

Hydrogen

ALSA067A



2.1 : flammable gas.

Danger**SECTION 1. Identification of the substance/mixture and of the company/undertaking****Product identifier**

Trade name : Hydrogen
SDS Nr : ALSA067A
Chemical description : Hydrogen
CAS No :001333-74-0
EC No :215-605-7
Index No :001-001-00-9
Registration-No. : Listed in Annex IV / V REACH, exempted from registration.
Chemical formula : H₂

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use. Laboratory use Chemical reaction / Synthesis. Contact supplier for more uses information
Uses advised against : Do not inflate in party balloons

Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE (PTY) LTD
Crn Vereeniging Road & Andre Marais Street
Alrode, Alberton
Gauteng SOUTH AFRICA
Tel. : +27 87 288 1100
E-Mail address (competent person) : scr.sales@airliquide.com

Emergency telephone number

Emergency telephone number : +27 87 288 1100

SECTION 2. Hazards identification**Classification of the substance or mixture****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

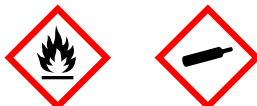
• Physical hazards : Flammable gases - Category 1 - Danger - (CLP : Flam. Gas 1) - H220
Gases under pressure - Compressed gas - Warning - (CLP : Press. Gas) - H280

Classification EC 67/548 or EC 1999/45

: F+; R12

Label elements**Labelling Regulation EC 1272/2008 (CLP)**

• Hazard pictograms



Hydrogen

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SECTION 2. Hazards identification (continued)

- Hazard pictograms code : GHS02 - GHS04
- 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 or 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 : P403 - Store in a well-ventilated place.

Other hazards

: None.

SECTION 3. Composition/information on ingredients

Substance / 3.2. Mixture

Substance.

Substance name	Contents	CAS No	EC No	Index No	Registration no	Classification
Hydrogen	: 100 %	1333-74-0	215-605-7	001-001-00-9	* 1	F+; R12 Flam. Gas 1 (H220) Press. Gas (H280)

Contains no other components or impurities which will influence the classification of the product.

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

SECTION 4. First aid measures

Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

Most important symptoms and effects, both acute and delayed

: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation.

Indication of any immediate medical attention and special treatment needed

: None.

SECTION 5. Fire-fighting measures

Extinguishing media

Extinguishing media

- Suitable extinguishing media : Water.
Dry powder.
Foam.
- Unsuitable extinguishing media : Carbon dioxide.

Special hazards arising from the substance or mixture

Hydrogen**ALSA067A****SECTION 5. Fire-fighting measures (continued)****Specific hazards** : Exposure to fire may cause containers to rupture/explode.**Hazardous combustion products** : None.**Advice for fire-fighters****Specific methods** : If possible, stop flow of product.
Coordinate fire measure to the surrounding fire. Cool endangered containers with water spray jet from a protected position. Do not empty contaminated fire water into drains.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.**Special protective equipment for fire fighters** : In confined space use self-contained breathing apparatus.**SECTION 6. Accidental release measures****Personal precautions, protective equipment and emergency procedures**: Try to stop release.
Evacuate area.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Ensure adequate air ventilation.
Consider the risk of potentially explosive atmospheres.
Eliminate ignition sources.**Environmental precautions**

: Try to stop release.

Methods and material for containment and cleaning up

: Ventilate area.

Reference to other sections

: See also sections 8 and 13.

SECTION 7. Handling and storage**Precautions for safe handling****Safe use of the product** : Only experienced and properly instructed persons should handle gases under pressure. The product must be handled in accordance with good industrial hygiene and safety procedures.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Take precautionary measures against static discharge.
Purge air from system before introducing gas.
Keep away from ignition sources (including static discharges).
Do not smoke while handling product.
Assess the risk of potentially explosive atmosphere and the need for explosion-proof equipment.
Consider the use only non-sparking tools.
Ensure the complete gas system was (or is regularly) checked for leaks before use.**Safe handling of the gas receptacle** : Refer to supplier's container handling instructions.
Suck back of water into the container must be prevented.
Do not allow backfeed into the container.
Protect cylinders from physical damage; do not drag, roll, slide or drop.
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
Never attempt to repair or modify container valves or safety relief devices.
Damaged valves should be reported immediately to the supplier.
Keep container valve outlets clean and free from contaminants particularly oil and water.
Replace valve outlet caps or plugs and container caps where supplied as soon as container is

Hydrogen**ALSA067A****SECTION 7. Handling and storage (continued)**

disconnected from equipment.
Close container valve after each use and when empty, even if still connected to equipment.
Never attempt to transfer gases from one cylinder/container to another.
Never use direct flame or electrical heating devices to raise the pressure of a container.
Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Conditions for safe storage, including any incompatibilities

: Keep container below 50°C in a well ventilated place.
Segregate from oxidant gases and other oxidants in store. Containers should be stored in the vertical position and properly secured to prevent toppling. Stored containers should be periodically checked for general condition and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials. All electrical equipment in the storage areas should be compatible with the risk of potentially explosive atmosphere.
Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion.

