

Safety data sheet

Complies with Regulation (EC) No. 1907/2006 (REACH) as amended by Regulation (EU) 2015/830

HYDROGEN 4.5

Issue date: 10/14/2021

Revision date: 10/14/2021

Version: 6.0

SDS reference: EIGA067A

SECTION 1: Identification of the substance/mixture and company/undertaking

1.1. Product identifier

Trade name	HYDROGEN
MSDS No.	EIGA067A
Chemical description	HYDROGEN
	CAS number: 1333-74-0
	N°ONE: 1049
	EC number: 215-605-7
Registration number	Listed in Annex IV/V of REACH, exempt from registration
Chemical formula	H2

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

Relevant uses identified	Industrial and professional. Carry out a risk analysis before use Test or calibration gas. Chemical reaction/synthesis. Laboratory use. Use as fuel. Shielding gas for welding processes. Use in the manufacture of electronic or photovoltaic components. Lasing gases.
Uses advised against	Consumer use

1.3. Information regarding the supplier of the safety data sheet

Company identification	SARL RAYANOX ZA Bethioua Wilaya of Oran, Algeria Tel: 041-79-35-22 Fax: 041-79-32-23 Contact@rayanox.co sarlrayanox@gmail.com
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1.4. Emergency call number

Emergency call number	Tel: +21365550342
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SECTION 2: Hazard Identification

2.1. Classification of the substance or mixture

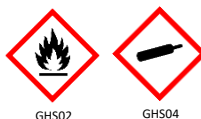
Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards	Flammable gases, Category 1	H220
	Gas under pressure: Compressed gas	H280

2.2. Label elements

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

Hazard pictograms (CLP)



Signal word (CLP)	: Hazard
Hazard statements (CLP)	: H220 - Extremely flammable gas. H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)

- Prevention: P210 - Keep away from heat, hot surfaces, sparks, open flames and other sources of ignition. NO SMOKING.
- Intervention: P377 - Burning gas leak: Do not extinguish if the leak cannot be stopped without Hazard.
- Storage: P381 - In case of leak, eliminate all sources of ignition
P403 - Store in a well-ventilated area.

2.3. Other dangers

: Asphyxiant at high concentration.

These high concentrations are in the flammable zone

SECTION 3: Composition/information on ingredients

3.1. Substance

NAME	Product identifier	%	Impurity			Classification according to Regulation (EC) No. 1272/2008 [CLP]
<u>Hydrogen</u>	(CAS No.) 1333-74-0 (EC No.) 215-605-7	<u>99.99</u>	N2 ≤60ppm	H2O ≤5ppm	O2 ≤2ppm	Ox. Gas 1, H270 Press. Gas (Comp.), H280

Does not contain other components or impurities which could modify the classification of the product.

3.2. Mixtures: Not applicable

SECTION 4: First aid

4.1. Description of first aid

- Inhalation Move the victim to an uncontaminated area, putting on a breathing apparatus
Individual autonomy (ARI). Keep the victim warm and at rest. Call a doctor.
Perform cardiopulmonary resuscitation if the victim stops breathing.
Evacuate the victim to a non-contaminated area.
- Skin contact No adverse effects expected with this product.
- Eye contact No adverse effects expected with this product.
- Ingestion Ingestion is not considered a possible mode of exposure

4.2. Most important symptoms and effects, both acute and delayed

May cause asphyxiation at high concentrations. Symptoms may include loss of consciousness or motor skills. The victim may not be aware of the asphyxiation.
Refer to section 11.

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

: None).

SECTION 5: Fire-fighting measures

5.1. Extinguishing media

- Suitable extinguishing agents Water spray or cloud
- Dry powder
- Carbon dioxide
- Shutting off the gas source is the preferred method of control.
- Be aware of the risk of static electricity formation when using CO2 extinguishers. Do not use them in locations where a flammable atmosphere may be present.
- Unsuitable extinguishing agents Do not use a jet of water to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific risks Exposure to fire may cause containers to rupture and explode
Hazardous combustion products Carbon monoxide

5.3. Advice for firefighters

Specific methods Use extinguishing media suitable for the surrounding fire. Exposure to fire and heat may cause gas containers to rupture. Cool exposed containers with water spray from a protected location. Do not allow watering water used in emergency cases to flow into the gutters. If possible, stop the gas flow.
Use water spray or cloud to reduce the fumes to the ground if possible
Do not extinguish a flaming gas leak unless absolutely necessary. Spontaneous and explosive re-ignition may occur. Turn off other fires
Continue to water from a protected location until the container remains cool.
Move containers from fire area if it can be done without risk.

