

Danger



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

1.1. Product identifier

Trade name : Hydrogen, High purity hydrogen
 SDS Nr : AWO012
 Chemical description : Hydrogen
 CAS No : 1333-74-0
 EC no : 215-605-7
 EC 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.
 Use as a fuel.
 Shield gas for welding processes.
 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.

1.3. Details of the supplier of the safety data sheet

Company identification : Oy Woikoski Ab
 PL1
 52020 Woikoski Finland
 +358 40 166 2023
 info@woikoski.fi

1.4. Emergency telephone number

Country	Organisation/Company	Address	Emergency number	Comment
	Myrkytystietokeskus Gif tinformationscentralen, Poison Information Centre	P.O.B 790 (Tukholmankatu 17) HUS SF - 00029 Helsinki	+358 9 471 977	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

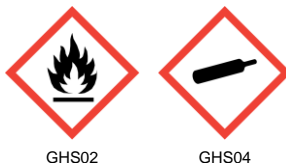
Classification according to Regulation (EC) No. 1272/2008 [CLP]

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

2.2. Label elements

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

Hazard pictograms (CLP) :



Signal word (CLP) :

Danger

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 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

Name	Product identifier	%	Classification according to Directive 67/548/EEC	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Hydrogen	(CAS No) 1333-74-0 (EC no) 215-605-7 (EC index no) 001-001-00-9 (Registration-No.) *1	100	F+; R12	Flam. Gas 1, H220 Compressed 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 section 16. Full text of H-statements see section 16.

3.2. Mixture : Not applicable

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.

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



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: None.

SECTION 5: Firefighting 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 : 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.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
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.
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- : Evacuate area.
Consider the risk of potentially explosive atmospheres.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Eliminate ignition sources.
Ensure adequate air ventilation.

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.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Safe use of the product** :
- The substance must be handled in accordance with good industrial hygiene and safety procedures.
 - Only experienced and properly instructed persons should handle gases under pressure.
 - Consider pressure relief device(s) in gas installations.
 - Ensure the complete gas system was (or is regularly) checked for leaks before use.
 - Do not smoke while handling product.
 - Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
 - Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
 - Purge air from system before introducing gas.
 - Take precautionary measures against static discharge.
 - Keep away from ignition sources (including static discharges).
 - Consider the use of only non-sparking tools.
- Safe handling of the gas receptacle** :
- Refer to supplier's container handling instructions.
 - 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.
 - Suck back of water into the container must be prevented.

7.2. Conditions for safe storage, including any incompatibilities

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

7.3. Specific end use(s)

: None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

OEL (Occupational Exposure Limits) : No data available.

DNEL (Derived-No Effect Level) : No data available.

PNEC (Predicted No-Effect Concentration) : No data available.

8.2. Exposure controls



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8.2.1. Appropriate engineering controls

- : Provide adequate general and local exhaust ventilation.
- Systems under pressure should be regularly checked for leakages.
- Gas detectors should be used when flammable gases/vapours may be released.
- 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.

- Respiratory protection

- : None necessary.

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.

Odour threshold :

pH value : Not applicable.

Molar mass : 2 g/mol

Melting point : -259 °C

Boiling point : -253 °C

Flash point : Not applicable for gases and gas-mixtures.

Critical temperature : -240 °C

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

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

Vapour pressure [20°C] : Not applicable.

Vapour pressure [50°C] :

Relative density, gas (air=1) : 0.07

Relative density, liquid (water=1) : 0.07

Solubility in water [mg/l] : 1.6 mg/l



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Partition coefficient n-octanol/water [log Kow]	: Not applicable for inorganic gases.
Auto-ignition temperature [°C]	: 560 °C
Viscosity at 20°C	: Not applicable.
Explosive Properties	: Not applicable.
Oxidising Properties	: None.

9.2. Other information

Other data	: Burns with an invisible flame.
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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

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

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.
Germ cell mutagenicity	: No known effects from this product.
Carcinogenicity	: No known effects from this product.
Toxic for reproduction : Fertility	: No known effects from this product.
Toxic for reproduction : unborn child	: 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.

SECTION 12: Ecological information

12.1. Toxicity

Assessment	: No ecological damage caused by this product.
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12.2. Persistence and degradability

Assessment : No ecological damage caused by this product.

12.3. Bioaccumulative potential

Assessment : No ecological damage caused by this product.

12.4. Mobility in soil

Assessment : No ecological damage caused by this product.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Other adverse effects

Effect on ozone layer : None.

Effect on the global warming : No known effects from this product.

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.
Ensure that the emission levels from local regulations or operating permits are not exceeded.

List of hazardous wastes : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14: Transport information

14.1. UN number

UN-No. : 1049

14.2. UN proper shipping name

Land transport (ADR/RID) : HYDROGEN, COMPRESSED

Air transport (ICAO-TI / IATA-DGR) : HYDROGEN, COMPRESSED

Sea transport (IMDG) : HYDROGEN, COMPRESSED

14.3. Transport hazard class(es)

Labelling :



2.1 : Flammable gases

Land transport (ADR/RID)

Class : 2

Classification code : 1F

Hazard identification number : 23



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

Air transport (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.1

Sea transport (IMDG)

Class / Div. (Sub. risk(s)) : 2.1

Emergency Schedule (EmS) - Fire : F-D

Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

Land transport (ADR/RID) : Not applicable

Air transport (ICAO-TI / IATA-DGR) : Not applicable

Sea transport (IMDG) : Not applicable

14.5. Environmental hazards

Land transport (ADR/RID) : None.

Air transport (ICAO-TI / IATA-DGR) : None.

Sea transport (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Land transport (ADR/RID) : P200

Air transport (ICAO-TI / IATA-DGR)

 Passenger and Cargo Aircraft : Forbidden

 Cargo Aircraft only : 200

Sea transport (IMDG) : P200

Special transport precautions : 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 there is adequate ventilation.
- 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.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU-Regulations

Restrictions on use : None.

Seveso directive 96/82/EC : Listed.



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National regulations

National legislation : Ensure all national/local regulations are observed.
Water hazard class (WGK) : -
Kenn-Nr. : 741

15.2. 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.
Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of R-, H- and EUH-phrases

Compressed gas	Gases under pressure : Compressed gas
Flam. Gas 1	Flammable gases, Category 1
H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated

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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