

Safety Data Sheet

Hydrogen (CANGas)

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

Reference number: D-H2-067A-DD

Issue date: 4/1/2015 Revision date: 1/6/2023 Supersedes version of: 6/20/2018 Version: 4.2

Danger



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

1.1. Product identifier

Trade name	: Hydrogen (CANGas)
SDS no	: D-H2-067A-DD
Other means of identification	: Hydrogen (CANGas)
	CAS-No. : 1333-74-0
	EC-No. : 215-605-7
	EC Index-No. : 001-001-00-9
REACH registration No	: Listed in Annex IV / V REACH, exempted from registration.
Chemical formula	: H ₂

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

Relevant identified uses	: Industrial and professional uses. Perform risk assessment prior to use. Test gas/Calibration gas. Laboratory use. Contact supplier for more information on uses.
Uses advised against	: Do not inflate in party balloons because of the risk of explosion. Consumer use. Uses other than those listed above are not supported, contact your supplier for more information on other uses. Attention: These products must not be applied to humans or animals unless they are expressly designated as medical or medicinal gases!.

1.3. Details of the supplier of the safety data sheet

Messer Industriegase GmbH GmbH
Messer- Platz 1
D - 65812 Bad Soden am Taunus
Germany
T 0049-(0)-6196 7760-200 - F 0049-(0)-6196 7760-280
SDB.de@messergroup.com - www.messer.de

1.4. Emergency telephone number

Emergency telephone number	: Messer Produktionsgesellschaft Salzgitter GmbH +49 (0) 5341 21-9333, erreichbar Montags 0:00 bis Sonntags 24:00
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SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Physical hazards	Aerosol, Category 1	H222;H229
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2.2. Label elements

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

Hazard pictograms (CLP)

:



GHS02

Signal word (CLP)

: Danger

Hazard statements (CLP)

: H222 - Extremely flammable aerosol.

H229 - Pressurised container: May burst if heated.

Precautionary statements (CLP)

- Prevention

: P211 - Do not spray on an open flame or other ignition source.

P210 - Keep away from heat, hot surfaces, open flames, sparks. No smoking.

P251 - Do not pierce or burn, even after use.

- Storage

: P410+P412 - Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F.

2.3. Other hazards

None.

Not classified as PBT or vPvB.

The substance/mixture has no endocrine disrupting properties.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	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 REACH registration No: *1	100	Flam. Gas 1A, 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.

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

Not applicable

3.2. Mixtures

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation

: When symptoms occur: go into open air and ventilate suspected area.

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation 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.

None.

See section 11.

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

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
Product does not burn, use fire control measures appropriate for the surrounding fire.
- Unsuitable extinguishing media : Carbon dioxide.
Do not use water jet to extinguish.

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 firefighters

- 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.
Move containers away from the fire area if this can be done without risk.
- 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 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

- For non-emergency personnel : Act in accordance with local emergency plan.
Try to stop release.
Evacuate area.
Eliminate ignition sources.
Ensure adequate air ventilation.
Stay upwind.
See section 8 of the SDS for more information on personal protective equipment
- For emergency responders : Monitor concentration of released product.
Consider the risk of potentially explosive atmospheres.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
See section 5.3 of the SDS for more information.

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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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product

- : Do not smoke while handling product.
- 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.
- The product 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.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Do not breathe gas.
- Avoid release of product into work area.
- Avoid suck back of water, acid and alkalis.

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Protect containers 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 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 content of the container.
- Suck back of water into the container must be prevented.
- Open valve slowly to avoid pressure shock.

7.2. Conditions for safe storage, including any incompatibilities

- 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.
- 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.
- 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 them from falling over.
- Stored containers should be periodically checked for general condition and leakage.
- Keep away from combustible materials.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

DNEL (Derived-No Effect Level) : None available.

PNEC (Predicted No-Effect Concentration) : None available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation.
Systems under pressure should be regularly checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Keep concentrations well below lower explosion limits.
Gas detectors should be used when flammable gases/vapours may be released.
Consider the use of a 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 - specifications.
- Skin protection
 - Hand protection : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher.
 - Other : Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Standard EN 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.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
- Thermal hazards : None necessary.

8.2.3. Environmental exposure controls

Specific risk management measures are not required beyond good industrial hygiene and safety procedures.
Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

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 is subjective and inadequate to warn of overexposure.
Odour threshold is subjective and inadequate to warn of overexposure.

pH : Not applicable.

Melting point / Freezing point : -259 °C
-259 °C

Boiling point : -253 °C

Flash point : Not applicable for gases and gas mixtures.

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Flammability	: Flammability range not available. Extremely flammable aerosol.
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Density	: Not applicable
Vapour density	: Not applicable for gases and gas mixtures.
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 for inorganic products.
Auto-ignition temperature	: ≈ 560 °C Not known.
Decomposition temperature	: Not applicable.
Viscosity, kinematic	: Not applicable.
Particle characteristics	: Not applicable for gases and gas mixtures.