Special protective equipment for firefighters In confined spaces use a personal self-contained breathing apparatus (SCBA). Protective clothing and self-contained breathing equipment for firefighters.
Standard EN 137 - Autonomous open circuit compressed air device with a full face mask.
Standard EN 469: protective clothing for firefighters. Standard EN 659: Protective gloves
For firefighters

SECTION 6: Measures to be taken in the event of accidental release

6.1. Personal precautions, protective equipment and emergency procedures

For non-rescuers

Act according to the local emergency plan
Try to stop the leak
Evacuate the area.
Eliminate sources of ignition
Ensure adequate air ventilation.

For first aiders

See section 8 of the SDS for more information on personal protective equipment
Check the concentration of the released product.
Wear a self-contained breathing apparatus (SCBA) when entering the area unless you have verified that it is safe
See section 5.3 of the SDS for more information

6.2. Precautions for environmental protection

Try to stop the leak.

6.3. Methods and material for containment and cleaning up

Ventilate the area

6.4. Reference to other SECTIONS

See also sections 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safety when using the product

The product must be handled in accordance with good industrial hygiene and safety procedures. Only persons with appropriate experience and training should handle gases under pressure. Consider adding pressure safety valve(s) to the installation.
You ensure that the entire gas installation has been (or is regularly) checked for the absence of leaks, before use
Do not smoke while handling the product.
Use only specified equipment appropriate for this product and its operating pressure and temperature. Contact your gas supplier if in doubt.
Assess the potential risks of explosive atmospheres and the need for anti-explosion equipment (ATEX).
Purge the air from the installation before introducing the gas.
Take precautionary measures against electrostatic discharge.
Keep away from all sources of ignition (including electrostatic charges).
Use only non-sparking tools.
Consider the use of flame retardants.
Solvent can build up in pipes. For maintenance, use suitable resistant gloves (specific for DMF or acetone), waterproof protective glasses. Do not breathe solvent vapors. Maintain adequate ventilation.

Safety when handling the gas container

Don't breathe the gas
Avoid letting the product into the air
Ensure equipment is properly grounded
Refer to the supplier's instructions for handling the container.
Prohibit products from rising into the container
Protect cylinders from physical damage, do not pull, roll, slide, drop
To move the bottles even a short distance, use a cart (bottle rolls, etc.), designed for transporting bottles
Leave the tap protection cap in place until the container is again secured either by a wall or support or placed in a container or placed in position for use.
If the user encounters any difficulty opening or closing the cylinder valve, the user should discontinue use and contact the supplier
Never attempt to repair or modify a container valve or its pressure relief devices.
Damaged faucets should be reported immediately to the supplier
Keep tap outlets from containers clean and not contaminated, particularly with oil or water.
If the container has been equipped with one, as soon as it has been disconnected from the installation, replace the cap or the tap outlet cap.
Close the container tap after each use and when empty, even if it is still connected to the equipment.
Never attempt to transfer gases from a bottle/container into another container.
Never use a direct flame or electric heater to increase the pressure in the container.
Do not remove or damage the labels put by the supplier to identify the contents of the bottle.
Prevent water from being drawn into the container.
Open the tap slowly to avoid a sudden build-up of pressure (water hammer).

7.2. Conditions for safe storage, including any incompatibilities

Follow all local regulations and requirements for container storage.
Containers should not be stored in conditions likely to aggravate corrosion.
Container valve covers or caps must be in place.
Containers must be stored in an upright position and secured to prevent falling.
Containers in stock should be periodically checked for general condition and absence of leaks.
Store the container in a well-ventilated area, at a temperature below 50°C
In storage, separate flammable gases and other flammable materials
Store containers in areas not exposed to the risk of fire and away from sources of heat and ignition.
Keep away from combustible materials
Store away from oxidizing gases and other oxidizing materials.
All electrical installations in storage must be compatible with the risk of exposure to potentially explosive atmospheres

7.3. Specific end use(s)

: None).

SECTION 8: Exposure controls/personal protection

8.1. Control Settings

OEL (Occupational Exposure Limits) : Not available.
DNEL (Derived No Effect Dose) : Not available
PNEC (Predicted No Effect Concentration(s)) : Not available.

8.2. Exposure controls

8.2.1. Appropriate technical controls

Maintain appropriate exhaust ventilation locally and overall.
Product to be handled in a closed system.
Pressure equipment should be checked regularly for leaks
Avoid atmospheres enriched in oxygen (>23.5%)
Gas detectors should be used when oxidizing gases are likely to be released
Think about work permits, e.g. for maintenance.

