AUTOMOTIVE HYDROGEN

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878
Issue date: 9/9/2021 Revision date: 2/9/2023 Version: 2.1

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

1.1. Product identifier

Product form	:	Substance
Trade name	:	AUTOMOTIVE HYDROGEN
Chemical name	:	hydrogen
EC Index-No.	:	001-001-00-9
EC-No.	:	215-605-7
CAS-No.	:	1333-74-0
Formula	:	H2
Product group	:	Trade product

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

Relevant identified uses

Main use category	:	ENGINE, FUEL CELL, FLAMMABLE GAS POWERED,Industrial use,Professional use,Industrial and professional use for chemical analysis, calibration, (routine) quality control, laboratory use, under controlled conditions,Chemical reaction / Synthesis

Uses advised against

Restrictions on use	:	Other

1.3. Details of the supplier of the safety data sheet

ORLEN Południe S.A.
Fabryczna 22
32-540 Trzebinia
Poland
T +48 24 201 00 00, F +48 24 367 74 14
E-mail address of competent person responsible for the SDS : reach.poludnie@orlen.pl

1.4. Emergency telephone number

Emergency number	:	+48 24 201 00 00 Emergency number 112

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flammable gases, Category 1	H220
Gases under pressure	H280

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

Adverse physicochemical, human health and environmental effects

Extremely flammable gas.

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 pressurized gas; heating may cause explosion.

Precautionary statements (CLP) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leakage, eliminate all ignition sources.
P403 - Store in a well-ventilated place.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
Contains no PBT and/or vPvB substances ≥ 0.1% assessed in accordance with REACH Annex XIII

Component	
Substance(s) not meeting the PBT criteria of REACH regulation, in accordance with Annex XIII	AUTOMOTIVE HYDROGEN (1333-74-0)
Substance(s) not meeting the vPvB criteria of REACH regulation, in accordance with Annex XIII	AUTOMOTIVE HYDROGEN (1333-74-0)

The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

SECTION 3: Composition/information on ingredients

3.1. Substances

Name : AUTOMOTIVE HYDROGEN
CAS-No. : 1333-74-0
EC-No. : 215-605-7
EC Index-No. : 001-001-00-9

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
AUTOMOTIVE HYDROGEN	CAS-No.: 1333-74-0 EC-No.: 215-605-7 EC Index-No.: 001-001-00-9	≥ 99.9	Flam. Gas 1, H220 Press. Gas

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

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a poison center or a doctor. Allow the victim to rest.
First-aid measures after skin contact : W tym przypadku nie dotyczy.
First-aid measures after eye contact : W tym przypadku nie dotyczy.
First-aid measures after ingestion : W tym przypadku nie dotyczy.

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

Symptoms/effects after inhalation : 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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray. Dry powder. Foam.

Unsuitable extinguishing media : Strong water jet.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Extremely flammable gas. Exposure to fire may cause containers to rupture/explode.

5.3. Advice for firefighters

Firefighting instructions : Eliminate all ignition sources if safe to do so. Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : No flames, no sparks. Eliminate all sources of ignition. Use special care to avoid static electric charges.

For non-emergency personnel

Emergency procedures : Act in accordance with local emergency plan. No open flames, no sparks, and no smoking. Evacuate unnecessary personnel. Only qualified personnel equipped with suitable protective equipment may intervene. Smoking is forbidden. Ensure that there is a suitable ventilation system. Evacuate area.

For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection". Monitor concentration of released product. Consider the risk of potentially explosive atmospheres.

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Ensure that there is a suitable ventilation system.

6.4. Reference to other sections

For further information refer to section 13. See Section 8. Section 15: Regulatory information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Ensure good ventilation of the work station. Wear personal protective equipment. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Eliminate all ignition sources if safe to do so. Ground equipment electrically.

Hygiene measures : Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a well-ventilated place. Keep cool. Keep away from any flames or sparking source. Ground equipment electrically.

Storage temperature : ≥ 10 – ≤ 25 °C

Germany

Storage class (LGK, TRGS 510) : LGK 2A - Gases (except aerosol dispensers and lighters)

Joint storage 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

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

Switzerland

Storage class (LK) : LK 2 - Liquefied or pressurized gases

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls

Appropriate engineering controls:
Ensure good ventilation of the work station. Do not eat, drink or smoke during use. Do not breathe dust. Use personal protective equipment as required. Explosion-free electrical equipment and lighting with earth. Use non-sparking handtools.

Personal protection equipment

Personal protective equipment:
Wear protective clothing.