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosive properties	: Not applicable.
Explosion limits	: Flammability range not available. ≥ 3.4 (3.4 – 65) g/m ³
Oxidising properties	: None.
Tci	: 5.5 %
Critical temperature [°C]	: -240 °C

9.2.2. Other safety characteristics

Molar mass	: 2 g/mol
Evaporation rate	: Not applicable for gases and gas mixtures.
Gas group	: Compressed gas
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

None under recommended storage and handling conditions (see section 7).
Can form explosive mixture with air.
May react violently with oxidants.

Reactivity	: This mixture contains components with the following reactivity : Can form explosive mixture with air. May react violently with oxidants.
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10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Avoid moisture in installation systems.

10.5. Incompatible materials

Air, Oxidisers.
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 hazard classes as defined in Regulation (EC) No 1272/2008

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.

11.2. Information on other hazards

Other information	: The substance/mixture has no endocrine disrupting properties.
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SECTION 12: Ecological information

12.1. Toxicity

Assessment	: No ecological damage caused by this product.
EC50 48h - Daphnia magna [mg/l]	: No data available.
EC50 72h - Algae [mg/l]	: No data available.
LC50 96 h - Fish [mg/l]	: No data available.

12.2. Persistence and degradability

Assessment	: No ecological damage caused by this product. No data available.
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12.3. Bioaccumulative potential

Assessment	: No ecological damage caused by this product.
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12.4. Mobility in soil

Assessment	: No data available.
Assessment	: No ecological damage caused by this product.

12.5. Results of PBT and vPvB assessment

Assessment	: Not classified as PBT or vPvB.
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12.6. Endocrine disrupting properties

The substance/mixture has no endocrine disrupting properties.

12.7. Other adverse effects

Other adverse effects	: No known effects from this product.
Effect on the ozone layer	: None.
Global warming potential [CO ₂ =1]	: 6
Effect on global warming	: No known effects from this product. When discharged in large quantities may contribute to the greenhouse effect. Contains greenhouse gas(es).

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
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.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.eu> for more guidance on suitable disposal methods.
Return unused product in original container to supplier.
16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended)

13.2. Additional information

None.
External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

14.1. UN number or ID number

In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 1950

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : AEROSOLS
Transport by air (ICAO-TI / IATA-DGR) : Aerosols, flammable
Transport by sea (IMDG) : AEROSOLS

14.3. Transport hazard class(es)

Labelling



2.1 : Flammable gases.

Transport by road/rail (ADR/RID)

Class : 2
Classification code : 5F
Tunnel Restriction : D - Passage forbidden through tunnels of category D and E

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

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

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.1
Emergency Schedule (EmS) - Fire : F-D
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable
Transport by air (ICAO-TI / IATA-DGR) : Not applicable
Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.
Transport by air (ICAO-TI / IATA-DGR) : None.
Transport by sea (IMDG) : None.

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14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID)	: P207. LP02
Transport by air (ICAO-TI / IATA-DGR)	
Passenger and Cargo Aircraft	: 203.
Cargo Aircraft only	: 203.
Transport by sea (IMDG)	: P207. LP02
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 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. Maritime transport in bulk according to IMO instruments

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.
Other information, restriction and prohibition regulations	: Ensure all national/local regulations are observed. None.
Seveso Directive : 2012/18/EU (Seveso III)	: Listed. Covered.

National regulations

Water hazard class (WGK)	: nwg - Non-hazardous to water
Kenn-Nr.	: 741
Regulatory reference	: National / local legislations : Sec15 DE General. Sec 15 DE Flam. . Classification for storage according to TRGS 510 : 2B Aerosolpackungen und Feuerzeuge.

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 2020/878.
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Abbreviations and acronyms

: ATE - Acute Toxicity Estimate
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
EINECS - European Inventory of Existing Commercial Chemical Substances
CAS# - Chemical Abstract Service number
PPE - Personal Protection Equipment
LC50 - Lethal Concentration to 50 % of a test population
RMM - Risk Management Measures
PBT - Persistent, Bioaccumulative and Toxic
vPvB - Very Persistent and Very Bioaccumulative
STOT- SE : Specific Target Organ Toxicity - Single Exposure
CSA - Chemical Safety Assessment
EN - European Standard
UN - United Nations
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
IATA - International Air Transport Association
IMDG code - International Maritime Dangerous Goods
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
WGK - Water Hazard Class
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure
UFI : Unique Formula Identifier

Training advice

: The hazard of asphyxiation is often overlooked and must be stressed during operator training.
Ensure operators understand the flammability hazard.
Receptacle under pressure.

Further information

: Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).
Key literature references and sources of data are maintained in EIGA doc 169 :
'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

Full text of H- and EUH-statements	
Aerosol 1	Aerosol, Category 1
H222	Extremely flammable aerosol.
H229	Pressurised container: May burst 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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