

HyApproval

WP2 – Handbook Compilation

Deliverable 2.2

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APPENDIX I

Safety Data Sheets for hydrogen and refrigerated hydrogen

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Prepared by:

AIR LIQUIDE DTA

The European Safety Data Sheets attached hereto are for informational purposes only. The readers may use them only at their own discretion and risk. The Safety Data Sheets documents were prepared by EIGA (the European Industrial Gas Association) in consideration of the European Union standards. Although Air Liquide believes the information in the Safety Data Sheets documents to be correct, it is not responsible for the content of such documents, which may not meet regulatory requirements in other locations. The Safety Data Sheets are subject to revision. Readers have to assure they have the latest version.

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		Revised edition no : 1
		Date : 15/7/2005
		Supersedes : 0/0/0
Hydrogen		AL067A

6 ACCIDENTAL RELEASE MEASURES

Personal precautions	: Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Evacuate area. Ensure adequate air ventilation. Eliminate ignition sources.
Environmental precautions	: Try to stop release.
Clean up methods	: Ventilate area.

7 HANDLING AND STORAGE

Storage	: Keep container below 50°C in a well ventilated place. Segregate from oxidant gases and other oxidants in store.
Handling	: Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Purge air from system before introducing gas. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Keep away from ignition sources (including static discharges). Refer to supplier's container handling instructions.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Personal protection	: Ensure adequate ventilation. Do not smoke while handling product.
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9 PHYSICAL AND CHEMICAL PROPERTIES

Physical state at 20 °C	: Compressed gas.
Colour	: Colourless.
Odo(u)r	: None.
Molecular weight	: 2
Melting point [°C]	: -259
Boiling point [°C]	: -253
Critical temperature [°C]	: -240
Vapour pressure, 20°C	: Not applicable.
Relative density, gas (air=1)	: 0.07
Relative density, liquid (water=1)	: 0.07
Solubility in water [mg/l]	: 1.6
Flammability range [vol% in air]	: 4 to 75
Auto-ignition temperature [°C]	: 560
Other data	: Burns with a colourless invisible flame.

10 STABILITY AND REACTIVITY

Stability and reactivity	: Can form explosive mixture with air. May react violently with oxidants.
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11 TOXICOLOGICAL INFORMATION

Toxicity information : No known toxicological effects from this product.

12 ECOLOGICAL INFORMATION

Ecological effects information : No known ecological damage caused by this product.

13 DISPOSAL CONSIDERATIONS

General : 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.
Contact supplier if guidance is required.

14 TRANSPORT INFORMATION

UN No. : 1049
H.I. nr : 23
ADR/RID
- Proper shipping name : HYDROGEN, COMPRESSED
- ADR Class : 2
- ADR/RID Classification code : 1 F
- Labelling ADR : Label 2.1 : flammable gas.
Other transport information : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
 Before transporting product containers :
 - Ensure that containers are firmly secured.
 - Ensure cylinder valve is closed and not leaking.
 - Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
 - Ensure valve protection device (where provided) is correctly fitted.
 - Ensure there is adequate ventilation.
 - Compliance with applicable regulations.


15 REGULATORY INFORMATION

EC Classification : Index No : 001-001-00-9
F+; R12
EC Labelling
- Symbol(s) : F+ : Extremely flammable
- R Phrase(s) : R12 : Extremely flammable.
- S Phrase(s) : S9 : Keep container in a well-ventilated place.
S16 : Keep away from sources of ignition - No smoking.
S33 : Take precautionary measures against static discharges.

16 OTHER INFORMATION

Ensure all national/local regulations are observed.
 Ensure operators understand the flammability hazard.
 The hazard of asphyxiation is often overlooked and must be stressed during operator training.

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16 OTHER INFORMATION (continued)


This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws.

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.

Recommended uses and restrictions : This SDS is for information purposes only and is subject to change without notice. [Prior to purchase of products, please contact your local AIR LIQUIDE office for a complete SDS (with Manufacturer's name and emergency phone number).]

End of document

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5 FIRE-FIGHTING MEASURES (continued)

explosive re-ignition may occur. Extinguish any other fire.
 If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire.

Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions : Use protective clothing.
 Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
 Evacuate area.
 Ensure adequate air ventilation.
 Eliminate ignition sources.

Environmental precautions : Try to stop release.

Clean up methods : Ventilate area.

7 HANDLING AND STORAGE

Storage : Keep container below 50°C in a well ventilated place.
 Segregate from oxidant gases and other oxidants in store.

Handling : Ensure equipment is adequately earthed.
 Suck back of water into the container must be prevented.
 Purge air from system before introducing gas.
 Do not allow backfeed into the container.
 Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
 Keep away from ignition sources (including static discharges).
 Refer to supplier's container handling instructions.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Personal protection : Ensure adequate ventilation.
 Protect eyes, face and skin from liquid splashes.
 Do not smoke while handling product.

9 PHYSICAL AND CHEMICAL PROPERTIES

Physical state at 20 °C : Refrigerated liquefied gas.

Colour : Colourless.

Odo(u)r : None.

Molecular weight : 2

Melting point [°C] : -259

Boiling point [°C] : -253

Critical temperature [°C] : -240

Vapour pressure, 20°C : Not applicable.

Relative density, gas (air=1) : 0.07


Relative density, liquid (water=1) : 0.07

Solubility in water [mg/l] : 1.6

Flammability range [vol% in air] : 4 to 75

Auto-ignition temperature [°C] : 560

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9 PHYSICAL AND CHEMICAL PROPERTIES (continued)

Other data : Burns with a colourless invisible flame.

10 STABILITY AND REACTIVITY

Stability and reactivity : Can form explosive mixture with air.
Liquid spillages can cause embrittlement of structural materials.
May react violently with oxidants.

11 TOXICOLOGICAL INFORMATION

Toxicity information : No known toxicological effects from this product.

12 ECOLOGICAL INFORMATION

Ecological effects information : Can cause frost damage to vegetation.

13 DISPOSAL CONSIDERATIONS

General : 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.
Contact supplier if guidance is required.

14 TRANSPORT INFORMATION


UN No. : 1966
H.I. nr : 223
ADR/RID
 - **Proper shipping name** : HYDROGEN, REFRIGERATED LIQUID
 - **ADR Class** : 2
 - **ADR/RID Classification code** : 3 F
 - **Labelling ADR** : Label 2.1 : flammable gas.
Other transport information : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
 Before transporting product containers :
 - Ensure that containers are firmly secured.
 - Ensure cylinder valve is closed and not leaking.
 - Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
 - Ensure valve protection device (where provided) is correctly fitted.
 - Ensure there is adequate ventilation.
 - Compliance with applicable regulations.

15 REGULATORY INFORMATION

EC Classification : Not included in Annex I.
Proposed by the industry.
F+; R12

EC Labelling

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15 REGULATORY INFORMATION (continued)

- **Symbol(s)** : F+ : Extremely flammable
- **R Phrase(s)** : R12 : Extremely flammable.
- **S Phrase(s)** : S9 : Keep container in a well-ventilated place.
S16 : Keep away from sources of ignition - No smoking.
S33 : Take precautionary measures against static discharges.

16 OTHER INFORMATION

May cause frostbite.
 Ensure operators understand the flammability hazard.
 The hazard of asphyxiation is often overlooked and must be stressed during operator training.
 Ensure all national/local regulations are observed.
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 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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