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

1.1. Product identifier

Name:	**Liquefied Natural Gas (LNG)**
CAS number:	95046-41-6
WE number:	305-828-9

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

Use	Following the regasification used as gaseous fuel (distributed through gas networks to consumers, used in gas fired power plants, as an alternative motor fuel) or as a chemical feedstock. Liquefied natural gas occupies approximately 600 times smaller volume than gas after regasification and thus it is easier to transport and store. It can be transported by sea over large distances.
Scope of use:	Product available for industrial use only

1.3. Details of the supplier of the safety data sheet

Name	ORLEN Spółka Akcyjna – Oddział Centralny Polskie Górnictwo Naftowe i Gazownictwo w Warszawie
Address	01-224 Warszawa, ul. Kasprzaka 25
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

Flam. Gas 1 H220, Press. Gas: Ref. Liq. Gas H281

Extremely flammable gas. Contains refrigerated gas; may cause cryogenic burns or injury.

2.2. Label elements

Hazard pictogram and signal word

DANGER

Hazard statements

H220 Extremely flammable gas.
H281 Contains refrigerated gas; may cause cryogenic burns or injury.

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
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 no rub affected area.
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.

2.3. Other hazards

The substance does not meet the PBT or vPvB criteria according to Annex XIII of the REACH Regulation.
The substance is not assessed as having endocrine disrupting properties.
Natural gas forms explosive and flammable mixtures with air (for approximate gas explosion limits see Section 9), is lighter than air, it concentrates in the upper part of confined spaces.
A rapid decompression of liquefied gas leads to a major temperature decrease and may cause thermal damage to skin and eyes.

SECTION 2: Hazards identification

The gas has a suffocating effect on humans by displacing atmospheric oxygen from the air. Insufficient concentration of the oxygen in the air may cause unconsciousness and death (see Section 11).
Permeating through the soil, natural gas displaces oxygen and thus damages the plant cover.
It is an aggressive greenhouse gas.

SECTION 3: Composition/information on ingredients

3.1. Components

Name:	Liquefied Natural Gas (LNG)
CAS number:	95046-41-6
WE number:	305-828-9
Index number:	-
Registration number:	not subject to registration

Liquefied natural gas is a multi-component substance with varying composition, mainly composed of methane, and generally also containing ethane, propane and some higher hydrocarbons in much lower concentrations, as well as some non-flammable gases such as nitrogen, carbon dioxide and, potentially, helium.

3.2. Mixtures

Not aplplicable – the product is a substance.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation

Move the victim away from source exposure into fresh air. If breathing is difficult, administer artificial respiration and call a doctor. In case of other symptoms (e.g. headache or dizziness) call a doctor. In both cases, oxygen should be administered to the victim by a trained person. Ensure that the victim is kept warm and rests.

Skin contact

Gently remove clothing (do not tear it off by force), softly wipe the affected skin area with lukewarm water, do not use excessively warm water (temperature above 44°C) nor rub the cooled skin. In case of frostbite symptoms (changed skin colour, blisters), apply a sterile dressing and contact a doctor.

Eye contact

In case of an eye damage, apply a sterile dressing and immediately contact an ophthalmologist – ensure specialist medical care for the victim.

Ingestion

Not applicable.

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

The gas is suffocating, inhalation may cause somnolence, breathlessness, accelerated breathing, breathing difficulties, headaches and dizziness, and in case of high gas concentrations – loss of coordination, vomiting, loss of consciousness or death. Cooled liquid or low-temperature gas may cause frostbites on the skin or mucosae, thermal damage of eyes, and exposure to low temperatures causes hypothermia. The symptoms of hypothermia (dangerous drop in body temperature) include: apathy, shivering, mumbled speech, loss of coordination, memory loss, accelerated heart rate.

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

WARNING! An unconscious patient should be put in the recovery position, a calm shelter should be provided to the poisoned person and they should be protected from heat loss, with their breath and pulse controlled. Never provoke vomiting nor administer anything orally to an unconscious or dazed person.

In case of any serious symptoms immediately call a doctor or take the victim to a hospital.

Persons providing first aid must be equipped with personal protection equipment (depending on the hazard level).

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: dry chemicals, foam, water – spray (only as a means of protection of gas tanks against the heat flow).

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

Immediately after the evaporation the vapours have a very low temperature and higher density than air, they accumulate close to the ground, form a mist and sudden cooling (freezing) of the surroundings.

