

Date of preparation: 24.10.2022 r.

Update date: 07.11.2022

Version: 1.1/EN

s. 1 z 8

Prepared in accordance with Regulation EC 1907/2006 (REACH), and 2020/878/EU.

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

1.1. Product identifier

Trade name:	Liquefied Helium
Chemical name:	Helium
CAS number:	7440-59-7
WE number:	231-168-5

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

Use	Inert gas used for: <ul style="list-style-type: none">- cooling superconducting magnet in medical MRI or nuclear NMR resonance;- in superconductivity - superconducting cables, Josephson microswitches;- in space programs, for the production of rocket fuel or for the cooling of telescopes;- in military programs - to cool infrared sensors used for location and guidance;- in research programs - particle accelerators, magnetohydrodynamic water transport system (MHR), superconducting magnetic energy storage system (SMES).
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Scope of use:	product is available for professional use only
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1.3. Details of the supplier of the safety data sheet

Name	Polski Koncern Naftowy ORLEN Spółka Akcyjna – Oddział PGNiG w Odolanowie (Branch in Odolanów)
Address	63-430 Odolanów, ul. Krotoszyńska 148
Tel	(62) 736 44 41
Fax	(62) 736 59 89
Person responsible for the safety data sheet	janusz.brzezicha@pgnig.pl

1.4. Emergency telephone number

112 - General emergency number

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture.

Press. Gas: Ref. Liq. Gas H281

Contains refrigerated gas; may cause cryogenic burns or injury.

2.2. Label elements

Hazard pictogram and signal word



WARNING

Hazard statements

H281 Contains refrigerated gas; may cause cryogenic burns or injury.

Precautionary statements

P282 Wear cold insulating gloves and either face shield or eye protection.

P315 Get immediate medical advice/attention.

P336 Thaw frosted parts with lukewarm water. Do not rub affected area.

P403 Store in a well-ventilated place.

2.3. Other hazards

The substance does not meet the PBT or vPvB criteria according to Annex XIII of the REACH Regulation.

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SECTION 2: Hazards identification

The substance is not deemed as substance with endocrine-disrupting properties.

Possibility of unsealing of containers - the gas has a suffocating effect on people by displacing oxygen from the air. Too low concentration of oxygen in the air can lead to unconsciousness and death. Exposure to cold temperature can cause excessive hypothermia (see section 11).

Containers may burst when exposed to high temperatures.

SECTION 3: Composition/information on ingredients

3.1. Components

Name: Helium, Liquefied
CAS number: 7440-59-7
WE number: 231-168-5
Index number: -
Registration number: The substance does not require registration

3.2. Mixtures

Not applicable – the product is a substance.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation

Remove the victim to fresh air, in a non-cooled place. If symptoms occur, call a doctor immediately. If breathing disorders occur, apply artificial respiration. Properly trained persons should give the injured person oxygen. Provide the injured with warmth and conditions for rest.

Skin contact

Gently remove the clothing (do not tear it off the skin by force), defrost the skin surface gently with lukewarm water, do not use too warm water (temperature over 44 ° C) or rub the cooled skin. In case of frostbite symptoms (change of skin color, blisters) put on a sterile dressing and consult a doctor.

Eye contact

In case of eye damage, apply a sterile dressing and consult an ophthalmologist immediately - provide the victim with specialist medical assistance.

Ingestion

Not applicable.

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

The gas may cause asphyxiation, inhalation may cause a feeling of breathlessness, breathing difficulties, and pain and dizziness, high gas concentrations confusion, nausea, fainting, unconsciousness, death. Chilled liquid or low temperature gas may cause frostbite to skin and mucous membranes, thermal damage to eyes. Staying in a low temperature causes the body to cool down. Symptoms of hypothermia (excessive hypothermia): apathy, tremors, speech disorders, incoordination, memory loss, increase in heart rate.

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

ATTENTION! Do not give the victim alcohol, do not allow him to smoke if the victim is fully conscious, you can give him warm drinks or hot meal. Place the unconscious patient in the recovery position, keep the poisoned at rest, protect against heat loss, control breathing and pulse. Never make yourself vomit or give anything by mouth to an unconscious or dizzy person.

In the event of symptoms of hypothermia or any other disturbing symptoms, call a doctor immediately or take the victim to the hospital. First aiders must be equipped with personal protective equipment (depending on the degree of risk).

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SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: select depending on the burning area (helium is non-flammable gas).

Unsuitable extinguishing media: do not use water jets, do not direct water at the source of the leak.

5.2. Special hazards arising from the substance or mixture

Cylinders and installations containing refrigerated liquefied gas may explode when exposed to fire or high temperatures. As a result of rapid heating and damage to the container, the liquefied helium evaporates rapidly, it can displace oxygen from the surrounding air. Liquid helium has a very low temperature. May crush construction materials. If water comes in contact with liquid helium, it can freeze and create fog.