Personal protective equipment symbol(s):

Eye and face protection

Eye protection:
Safety glasses

Eye protection			
Type	**Field of application**	**Characteristics**	**Standard**
Safety glasses			EN 166

Skin protection

Skin and body protection:
Wear suitable protective clothing

Hand protection:
Protective gloves

Hand protection					
Type	**Material**	**Permeation**	**Thickness (mm)**	**Penetration**	**Standard**
Reusable gloves					EN 388

Respiratory protection

Respiratory protection:
In case of insufficient ventilation, wear suitable respiratory equipment

Environmental exposure controls

Environmental exposure controls:
Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Colour	:	Colourless gas.
Odour	:	odourless.
Odour threshold	:	Not available
Melting point	:	-259.2 °C
Freezing point	:	Not applicable
Boiling point	:	-252.7
Flammability	:	Extremely flammable gas.
Lower explosion limit	:	4 vol %
Upper explosion limit	:	77 vol %
Flash point	:	Not applicable
Auto-ignition temperature	:	560 °C
Decomposition temperature	:	Not available
pH	:	Not applicable
Viscosity, kinematic	:	Not applicable
Solubility	:	Water: 1.62 mg/l
Partition coefficient n-octanol/water (Log Kow)	:	Not available
Vapour pressure	:	Not available
Vapour pressure at 50°C	:	Not available
Density	:	0.089 kg/m³
Relative density	:	Not applicable
Relative vapour density at 20°C	:	Not available
Particle characteristics	:	Not applicable

9.2. Other information

Information with regard to physical hazard classes

Pseudo-critical temperature	:	-240 °C

SECTION 10: Stability and reactivity

10.1. Reactivity

Extremely flammable gas.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May react violently with oxidants. Can form explosive mixtures with air.

10.4. Conditions to avoid

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Oxidizing agent. Air.

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 (oral)	:	Not classified
Acute toxicity (dermal)	:	Not classified
Acute toxicity (inhalation)	:	Not classified
Skin corrosion/irritation	:	Not classified
Serious eye damage/irritation	:	Not classified
Respiratory or skin sensitisation	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
STOT-single exposure	:	Not classified
STOT-repeated exposure	:	Not classified
Aspiration hazard	:	Not applicable

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	:	The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.
Hazardous to the aquatic environment, short–term (acute)	:	Not classified
Hazardous to the aquatic environment, long–term (chronic)	:	Not classified

12.2. Persistence and degradability

AUTOMOTIVE HYDROGEN (1333-74-0)	
Persistence and degradability	W tym przypadku nie dotyczy.

12.3. Bioaccumulative potential

AUTOMOTIVE HYDROGEN (1333-74-0)	
Bioaccumulative potential	W tym przypadku nie dotyczy.

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

AUTOMOTIVE HYDROGEN (1333-74-0)
This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

Component	
Substance(s) not meeting the PBT criteria of REACH regulation, in accordance with Annex XIII	AUTOMOTIVE HYDROGEN (1333-74-0)
Substance(s) not meeting the vPvB criteria of REACH regulation, in accordance with Annex XIII	AUTOMOTIVE HYDROGEN (1333-74-0)

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties : The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

HP Code : HP3 - "Flammable:"
– flammable liquid waste: liquid waste having a flash point below 60 °C or waste gas oil, diesel and light heating oils having a flash point > 55 °C and ≤ 75 °C;
– flammable pyrophoric liquid and solid waste: solid or liquid waste which, even in small quantities, is liable to ignite within five minutes after coming into contact with air;
– flammable solid waste: solid waste which is readily combustible or may cause or contribute to fire through friction;
– flammable gaseous waste: gaseous waste which is flammable in air at 20 °C and a standard pressure of 101.3 kPa;
– water reactive waste: waste which, in contact with water, emits flammable gases in dangerous quantities;
– other flammable waste: flammable aerosols, flammable self-heating waste, flammable organic peroxides and flammable self-reactive waste.

SECTION 14: Transport information

In accordance with ADR / IMDG / RID

ADR	RID
14.1. UN number or ID number	
UN 1049	UN 1049
14.2. UN proper shipping name	
HYDROGEN, COMPRESSED	HYDROGEN, COMPRESSED
Transport document description	
UN 1049 HYDROGEN, COMPRESSED, 2.1, (B/D)	UN 1049 HYDROGEN, COMPRESSED, 2.1

ADR	RID
14.3. Transport hazard class(es)	
2.1	2.1
	
14.4. Packing group	
Not applicable	Not applicable
14.5. Environmental hazards	
Dangerous for the environment: No	Dangerous for the environment: No
No supplementary information available	

