



Hydrogen, compressed

Safety Data Sheet

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

Reference number: EIGA067A

Issue date: 16/01/2013 Revision date: 10/11/2023 Version: 1.12

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

1.1. Product identifier

| | |
|-----------------------|---|
| Product form | : Substance |
| Name | : Hydrogen, compressed |
| Trade name | : Hydrogen, compressed |
| EC Index-No. | : 001-001-00-9 |
| EC-No. | : 215-605-7 |
| CAS-No. | : 1333-74-0 |
| REACH registration No | : Listed in Annex IV / V REACH, exempted from registration. |
| Product code | : 000010021694 |
| Formula | : H ₂ |

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

1.2.1. Relevant identified uses

| | |
|------------------------------|--|
| Relevant identified uses | : Industrial and professional uses. Perform risk assessment prior to use. Test gas/Calibration gas. Chemical reaction / Synthesis. Laboratory use. Use as a fuel. Shield gas for welding processes. Use for manufacture of electronic/photovoltaic components. Laser gas. |
| Use of the substance/mixture | : Aerosol propellant Propellant gas Balance gas for mixtures. Carrier gas. Combustion, melting and cutting processes. Fuel cells. Process gas. Fuel gas for welding, cutting, heating, brazing and soldering applications. |

1.2.2. Uses advised against

| | |
|----------------------|---|
| Uses advised against | : Consumer use. Uses other than those listed above are not supported, contact your supplier for more information on other uses. |
| Restrictions on use | : This gas is not intended to be filled into balloons for consumer use and advertising purposes because of the danger of explosion, Do not inflate commercial balloons. |

1.3. Details of the supplier of the safety data sheet

Linde GmbH Division Gas
Seitnerstr. 70
DE- 82049 Pullach
Germany
T +49 8974460
info@linde.com



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1.4. Emergency telephone number

Emergency number : UMCO/NCEC: +44 1865 407333 (English); +49 89 220 61012 (German)

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 1A | H220 |
| | Gases under pressure : Compressed gas | H280 |

Full text of H- and EUH-statements: see section 16

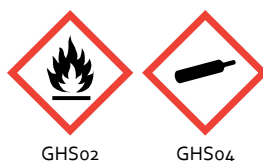
Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

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

Hazard pictograms (CLP) :



GHS02

GHS04

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 - In case of leakage, eliminate all ignition sources. |
| - Storage | : P403 - Store in a well-ventilated place. |

2.3. Other hazards

Other hazards : Asphyxiant in high concentrations. These high concentrations are within the flammability range.
The substance/mixture has no endocrine disrupting properties.



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SECTION 3: Composition/information on ingredients

3.1. Substances

| Name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
|----------------------|---|-----|---|
| Hydrogen, compressed | CAS-No.: 1333-74-0 EC-No.: 215-605-7 EC Index-No.: 001-001-00-9 REACH-no: *1 | 100 | Flam. Gas 1A, H220 Press. Gas (Comp.), H280 |

Full text of H- and EUH-statements: see section 16

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.

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

| | |
|---------------------------------------|--|
| First-aid measures after inhalation | : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped. |
| First-aid measures after skin contact | : Adverse effects not expected from this product. |
| First-aid measures after eye contact | : Adverse effects not expected from this product. |
| First-aid measures after ingestion | : Ingestion is not considered a potential route of exposure. |

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

| | |
|---|---|
| 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. See section 11. |
|---|---|

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

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

| | |
|--------------------------------|--|
| Suitable extinguishing media | : Dry powder. Carbon dioxide. Shutting off the source of the gas is the preferred method of control. Water spray or fog. Be aware of the risk of formation of static electricity with the use of CO ₂ extinguishers. Do not use them in places where a flammable atmosphere may be present. |
| Unsuitable extinguishing media | : Do not use water jet to extinguish. |

