

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Hydrogen Sulphide	Trade Name: Hydrogen Sulphide
Product Use: Many.	
Chemical Name: Hydrogen Sulphide	Synonym: Sulfuretted hydrogen, stink damp, sulfur hydride, hydrosulfuric acid, hepatic gas.
Chemical Formula: H ₂ S	Chemical Family: Acid.
Telephone: Emergencies: * 1-800-363-0042	Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2
	Phone: 905-803-1600
	Fax: 905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Hazards Identification



Emergency Overview



DANGER! Toxic, flammable, corrosive liquid and gas under pressure. May be fatal if inhaled. May form explosive mixtures with air. May cause respiratory tract and central nervous system damage. Can cause eye irritation. Gas deadens sense of smell. symptoms may be delayed. Self-contained breathing apparatus and protective clothing must be worn by rescue workers. Odour: Rotten Eggs.

ROUTES OF EXPOSURE: Inhalation. Swallowing. Skin contact. Eye contact.

THRESHOLD LIMIT VALUE: TLV-TWA Data from 2007 Guide to Occupational Exposure Values (ACGIH). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION: May be fatal if inhaled; causes respiratory paralysis by depression of central nervous system activity. Effects of overexposure include headache, dizziness, vertigo, giddiness, confusion, chest pains, olfactory fatigue, unconsciousness and death. Rhinitis, pharyngitis, bronchitis, pneumonitis, pulmonary edema and cyanosis may occur. Lack of oxygen can cause death.

SKIN CONTACT: Causes irritation seen as local redness and swelling. Liquid may be corrosive and cause frostbite.

SKIN ABSORPTION: None known.

SWALLOWING: An unlikely route of exposure, but frostbite of the lips and mouth may result from contact with the liquid. This product is a gas at normal temperature and pressure.

EYE CONTACT: Causes irritation seen as excess redness of conjunctiva. Prolonged exposure to vapour at low concentrations may cause painful conjunctivitis, blurred vision, excess tearing, photophobia, and the perception of halos around lights. Severe overexposure can lead to conjunctivitis and corneal injury with vesiculation of the corneal epithelium.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

Repeated exposure may cause nausea, vomiting, weight loss, persistent low blood pressure, and loss of sense of smell.

OTHER EFFECTS OF OVEREXPOSURE:

Survivors sometimes exhibit neurologic sequelae such as amnesia, intention tremor, neurasthenia, disturbance of equilibrium, or more serious brain stem and cortical damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Breathing of vapour (and/or mist) may aggravate asthma and inflammatory or fibrotic pulmonary disease. The skin irritating effects of the material may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

Although not demonstrated with hydrogen sulfide, repeated or prolonged maternal hypoxia induced by overexposure to other chemical asphyxiants has produced embryofetal toxicity in laboratory animals.

CARCINOGENICITY:

Not listed as carcinogen by OSHA, NTP or IARC.

3. Composition and Information on Ingredients

COMPONENTS	CAS NUMBER	CONCENTRATION % by Mole
Hydrogen Sulphide	7783-06-4	100

4. First Aid Measures

INHALATION:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

SKIN CONTACT:

Remove contaminated clothing and flush skin with plenty of water. For exposure to liquid, immediately warm frostbite area with warm water (not to exceed 40 C). In case of massive exposure, remove clothing while showering with warm water. Call a physician. Wash clothing before reuse.

SWALLOWING:

This product is a gas at normal temperature and pressure.

EYE CONTACT:

Immediately flush eyes with water for a least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

Keep under observation for delayed onset of pulmonary edema. There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

FLAMMABLE : Yes. **IF YES, UNDER WHAT CONDITIONS?** Forms explosive mixtures with air and oxidizing agents.

EXTINGUISHING MEDIA:

CO2, dry chemical, water spray or fog.

PRODUCTS OF COMBUSTION:

These products are sulphur oxides (SO2, SO3...).

PROTECTION OF FIREFIGHTERS:

DANGER! Evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Immediately cool containers with water spray from maximum distance taking care not to extinguish flames. Remove ignition sources if without risk. If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken; e.g., total evacuation. Reapproach with extreme caution. Reduce corrosive vapours with water spray or fog. Stop flow of gas if without risk while continuing water spray. Remove all containers from area if without risk. Allow fire to burn out.

SPECIFIC PHYSICAL AND CHEMICAL HAZARDS:

Forms explosive mixture with air and oxidizing agents. Container may rupture due to heat of fire. Do not extinguish flames due to possibility of explosive re-ignition. Toxic, flammable, corrosive vapours may spread from spill. Toxic, explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with appropriate device. Vapours are irritating. Contact may cause burns to skin and eyes. No part of a container should be subjected to a temperature higher than 52 C. Hydrogen sulphide deadens the sense of smell. Some means of detecting its presence other than smell should be readily available. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperatures. NOTE: Reverse flow into cylinder may cause rupture.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Possible.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:

Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

FLAMMABLE LIMITS IN AIR, % by volume:

LOWER: 4.3

UPPER: 46

FLASH POINT:

Flammable gas.

