

Chemical Safety Data Sheet MSDS / SDS

Hydrogen Sulfide

Revision Date:2024-06-29 Revision Number:1

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

Product identifier

Product name : Hydrogen Sulfide
CBnumber : CB0122872
CAS : 7783-06-4
EINECS Number : 231-977-3
Synonyms : H₂S,Hydrogen Sulfide

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

Relevant identified uses : For R&D use only. Not for medicinal, household or other use.
Uses advised against : none

Company Identification

Company : Chemicalbook
Address : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing
Telephone : 400-158-6606

SECTION 2: Hazards identification

Classification of the substance or mixture

Gases under pressure: Liquefied gas
Flammable gases, Category 1A, Flammable gas
Acute toxicity - Category 2, Inhalation
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

Label elements

Pictogram(s)

□□□□

Signal word : Danger

Hazard statement(s)

H220 Extremely flammable gas
H225 Highly Flammable liquid and vapour
H280 Contains gas under pressure; may explode if heated
H302 Harmful if swallowed
H319 Causes serious eye irritation

H330 Fatal if inhaled

H335 May cause respiratory irritation

H351 Suspected of causing cancer

H400 Very toxic to aquatic life

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P284 Wear respiratory protection.

P310 Immediately call a POISON CENTER or doctor/physician.

P370+P378 In case of fire: Use ... for extinction.

P403+P235 Store in a well-ventilated place. Keep cool.

P410+P403 Protect from sunlight. Store in a well-ventilated place.

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P271 Use only outdoors or in a well-ventilated area.

P284 [In case of inadequate ventilation] wear respiratory protection.

P273 Avoid release to the environment.

Response

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 In case of leakage, eliminate all ignition sources.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P316 Get emergency medical help immediately.

P320 Specific treatment is urgent (see ... on this label).

P391 Collect spillage.

Storage

P410+P403 Protect from sunlight. Store in a well-ventilated place.

P403 Store in a well-ventilated place.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards

no data available

SECTION 3: Composition/information on ingredients

Substance

Product name : Hydrogen Sulfide

| | |
|-----------|-------------------------------------|
| Synonyms | : H ₂ S,Hydrogen Sulfide |
| CAS | : 7783-06-4 |
| EC number | : 231-977-3 |
| MF | : H ₂ S |
| MW | : 34.08 |

SECTION 4: First aid measures

Description of first aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. No mouth-to-mouth artificial respiration. Refer for medical attention.

Following skin contact

ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Refer for medical attention .

Most important symptoms and effects, both acute and delayed

Exposure to very high concentrations causes immediate death. Also death or permanent injury may occur after very short exposure to small quantities. It acts directly upon the nervous system resulting in paralysis of respiratory centers. (EPA, 1998)

Indication of any immediate medical attention and special treatment needed

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Sulfur and related compounds

SECTION 5: Firefighting measures

Extinguishing media

Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Use fine spray or fog to control fire by preventing its spread and absorbing some of its heat. Water or foam may cause frothing of molten sulfur.

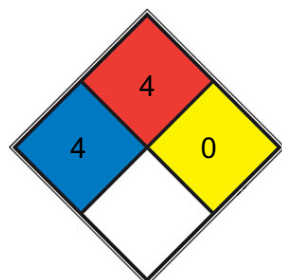
Specific Hazards Arising from the Chemical

Compound is heavier than air and may travel a considerable distance to source of ignition and flash back. It forms explosive mixtures with air over a wide range. Also reacts explosively with bromine pentafluoride, chlorine trifluoride, nitrogen triiodide, nitrogen trichloride, oxygen difluoride, and phenyl diazonium chloride. When heated to decomposition, it emits highly toxic fumes of oxides of sulfur. Incompatible with many materials including strong oxidizers, metals, strong nitric acid, bromine pentafluoride, chlorine trifluoride, nitrogen triiodide, nitrogen trichloride, oxygen difluoride and phenyl diazonium chloride. Avoid physical damage to containers; sources of ignition; storage near nitric acid, strong oxidizing materials, and corrosive liquids or gases. (EPA, 1998)

Advice for firefighters

Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with water spray, dry powder. In case of fire: keep cylinder cool by spraying with water.