5.2. Special hazards arising from the substance or mixture

| | |
|-------------------------------|--|
| Reactivity in case of fire | : No reactivity hazard other than the effects described in sub-sections below. |
| Specific hazards | : Exposure to fire may cause containers to rupture/explode. |
| Hazardous combustion products | : None. |



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5.3. Advice for firefighters

| | |
|--|--|
| Specific methods | <p>: Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.</p> <p>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.</p> <p>If possible, stop flow of product.</p> <p>Use water spray or fog to knock down fire fumes if possible.</p> <p>Move containers away from the fire area if this can be done without risk.</p> |
| Special protective equipment for fire fighters | <p>: In confined space use self-contained breathing apparatus.</p> <p>Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.</p> <p>Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.</p> <p>Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.</p> |

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

| | |
|----------------------|---|
| Emergency procedures | <p>: 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.</p> |
|----------------------|---|

6.1.2. For emergency responders

| | |
|----------------------|---|
| Emergency procedures | <p>: 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.</p> |
|----------------------|---|

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

| | |
|--|-------------------|
| 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

- : 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.
- Ensure equipment is adequately earthed.
- 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.
- 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.
- Avoid suck back of water, acid and alkalis.
- Do not breathe gas.
- Avoid release of product into work area.

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.



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7.2. Conditions for safe storage, including any incompatibilities

Conditions for safe storage, including any incompatibilities :

- 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 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.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

No additional information available

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

| Hydrogen, compressed (1333-74-0) | |
|------------------------------------|-------------------|
| DNEL/DMEL (additional information) | |
| Additional information | None available. |
| PNEC (additional information) | |
| Additional information | None available. |
| Additional information | : None available. |

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Provide adequate general and local exhaust ventilation. Product to be handled in a closed system. 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. Systems under pressure should be regularly checked for leakages.



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8.2.2. Personal protection equipment

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.

Personal protective equipment symbol(s):



8.2.2.1. Eye and face protection

Eye protection:

Wear safety glasses with side shields.

Standard EN 166 - Personal eye-protection - specifications

8.2.2.2. Skin protection

Hand protection:

Wear working gloves when handling gas containers.

Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher.

Other skin protection

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.

Other information:

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.

8.2.2.3. Respiratory protection

Respiratory protection:

Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.

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.

8.2.2.4. Thermal hazards

Thermal hazard protection:

None in addition to the above sections.

8.2.3. Environmental exposure controls

Environmental exposure controls:

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.



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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---|--|
| Appearance | |
| Physical state | : Gas |
| Colour | : Colourless. |
| Form | : Compressed gas |
| Odour | : Odourless. |
| Odour threshold | : Odour threshold is subjective and inadequate to warn of overexposure. |
| Melting point | : -259 °C |
| Freezing point | : Not applicable |
| Boiling point | : -253 °C |
| Flammability | : Extremely flammable gas. |
| Oxidising properties | : No oxidising properties. |
| Explosive limits | : Not known. |
| Lower explosion limit | : 4 vol % |
| Upper explosion limit | : 77 vol % |
| Flash point | : Not applicable for gases and gas mixtures. |
| Auto-ignition temperature | : 560 °C |
| Decomposition temperature | : Not applicable. |
| pH | : Not applicable for gases and gas mixtures. |
| Viscosity, kinematic | : No reliable data available. |
| Viscosity, dynamic | : No reliable data available. |
| Solubility in water | : 1.6 mg/l |
| Partition coefficient n-octanol/water (Log Kow) | : Not applicable for inorganic products. |
| Partition coefficient n-octanol/water (Log Pow) | : Not applicable for gas mixtures. |
| Vapour pressure | : Not applicable. |
| Vapour pressure at 50°C | : Not applicable. |
| Critical pressure | : 1293 kPa |
| Density | : Not applicable for gases and gas mixtures. |
| Relative density | : 0.07 |
| Relative vapour density at 20°C | : Not applicable. |
| Relative gas density | : 0.07 |
| Particle characteristics | : Not applicable Not applicable for gases and gas mixtures. Nanoforms are not relevant for gases and gas mixtures. |

9.2. Other information

9.2.1. Information with regard to physical hazard classes

| | |
|----------------------|-----------|
| Tci | : 5.5 % |
| Critical temperature | : -240 °C |

9.2.2. Other safety characteristics

| | |
|------------------------|----------------------------------|
| Molecular mass | : 2 g/mol |
| Gas group | : Compressed gas |
| Additional information | : 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.



