

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, amended by 2015/830/EU

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Identification of the product

Product Description	Hydrogen
Pure Substance/preparation	Substance
CAS Number	1333-74-0
EC Number	215-605-7

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Relevant Identified Uses	Industrial Use
Uses advised against	No uses advised against has been identified

1.3 Details of the Supplier of the Safety Data Sheet

Gujrat Fluorochemicals Ltd.

12/A Dahej Industrial Estate, Taluka Vagra,
Distt. Bharuch-392130, Gujrat, India

Website	www.gfl.co.in
Telephone	+91-2641-618031(Admin)/618041-50(Purchase)/618086-87(Security)
Fax	+91-2641-618012
E-mail address	contact@gfl.co.in

1.4 Emergency Telephone Number

Emergency telephone number	+91-2641-618086-87 (Security)
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2. Hazard Identification

2.1 Classification of the substance or Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Classification acc. to GHS

Flammable gases	Category 1 – (H220)
Gases under pressure: Compressed gas	H280

Pictogram



Signal Word
DANGER

Hazard Statements

H220 Extremely flammable gas
H280 Contains gas under pressure; may explode if heated

Precautionary Statements

Prevention

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

Response

P377 Leaking gas fire; Do not extinguish unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.

Storage

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

Disposal

P501 Dispose of contents/container to an approved waste disposal plant.

2.3 Other hazards

The substance does not meet the criteria for a PBT or vPvB substance

3. Composition/information on Ingredients

3.1. Substance

Chemical name	CAS-No	EC No	Weight %	EU - GHS Substance Classification (REGULATION (EC) No 1272/2008)	REACH No.
Hydrogen	1333-74-0	215-605-7	<=100	Flam. Gas ; Press. Gas (Comp.); H220,H280	Listed in Annex IV/V Exempted

For the full text of the H-Statements mentioned in this Section, see Section 16

4. First aid measures

4.1 Description of first-aid measures

General advice

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

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. Get immediate medical attention.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	Ingestion is not considered a potential route of exposure.
Inhalation	In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

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.

Indication of immediate medical attention and special treatment needed

Treat symptomatically and supportively.

The substance can be absorbed into the body by inhalation. Inhalation: High concentrations of this gas can cause an oxygen-deficient environment (Asphyxiation). Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting and depression of all the senses.

Contact with cryogenic liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media	Use extinguishing agents appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	High pressure water jets

5.2 Special hazards arising from the substance or mixture

Special Hazard	Contains gas under pressure. Extremely flammable gas. Burns with invisible fire. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
Hazardous Combustion Products	No additional information available.

5.3 Advice for Firefighters

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. 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.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Danger: EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents. See section 5. Evacuate personnel to a safe area. Appropriate self-contained breathing apparatus may be required. Approach suspected leak area with caution. Remove all sources of ignition, if safe to do so. Reduce gas with fog or fine water spray. Stop flow of product if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable gas may spread from leak. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.

6.2 Environmental Precautions

Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

6.3 Methods and materials for containment and cleaning up

Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

6.4 Reference to other sections

Hazardous combustion products: see section 10. Personal Protective equipment: See section 8. Incompatible materials: see section 8. Incompatible Material: see section 10. Disposal Consideration: see section 13

7. Handling and Storage

7.1 Precautions for Safe Handling

7.1.1 Handling

Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

7.1.2 Hygiene measures

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

7.3 Specific end uses

Industrial Use

8. Exposure Controls/ Personal Protection

8.1 Control Parameters

Exposure Limits Apply technical measures to comply with the occupational exposure

Component	ACGIH TLV	NIOSH IDLH	OSHA PEL
Hydrogen (1333-74-0)	-	-	-

Derived No Effect level (DNEL) No information available

Predicted No Effect Concentration No information available

8.2 Exposure Controls

Appropriate Engineering Control Use with adequate ventilation to maintain oxygen levels above 19.5% in the workplace. Local exhaust ventilation is preferred, because it prevents Hydrogen dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen and the presence of potentially explosive air-gas mixtures. Monitoring devices should be installed near the ceiling.

Personal protective equipment

Eye protection Wear safety glasses with side shields. Standard EN 166 - Personal eye-protection.

Skin protection Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Hand protection Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risk.