14.6. Special precautions for user

Overland transport

Classification code (ADR)	:	1F
Special provisions (ADR)	:	392, 662
Limited quantities (ADR)	:	0
Excepted quantities (ADR)	:	E0
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	:	23 1049
Tunnel restriction code (ADR)	:	B/D
EAC code	:	2SE

Transport by sea

Not applicable

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

Not applicable

SECTION 15: Regulatory information

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

EU-Regulations

REACH Annex XVII (Restriction List)

Not listed on REACH Annex XVII

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Contains no substance(s) listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

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

POP Regulation (Persistent Organic Pollutants)

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

Ozone Regulation (2024/590)

Not listed on the Ozone Depletion list (Regulation EU 2024/590)

Council Regulation (EC) for the control of dual-use items

Contains no substance subject to the COUNCIL REGULATION (EC) for the control of dual-use items

Explosives Precursors Regulation (EU 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 (EC 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)

National regulations

Austria

Toxic Substances Ordinance 2000	:	Is not subject to the Toxic Substances Ordinance 2000.

Germany

VOC ordinance (ChemVOCFarbV)	:	
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 (Not classified according to Regulation Governing Systems for Handling Substances Hazardous to Waters (AwSV); ID No. 741).
Major Accidents Ordinance (12. BImSchV)	:	Is not subject to the Major Accidents Ordinance (12. BImSchV)

Netherlands

ABM category	:	B(4) - low hazard for aquatic organisms
SZW-lijst van kankerverwekkende stoffen	:	The substance is not listed
SZW-lijst van mutagene stoffen	:	The substance is not listed
SZW-lijst van reprotoxische stoffen – Borstvoeding	:	The substance is not listed
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid	:	The substance is not listed
SZW-lijst van reprotoxische stoffen – Ontwikkeling	:	The substance is not listed

Denmark

Danish National Regulations	:	Young people below the age of 18 years are not allowed to use the product

Poland

Polish National Regulations	:	Regulation of the Minister of Economy of 21 December 2005 on the essential requirements for personal protective equipment (J. o L. No. 259, item 2173). Decree of the Minister of Environment of 14 December 2014 on the catalogue of waste (J. o L. 2014, item 1923). Regulation of the Minister of Family, Labour and Social Policy of 12 June 2018 on the highest permissible concentration and intensity of noxious agents for health at work environment (J. o L. item 1286 as amended). Regulation of the Minister of Health of 10 August 2012 on the criteria and classification method of chemical substances and their mixtures (consolidated text: J. o L. 2015, item 208). Regulation of the Minister of Health of 2 February 2011 on tests and measurements of the noxious agents for health at work environment (J. o L. No. 33, item 166 as amended). Regulation of the Minister of Health of 20 April 2012 on labelling of hazardous substances and hazardous mixtures and certain mixtures (consolidated text: J. o L. 2015, item 450) The announcement of Minister of Health dated 9 September 2016 concerning the consolidated text announcement of the decree of the Minister of Health of 30 December 2004 on health and safety at work related to exposure to chemical agents at work (J. o L. of 16 September 2016, item 1488) Regulation of the Minister of Environment of 3 September 2014 on designs of packaging labelling (J. o L. 2014 item 1298) Regulation of the Minister of Environment of 9 December 2003 on particularly hazardous substances to the environment (J. o L. No. 217, item 2141). Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008 The ADR Agreement - Annex to the J. o L. of 26 April 2019 Government Statement of 18 February 2019 on the entry into force of the amendments to Annex A and B to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), signed in Geneva on 30 September 1957 (J. o L. 2019, item 769) The announcement of Marshal of the Sejm of the Republic of Poland dated 19 October 2016 concerning the consolidated text announcement of the decree on the management of packaging and packaging waste (J. o L. 2016, item 1863 as amended). Act of 14 December 2012 on waste (J. o L. 2013, item 322 as amended; consolidated text J. o L. 2020, item 797). Act of 19 August 2011 on the Carriage of Dangerous Goods (J. o L. 2011 No. 227, item 1367 as amended; consolidated text J. o L. 2020, item 154). Act of 25 February 2011 on chemical substances and their mixtures (J. o L. No. 63, item 322 as amended; consolidated text J. o L. 2019, item 1225). according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:
Modified.

Abbreviations and acronyms:	
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)

Abbreviations and acronyms:	
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	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
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disruptor

Data sources : REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Training advice : Personal monitoring. As from 24 August 2023 adequate training is required before industrial or professional use.

Full text of H- and EUH-statements:	
Flam. Gas 1	Flammable gases, Category 1
Press. Gas	Gases under pressure
H220	Extremely flammable gas.

The classification complies with : ATP 12