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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. 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. |
| Acute toxicity (dermal) | : Not classified |
| Acute toxicity (inhalation) | : Not classified |
| Skin corrosion/irritation | : No known effects from this product. pH: Not applicable for gases and gas mixtures. |
| Serious eye damage/irritation | : No known effects from this product. pH: Not applicable for gases and gas mixtures. |
| 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. |
| Reproductive toxicity | : Not classified |
| 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. |

Hydrogen, compressed (1333-74-0)

| | |
|----------------------|-----------------------------|
| Viscosity, kinematic | No reliable data available. |
|----------------------|-----------------------------|

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties : The substance/mixture has no endocrine disrupting properties.

11.2.2. Other information

No additional information available



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SECTION 12: Ecological information

12.1. Toxicity

| | |
|---|--|
| Assessment | : No ecological damage caused by this product. |
| Hazardous to the aquatic environment, short-term (acute) | : Not classified |
| Hazardous to the aquatic environment, long-term (chronic) | : Not classified |
| Not rapidly degradable | |

Hydrogen, compressed (1333-74-0)

| | |
|---|--------------------|
| LC ₅₀ 96 h - Fish [mg/l] | No data available. |
| EC ₅₀ 48h - Daphnia magna [mg/l] | No data available. |
| EC ₅₀ 72h - Algae [mg/l] | No data available. |

12.2. Persistence and degradability

Hydrogen, compressed (1333-74-0)

| | |
|------------|--|
| Assessment | No ecological damage caused by this product. |
|------------|--|

12.3. Bioaccumulative potential

Hydrogen, compressed (1333-74-0)

| | |
|---|--|
| Partition coefficient n-octanol/water (Log Pow) | Not applicable for gas mixtures. |
| Partition coefficient n-octanol/water (Log Kow) | Not applicable for inorganic products. |
| Assessment | No ecological damage caused by this product. |

12.4. Mobility in soil

Hydrogen, compressed (1333-74-0)

| | |
|------------|--|
| 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. Endocrine disrupting properties

| | |
|-----------------------|---|
| Other adverse effects | : No known effects from this product. |
| Assessment | : 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 | : No effect on the ozone layer. |
| Global warming potential [CO ₂ =1] | : 6 |
| Effect on global warming | : 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






- 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. 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. Do not discharge into any place where its accumulation could be dangerous. Return unused product in original container to supplier.
- List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

| ADR | IMDG | IATA | ADN | RID |
|---|---|---|---|---|
| 14.1. UN number or ID number | | | | |
| UN 1049 | UN 1049 | UN 1049 | UN 1049 | UN 1049 |
| 14.2. UN proper shipping name | | | | |
| HYDROGEN, COMPRESSED | HYDROGEN, COMPRESSED | Hydrogen, compressed | HYDROGEN, COMPRESSED | HYDROGEN, COMPRESSED |
| Transport document description | | | | |
| UN 1049 HYDROGEN, COMPRESSED, 2.1, (B/D) | UN 1049 HYDROGEN, COMPRESSED, 2.1 | UN 1049 Hydrogen, compressed, 2.1 | UN 1049 HYDROGEN, COMPRESSED, 2.1 | UN 1049 HYDROGEN, COMPRESSED, 2.1 |
| 14.3. Transport hazard class(es) | | | | |
| 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
|  |  |  |  |  |
| 14.4. Packing group | | | | |
| Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| 14.5. Environmental hazards | | | | |
| Dangerous for the environment: No | Dangerous for the environment: No Marine pollutant: No | Dangerous for the environment: No | Dangerous for the environment: No | Dangerous for the environment: No |
| No supplementary information available | | | | |



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14.6. Special precautions for user

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.