On surfaces in contact with liquid helium, air condenses, rapidly evaporates the helium and leaves oxygen-rich condensate. Avoid contact of the condensate with oils and greases as they may ignite.

5.3. Advice for firefighters

Shut off the helium supply (if possible). Remove dewars and containers from the area at risk of fire, if it is possible without endangering life or health of rescuers, dewars and containers and tanks already exposed to fire or high temperatures may explode - cool them with a spray of water from a safe distance, do not direct water directly at the valves.

Special protective equipment for firefighting personnel:

Special firefighting clothing and footwear, fire helmet with a visor, protective goggles, protective gloves for cryogenic liquids, breathing apparatus isolating the respiratory system with an independent air supply.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

Evacuate people and animals from the endangered area. The liquefied helium will freeze the environment locally, then it will gradually evaporate. At the time of evaporation, it has a very low temperature and depending on the amount released, it can significantly cool the surrounding air. Control the oxygen content in the air in the area or in the room where the leak has occurred. If the oxygen content is too low (below 18% vol.) Use breathing apparatus with an independent air source. Provide the inflow of fresh air to the rooms. Avoid direct contact with liquid helium, non-insulated tanks and other system components with liquid gas, frozen surfaces and expanding gas. Note - liquid helium, due to the very low temperature, can crush construction materials.

6.2. Environmental precautions

In case of release of large quantities of the product, notify local authorities and chemical rescue.

6.3. Methods and material for containment and cleaning up

If possible, stop the leak (shut off the flow). Gaseous helium is lighter than air - in the open, the liquid will evaporate and the gas will spread through the atmosphere.

6.4. Reference to other sections

Personal protection measures – see Section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

When working with the product, apply the general principles of health and safety at work and observe the precautionary measures applicable to all work with liquefied gases under pressure and when working with substances at very low temperatures (see section 15). Before starting work, familiarize yourself with the special precautions and hazardous properties of the substance, taking into account the rules of conduct in case of fire and providing pre-medical aid.

Avoid direct skin contact with non-insulated containers and lines. Be careful with all manipulations (pressure reduction, cables disconnection, pouring liquid helium), check valves and lines used for filling, emptying containers.

Use recommended personal protection measures. Avoid any release of liquid, gas to the environment.

On surfaces in contact with liquid helium, air condenses, and the helium evaporates quickly leaving oxygen-rich condensate. Avoid contact of the condensate with fats, oils and greases as they may ignite.

7.2. Conditions for safe storage, including any incompatibilities:

Store in tightly closed dewars and containers equipped with safety valves or other means of protection against bursting in the event of an undesirable increase in pressure inside the container. Use only containers, pipes and valves suitable for storing liquid helium (low temperatures!). Protect tanks, installations against mechanical damage and heating (heat sources, sunlight), store containers in an upright position. Pressure tanks must meet the requirements of technical inspection and must be periodically verified.

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SECTION 7: Handling and storage

Store in cool, well-ventilated, closed and marked places (see section 15), protect against access by unauthorized persons. Do not store together with combustible substances. Do not store in corrosive conditions. Provide access to fire-fighting and rescue equipment.

7.3. Specific end use(s): No information on uses other than those mentioned in subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

The product does not contain substances with specific values of the highest permissible concentrations at the workplace at the UE level.

Legal Basis: Commission Directive 2006/15/EC, 2000/39/EC, 2009/161/EC, 2017/164/EU, 2019/1831/EU.

8.2. Exposure controls

Appropriate engineering controls

Use adequate ventilation, in case of insufficient ventilation respiratory protection measures with an independent air source. Periodically check the tightness of the containers and the technical condition of the facilities, ventilation systems, and protection against the release of the substance into the environment. Monitor the oxygen content, especially in the case of work in closed rooms.

Personal protection

Observe the general precautionary measures (see section 7).

Avoid direct contact of uninsulated containers, lines and liquids with skin and eyes. Do not inhale the gas.

The necessity to select and use relevant personal protection appliances should take into consideration the type of risk posed by the product, workplace conditions, and the nature of interaction with the product. The personal protective appliances must comply with requirements stipulated by the Regulation (EU) 2016/425 and by the relevant standards.

The employer must provide all the necessary protective appliances relevant for the particular jobs on site and meeting all quality requirements, their maintenance and cleaning included. Any contaminated or damaged personal protection appliance must be replaced immediately. Industrial and professional body hygiene.

Eye / face protection: protective goggles in a sealed casing or face shields in accordance with the relevant standard for gloves.

Hand and body protection: Protective gloves against extremely low temperatures. Protective clothing and safety boots against extremely low temperatures.