NFPA 704



HEALTH 4 Very short exposure could cause death or major residual injury (e.g. hydrogen cyanide, phosgene, methyl isocyanate, [hydrofluoric acid](#))

FIRE 4 Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or is readily dispersed in air and will burn readily. Includes pyrophoric substances. Flash point below room temperature at 22.8 °C (73 °F). (e.g. acetylene, propane, [hydrogen gas](#))

REACT 0 Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium, [N₂](#))

SPEC.
HAZ.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Shut off cylinder if possible. Ventilation. Remove gas with fine water spray. Isolate the area until the gas has dispersed.

Environmental precautions

Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Remove gas with fine water spray.

Methods and materials for containment and cleaning up

Environmental considerations: Water spill: Use natural barriers or oil spill control booms to limit spill travel. Use natural deep water pockets, excavated lagoons, or sand bag barriers to trap material at bottom. Remove trapped material with suction hoses.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Do NOT use compressed air for filling, discharging, or handling. Handling in a well

ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Fireproof. Separated from strong oxidants. Cool. Keep in a well-ventilated room. Install continuous monitoring system with alarm. Store in cool, dry, well-ventilated location. Separate from chlorates, nitrates, other oxidizing materials, and hydrocarbons.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 1 ppm as TWA; 5 ppm as STEL. MAK: 7.1 mg/m³, 5 ppm; peak limitation category: I(2); pregnancy risk group: C. EU-OEL: 7 mg/m³, 5 ppm as TWA; 14 mg/m³, 10 ppm as STEL

Biological limit values

no data available

Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures

Eye/face protection

Wear safety goggles or eye protection in combination with breathing protection.

Skin protection

Cold-insulating gloves.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

| | |
|--|---|
| Physical state | colorless gas |
| Colour | Pure sulfur exists in two stable crystalline forms, alpha and beta, and at least two amorphous (liquid) forms. Alpha-sulfur: rhombic, octahedral, yellow crystals; beta-sulfur: monoclinic, prismatic, pale-yellow crystals |
| Odour | Pure sulfur is odorless, but traces of hydrocarbon impurity may impart an oily and/or rotten egg odor |
| Melting point/freezing point | -85°C(lit.) |
| Boiling point or initial boiling point and boiling range | -60°C |
| Flammability | Flammable Gas |

| | |
|--|--|
| Lower and upper explosion limit/flammability limit | 6% |
| Flash point | -82°C |
| Auto-ignition temperature | 500° F (USCG, 1999) |
| Decomposition temperature | no data available |
| pH | no data available |
| Kinematic viscosity | Dynamic viscosity of liquid (Pa.s): 0.17 at 120 deg C; 0.008 at 140 deg C; 0.0064 at 158 deg C; 5.952 at 160 deg C; 86.304 at 180 deg C; 93.0 at 187.8 deg C; 78.864 at 200 deg C; 3.72 at 300 deg C |
| Solubility | 0.4 % (NIOSH, 2016) |
| Partition coefficient n-octanol/water | no data available |
| Vapour pressure | 252 psi (21 °C) |
| Density and/or relative density | 1.19 (15°C. vs air) |
| Relative vapour density | 1.19 (15 °C, vs air) |
| Particle characteristics | no data available |

SECTION 10: Stability and reactivity

Reactivity

Heating may cause violent combustion or explosion. Decomposes on burning. This produces toxic gases of sulfur oxides. Reacts with strong oxidants. This generates fire and explosion hazard. Attacks many metals and some plastics.

On combustion, forms toxic and corrosive gases of sulfur oxides including sulfur dioxide (see ICSC 0074). Reacts violently with strong oxidants, especially if powdered. This generates fire and explosion hazard.

Chemical stability

Preparations containing sulfur may react with metals including silver and copper, resulting in discoloration of the metal.