Overland transport

Classification code (ADR) : 1F
 Special provisions (ADR) : 392, 662
 Limited quantities (ADR) : 0
 Excepted quantities (ADR) : Eo
 Packing instructions (ADR) : P200
 Mixed packing provisions (ADR) : MP9
 Portable tank and bulk container instructions (ADR) : (M)
 Tank code (ADR) : CxBN(M)
 Tank special provisions (ADR) : TA4, TT9
 Vehicle for tank carriage : FL
 Transport category (ADR) : 2
 Special provisions for carriage - Loading, unloading and handling (ADR) : CV9, CV10, CV36
 Special provisions for carriage - Operation (ADR) : S2, S20
 Hazard identification number (Kemler No.) : 23
 Orange plates :



Tunnel restriction code (ADR) : B/D

Transport by sea

Limited quantities (IMDG) : 0
 Excepted quantities (IMDG) : Eo
 Packing instructions (IMDG) : P200
 EmS-No. (Fire) : F-D
 EmS-No. (Spillage) : S-U
 Stowage category (IMDG) : E
 Stowage and handling (IMDG) : SW2
 Segregation (IMDG) : SG46
 Properties and observations (IMDG) : Flammable, odourless gas. Explosive limits: 4% to 75%. Much lighter than air (0.07).

Air transport

PCA Excepted quantities (IATA) : Eo
 PCA Limited quantities (IATA) : FORBIDDEN
 PCA limited quantity max net quantity (IATA) : FORBIDDEN
 PCA packing instructions (IATA) : FORBIDDEN
 PCA max net quantity (IATA) : FORBIDDEN
 CAO packing instructions (IATA) : 200
 CAO max net quantity (IATA) : 150kg
 Special provisions (IATA) : A1
 ERG code (IATA) : 10L



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Inland waterway transport

| | |
|-----------------------------------|-------------|
| Classification code (ADN) | : 1F |
| Special provisions (ADN) | : 392, 662 |
| Limited quantities (ADN) | : 0 |
| Excepted quantities (ADN) | : E0 |
| Equipment required (ADN) | : PP, EX, A |
| Ventilation (ADN) | : VE01 |
| Number of blue cones/lights (ADN) | : 1 |

Rail transport

| | |
|---|------------------------|
| Classification code (RID) | : 1F |
| Special provisions (RID) | : 392, 662 |
| Limited quantities (RID) | : 0 |
| Excepted quantities (RID) | : E0 |
| Packing instructions (RID) | : P200 |
| Mixed packing provisions (RID) | : MP9 |
| Portable tank and bulk container instructions (RID) | : (M) |
| Tank codes for RID tanks (RID) | : CxBN(M) |
| Special provisions for RID tanks (RID) | : TU38, TE22, TA4, TT9 |
| Transport category (RID) | : 2 |
| Special provisions for carriage - Loading, unloading and handling (RID) | : CW9, CW10, CW36 |
| Colis express (express parcels) (RID) | : CE3 |
| Hazard identification number (RID) | : 23 |

14.7. Maritime transport in bulk according to IMO instruments

| | |
|----------|-------------------|
| IBC code | : Not applicable. |
|----------|-------------------|

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

REACH Annex XVII (Restriction List)

| EU restriction list (REACH Annex XVII) | | |
|--|----------------------|--|
| Reference code | Applicable on | Entry title or description |
| 40. | Hydrogen, compressed | Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not. |

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Not listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)



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POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

Ozone Regulation (1005/2009)

Not listed on the Ozone Depletion list (Regulation EU 1005/2009)

VOC Directive (2004/42)

Restrictions on use : None.