Specific end use(s)

: None.

SECTION 8. Exposure controls/personal protection**Control parameters**

DNEL: Derived no effect level : None available.

PNEC: Predicted no effect concentration : None available.

Exposure controls

Appropriate engineering controls : Systems under pressure should be regularly checked for leakages.
Gas detectors should be used when flammable gases/vapours may be released.
Provide adequate general and local exhaust ventilation.
Consider work permit system e.g. for maintenance activities.

Individual protection measures, e.g. personal protective equipment : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk.
The following recommendations should be considered.
Wear leather safety gloves and safety shoes when handling cylinders.
Wear safety glasses with side shields
Consider the use of flame resistant anti-static safety clothing.

Environmental exposure controls : Specific risk management measures are not required beyond good industrial hygiene and safety procedures.

SECTION 9. Physical and chemical properties**Information on basic physical and chemical properties****Appearance**

- Physical state at 20°C / 101.3kPa : Gas.

- Colour : Colourless.

Odour : Odourless.

Molar mass [g/mol] : 2

Melting point [°C] : -259

Boiling point [°C] : -253

Critical temperature [°C] : -240

Flash point [°C] : Not applicable for gases and gas-mixtures.

Evaporation rate (ether=1) : Not applicable for gases and gas-mixtures.

Flammability range [vol% in air] : 4 to 77

Hydrogen**ALSA067A****SECTION 9. Physical and chemical properties (continued)**

Vapour pressure [20°C]	: Not applicable.
Relative density, gas (air=1)	: 0.07
Relative density, liquid (water=1)	: 0.07
Solubility in water [mg/l]	: 1.6
Partition coefficient n-octanol/water	: Not applicable for inorganic gases.
Auto-ignition temperature [°C]	: 560

Other information

Other data	: Burns with an invisible flame.
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SECTION 10. Stability and reactivity**Reactivity**

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

Chemical stability

: Stable under normal conditions.

Possibility of hazardous reactions: Can form explosive mixture with air.
May react violently with oxidants.**Conditions to avoid**

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

Incompatible materials: Air, Oxidiser.
For additional information on compatibility refer to ISO 11114**Hazardous decomposition products**

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

SECTION 11. Toxicological information**Information on toxicological effects**

Acute toxicity	: No known toxicological effects from this product.
Skin corrosion/irritation	: No known effects from this product.
Serious eye damage/irritation	: No known effects from this product.
Respiratory or skin sensitisation	: No known effects from this product.
Carcinogenicity	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Reproductive toxicity	: 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.

Hydrogen**ALSA067A****SECTION 12. Ecological information****Toxicity**

: No known ecological damage caused by this product.

Persistence - degradability

: No data available.

Bioaccumulative potential

: No data available.

Mobility in soil

: No data available.

Results of PBT and vPvB assessment

: Not classified as PBT or vPvB.

Other adverse effects

Effect on ozone layer

: None.

Effect on the global warming

: No known effects from this product.

SECTION 13. Disposal considerations**Waste treatment methods**

: 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. Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods

Additional information

: None.

SECTION 14. Transport information

UN number

: 1049

Labelling ADR, IMDG, IATA



: 2.1 : flammable gas.

Land transport (ADR/RID)

H.I. nr

: 23

UN proper shipping name

: HYDROGEN, COMPRESSED

Transport hazard class(es)

: 2

Classification code

: 1 F

Packing Instruction(s)

: P200

Tunnel Restriction

: B/D Tank carriage: Passage forbidden through tunnels of category B, C, D

Environmental hazards

: None.

Sea transport (IMDG)

Proper shipping name

: HYDROGEN, COMPRESSED

Class

: 2.1

Packing group

: P200

Hydrogen**ALSA067A****SECTION 14. Transport information (continued)**

Emergency Schedule (EmS) - Fire : F-D
Emergency Schedule (EmS) - Spillage : S-U
Packing instruction : P200

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : HYDROGEN, COMPRESSED
Class : 2.1
Passenger and Cargo Aircraft : DO NOT LOAD IN PASSENGER AIRCRAFT.
Cargo Aircraft only : Allowed.
Packing instruction - Cargo Aircraft only : 200

Special precautions for user

: 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 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.
- Ensure valve protection device (where provided) is correctly fitted.
- Ensure there is adequate ventilation.

SECTION 15. Regulatory information**Safety, health and environmental regulations/legislation specific for the substance or mixture****EU legislation**

Restrictions on use : None.
Seveso directive 96/82/EC : Listed

National legislation

: Ensure all national/local regulations are observed.

Chemical Safety Assessment

: A CSA does not need to be carried out for this product.

SECTION 16. Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
Training advice : Ensure operators understand the flammability hazard.
The hazard of asphyxiation is often overlooked and must be stressed during operator training.
List of full text of R-phrases in section 3. : R12 : Extremely flammable.
List of full text of H-statements in section 3. : H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
Note : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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