The gas forms explosive mixtures with air. It is lighter than air and concentrates in the upper part of confined spaces. The ignition or explosion may be caused by sparks or static electricity. Containers and installations exposed to fire or high temperature may explode. It burns with a pale flame, emitting carbon dioxide.

5.3. Advice for firefighters

Shut off gas inflow. Liquefied natural gas spills may be covered with a layer of light foam in order to mitigate excessive vaporisation of the cryogenic liquid and thus minimize the risk of explosion or fire. Gas containers should be removed from the area exposed to a fire hazard, if this is possible without risk to the rescuers' life or health. Containers which were already exposed to fire or high temperature may explode – they should be cooled down with a water spray. Avoid directing water on the fittings. In case of a leaking gas fire, do not extinguish unless the leak can be safely stopped. Control the combustion process to prevent an explosion and excessive influence of the heat flow on the adjacent infrastructure.

Special protective equipment for firefighting personel:

Antistatic gas-tight clothing, goggles, protective gloves and antistatic boots, self-contained breathing apparatus with independent air source.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

Remove all ignition sources, extinguish the fire, switch off any equipment which may cause sparking, do not smoke. The gas forms flammable and explosive mixtures with air. It is lighter than air and concentrates in the upper part of confined spaces. An ignition or explosion may be caused by e.g. sparks. An LNG spill and its immediate surroundings constitute explosion hazard zone 0, control the speed of vapour release (slow down it by the means of high expansion foam or blanketing).

In the initial emission phase, liquefied natural gas will cause freezing of the surroundings, sudden and intensive vaporisation, and then will continue to evaporate at a slower rate. At the time of evaporation, it has a very low temperature and, depending on the released quantity, it may cause a significant ambient temperature drop.

Outsiders and unauthorised persons as well as animals should be removed from the spill site and put in a safe, well-ventilated place. The site should be marked with warning boards. Individuals assigned to the failure removal operations should be trained and provided with personal protection equipment. Adequate ventilation should be ensured. Avoid breathing in the gas or thermal decomposition products. Avoid direct contact with the released product. Due to its extremely low temperature, liquefied gas may cause crushing of some construction materials.

6.2. Environmental precautions

In case of release of large quantities of the product or environmental contamination, the competent authorities and chemical rescue services should be notified.

6.3. Methods and material for containment and cleaning up

If possible, the leak should be eliminated (gas inflow shut off). Ensure sufficient ventilation of the spillage area.

6.4. Reference to other sections

Personal protection measures – see Section 8.

Wastes should be removed according to the recommendations set out in Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

General occupational health and safety principles should be applied when working with the product, specifically those concerning particularly hazardous works and fire protection regulations concerning the performance of hazardous works involving a fire risk (see Section 15). Observe the precautions applicable to works involving substances in extremely low temperatures.

Prior to undertaking the work, employees should be introduced to specific safety precautions and hazardous properties of the substances, including the rules of conduct in case of fire and provision of the first aid.

Avoid a direct skin contact with uninsulated elements of tanks and their fittings. Caution should be taken during all manipulations (pressure reduction, disconnection of manifolds), control the valves and manifolds used for tank filling, emptying. Use the recommended personal

SECTION 7: Handling and storage

protection measures. Avoid liquid, gas releases to the environment.

Immediately after the evaporation the vapours have a very low temperature and higher density than air, they accumulate close to the ground, form a mist and sudden cooling (freezing) of the surroundings. Avoid direct contact with decompressing gas.

Gas may form explosive and flammable mixtures with air. As the vapours warm up to the temperature above -112 °C, they become lighter than the air and concentrate in the upper part of contained spaces. Effective ventilation should be ensured. Concentrations of hazardous components in the air should be kept below the permissible exposure levels and explosion limits. Do not any sparking equipment or tools. Provide protection against electrostatic discharge (grounding, bonding). Do not use open flame and do not smoke. Ventilation and electric installations must conform to the conditions predefined taking into account the risk of fire and explosion. Do not inhale the product. Use working cloths and the recommended personal protection measures in an antistatic version.

7.2. Conditions for safe storage, including any incompatibilities:

Store in cool, fireproof place, provided with mechanical ventilation along the floor and the ceiling, with explosion-proof electric and ventilation installation, prevent the accumulation of static electric charges. Do not store close to the sources of ignition, flammable materials, oxidants. Absolute smoking prohibition. Ensure access to extinguishing and rescue equipment.