Seveso Directive (Disaster Risk Reduction)

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

| Seveso III Part II (Named dangerous substances) | Qualifying quantity (tonnes) | |
|---|------------------------------|------------|
| | Lower-tier | Upper-tier |
| Hydrogen | 5 | 50 |

Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

15.1.2. National regulations

Ensure all national/local regulations are observed.

Safety data sheet in accordance with commission regulation (EU) No 2020/878.

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work

Directive 2016/425/EEC on personal protective equipment

Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)

Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.

This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

Germany

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|----------|----------|-----------|-------|----------|----------|---------|---------|----------|----------|----------|---------|----------|----------|----------|----------|---------|-------|--------|--------|--------|--------|--------|--------|-----------|
| Employment restrictions | : Observe restrictions according Act on the Protection of Working Mothers (MuSchG). Observe restrictions according Act on the Protection of Young People in Employment (JArbSchG). | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water hazard class (WGK) | : WGK nwg, Non-hazardous to water (Classification according to AwSV; ID No. 741). | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kenn-Nr. | : 741 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Storage class (LGK, TRGS 510) | : LGK 2A - Gases (except aerosol dispensers and lighters). | | | | | | | | | | | | | | | | | | | | | | | | | |
| Joint storage table | : <table><tr><td>LGK 1</td><td>LGK 2A</td><td>LGK 2B</td><td>LGK 3</td><td>LGK 4.1A</td></tr><tr><td>LGK 4.1B</td><td>LGK 4.2</td><td>LGK 4.3</td><td>LGK 5.1A</td><td>LGK 5.1B</td></tr><tr><td>LGK 5.1C</td><td>LGK 5.2</td><td>LGK 6.1A</td><td>LGK 6.1B</td><td>LGK 6.1C</td></tr><tr><td>LGK 6.1D</td><td>LGK 6.2</td><td>LGK 7</td><td>LGK 8A</td><td>LGK 8B</td></tr><tr><td>LGK 10</td><td>LGK 11</td><td>LGK 12</td><td>LGK 13</td><td>LGK 10-13</td></tr></table> | LGK 1 | LGK 2A | LGK 2B | LGK 3 | LGK 4.1A | LGK 4.1B | LGK 4.2 | LGK 4.3 | LGK 5.1A | LGK 5.1B | LGK 5.1C | LGK 5.2 | LGK 6.1A | LGK 6.1B | LGK 6.1C | LGK 6.1D | LGK 6.2 | LGK 7 | LGK 8A | LGK 8B | LGK 10 | LGK 11 | LGK 12 | LGK 13 | LGK 10-13 |
| LGK 1 | LGK 2A | LGK 2B | LGK 3 | LGK 4.1A | | | | | | | | | | | | | | | | | | | | | | |
| LGK 4.1B | LGK 4.2 | LGK 4.3 | LGK 5.1A | LGK 5.1B | | | | | | | | | | | | | | | | | | | | | | |
| LGK 5.1C | LGK 5.2 | LGK 6.1A | LGK 6.1B | LGK 6.1C | | | | | | | | | | | | | | | | | | | | | | |
| LGK 6.1D | LGK 6.2 | LGK 7 | LGK 8A | LGK 8B | | | | | | | | | | | | | | | | | | | | | | |
| LGK 10 | LGK 11 | LGK 12 | LGK 13 | LGK 10-13 | | | | | | | | | | | | | | | | | | | | | | |
| Joint storage not permitted for | : LGK 1, LGK 3, LGK 4.1A, LGK 4.1B, LGK 4.2, LGK 4.3, LGK 5.1A, LGK 5.1B, LGK 5.2, LGK 6.1A, LGK 6.1B, LGK 6.1C, LGK 6.1D, LGK 6.2, LGK 7, LGK 10. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Joint storage with restrictions permitted for | : LGK 2A, LGK 2B, LGK 5.1C, LGK 8A, LGK 11, LGK 10-13. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Joint storage permitted for | : LGK 8B, LGK 12, LGK 13. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hazardous Incident Ordinance (12. BImSchV) | : Is not subject to the Hazardous Incident Ordinance (12. BImSchV) | | | | | | | | | | | | | | | | | | | | | | | | | |

