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

1.1 Product identifiers

Product name: Hydrogen sulfide

Product Number: 295442
Brand: Aldrich
Index-No.: 016-001-00-4
REACH No.: A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.: 7783-06-4

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

Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable gases (Category 1), H220
Gases under pressure (Liquefied gas), H280
Acute toxicity, Inhalation (Category 1), H330
Short-term (acute) aquatic hazard (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.
2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H330 Fatal if inhaled.
H400 Very toxic to aquatic life.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P284 Wear respiratory protection.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Supplemental Hazard Statements none

Reduced Labeling (<= 125 ml)

Pictogram

Signal word Danger

Hazard statement(s)
H220 Extremely flammable gas.
H330 Fatal if inhaled.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P271 Use only outdoors or in a well-ventilated area.
P284 Wear respiratory protection.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

Supplemental Hazard Statements none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Contact with liquid or refrigerated gas can cause cold burns and frostbite.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : H₂S
Molecular weight : 34.08 g/mol
CAS-No. : 7783-06-4
SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Sulfur oxides
Not combustible.
Pay attention to flashback.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe gas. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Stop flow of gas, move leaking cylinder to open air if without risk.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Storage conditions
Tightly closed. Keep locked up or in an area accessible only to qualified or authorized persons. Keep away from combustible materials and sources of ignition.
Moisture sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated
SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

- Full contact
  Material: Nitrile rubber
  Minimum layer thickness: 0,11 mm
  Break through time: 480 min
  Material tested: KCL 741 Dermatril® L

- Splash contact
  Material: Nitrile rubber
  Minimum layer thickness: 0,11 mm
  Break through time: 480 min
  Material tested: KCL 741 Dermatril® L

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type B

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance
   Form: Liquefied gas
   Color: colorless

The life science business of Merck operates as MilliporeSigma in the US and Canada
b) Odor Stench.
c) Odor Threshold 0,0005 ppm
d) pH No data available
e) Melting point/freezing point Melting point/range: -85 °C - lit.
f) Initial boiling point and boiling range -60 °C - lit.
g) Flash point Not applicable
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available
j) Upper/lower flammability or explosive limits Upper explosion limit: 46 % (V) 45,5 % (V) Lower explosion limit: 4 % (V) 4,3 % (V) 4 % (V)
k) Vapor pressure 17.369,8 hPa at 21 °C
l) Vapor density 1,17 - (Air = 1.0)
m) Relative density No data available
n) Water solubility No data available
o) Partition coefficient: n-octanol/water No data available
p) Autoignition temperature No data available
q) Decomposition temperature No data available
r) Viscosity Viscosity, kinematic: No data available Viscosity, dynamic: No data available
s) Explosive properties No data available
t) Oxidizing properties No data available

9.2 Other safety information
Relative vapor density 1,17 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
Exothermic reaction with:
Ammonia
alkaline earth hydroxides
Ethylene oxide
Sodium hydroxide

The life science business of Merck operates as MilliporeSigma in the US and Canada
Potassium hydroxide
sulphur dioxide
sulfuric acid
Tungsten
Copper
in powder form
Risk of ignition or formation of inflammable gases or vapours with:
Hypochlorites
Lead oxides
Chlorine
chromium(VI) oxide
chromyl chloride
Amines
Fluorine
Oxidizing agents
halogens
Potassium
metallic oxides
sodium
Peroxides
Nitric acid
Oxygen
barium oxide
barium peroxide
Risk of explosion with:
halogen-halogen compounds
halogen oxides
ferric oxide
iodates
perchloryl fluoride
Rust
bromates
nitrogen dioxide
nitrogen trichloride
chromates/perchromates
Copper
with
Oxygen
mercury oxide
with
Air

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5
SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LC50 Inhalation - Mouse - 1 h - 634 ppm
LC50 Inhalation - Rat - 444 ppm