8.2.2. Personal protective equipment

- Eye/face protection
- Skin protection
 - Hand protection
 - Miscellaneous

A risk analysis of the use of the product must be conducted and documented in all workplaces affected by the use of the product in order to choose personal safety equipment regarding the identified risks. The following recommendations should be considered
Choose Personal Protective Equipment that complies with recommended EN/ISO standards.
Wear safety glasses equipped with side protection
Standard EN 166 - Individual eye protection - Specifications.

- Respiratory protection
- Thermal risks

Wear protective gloves when handling gas cylinders.
Standard EN 388-Protective gloves against mechanical risks.
Consider wearing fire-resistant and anti-static safety clothing.
Standard EN ISO 14116 - Materials with limited flame expansion.
Standard EN 1149-5 - protective clothing: Electrostatic properties.
Wear safety shoes when handling cylinders.
Standard EN ISO 20345: Personal Protective Equipment - safety shoes.
None are necessary
No additions to previous sections.

8.2.3. Ambient exposure controls

Refer to local regulations for atmospheric emission restrictions. See Section 13 for specific methods for treating waste gases.

SECTION 9: Physical and chemical properties

Information on essential physical and chemical properties

Appearance

- Physical state at 20°C / 101.3kPa : Gaseous
- Color : Colorless.

Smell

: Scentless.

Olfactory threshold

: Detection of thresholds by smell is subjective and inappropriate for warning in the event of overexposure

pH

: Not applicable to gases and gas mixtures.

Melting point / Freezing point

: -259°C

Boiling point

: -253°C

Flash point	: Not applicable to gases and gas mixtures.
Evaporation rate	: Not applicable to gases and gas mixtures.
Flammability (solid, gas)	: Extremely flammable gas.
Explosive limits	: 4 - 77 vol%.
Vapor pressure [20°C]	: Not applicable.
Vapor pressure [50°C]	: Not applicable.
Vapor density	: Not applicable.
Relative density, liquid (water=1)	: 0.07.
Relative density, gas (air=1)	: 0.07
Water solubility	: 1.6 mg/l
Partition coefficient n-octanol/water (Log Kow)	: Not applicable to non-organic products.
Auto-ignition temperature	: 560°C.
Decomposition temperature	: Not applicable.
Viscosity	: No reliable data available.
Explosive properties	: Not applicable.
Oxidizing properties	: Not applicable.
Other information	
Molar mass	2 g/mol
Critical temperature [°C]	-240°C
Other data	Burns with an invisible flame.

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in the sections below

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May 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.

Avoid humidity in installations.

10.5. Incompatible materials

Air, Oxidizers.

Forms explosive acetylides with copper, silver and mercury.

Do not use alloys containing more than 65% copper.

Do not use alloys containing more than 43% silver.

For further information on compatibility, refer to ISO 11114.

10.6. Hazardous decomposition products

: No dangerous decomposition products under normal conditions of use and storage

SECTION 11: Toxicological information

11.1. Information on toxicological effects

acute toxicity	: This product has no known toxicological effects
Skin corrosion/irritation	: No known effects with this product.
Serious eye damage/eye irritation	: No known effects with this product.
Respiratory or skin sensitization	: No known effects with this product.
Cell mutagenicity	: No known effects with this product.
Carcinogenicity	: No known effects with this product.
Toxic for reproduction: fertility	: No known effects with this product.
Toxic for reproduction: fetus	: No known effects with this product.
Specific target organ toxicity — single exposure	: No known effects with this product.
Specific target organ toxicity — repeated exposure	: No known effects with this product.
Inhalation hazard	: Not applicable to gases and gas mixtures

SECTION 12: Ecological information

12.1. Toxicity

Assessment	: This product is ecologically safe.
EC50 48h - Daphnia magna [mg/l]	: No data available.
EC50 72h - Algae [mg/l]	: No data available.

LC50 96 Hours - fish [mg/l]

: No data available.

12.2. Persistence and degradability

Assessment

: This product is ecologically safe.

12.3. Bioaccumulation potential

Assessment

: This product is ecologically safe.

12.4. Mobility in the ground

Assessment

This product is ecologically safe

12.5. Results of PBT and VPVB assessments

Assessment

Not classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects

: No known effects with this product.

Effect on the ozone layer

: No effect on the ozone layer.

Global warming potential [CO2=1]

: 6

Effect on global warming

: May contribute to the greenhouse effect when discharged in large quantities.
Contains greenhouse gas(es)

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

Contact the supplier if instructions are needed.

Do not vent into areas where there is a risk of forming an explosive mixture with air. The released gas must be burned in a suitable burner equipped with a flame arrester.

