational Health and Safety Commission (Australia)

Sulfuric acid (98% solution) is classified for physicochemical hazards and specified as dangerous in the Australian

Code for the Transport of Dangerous Goods by Road and Rail (ADG Code), 6th Edition, (FORS, 1998).

Risk Phrases Description

Sulfuric acid (98% solution) is classified as corrosive.

R23/25 Toxic by inhalation and if swallowed.

R35 Causes severe burns

R36/37/38 Irritating to eyes, respiratory system and skin.

R41 Risk of serious damage to the eyes.

R48 Danger of serious damage to health by prolonged exposure.

R49 May cause cancer by inhalation

Safety Phrases Description

Sulfuric acid (98% solution) is a hazardous substance.

S1/2 Keep locked and out of reach of children.

S21 When using do not smoke.

S23 Do not breathe fumes, vapour or mist.

S24/25 Avoid contact with skin and eyes.

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S27 Take off immediately all contaminated clothing.

S28 After contact with skin, wash immediately with plenty of water.

S29 Do not empty into drains.

S30 Never add water to this product.

S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

S41 In case of fire and/or explosion do not breathe fumes.

S45 In case of accident or if you feel unwell seek medical attention immediately (show the label where possible).

S46/62/64 If swallowed, rinse mouth with water (only if the person is conscious), do not induce vomiting; seek medical advice immediately and show this label.

S50 Do not mix with hypochlorites, cyanides, strong alkalies, or organic and combustible materials.

4. First Aid measures

First aid Sulfuric Acid (98% solution) is corrosive on contact and poisonous by ingestion and inhalation of its vapour. First aid attention must be given as urgently as possible as outlined below. All suspected Sulfuric Acid (98% solution) burns should receive medical attention. Training on handling Sulfuric Acid (98% solution) incidents using this MSDS should be provided before any Sulfuric Acid (98% solution) handling or use commences.

First aid facilities First aid procedures, equipment, medication and training for the treatment of burns with sulfuric acid (98% solution) should be in place BEFORE the use commences. Company physician, occupational health nurse and first aid personnel should be aware of the nearest hospitals which are familiar with the treatment of sulfuric acid (98% solution) burns.
Equipment and medication in place should be: Safety shower and eyewash stations immediately accessible in the workplace;
Eye-wash bottle;
Personal protective equipment for use by first aid personnel;
Fresh, clean cool drinking water;
Oxygen;
"Space" or thermal blankets for treating patients for shock.

Skin contact Immediately remove contaminated clothing and wash contaminated area on skin with soap or mild detergent and running water. Contaminated clothing should be washed before re-use.

FIRST AID PROCEDURES FOR DEALING WITH THIS PRODUCT AND EXPOSURE TO IT

Personal protection by first aid staff First aid personnel providing first aid treatment to a patient exposed to sulfuric acid (98% solution) should observe the following precautions for their own personal protection:
Avoid contact with contaminated skin, clothing and equipment by wearing protective gloves to prevent contact of sulfuric acid (98% solution) with skin;
Wear chemical goggles as a minimum level of eye protection to prevent splashes of sulfuric acid (98% solution) entering eyes;
Avoid inhalation of sulfuric acid (98% solution) fumes or mist during rescue in contaminated areas by wearing suitable respiratory protection; Respiratory protection suggested is: an air supplied breathing apparatus, or positive pressure self-contained breathing apparatus.

Eye contact Persons with potential eye exposure should not wear contact lenses. Immediately irrigate with copious quantities of water, while holding eyelids open, for at least 15 minutes.

Swallowed/Ingestion Do not give anything by mouth if victim is losing consciousness, or is unconscious, or convulsing. If victim is conscious, rinse mouth thoroughly with water immediately and give water or milk to drink.
DO NOT induce vomiting.
Seek urgent medical assistance.

Skin contact First aid personnel must avoid contact with this chemical. Wear protective gloves when assisting patient. DO NOT USE HOT WATER. Immediately wash affected areas with copious amounts of water. Remove all contaminated clothing and launder before re-use. DO NOT apply creams or ointments.

