

Safety Data Sheet P-4611

according to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1979 Revision date: 03/20/2015 Supersedes: 06/01/2014

SECTION: 1. Product and company identification

1.1. Product identifier

Product form : Substance

Name : Hydrogen Sulfide

CAS No : 7783-06-4

Formula : H2S

Other means of identification : Sulfuretted hydrogen, sulfur hydride, hydrosulfuric acid, hepatic gas, stink damp

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

Use of the substance/mixture : Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.

39 Old Ridgebury Road

Danbury, CT 06810-5113 - USA

T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146

www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week — Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887 (collect calls accepted, Contract 17729)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Flam. Gas 1 H220 Liquefied gas H280 Acute Tox. 2 (Inhalation:gas) H330 STOT SE 3 H335 Aquatic Acute 1 H400

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US)



 \Diamond







GHS02

GHS04

GHS06

GHS07

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) : H220 - EXTREMELY FLAMMABLE GAS

H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED

H330 - FATAL IF INHALED

H335 - MAY CAUSE RESPIRATORY IRRITATION

H400 - VERY TOXIC TO AQUATIC LIFE

CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR

CGA-HG11 - SYMPTOMS MAY BE DELAYED

CGA-HG16 - EXTENDED EXPOSURE TO GAS REDUCES THE ABILITY TO SMELL

SULFIDES.

Precautionary statements (GHS-US) : P202 - Do not handle until all safety precautions have been read and understood

P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking

P260 - Do not breathe gas

P271+P403 - Use and store only outdoors or in a well-ventilated place.

P273 - Avoid release to the environment.

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P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection.

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

P381 - Eliminate all ignition sources if safe to do so

P405 - Store locked up

P501 - Dispose of contents/container in accordance with container supplier/owner instructions

CGA-PG05 - Use a back flow preventive device in the piping.

CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure.

CGA-PG12 - Do not open valve until connected to equipment prepared for use. CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug.

CGA-PG06 - Close valve after each use and when empty.

CGA-PG29 - Do not depend on odor to detect the presence of gas.

CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

2.3. Other hazards

Other hazards not contributing to the classification

: Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%
Hydrogen Sulfide (Main constituent)	(CAS No) 7783-06-4	100

3.2. Mixture

Not applicable

4.2.

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation

: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

First-aid measures after skin contact

For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact

. Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an

ophthalmologist immediately.Ingestion is not considered a potential route of exposure.

First-aid measures after ingestion

Most important symptoms and effects, both acute and delayed

No additional information

No additional information available

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

Obtain medical assistance. Treat with corticosteroid spray as soon as possible after inhalation.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

: Carbon dioxide, Dry chemical, Water spray or fog. Use extinguishing media appropriate for surrounding fire.

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5.2. Special hazards arising from the substance or mixture

Fire hazard

: EXTREMELY FLAMMABLE GAS. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions

: DANGER! Toxic, flammable liquid and gas under pressure

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Special protective equipment for fire fighters

Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire

fighters.

Other information

: Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures

: DANGER! Toxic, flammable liquid and gas under pressure . Forms explosive mixtures with air and oxidizing agents. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Reduce vapor with fog or fine water spray. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling

: Leak-check system with soapy water; never use a flame.

All piped systems and associated equipment must be grounded.

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions

: Store only where temperature will not exceed 125°F (52°C). Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Hydrogen Sulfide (7783-06-4)		
ACGIH	ACGIH TLV-TWA (ppm)	1 ppm
ACGIH	ACGIH TLV-STEL (ppm)	5 ppm
USA OSHA	OSHA PEL (Ceiling) (ppm)	20 ppm

8.2. Exposure controls

Appropriate engineering controls

: Use corrosion-resistant equipment. Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards.

MECHANICAL (GENERAL): Inadequate - Use only in a closed system. Use explosion proof

equipment and lighting.

Eye protection

: Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

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Skin and body protection

: Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves (e.g. neoprene, nitrile, etc.) during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132,

1910.136, and 1910.138.

Respiratory protection

When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a

self-contained breathing apparatus (SCBA).

Thermal hazard protection

: Wear cold insulating gloves when transfilling or breaking transfer connections. Standard EN

511 - Cold insulating gloves. None necessary.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Colorless gas. Colorless liquid at low temperature or under high pressure.

Molecular mass : 34 g/mol
Color : Colorless.

Odor : Odor can persist. Poor warning properties at low concentrations. Rotten eggs.

Odor threshold : Odor threshold is subjective and inadequate to warn for overexposure.

pH : Not applicable.

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable.

Melting point : -86 °C

Freezing point : No data available

Boiling point : -60.3 °C

Flash point : Not applicable.

Critical temperature : 100.4 °C

Auto-ignition temperature : 260 °C

Decomposition temperature : No data available Flammability (solid, gas) : 4.3 - 46 vol % Vapor pressure : 1880 kPa Critical pressure : 8940 kPa

Relative vapor density at 20 °C : No data available Relative density : No data available

Relative gas density : 1.2

Solubility : Water: 3980 mg/l
Log Pow : Not applicable.
Log Kow : Not applicable.
Viscosity, kinematic : Not applicable.
Viscosity, dynamic : Not applicable.
Explosive properties : Not applicable.
Oxidizing properties : None.

E i i i i i

Explosion limits : No data available

9.2. Other information

Gas group : Liquefied gas

Additional information : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground

level.