Respiratory protection Maintain oxygen levels above 19.5% in the workplace. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full face piece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

Environmental exposure controls Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance Colorless Gas
Physical state Gas
Odor Odorless
Odor threshold No information available

<u>Property</u>	<u>VALUES</u>	<u>Remarks/ Method</u>
pH	No information available	

Melting point/freezing point	-259 °C
Boiling Point/Range	-253 °C
Flash Point	No information available
Evaporation rate	Not applicable for gases and gas mixture
Flammability (solid, gas)	Extremely, flammable gas
Flammability or explosive limits	
Lower Explosive Limit (LEL)	4%
Upper Explosive Limit (UEL)	75%
Relative Density (Air = 1)	0.07
Vapor Density	Not applicable
Vapor pressure (air = 1)	165320 at 25°C
Water solubility	1.62 mg/l
Solubility in Other Solvents	No information available
Partition coefficient: n-octanol/water	Not applicable for inorganic product
Autoignition temperature	560 °C
Decomposition temperature	Not applicable
Viscosity Kinematics	Not Applicable
Viscosity Dynamics	Not Applicable
Oxidizing properties	No information available
Explosive properties	No information available
Molecular Formula	H2
Molecular Weight	2 g/mol

9.2 OTHER INFORMATION

Critical Temperature	-239.9°C
Additional Information	Burns with invisible fire

10. Stability and Reactivity

10.1 Reactivity

No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reaction

Under normal conditions of storage and use, hazardous reactions will not occur.
Can form explosive mixture with air. May react violently with oxidants.

10.4 Conditions to avoid

Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

10.5 Incompatible Materials

Oxidizing agents, Lithium, Halogens

10.6 Hazardous Decomposition Products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. Toxicological Information

11.1 Information on Toxicological Effects

Acute toxicity

Component Information

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hydrogen gas CAS 1333-74-0	-	-	-

Source: ECHA

Local effect

Inhalation	May cause asphyxiation
Eye contact	No known effects from this product
Skin contact	May cause frostbite
Ingestion	No known effects from this product

Chronic toxicity

Skin Corrosion/Irritation	May cause frostbite
Eye damage/irritation	No known effects from this product
Sensitization	No known effects from this product
Mutagenic effects	No known effects from this product
Carcinogenic effects	No known effects from this product
Reproductive effects	No known effects from this product
STOT - Single Exposure	No known effects from this product
STOT - repeated exposure	No known effects from this product
Aspiration hazard	Not applicable for gases and gas mixtures

Other Hazard

The substance can be absorbed into the body by inhalation. Inhalation: High concentrations of this gas can cause an oxygen-deficient environment (Asphyxiation). Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting and depression of all the senses.

Contact with cryogenic liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

12. Ecological Information

12.1 Ecotoxicity

Acc. to 1272/2008/EC: Shall not be classified as hazardous to the aquatic environment.

Chemical Name	Toxicity to Fish	Toxicity to Daphnia and other aquatic invertebrate	Toxicity to Algae
Hydrogen gas CAS 1333-74-0	-	-	-

Source: ECHA

12.2 Persistence and Degradability

No data available

12.3 Bioaccumulative Potential

No data available

12.4 Mobility in Soil

No data available

12.5 Results of PBT and vPvB Assessment

No data available

12.6 Other Adverse Effects

Other Adverse Effects	:	No known effects from product
Effects on Ozone layer	:	None
Global Warming Potential [CO ₂ = 1]	:	6

13. Disposal Considerations

13.1 Waste Treatment Methods

Waste from Residues / Unused Products

Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into any place where its accumulation could be dangerous.

Ensure that the emission level from local regulations or operating system are not exceeded.

Contaminated packaging

External treatment and disposal of waste should comply with applicable local and/or national regulations.

14. Transport Information

IMDG/IMO

UN-No	UN 1049
Proper Shipping name	HYDROGEN, COMPRESSED
Hazard class	2.1
Packing group instruction	P200
Environmental Hazard	No

IATA/ICAO

UN-No	UN 1049
Proper Shipping name	HYDROGEN, COMPRESSED
Hazard class	2.1
Packing group instruction	P200
Environmental Hazard	No

15. Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

International Inventories

TSCA	Complies
EINECS/ ELINCS	Complies
DSL/NDSL	Complies
PICCS	Complies
ENCS	Complies
IECSC	Complies
AICS	Complies
KECL	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

AICS - Australian Inventory of Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

15.2 Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance.

16. Other Information

Full text of H-Statements referred to under sections 2 and 3.

H220	Extremely flammable gas
H280	Contain gases under pressure; may explode if heated

Preparation Date	03-August-2021
Revision Date	03-August-2021
Revision Note	Not applicable

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Disclaimer

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

End of Safety Data Sheet