Do not discharge into any location where its accumulation could be hazardous.

Check that the emission levels imposed by local regulations or operating permits are not exceeded.

For further recommendations on gas disposal methods, refer to the EIGA code of practice Doc 30 "Disposal of gases", downloadable from <http://www.eiga.eu>.

Return the uneaten product to the supplier in its original container

16 05 04: Gases in pressure vessels (including halons) containing substances

Dangerous.

List of hazardous waste

13.2. Further information

The treatment and disposal of waste by third parties must be in accordance with local and/or national legislation.

SECTION 14: Transport information

14.1. UN number

UN number

: 1049

14.2. UN proper shipping name

Transport by road/rail (ADR/RID)

COMPRESSED HYDROGEN

Air transport (ICAO-TI / IATA-DGR)

Hydrogen, compressed,

Transport by sea (IMDG)

HYDROGEN, COMPRESSED

14.3. Transport hazard class(es)

Labeling



2.1: Flammable gases.

Transport by road/rail (ADR/RID)

Class

:2

Classification code

: 1F

Danger no.

:23

Restriction of passage in tunnels

: B/D - Prohibition on crossing tunnels of categories B, C, D and E for transport in cisterns. Prohibition on crossing category D and E tunnels.

Transport by sea (IMDG)

Class or division / Subsidiary risk(s)

: 2.1

14.4. Packing group

Transport by road/rail (ADR/RID)

: Not applicable

Air transport (ICAO-TI / IATA-DGR)

: Not applicable

Transport by sea (IMDG)

: Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID)

: None).

Air transport (ICAO-TI / IATA-DGR)

: None).

Transport by sea (IMDG)

: None).

14.6. Special precautions to be taken by the user

Packaging instruction(s)

Transport by road/rail (ADR/RID) : P200

Air transport (ICAO-TI / IATA-DGR)

Passenger and cargo aircraft : Forbidden

Cargo plane only : 200

Transport by sea (IMDG) : P200

Precautionary measures for transport

Avoid transport in vehicles where the load compartment is not separated from the driver's cab.

Ensure that the vehicle driver is aware of the potential hazards of the load and the steps to take in the event of an accident or other emergency situation.

Before transporting containers:

- Ensure there is adequate ventilation.
- Make sure containers are firmly secured
- Make sure the cylinder valve is closed and not leaking
- Make sure that the faucet outlet protection cap (if it exists) is correctly in place.
- Ensure that the tap protection device (if it exists) is correctly put in place

14.7. Transport in bulk in accordance with Annex II of the Marpol Convention and the IBC Code

: Not applicable.

SECTION 15: Regulatory information

Safety, health and environmental regulations/legislation specific to the substance or mixture

EU regulations

Employment restrictions : None).

Seveso Directive 2012/18/EU (Seveso III) : List.

National guidelines

National regulations: : Ensure that all national or local regulations are followed.

Chemical Safety Assessment

:A Chemical Risk Assessment (CSA) does not need to be carried out for this product.

SECTION 16: Other information

Indications of change : None).

Abbreviations and acronyms

ETA-Estimate of Acute Toxicity

CLP- Classification Labeling Packaging - Regulation (EC) No 1272/2008 relating to classification, labeling and packaging.

REACH - Registration, Evaluation, Authorization and Restriction of Chemicals – Regulation (EC) No 1907/2006 concerning the registration, evaluation and authorization of chemical substances, as well as the restrictions applicable to these substances.

EINECS - European Inventory of Existing Commercial Chemical Substances - Inventory

European marketed chemical substances

CAS number - numerical identifier assigned by the Chemical Abstract Service (USA)

PPE - Personal protective equipment

LC50 - Lethal Concentration - Lethal concentration for 50% of the population tested

RMM-Risk Management Measures

PBT - Persistent, Bioaccumulative and Toxic.

vPvB - very (very) Persistent and very (very) Bioaccumulative.

STOT - SE: Specific Target Organ Toxicity - Single Exposure; Specific target organ toxicity - Single exposure.

CSA - Chemical Safety Assessment

EN - European Norm - European Standard

UN - United Nations - United Nations

ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road

IATA - International Air Transport Association - International Air Transport Association

Training Tips

DISCLAIMER OF LIABILITY

IMDG Code - International Maritime Dangerous Goods Code - Code for maritime transport

: Ensure that operators understand the flammability risks

Before using this product for a new application or for testing, a thorough material compatibility study and risk analysis should be performed.

The information given in this document is believed to be accurate at the time of printing.

Despite the care taken in drafting this document, no liability can be accepted in the event of damage or accident resulting from its use.