The glove material has to be impermeable and resistant to the product. The choice of the material for protective gloves should be made taking into account the breakthrough times, the rate of penetration and degradation. Moreover, the selection of the appropriate gloves does not only depend on the material, but also on other quality characteristics and varies from manufacturer to manufacturer. The exact break through time should be obtained from the glove manufacturer and must be observed.

Respiratory tract protection: liquid helium has a very low temperature, can cause frostbite and irreversible damage to the skin and eyes, the evaporating gas also has a very low temperature and causes a significant reduction in the ambient temperature.

Thermal hazards: helium has a very low temperature, can cause frostbite and irreversible damage to the skin and eyes, the evaporating gas also has a very low temperature and causes a significant reduction in the ambient temperature.

Environmental exposure controls

Periodically check the tightness of installations and tanks as well as the technical condition of protection against release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	gas liquefied
Colour:	colorless
Odour	odorless
Melting point/freezing point:	-272.2 ° C (under pressure 2.6 x 104 hPa)
Boiling point or initial boiling point and boiling range :	-268.9°C
Flammability:	non flammable
Lower and upper explosion limit:	not applicable
Flash point:	not applicable
Auto-ignition temperature:	not applicable
Decomposition temperature:	not applicable
pH:	not determined

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SECTION 9: Physical and chemical properties

Kinematic viscosity:	not determined
Solubility:	very slightly soluble in water, about 1.5 mg / l (20 ° C)
Partition coefficient n-octanol/water (log value):	0.28
Vapour pressure:	not applicable
Density and/or relative density:	gas lighter than air - 0.1785 x 10 ⁻³ g / cm ³ (0 ° C, 1013 hPa)
Relative vapour density:	0.125 g / cm ³ (liquid at boiling point)
Particle characteristics:	not applicable

9.2. Other information

Critical temperature: -267.9°C

SECTION 10: Stability and reactivity

10.1. Reactivity: The product is considered non-reactive. Not prone to hazardous polymerization.

10.2. Chemical stability : substance is stable under normal conditions of use and storage.

10.3. Possibility of hazardous reactions: no information regarding hazardous reactions.

10.4. Conditions to avoid : high temperature (absolutely avoid temperatures above 50 ° C), heating containers with liquefied gas (possibility of explosion and bursting of the container); unsealing of containers.

10.5. Incompatible materials: no information on incompatible materials.

10.6. Hazardous decomposition products : no information on hazardous decomposition products.

SECTION 11: Toxicological information

11.1. Information on the hazard classes defined in Regulation (EC) No 1272/2008

Acute toxicity

Helium is a physically suffocating gas - it is not toxic, but it has a suffocating effect by displacing oxygen from the surrounding air. In case of inhalation exposure, shortness of breath, breathing difficulties, headaches and dizziness, fainting may occur, at high gas concentrations (when the oxygen concentration drops to 18% and below), orientation disorders (preventing the victim, e.g. from properly assessing the risk and finding the exit from the room) , nausea, vomiting, unconsciousness, death. The evaporating helium vapors have a very low temperature, they can cause cryogenic damage to the skin, eyes, mucous membranes, respiratory system, general hypothermia.

Skin corrosion/irritation

Helium is not irritating, but the liquid and the vapors generated from it, due to the very low temperature, may cause frostbite of the skin.

Serious eye damage/irritation

Helium is not irritating, but the liquid and the vapors generated from it, due to the very low temperature, may cause cryogenic damage to the eyes.

Respiratory or skin sensitisation

The classification criteria in accordance with CLP are not met.

Germ cell mutagenicity

The classification criteria in accordance with CLP are not met.

Carcinogenicity

The classification criteria in accordance with CLP are not met.

Reproductive toxicity

The classification criteria in accordance with CLP are not met.

STOT-single exposure

The classification criteria in accordance with CLP are not met.

STOT-repeated exposure

The classification criteria in accordance with CLP are not met.

Aspiration hazard

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SECTION 11: Toxicological information

The classification criteria in accordance with CLP are not met.

Symptoms related to the physical, chemical and toxicological characteristics

The gas is suffocating, inhalation may cause a feeling of breathlessness, breathing difficulties, and pain and dizziness, high gas concentrations confusion, nausea, fainting, unconsciousness, death. Chilled liquid or low temperature gas may cause frostbite to skin and mucous membranes, thermal damage to eyes. Staying in a low temperature causes the body to cool down. Symptoms of hypothermia (excessive hypothermia): apathy, tremors, speech disorders, incoordination, memory loss, increase in heart rate.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

No data.

11.2. Information on other hazards

Endocrine disrupting properties

The substance is not deemed as substance with endocrine-disrupting properties

Other information

Not applicable.

SECTION 12: Ecological information

Helium is an inert gas contained in trace amounts in the atmospheric air.

It is not harmful in the aquatic environment, and in the soil its unfavorable effect comes down to displacing oxygen.