Use specially designed containers (cryogenic containers fitted with release valves). During the inspection or cleaning of the containers, monitor the atmosphere for the presence of oxygen and other flammable gases. Do not decompress the containers by releasing their contents to the atmosphere in contained spaces. Store in locked places, protect against unauthorised access. The storerooms should be provided with a built-in gas detection system activating an emergency ventilation system in case of the release of gas to the atmosphere. Do not store together with food, beverages and fodder.

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 substance is a complex mixture of hydrocarbons. The values of permissible concentrations in the work environment of the following mixtures of hydrocarbons have been established:

Specification	TWA 8 hour	STEL 15 min
pentane [CAS 109-66-0]	3000 mg/m^3	-

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

The table above shows the maximum workplace concentration values at the Community level.

Please check any national occupational exposure limit values in your country.

8.2. Exposure controls

recommended monitoring procedures

Procedures for monitoring the concentration of a hazardous component in the air and procedures for monitoring air purity in the workplace should be applied - if available and justified at a given position - in accordance with the relevant Polish or European Standards, taking into account the conditions prevailing at the exposure site and the appropriate measurement methodology adapted to the conditions work. The procedure, type and frequency of tests and measurements should meet the requirements of the Regulation of the Minister of Health of February 2, 2011 (Journal of Laws 2011, No. 33, item 166, as amended).

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 rules of precaution when working with chemicals. Do not eat, drink or smoke while using the product. Keep the product away from food, drink and fodder. Do not inhale gas or combustion products. Avoid contact of the product with skin and eyes. Observe the frequency of periodic tests.

Eye / face protection: For operations which may result in contact, wear glasses or face visors in accordance with with the relevant standard.

Hand and body protection: antistatic protective gloves for work with cryogenic liquids in accordance with the relevant standard for gloves. Protective clothing and safety shoes protecting against extremely low temperatures in antistatic version.

Respiratory tract protection: in case of prolonged exposure, in case of insufficient ventilation or in case of emergency use breathing apparatus isolating the respiratory tract with an independent source of air**.**

Thermal hazards: Liquefied natural gas 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**.**

SECTION 8: Exposure controls/personal protection

Environmental exposure controls

Emissions from ventilation and process equipment should be checked to determine their compliance with the requirements of environmental law. Periodically check the tightness of natural gas 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:	187°C do -182°C
Boiling point or initial boiling point and boiling range :	-162 °C for methane
Flammability:	extremely flammable
Lower and upper explosion limit:	4.3 Vol% lower limit, 16.2 Vol% upper limit
Flash point:	-58 °C for methane
Auto-ignition temperature:	560°C
Decomposition temperature:	not determined
pH:	not determined
Kinematic viscosity:	not determined
Solubility:	practically insoluble in water. Soluble in organic solvents (e.g. benzene, carbon tetrachloride, chloroform)
Partition coefficient n-octanol/water (log value):	1,09 for methane
Vapour pressure:	not determined
Density and/or relative density:	0,727÷1,082 kg/m3 (normal conditions)
Relative vapour density:	1,5 in -162°C 1,0 in -112°C 0,55 in 21°C
Particle characteristics:	not applicable

9.2. Other informatiom

minimum ignition energy:	E_{min} = 0,25 mJ for methane

SECTION 10: Stability and reactivity

10.1. Reaktivity: The substance reacts with strong oxidants. It does not undergo hazardous polymerization.

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

10.3. Possibility of hazardous reactions: exposure of containers with the substance to high temperatures (possibility of explosion); container leakage – gas release (flammable and explosive mixtures may form).

10.4. Conditions to avoid : sources of ignition (open flame, installations and equipment which may cause sparks, static electricity); heating, high temperatures; concentration of vapours and gas in a confined space.

10.5. Incompatible materials: powerful oxidants, e.g. chloranes (V) and (VII) and halogens .

10.6. Hazardous decomposition products : none (organic substance – in case of a fire, carbon monoxide is produced, among other things).