Inhalation Rescuer should wear appropriate personal protection to avoid skin contamination skin and breathing sulfuric acid (98% solution) fumes or mist. Remove affected persons from exposure. Allow affected person to assume most comfortable position and keep warm. Keep at rest until fully recovered. If breathing is laboured, or affected person is cyanotic (blue), ensure airways are clear and have a qualified person give oxygen through a face-mask. If breathing has stopped apply expired air resuscitation immediately. If the affected person suffers cardiac arrest commence cardio-pulmonary resuscitation immediately.

5. Fire-Fighting measures

Fire extinguishing data Not flammable, not combustible, does not burn.

Extinguishing media Water fog (or if unavailable, fine water spray), foam, dry chemical powder, or carbon dioxide.

Special protective equipment Wear full body protective clothing with breathing apparatus.
For firefighters Prevent spillage from entering drains or waterways. Consider evacuation. Use water to control fire and cool adjacent area and fire exposed sulfuric acid (98% solution) storage containers. Avoid direct water impingement on strong acid since this creates heat increasing toxic fume evolution. Do not approach sulfuric acid (98% solution) containers suspected to be hot. If safe and practicable to do so remove sulfuric acid (98% solution) containers from path of fire. Equipment should be thoroughly decontaminated after use. Wear self-contained breathing apparatus with a full-face piece operated in pressure-demand or positive pressure mode.

Combustion and thermal decomposition products Decomposes on heating producing toxic fumes of sulfur oxides. On contact with most metals, it will liberate hydrogen gas, which is flammable and (when confined) explosive. Sulfuric acid (98% solution) is an oxyacid with a good oxidizing ability – therefore, contact with cellulose based products (e.g., paper and cotton), or organic solvents and other organic materials may lead to liberation of large quantities of heat.

6. Accidental release measures

Emergency procedures The hazardous nature of sulfuric acid (98% solution) requires emergency and spill procedures to be effective to avoid both human and environmental exposure. Hazardous conditions may result if material is managed improperly. Make plans in advance to handle possible emergencies, including obtaining stocks of absorbent materials.

Always wear recommended personal protective equipment and respiratory protection. Good ventilation is necessary. Sulfuric acid (98% solution) dissolves very readily in water, giving off large quantities of heat. Avoid direct water contact with sulfuric acid (98% solution) leaks.

Methods and Materials for containment and clean up For ALL spills, evacuate unprotected personnel upwind and out of danger.

Shut off sulfuric acid (98% solution) supply, if safe to do so. Shut off all sources of ignition. Stay upwind of vapours. Restrict access to spill site.

Small Leaks Sulfuric acid (98% solution) fumes: Increase ventilation and allow fumes to vent to a safe area Sulfuric acid (98% solution) liquid: If possible contain the surface area of a spill by bunding with sand, earth or vermiculite. Do NOT use sawdust. Dilute spill with water, then neutralise with lime or soda ash to pH 6 to 10. Prevent run-off into drains and waterways.

Large Leaks Sulfuric acid (98% solution) fumes: Use water fog to dampen cloud of sulfuric acid (98% solution) fumes and reduce vapours. Do not spray water directly on the leak or sulfuric acid (98% solution) container.

Sulfuric acid (98% solution) liquid: If possible contain the surface area of a spill by bunding with sand, earth or vermiculite. Do NOT use sawdust. Use water fog to dampen sulfuric acid (98% solution) fumes and reduce vapours.

Prevent run-off into drains and waterways.

Dispose of all contained spill residues in accordance with the requirements of the Department of Environment Protection/Authorized local department.

Clean up personnel will need personal protection equipment and respiratory protection. Portable safety shower and eyewash facilities may also be needed for clean up personnel. Bags of lime or soda ash neutralising agent or chemical absorbent and substantial amounts of water will be required for large spill. A front-end loader may be required to scoop up neutralised acid/lime/soda ash residue.

Spills For very small leaks wash away with large quantities of water. For other leaks collect liquid either by pumping into an emergency tank or by absorption in dry sand.

Absorb spill with sand or non-combustible dry material and collect in appropriate container for disposal. Flush area with water.