Skin corrosion/irritation

Serious eye damage/eye irritation

Respiratory or skin sensitization

Germ cell mutagenicity

Carcinogenicity

No data available

Reproductive toxicity

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure

Aspiration hazard

11.2 Additional Information

RTECS: MX1225000

Hydrogen sulfide is strongly bound to methemoglobin in a manner similar to cyanide. Toxicologically, its reaction with enzymes in the blood stream inhibits cell respiration resulting in pulmonary paralysis, sudden collapse, and death. It is recognized by its characteristic odor of "rotten eggs". The detectable, minimum perceptible odor occurs at 0.13 ppm, rapid olfactory fatigue can occur at high concentrations (>100 ppm). At concentrations of 20 ppm hydrogen sulfide begins acting as an irritant on the mucous membranes of the eyes and respiratory tract and increases with concentration and exposure time. Eye irritation is characterized by irritation of the conjunctiva with photophobia to keratoconjunctivitis and vesiculation of the cornea epithelium. Prolonged exposure to moderate concentrations (250 ppm) may cause pulmonary edema. At concentrations over 500 ppm, drowsiness, dizziness, excitement, headache, unstable gait, and other systemic symptoms occur within a few minutes. Sudden loss of consciousness without premonition, anxiety, or sense of struggle are characteristic of acute exposure at concentrations above 700 ppm. At concentrations of 1000-2000 ppm hydrogen sulfide is rapidly absorbed through the lung into the blood. In this range a single inhalation may cause coma and may be rapidly fatal. Initially hyperpnea occurs, followed by rapid collapse and respiratory inhibition. At higher concentrations, hydrogen sulfide exerts an immediate paralyzing effect on the respiratory centers. When concentration reaches 5000 ppm, imminent death almost always results. Exposure to and/or consumption of alcohol may increase toxic effects. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
After absorption:

The following applies to hydrogen sulfide: odour perception limit 0.025 - 8 ppm. After inhalation: < 100 ppm: rhinitis, photophobia, mucosal irritations, coughing, irritations after contact with the eyes. > 500 ppm: headache, dizziness, ataxia (impaired locomotor coordination), cardiovascular disorders, agitation, spasms. Inhalation may lead to the formation of oedemas in the respiratory tract. > 1000 ppm: respiratory arrest within seconds to minutes. Late sequelae: the following organs may be damaged after uptake: lungs, heart, eyes.

This substance should be handled with particular care.

SECTION 12: Ecological information

12.1 Toxicity

| Toxicity to fish | LC50 - Pimephales promelas (fathead minnow) - 0,016 mg/l - 96,0 h |
| Toxicity to daphnia and other aquatic invertebrates | EC50 - Daphnia magna (Water flea) - < 1 mg/l |
| Remarks: | (Hommel) |
| Toxicity to bacteria | EC50 - Bacteria - 90 mg/l - 24 h |
| Remarks: | (Lit.) |

12.2 Persistence and degradability

12.3 Bioaccumulative potential

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Pressurised gas bottle: dispose of only in empty condition! See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1053  
IMDG: 1053  
IATA: 1053
14.2 UN proper shipping name
ADR/RID: HYDROGEN SULPHIDE
IMDG: HYDROGEN SULPHIDE
IATA: Hydrogen sulphide
Passenger Aircraft: Not permitted for transport
Cargo Aircraft: Not permitted for transport

14.3 Transport hazard class(es)
ADR/RID: 2.3 (2.1)  IMDG: 2.3 (2.1)  IATA: 2.3 (2.1)

14.4 Packaging group
ADR/RID: -  IMDG: -  IATA: -

14.5 Environmental hazards
ADR/RID: yes  IMDG Marine pollutant: yes  IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

National legislation

Other regulations
Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information
Full text of H-Statements referred to under sections 2 and 3.

H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H330 Fatal if inhaled.
H400 Very toxic to aquatic life.
**Further information**
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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