AUTOIGNITION TEMPERATURE:

260°C (500°F)

6. Accidental Release Measures**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:****Personal Precautions:**

DANGER! Immediately evacuate all personnel from danger area. **DANGER:** Poisonous, flammable gas. Forms explosive mixtures with air. Use self-contained breathing apparatus and protective clothing where needed. Remove all sources of ignition if without risk. Reduce vapours with fog or fine water spray. Shut off leak if without risk. Ventilate area of leak or move leaking container to well ventilated area. Prevent runoff from contaminating surrounding environment. **CAUTION:** Poisonous, flammable vapours may spread from spill. Before entering area, especially confined areas, check atmosphere with appropriate device.

Environmental Precautions:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. 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. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Toxic, flammable high-pressure gas. May be fatal if inhaled. Do not breathe gas. Use only in a closed system. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only spark-proof tools and explosion-proof equipment. Keep away from heat, sparks, and open flame. **May form explosive mixtures with air.** Ground all equipment. Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier,** be sure valve is closed, then install valve outlet plug tightly. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

RECOMMENDED PUBLICATIONS:

Additional information on storage, handling, and use of this product is provided in **NFPA 55: Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders**, published by the National Fire Protection Association.

See also Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

INGREDIENTS	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	Exposure Limits
Hydrogen Sulphide	7783-06-4	Not applicable.	356 ppm	10 ppm.

THRESHOLD LIMIT VALUE: TLV-TWA Data from 2007 Guide to Occupational Exposure Values (ACGIH). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH):

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST: Explosion-proof, corrosion resistant, forced draft fume hood is preferred.

MECHANICAL (General): Inadequate.
See SPECIAL.

SPECIAL: Use only in a closed system.
A corrosion-resistant, forced-draft fume hood is preferred.

OTHER: See SPECIAL.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Select in accordance with provincial regulations, local bylaws or guidelines. Selection should also be based on the current CSA standard Z94.4, "Selection, Care and Use of Respirators". Respirators should also be approved by NIOSH and MSHA. For concentrations up to 10 times the applicable exposure limit any NIOSH/MSHA approved supplied air respirator is recommended. Up to 100 times the TLV, a NIOSH/MSHA approved respirator with a full-face piece or self-contained breathing apparatus is recommended. For higher concentration us only self-contained breathing apparatus operated in the pressure demand mode.

SKIN PROTECTION: Neoprene gloves. Butyl rubber gloves. PVC gloves.

EYE PROTECTION: Wear safety glasses when handling cylinders.

Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE: Gas. (Compressed Gas)	FREEZING POINT: -82.9°C (-117.2°F)	pH: Not applicable.
BOILING POINT: -60.2°C (-76.4°F)	VAPOUR PRESSURE: 1838 kPa (@ 20°C)	MOLECULAR WEIGHT: 34.08 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1) 0.79 @ 15.6 C	SOLUBILITY IN WATER, 38 kg/m3	
SPECIFIC GRAVITY: VAPOUR (air = 1) 1.19 @ 15	EVAPORATION RATE (Butyl Acetate=1): High.	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: Not available.	% VOLATILES BY VOLUME: 100% (v/v).	ODOUR THRESHOLD: 0.1 ppm

APPEARANCE & ODOUR: Colourless. Odour: rotten eggs. (Strong.) Hydrogen Sulphide deadens the sense of smell.

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Not available.
INCOMPATIBILITY (materials to avoid):	Avoid contact with ammonia, bases, bromine pentafluoride, chlorine trifluoride, chromium trioxide and heat, copper (powdered copper and air), fluorine, lead, lead oxide, mercury, nitric acid, nitrogen trifluoride, nitrogen sulphide, organic compounds, oxidizing agents, oxygen difluoride, rubber, sodium and moisture, and water.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or burning may produce sulphur oxides, sulphur, hydrogen.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS TO AVOID:	None known.
CONDITIONS OF REACTIVITY:	None known.

11. Toxicological Information

ACUTE DOSE EFFECTS: LC50 = 750 ppm, 1 hr, rat.

See section 2.

STUDY RESULTS:

None known.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME: Hydrogen sulphide

HAZARD CLASS:	CLASS 2.3: Poisonous gas. CLASS 2.1: Flammable gas.	IDENTIFICATION #: UN1053	PRODUCT RQ: All.
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SHIPPING LABEL(s): Poison gas, Flammable gas (subsidiary)

PLACARD (When Required): Poison gas, Flammable gas (subsidiary)

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS (Canada): Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
This product is on the DSL list.

International Regulations:

EINECS: Not available.
DSCL (EEC): R26- Very toxic by inhalation.

International Lists: No products were found.

16. Other Information

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to 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 make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:

HMIS RATINGS:

HEALTH 2
FLAMMABILITY 4
PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-330
PIN-INDEXED YOKE: Not available.
ULTRA-HIGH-INTEGRITY CONNECTION: Not available.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

AV-1 Safe Handling and Storage of Compressed Gas
G-12 Hydrogen Sulphide
P-1 Safe Handling of Compressed Gases in Containers
V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
--- Handbook of Compressed Gases, Fourth Edition

Praxair asks users of this product to study this MSDS and become aware of 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 MSDS 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.

PREPARATION INFORMATION:

DATE: 10/15/2007
DEPARTMENT: Safety and Environmental Services
TELEPHONE: 905-803-1600

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

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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Praxair Canada Inc.
1 City Centre Drive
Suite 1200
Mississauga, ON L5B 1M2

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