SECTION 11: Toxicological information

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

Acute toxicity

Natural gas has a suffocating effect (by displacing atmospheric oxygen from the air), inhalation exposure may cause somnolence, breathlessness, accelerated breathing, breathing difficulties, headaches and dizziness, accelerated heartbeat, and in case of high gas concentrations (when oxygen concentration level falls to 18% and below) loss of coordination, nausea, vomiting, loss of consciousness, death. Evaporating gas vapours have an extremely low temperature, may cause cryogenic damage to the skin, eyes, mucosae, respiratory system, general hypothermia.

The classification criteria in accordance with CLP are not met.

Skin corrosion/irritation

Caustic effect of the gas on the skin has not been observed but, do to an extremely low temperature, the liquid and the vapours may cause frostbite.

Serious eye damage/irritation

No irritating effect of the gas on the eyes has not been observed but, do to an extremely low temperature, the liquid and the vapours may cause cryogenic damage to the eyes.

Respiratory or skin sensitisation

Not classified as sensitizer. In some cases exposure may cause increased allergic reactions to other chemicals as well as asthmatic troubles.

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

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 somnolence, breathlessness, accelerated breathing, breathing difficulties, headaches and dizziness, and in case of high gas concentrations – loss of coordination, vomiting, loss of consciousness or death. Cooled liquid or low-temperature gas may cause frostbites on the skin or mucosae, thermal damage of eyes, and exposure to low temperatures causes hypothermia. The symptoms of hypothermia (dangerous drop in body temperature) include: apathy, shivering, mumbled speech, loss of coordination, memory loss, accelerated 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 assessed as having endocrine disrupting properties.

Other information

Not applicable.

SECTION 12: Ecological information

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

SECTION 12: Ecological information

12.2. Persistence and degradability: methane is considered a to be an environmentally persistent substance, in the air it is prone to photochemical decomposition (half-life period approx. 6 years), in soil it is decomposed with the aid of soil bacteria.

12.3. Bioaccumulative potential: methane is not accumulated in living organisms nor the thropic chain

12.4. Mobility in soil: volatile substance – when released to the atmosphere, natural gas quickly evaporates, propagates in the air, and easily permeates to the air from soil or water.

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 assessed as having endocrine-disrupting properties.

12.7. Other adverse effects: spills of liquid gas may cause a drastic decline of the temperature and freezing of the environment.

Natural gas (and specifically its main component - methane) is one of the greenhouse gasses (e.g. as a result of the evaporation from leaking installations).

Permeating through the soil, natural gas displaces oxygen and thus damages the plant cover.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Substance recommendations

The use of natural gas as fuel does not generate waste. The spills dissipate into the atmosphere. Liquid gas tanks are waste.

Disposal of collected waste should be carried out in accordance with applicable regulations (see section 15). Disposal of this product or related products should always comply with environmental protection requirements and legislation related to waste disposal as well as with the requirements of local authorities.

16 05 04 * gases in pressure containers (including halons) containing dangerous substances (group 16, subgroup 16 05 – gases in pressure containers and discarded chemicals)

* the waste is on the list of hazardous waste

Recommendations for used packaging

Recovery, recycling or liquidation of packaging waste generated in the area 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.

EU legal acts: directives of the European Parliament and of the Council: 2008/98 / EC as amended amended, 94/62 / EC, as amended d.

SECTION 14: Transport information

14.1. Numer UN lub numer indentyfikacyjny ID: UN 1972

14.2. UN proper shipping name: NATURAL GAS, REFRIGERATED LIQUID with high methane content

14.3. Transport hazard class(es): 2 (classification code 3F, label 2.1, hazard no. 223)

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:
do not smoke, do not use open fire or any sparking objects due to fire hazard and the possibility of explosion; transport in tight, sealed containers suitable for cryogenic gases or in trucks conforming to ADR requirements; do not ship with other substances

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

According to the REACH regulation, there is no obligation to perform a chemical safety assessment for the mixture.

SECTION 16: Other information

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

H220	Extremely flammable gas.
H281	Contains refrigerated gas; may cause cryogenic burns or injury.

Clarification of abbreviations and acronyms

Log Pow	log of the octanol-water partition coefficient
Flam. Gas 1	Flammable gas (hazard category 1)
Press. Gas	Pressurised gas
Ref. Liq. Gas	Refrigerated liquefied gas

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:	ORLEN Spółka Akcyjna – Oddział Laboratorium Pomiarowo-Badawcze PGNiG w Warszawie
Date of update:	03/07/2023
Version:	2.1/EN

Modifications: Section 1: Contact details in subsection 1.3 are updated due to change of the name of 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.