12.1. Toxicity: The product is not classified as hazardous to the environment.

12.2. Persistence and degradability: the substance is durable, it does not decompose, it is inactive in the environment, does not undergo chemical reactions.

12.3. Bioaccumulative potential: it does not accumulate in organisms and in the food chain (log Pow 0.28).

12.4. Mobility in soil: highly volatile substance - in case of release to the environment, it quickly spreads in the atmospheric air, from soil and water it easily enters the air.

12.5. Results of PBT and vPvB assessment: the substance does not meet the PBT or vPvB criteria in accordance with Annex XIII of the REACH Regulation.

12.6. Endocrine disrupting properties: the substance is not deemed as substance with endocrine-disrupting properties.

12.7. Other adverse effects: the substance is not classified as hazardous to the ozone layer. It may be harmful to the environment due to very low temperature (freezing the immediate vicinity of the leak).

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Disposal methods for the product:

Dispose of in accordance with applicable regulations. The substance disperses in the atmosphere, no waste is generated when handling helium.

Disposal methods for used packing:

Recovery, recycling or liquidation of packaging waste generated in the field of professional activity should be carried out in accordance with applicable regulations. Disposal of transport containers or other contaminated tanks and devices should be carried out by authorized persons, in a manner that does not pose any threat to the environment.

Legal basis: Directive 2008/98/EC, 94/62/EC.

The waste code should be assigned at the place of its production.

Suggested waste code:

16 05 05 gases in pressure containers other than those mentioned in 16 05 04 (group 16, subgroup 16 05 - gases in pressure containers and discarded chemicals).

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SECTION 14: Transport information

14.1. Numer UN lub numer identyfikacyjny ID: UN 1963**14.2. UN proper shipping name:** HELIUM, REFRIGERATED LIQUID**14.3. Transport hazard class(es):** 2 (classification code 3A, label 2.2, hazard no. 22)**14.4. Packing group:** not applicable**14.5. Environmental hazards:** The goods do not pose a threat to the environment in accordance with the transport regulations.**14.6. Special precautions for user:**

Liquefied helium is transported in cryogenic containers made of a suitable material, containers must be upright, secured, ventilation should be provided during transport, containers must not be exposed to high temperatures.

14.7. Sea transport in bulk in accordance with IMO instruments: not applicable

SECTION 15: Regulatory information

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

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC as amended.

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 as amended.

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives as amended.

European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste as amended.

Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

Commission Directive 2006/15/EC of 7 February 2006 establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39/EC.

Commission Directive 2009/161/EU of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC.

Commission Directive 2017/164/EU of 31 January 2017 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU.

Regulation (EU) No 2016/425 of the European Parliament and of the Council of 9 March 2016 on personal protective equipment and repealing Council Directive 89/686/EEC.

Commission Directive 2019/1831/EU of 24 October 2019 establishing a fifth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC and amending Commission Directive 2000/39/EC.

Commission Regulation (EU) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

The product components are not on the REACH candidate list.

15.2. Chemical safety assessment

No chemical safety assessment - substance exempt from registration.

SECTION 16: Other information

Full text of H-phrases from section 2 of this sheet

H281 Contains refrigerated gas; may cause cryogenic burns or injury.

Clarification of abbreviations and acronyms

NDS the highest acceptable concentration

NDSch maximum permissible instantaneous concentration

DSB permissible concentration in biological material

Log Pow log of the octanol-water partition coefficient

Press. Gas Pressurised gas

Ref. Liq. Gas Refrigerated liquefied gas

SECTION 16: Other information**Necessary training**

Before starting work with the product, the user should learn the health and safety rules and regulations regarding handling with chemicals, and in particular, undergo appropriate on-the-job training.

Persons involved in the transport of hazardous materials, in accordance with the ADR agreement, should be properly trained in the scope of performed duties (general, workplace and safety training).

References to key literature and data sources

The data sheet was developed on the basis of the MSDS for individual ingredients, literature data, internet databases (e.g. ECHA, TOXNET, COSING) as well as the possessed knowledge and experience, taking into account the currently applicable legal regulations.

Additional information

The card was updated by the company: Polski Koncern Naftowy ORLEN Spółka Akcyjna – Oddział Laboratorium Pomiarowo-Badawcze PGNiG w Warszawie

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Modifications:

Section 1: Contact details in subsection 1.3 were updated due to the inclusion of PGNiG S.A. to the structures of PKN ORLEN S.A.

The above information is based on the currently available data characterizing the product as well as the experience and knowledge of the manufacturer in this field. They do not constitute a quality description of the product or a promise of specific properties. They should be treated as an aid for safe handling in transport, storage and use of the product. This does not absolve the user from responsibility for the improper use of the above information and from compliance with all legal standards in this area.