15.2. Chemical safety assessment

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



Hydrogen, compressed

Safety Data Sheet

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

SECTION 16: Other information

Indication of changes:

Safety data sheet in accordance with commission regulation (EU) No 2020/878.

| Indication of changes | |
|-----------------------|--------------------|
| Changed item | Change Comments |

| Abbreviations and acronyms: | |
|-----------------------------|---|
| ADN | European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways |
| | ADR - Agreement concerning the International Carriage of Dangerous Goods by Road |
| | ATE - Acute Toxicity Estimate |
| BLV | Biological limit value |
| BOD | Biochemical oxygen demand (BOD) |
| CAO | Cargo Aircraft only / Cargo Aircraft only |
| CAS-No. | Chemical Abstract Service number |
| | CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008 |
| COD | Chemical oxygen demand (COD) |
| | CSA - Chemical Safety Assessment |
| DMEL | Derived Minimal Effect level |
| DNEL | Derived-No Effect Level |
| EC ₅₀ | Median effective concentration |
| EC | European Inventory of Existing Commercial Chemical Substances |
| ED | Endocrine disrupting properties |
| | EINECS - European Inventory of Existing Commercial Chemical Substances |
| EN | European Standard |
| IARC | International Agency for Research on Cancer |
| IATA | International Air Transport Association |
| IMDG | International Maritime Dangerous Goods |
| IOELV | Indicative Occupational Exposure Limit Value |
| LC ₅₀ | Median lethal concentration |
| LD ₅₀ | Median lethal dose |
| LOAEL | Lowest Observed Adverse Effect Level |
| NOAEC | No-Observed Adverse Effect Concentration |
| NOAEL | No-Observed Adverse Effect Level |
| NOEC | No-Observed Effect Concentration |



Hydrogen, compressed

Safety Data Sheet

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

| Abbreviations and acronyms: | |
|-----------------------------|---|
| N.O.S. | Not Otherwise Specified |
| OECD | Organisation for Economic Co-operation and Development |
| OEL | Occupational Exposure Limit |
| PBT | Persistent Bioaccumulative Toxic |
| PCA | Passenger and Cargo Aircraft / Passenger and Cargo Aircraft |
| PNEC | Predicted No-Effect Concentration |
| | PPE - Personal Protection Equipment |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 |
| RID | Regulations concerning the International Carriage of Dangerous Goods by Rail |
| | RMM - Risk Management Measures |
| STP | Sewage treatment plant |
| ThOD | Theoretical oxygen demand (ThOD) |
| TLM | Median Tolerance Limit |
| TRGS | Technical Rules for Hazardous Substances |
| STOT-RE | Specific Target Organ Toxicity-Repeated Exposure |
| STOT-SE | Specific Target Organ Toxicity-Single Exposure |
| UFI | Unique Formula Identifier |
| | UN - United Nations |
| VOC | Volatile Organic Compounds |
| vPvB | Very Persistent and Very Bioaccumulative |
| WGK | Water Hazard Class |

Training advice : Ensure operators understand the flammability hazard.

Other 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: | |
|-------------------------------------|---|
| Flam. Gas 1A | Flammable gases, Category 1A |
| H220 | Extremely flammable gas. |
| H280 | Contains gas under pressure; may explode if heated. |
| Press. Gas (Comp.) | Gases under pressure : Compressed gas |

The classification complies with : ATP 12



Hydrogen, compressed

Safety Data Sheet

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

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.

Safety Data Sheet (SDS), EU DE

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

End of document