

Compressed hydrogen**HYDROGEN_067A-SE**

2.1 : Flammable gases

Danger**SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : Compressed hydrogen , Alphagaz 1 Hydrogen, Alphagaz 2 Hydrogen, Hydrogen N35, Hydrogen N50, Hydrogen N56, Hydrogen UE

SDS Nr : HYDROGEN_067A-SE replaces HYDROGEN-067A-SE 10 / 7 / 2014

Chemical description : Hydrogen
CAS No :1333-74-0
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

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas/Calibration gas. Laboratory use. Chemical reaction / Synthesis.
Shield gas for welding processes.
Use as a fuel.
Use for manufacture of electronic/photovoltaic components.
Laser gas.
Contact supplier for more information on uses.

Uses advised against : Do not inflate in party balloons because of the risk of explosion.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE GAS AB
Lundavägen 151
212 24 Malmö SWEDEN
Tfn. 040 - 38 10 00, efter kontorstid 0220- 396 00

E-Mail address (competent person) : Info.sweden@airliquide.com

1.4. Emergency telephone number

Emergency telephone number : 112

Compressed hydrogen

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SECTION 2. Hazards identification

2.1. 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

2.2. Label elements

Labelling Regulation EC 1272/2008 (CLP)

• Hazard pictograms



- 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, hot surfaces, sparks, open flames and other ignition sources. 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.

2.3. Other hazards

: None.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Content [Vol-%]	CAS No	EC No	Index No	Registration No.	Classification
Hydrogen	100 %	1333-74-0	215-605-7	001-001-00-9	* 1	Flam. Gas 1 (H220) Press. Gas (Comp.) (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 section 16. Full text of H-statements see section 16.

SECTION 4. First aid measures

4.1. 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.

4.2. 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.

Compressed hydrogen**HYDROGEN_067A-SE****SECTION 4. First aid measures)continued)****4.3. Indication of any immediate medical attention and special treatment needed**

: None.

SECTION 5. Fire-fighting measures**5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.
Dry powder.
- Unsuitable extinguishing media : Do not use water jet to extinguish.
Carbon dioxide.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None.

5.3. Advice for fire-fighters

- Specific methods : If possible, stop flow of product.
Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Use water spray or fog to knock down fire fumes if possible.
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : None necessary.

In confined space use self-contained breathing apparatus.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

SECTION 6. Accidental release measures**6.1. 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.
Stay upwind.
Act in accordance with local emergency plan.

6.2. Environmental precautions

- : Try to stop release.

6.3. Methods and material for containment and cleaning up

- : Ventilate area.

6.4. Reference to other sections

- : See also sections 8 and 13.

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: Consider pressure relief device(s) in gas installations.
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 atmospheres and the need for explosion-proof equipment.
Consider the use of only non-sparking tools.
Ensure the complete gas system was (or is regularly) checked for leaks before use.
Do not breathe gas.
Avoid release of product into atmosphere.

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 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.

7.2. 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 them from falling over. 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. All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.
Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion. Keep away from combustible materials.

7.3. Specific end use(s)

: None.

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DNEL: Derived no effect level (Workers) : No data available.

PNEC: Predicted no effect concentration : No data available.

8.2. Exposure controls

8.2.1. 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.

8.2.2. 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:
PPE compliant to the recommended EN/ISO standards should be selected.

• **Eye/face protection** : Wear safety glasses with side shields.
Standard EN 166 - Personal eye-protection.

• **Skin protection**

- **Hand protection** : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
- **Other** : Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• **Thermal hazards** : None necessary.

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

SECTION 9. Physical and chemical properties**9.1. Information on basic physical and chemical properties****Appearance****Physical state at 20°C / 101.3kPa** : Gas.**Colour** : Colourless.**Odour** : Odourless.**pH value** : Not applicable for gases and gas-mixtures.**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**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 [log Kow]** : Not applicable for inorganic gases.

Compressed hydrogen**HYDROGEN_067A-SE****SECTION 9. Physical and chemical properties (continued)**

Auto-ignition temperature [°C] : 560
Viscosity at 20°C [mPa.s] : Not applicable.
Explosive Properties : Not applicable.
Oxidising Properties : None.

9.2. Other information

Other data : Burns with an invisible flame.

SECTION 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

: Can form explosive mixture with air.
May react violently with oxidants.

10.4. Conditions to avoid

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

10.5. Incompatible materials

: Air, Oxidiser.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

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

SECTION 11. Toxicological information**11.1. 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.

Compressed hydrogen**HYDROGEN_067A-SE****SECTION 12. Ecological information****12.1. Toxicity**

: No ecological damage caused by this product.

12.2. Persistence and degradability

: No ecological damage caused by this product.

12.3. Bioaccumulative potential

: No ecological damage caused by this product.

12.4. Mobility in soil

: No ecological damage caused by this product.

12.5. Results of PBT and vPvB assessment

: Not classified as PBT or vPvB.

12.6. Other adverse effects

Effect on the ozone layer : None.

Global warming potential [CO₂=1] : 6

Effect on global warming : When discharged in large quantities may contribute to the greenhouse effect.

SECTION 13. Disposal considerations**13.1. 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 EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
Consult supplier for specific recommendations.

List of hazardous waste codes)from Commission Decision 2001/118/EC) : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14. Transport information

UN number : 1049

Labelling ADR, IMDG, IATA



: 2.1 : Flammable gases

Transport by road/rail)ADR/RID)

Transport by air)ICAO-TI / IATA-DGR)

Transport by sea)IMDG)

Classification code : 1 F

H.I. nr : 23

AIR LIQUIDE GAS AB

Lundavägen 151 212 24 Malmö SWEDEN

Tfn. 040 - 38 10 00, efter kontorstid 0220- 396 00

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Tunnel Restriction : B/D Tank carriage: Passage forbidden through tunnels of category B, C, D E; Other carriage: Passage forbidden through tunnels of category D and E

Emergency Schedule)EmS) - Fire : F-D

Emergency Schedule)EmS) - Spillage : S-U

14.6 Special precautions for user

Packing Instruction(s) : P200

Passenger and Cargo Aircraft : FORBIDDEN.

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.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

UN proper shipping name : HYDROGEN, COMPRESSED

Transport hazard class(es) : 2

Environmental hazards : None.

Proper shipping name : HYDROGEN, COMPRESSED

Class : 2.1

Packing instruction : P200

IMDG-Marine pollutant : -

Proper shipping name)IATA) : HYDROGEN, COMPRESSED

Class : 2.1

SECTION 15. Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****EU legislation**

Restrictions on use : None.

Seveso directive 2012/18/EC : Listed.

National legislation

National legislation : Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

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

Compressed hydrogen**HYDROGEN_067A-SE****SECTION 16. Other information**

Indication of changes	: Revised safety data sheet in accordance with commission regulation (EU) No 2015/830.
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 H-statements in section 3.	: H220 - Extremely flammable gas. H280 - Contains gas under pressure; may explode if heated.
Further information	: 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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