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SECT	ION 10: Stability and reactivity	
10.1.	Reactivity	
		No reactivity hazard other than the effects described in sub-sections below.
10.2.	Chemical stability	
		Stable under normal conditions.
10.3.	Possibility of hazardous reactions	
		May react violently with oxidants. Can form explosive mixture with air.
10.4.	Conditions to avoid	
		Avoid moisture in installation systems. Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
10.5.	Incompatible materials	
		Ammonia. Bases. Bromine pentafluoride. Chlorine trifluoride. chromium trioxide. Copper. Fluorine. Lead. Lead oxide. (and heat). (powdered). Mercury. Nitric acid. Nitrogen trifluoride. nitrogen sulfide. Organic compounds. Oxidizing agents. Oxygen difluoride. Rubber. Sodium. (and moisture). Water.
10.6	Hazardous decomposition products	

Thermal decomposition may produce: Sulfur. Hydrogen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: FATAL IF INHALED.

Hydrogen Sulfide (\f)7783-06-4	
LC50 inhalation rat (mg/l)	0.99 mg/l (Exposure time: 1 h)
LC50 inhalation rat (ppm)	356 ppm/4h
ATE US (gases)	356.000 ppmV/4h
ATE US (vapors)	0.990 mg/l/4h
ATE US (dust, mist)	0.990 mg/l/4h

Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified Germ cell mutagenicity : Not classified Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : MAY CAUSE RESPIRATORY IRRITATION.

Specific target organ toxicity (repeated

exposure)

: Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : VERY TOXIC TO AQUATIC LIFE.

Hydrogen Sulfide (7783-06-4)	
LC50 fish 1	0.0448 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
LC50 fish 2	0.016 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

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12.2. Persistence and degradability

Hydrogen Sulfide (7783-06-4)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. **Bioaccumulative potential**

Hydrogen Sulfide (7783-06-4)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

Mobility in soil 12.4.

Hydrogen Sulfide (7783-06-4)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None

Effect on the global warming : No known effects from this product.

SECTION 13: Disposal considerations

Waste treatment methods

Regional legislation (waste) : U.S. - RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix

VIII to 40 CFR 261. U.S. - RCRA (Resource Conservation & Recovery Act) - U Series Wastes -

Acutely Toxic Wastes & Other Hazardous Characteristics.

: Do not attempt to dispose of residual or unused quantities. Return container to supplier. Waste disposal recommendations

SECTION 14: Transport information

In accordance with DOT

Hazard labels (DOT)

Transport document description : UN1053 Hydrogen sulfide, 2.3

UN-No.(DOT) : UN1053

Proper Shipping Name (DOT) : Hydrogen sulfide

Department of Transportation (DOT) Hazard

Classes

: 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115

: 2.3 - Poison gas 2.1 - Flammable gas



DOT Special Provisions (49 CFR 172.102)

: 2 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone B (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.

B9 - Bottom outlets are not authorized.

B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.

N89 - When steel UN pressure receptacles are used, only those bearing the "H" mark are authorized.

Additional information

Emergency Response Guide (ERG) Number

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Other information

: No supplementary information available.

Special transport precautions

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
 Ensure there is adequate ventilation.
 Ensure that containers are firmly secured.
 Ensure cylinder valve is closed and not leaking.
 Ensure valve outlet cap nut or plug (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1053

Proper Shipping Name (IMDG) : HYDROGEN SULPHIDE

Class (IMDG) : 2 - Gases MFAG-No : 117

Air transport

UN-No.(IATA) : 1053

Proper Shipping Name (IATA) : Hydrogen sulphide

Class (IATA) : 2

Civil Aeronautics Law : Gases under pressure/Gases toxic under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrogen Sulfide (7783-06-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Listed on the United States SARA Section 302	
Listed on United States SARA Section 313	
SARA Section 302 Threshold Planning Quantity (TPQ)	500
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard Immediate (acute) health hazard Fire hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	1.0 %

15.2. International regulations

CANADA

Hydrogen Sulfide (7783-06-4)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Hydrogen Sulfide (7783-06-4)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Hydrogen Sulfide (7783-06-4)

Listed on the AICS (Australian Inventory of Chemical Substances)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory

Listed on the Korean ECL (Existing Chemicals List)

Listed on NZIoC (New Zealand Inventory of Chemicals)

Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Listed on the Canadian IDL (Ingredient Disclosure List)

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15.3. US State regulations		
Hydrogen Sulfide(7783-06-4)		
U.S California - Proposition 65 - Carcinogens List	No	
U.S California - Proposition 65 - Developmental Toxicity	No	
U.S California - Proposition 65 - Reproductive Toxicity - Female	No	
U.S California - Proposition 65 - Reproductive Toxicity - Male	No	
State or local regulations	U.S Massachusetts - Right To Know List U.S New Jersey - Right to Know Hazardous Substance List U.S Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S Pennsylvania - RTK (Right to Know) List	

SECTION 16: Other information

Revision date

Other information

: 3/20/2015 12:00:00 AM

When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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NFPA health hazard

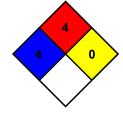
 4 - Very short exposure could cause death or serious residual injury even though prompt medical attention was given

NFPA fire hazard

: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.





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HMIS III Rating

Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 4 Severe Hazard
Physical : 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.