7. Handling and storage

Handling precautions Regulated dangerous goods as Class 8 Corrosive. Proper protective clothing must be worn that encapsulates the body including the face. A safety shower and eyewash should be available. Do not breathe vapour or mist.
Avoid contact with skin, eyes and clothing.
Do not add water to sulfuric acid (98% solution) – this may generate spitting and splashing of acid. In dilution process, sulfuric acid (98% solution) should be added to plenty of water.
Do not smoke anywhere near the storage and handling of sulfuric acid (98% solution) or associated pipework and equipment.
Do not touch damaged containers or spilled material unless wearing appropriate personal protective equipment.
Change and wash clothing, and personal protective equipment if contaminated, or before storing and/or reusing.
Wash hands and face thoroughly after handling and before work breaks, eating, drinking, smoking and using toilet facilities.

Conditions for safe storage, including any incompatibilities Ensure sulfuric acid (98% solution) in bulk is stored and handled in accordance with Australian Standard AS 3780 The storage and handling of corrosive substances. Ensure adequate ventilation to keep airborne concentration below exposure standard. Where necessary, use local exhaust ventilation in conjunction with P2 canister respirator, or as appropriate, self contained breathing apparatus.
Store away from strong alkalis, hypochlorites, cyanides, organic and combustible materials.
Sulfuric acid (98% solution) is highly corrosive to most metals.
Many plastics (except for Teflon - PTFE) do not resist sulfuric acid (98% solution).

8. Exposure controls and personal protection

Engineering measures to reduce exposure	Handle sulfuric acid (98% solution) within closed systems whenever possible. Provide adequate ventilation particularly at low level.
Personal protection equipment	Whenever the risk of exposure exists, such as tanker loading/unloading procedures, non-routine operations and emergency circumstances, the following personal protection measure are recommended: Respiratory protection: Supplied air or full face mask and filter respirator self contained breathing apparatus may be required if working with sulfuric acid (98% solution) or if decomposition fumes exits, for prolonged periods. Hand protection: PVC or butyl rubber gauntlet-type gloves. Eye protection: Chemical splash goggles (gas tight type preferred) and full face shield. Skin protection: PVC overalls or jacket and pants and butyl rubber Wellington boots.

9. Physical and chemical properties

Form	Hygroscopic, viscous clear to brownish liquid.
pH (10% solution)	< 1
Boiling point	335°C at 101.3 kPa.
Freezing/melting point	Melting point, approximately 10°C at 101.3 kPa.
Odor	No appreciable odour.
Solubility	Miscible in water in all proportions, soluble in most organic solvents.
Specific gravity or density	Specific gravity = 1.84 at 20°C (water = 1 at 4°C).
Additional information	Refer to producer/distributor technical specification data

10. Stability and reactivity

Stability Stable at ambient conditions of use and storage.

Conditions to avoid Sulfuric acid (98% solution) reacts violently with water, alkalis and most organic materials to liberate large quantities of heat. Dilute acid on contact with most metals, will liberate hydrogen gas, which is flammable and (when confined) explosive.

Incompatible materials Sulfuric acid (98% solution) can react with most metals generating flammable hydrogen gas. Most plastics do not resist concentrated sulfuric acid greater than 50 to 60% strength.

hazardous decomposition Releases sulfur dioxide at extremely high temperatures.

Hazardous reactions Sulfuric acid (98% solution) reacts vigorously, violently or explosively with many organic and inorganic chemicals including water, acrylonitrile, alkali solutions, carbides, chlorates, fulminates, nitrates, perchlorates, permanganates, picrates, metal acetylides or carbides, epichlorohydrin, aniline, ethylenediamine, alcohols with strong hydrogen peroxide, chlorosulfonic acid, cyclopentadiene, hydrofluoric acid, nitromethane, 4- nitrotoluene, phosphorus (iii) oxide, potassium, sodium, ethylene glycol, isoprene, styrene. Acetaldehyde and allyl chloride may polymerise violently in the presence of sulfuric acid (98% solution). Hazardous gases such as hydrogen cyanide, hydrogen sulfide, and acetylene, are evolved when sulfuric acid (98% solution) contacts cyanide, sulfides and carbides, respectively.