Possibility of hazardous reactions

Vapors given off during melting of sulfur may contain sufficient hydrogen sulfide & carbon disulfide to permit ignition of air/vapor mixture on contact with hot surface; such ignition may result in transmission of flames to molten sulfur. ... Sulfur is poor conductor of electricity & tends to develop charges of static electricity during transport or processing; static discharge may lead to ignition of sulfur dust. Fires in heaps of sulfur are frequent & insidious since they may break out again even after original conflagration has ... Been extinguished. The gas is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated., Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc. HYDROGEN SULFIDE reacts as an acid and as a reducing agent. Explodes on contact with oxygen difluoride, bromine pentafluoride, chlorine trifluoride, dichlorine oxide, silver fulminate. May ignite and explode when exposed to powdered copper in oxygen [Mertz, V. et al., Ber., 1880, 13, p. 722]. May react similarly with other powdered metals. Ignites on contact with metal oxides and peroxides (barium peroxide, chromium trioxide, copper oxide, lead dioxide, manganese dioxide, nickel oxide, silver oxide, silver dioxide, thallium trioxide, sodium peroxide, mercury oxide, calcium oxide) [Mellor, 1947, vol. 10, p. 129, 141]. Ignites with silver bromate, lead(II) hypochlorite, copper chromate, nitric acid, lead(IV) oxide and rust. May ignite if passed through rusty iron pipes [Mee, A. J., School Sci. Rev., 1940, 22(85), p. 95]. Reacts exothermically with bases. The heat of the reaction with soda lime, sodium hydroxide, potassium hydroxide, barium hydroxide may lead to ignition or explosion of the unreacted portion in the presence of air / oxygen [Mellor, 1947, vol. 10, p. 140].

Conditions to avoid

no data available

Incompatible materials

Reacts with oxidizing materials.

Hazardous decomposition products

Combustion by-products include sulfur dioxide gas.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Rat oral >5000 mg/kg bw
- Inhalation: LC50 Hamster inhalation >0.047 mg/L 4 hr
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

EPA-1

Reproductive toxicity

no data available

STOT-single exposure

Rapid evaporation of the liquid may cause frostbite. The substance is irritating to the eyes and respiratory tract. Inhalation of this gas may cause lung oedema. The effects may be delayed. Medical observation is indicated. See Notes. The substance may cause effects on the central nervous system. Exposure could cause unconsciousness. Exposure could cause death.

STOT-repeated exposure

no data available

Aspiration hazard

A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50; Species: Lepomis macrochirus (Bluegill); Conditions: freshwater, static; Concentration: <14000 ug/L for 96 hr /formulation

Toxicity to daphnia and other aquatic invertebrates: EC50; Species: Daphnia magna (Water flea, age <24 hr); Conditions: freshwater, static; Concentration: >5000000 ug/L for 48 hr; Effect: intoxication, immobilization /90% purity

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

Persistence and degradability

Biogenic sulfur compounds originate from non-specific bacterial reduction of organic sulfur, for example plant decomposition, and from specific sulfate reducing bacteria. Sulfate-reducing microbes are strict anaerobes, while the nonspecific reducers may be found in aerobic or anaerobic environments(1). Microbial activity plays a key role in the release and leaching of trace elements such as sulfur from metalliferous peat soils from the Elba, New York region(2).

Bioaccumulative potential

no data available

Mobility in soil

no data available

Other adverse effects

no data available

SECTION 13: Disposal considerations

Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

UN Number

ADR/RID: UN1053 (For reference only, please check.)

IMDG: UN1053 (For reference only, please check.)

IATA: UN1053 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: HYDROGEN SULPHIDE (For reference only, please check.)

IMDG: HYDROGEN SULPHIDE (For reference only, please check.)

IATA: HYDROGEN SULPHIDE (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 2.3 (For reference only, please check.)

IMDG: 2.3 (For reference only, please check.)

IATA: 2.3 (For reference only, please check.)

Packing group, if applicable

ADR/RID: (For reference only, please check.)

IMDG: (For reference only, please check.)

IATA: (For reference only, please check.)

Environmental hazards

ADR/RID: Yes

IMDG: Yes

IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

European Inventory of Existing Commercial Chemical Substances (EINECS)

Listed.

EC Inventory

Listed.

United States Toxic Substances Control Act (TSCA) Inventory

Listed.

China Catalog of Hazardous chemicals 2015

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Listed.

PICCS

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>

HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>

IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>

ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>

Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>

ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

Other Information

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available. Since the warning effect of the odour may be absent above the OEL (paralysis of the olfactory nerve), there is considerable risk of intoxication. The odour cannot be relied on as an adequate warning of the presence of hydrogen sulfide.

Disclaimer:

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