11. Toxicological information

- Acute toxicity** Sulfuric acid (98% solution) is extremely corrosive, irritating and toxic leading to severe burns and rapid destruction of tissue.
- Oral:** The product is not expected to be toxic.
- Inhalation:** Sulfuric acid (98% solution) is not very volatile; hence workplace exposures are mainly due to mists and aerosols. The acid mists are very corrosive and can cause severe irritation and injury if inhaled. The degree and severity of respiratory effects are influenced by the size of the aerosol particulate, deposition site, concentration and humidity. Inhalation of acid mists may cause severe lung damage and life threatening pulmonary oedema (accumulation of fluid in lungs). Symptoms of pulmonary oedema include coughing and shortness of breath, and may be delayed until hours or days after exposure. Asthma can also be aggravated by exposure to sulfuric acid mists. LC50 (Rat) = 510 mg/m³ 2 hour exposure.
- Carcinogenicity - The International Agency for Research on Cancer (IARC) has concluded that there is sufficient evidence that occupational exposure to strong inorganic mists containing sulfuric acid is carcinogenic to humans (Group 1)*. Many studies have reported an excess of cancer of larynx, and to a lesser extent, the lungs, in a variety of processes involving the use of strong inorganic acids including sulfuric acid.
- Throughout these studies, sulfuric acid mists were the most common exposure, and in two studies, the number of cancers increased as exposure increased.
- Mutagenicity – There was a significant higher number of sister chromatoid exchanges, micronuclei and chromosomal aberrations in cultured lymphocytes (white blood cells) from workers exposed to SO₂ in a sulfuric acid factory*.
- * IARC Monographs On The Evolution Of Carcinogenic Risks To Humans, Vol. 54, IARC, 1992, pp 41-130.
- Skin** Highly corrosive to skin. Causes severe burns leading to necrosis and scarring. The severity of injury depends on the concentration of sulfuric acid (98% solution) and the duration of exposure.
- Eyes** Corrosive to eyes. Contact may cause corneal burns. Permanent eye damage including loss of sight may occur. Sulfuric acid (98% solution) mists and aerosols are expected to be very irritating.
- Swallowed** Can kill if swallowed. Will cause severe damage to the mucous membranes. May cause nausea, vomiting, abdominal pain and severe burns to the mouth, throat, stomach and gastrointestinal tract. LD50 (Oral, rat)=2,140 mg/kg.
- Chronic** Chronic exposure to sulfuric acid (98% solution) may lead to teeth disorders (yellow discolouration and erosion of the dental enamel), dermatitis, and respiratory irritation such as bronchial hyperactivity.

12. Ecological information

Ecotoxicity	LC50/96h/algae=1.5-2mg/l (Al-Cl) Toxicity to bacteria=12mg/l (Al-Cl) LC50/48h/daphnia=3.9mg/l (Al-Cl)
Persistence and degradability	Sulfuric acid (98% solution) is soluble in water and remains indefinitely in the environment as sulfate.
Mobility	Sulfuric acid (98% solution) is soluble in water and has high mobility in soil. During transport through the soil, sulfuric acid (98% solution) will dissolve some of the soil material; in particular, the carbonate based materials. The acid will be neutralised to some degree with adsorption of the proton also occurring on clay materials. However, significant amounts of acid are expected to remain for transport down towards the ground water table. Upon reaching the ground water table, the acid will continue to move, now in the direction of the ground water flow. Lime addition may be required to rectify low pH resulting from sulfuric acid (98% solution) spillages.

13. Disposal considerations

Disposal methods and containers	Due to its inherent properties, hazardous conditions may result if material is managed improperly. Dispose of all contained and neutralised spill residue in accordance with Department of the Environment requirements. As required under the ADG Code treat empty containers as filled containers.
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14. Transport information

Class and subsidiary risk	Not classified as dangerous in the meaning of transport regulations. Not a hazardous material for transportation.		
Packing group	II	Hazchem code	2P
Special precautions for user	Not to be loaded with explosives (Class 1), dangerous when wet substances (Class 4.3), oxidizing agents (Class 5.1), organic peroxides (Class 5.2), toxic and infectious substances (Class 6) – where the Class 6 substance is a cyanide, radioactive substances (class 7) and foodstuffs and foodstuff empties.		

15. Regulatory information

OSHA: Hazardous by definition of Hazard Communication Standard (29CFR 1910.1200).

16. Other information

Notes The information contained in this safety data sheet is given in good faith. It is accurate to the best of our knowledge and belief and represents the most up to date information. The information given in this data sheet does not constitute or replace the user's own assessment of workplace risk as required by other health and safety legislation.

Prepared by Golgah Co.

Date 7/18/2016

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