

SAFETY DATA SHEET
according to Regulation (EC) No 1907/2006

LIQUEFIED NATURAL GAS (LNG)

Date of previous version: Not applicable

Date of revision: July 1, 2014 – Initial version

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND THE COMPANY/UNDERTAKING

1.1. PRODUCT IDENTIFIER

Product name: LIQUEFIED NATURAL GAS (LNG)

REACH Registration No.: This substance is exempt from registration according to Regulation (EC) No 1907/2006 (REACH).

Pure substance/mixture : Substance

1.2. RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

Identified uses: Fuel

1.3. DETAILS ON THE SUPPLIER OF THE SAFETY DATA SHEET

Supplier:

Address:

Tel.:

Fax:

For more information, please contact:

Information contact:

E-mail address:

1.4. EMERGENCY TELEPHONE NUMBER

In France: PARIS: Fernand Widal Hospital, 200 rue du Faubourg Saint-Denis, 75475 Paris cedex 10.
Tel.: (+33) (0)1 40 05 48 48.

MARSEILLE: Salvator Hospital, 249 bd Ste Marguerite, 13274 Marseille cedex 5.
Tel.: (+33) (0)4 91 75 25 25.

LYON: Edouard Herriot Hospital, 5 place d'Arsonval, 69437 Lyon cedex 3.
Tel.: (+33) (0)4 72 11 69 11.

NANCY: Central Hospital, 29 Av du Mal De Lattre de Tassigny, 54000 Nancy.
Tel.: (+33) (0)3 83 32 36 36.

Ambulance: Tel.: 15.

Emergency services: 112.

ORFILA (INRS) Tel.: (+33) (0)1 45 42 59 59.

2. HAZARDS IDENTIFICATION

2.1. CLASSIFICATION OF THE SUBSTANCE OR MIXTURE

CLASSIFICATION ACCORDING TO REGULATION (EC) No 1272/2008

For the full text of the H-statements mentioned in this section, see section 2.2.

Classification:

Flammable gases – Hazard category 1 - H220

Gases under pressure – Refrigerated liquefied gas - H281

CLASSIFICATION ACCORDING TO DIRECTIVE 67/548/EEC or 1999/45/EC

For the full text of the R-phrases mentioned in this section, see section 16.

Classification

F+; R12

2.2. LABEL ELEMENTS

Labelling according to REGULATION (EC) No 1272/2008

EC No. 232-343-9



Signal word

DANGER

Hazard statements

H224 – Extremely flammable liquid and vapour

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

Precautionary statements

P210 - Keep away from heat/sparks/open flames/hot surfaces — No smoking

P233 - Keep container tightly closed

P241 – Use explosion-proof electrical/ventilating/lighting equipment

P243 - Take precautionary measures against static discharge

P377 - Leaking gas fire: do not extinguish, unless leak can be stopped safely

P381 - Eliminate all ignition sources if safe to do so

P403 - Store in a well-ventilated place

2.3. OTHER HAZARDS

Physico-chemical properties

Extremely flammable.

May form explosive mixtures with air in confined or congested areas.

Accidentally exposing a receptacle containing this liquid to intense heat (e.g. in the event of a fire) may cause the receptacle to break and the product to spread – its vapours may then ignite, which could cause an explosion.

Vapour may be denser than air and may spread along the ground, before gradually dispersing.

Properties with effects on health

In gaseous state: May have an anaesthetic and/or asphyxiating effect as it may limit the atmosphere's oxygen content. Contact with the product may cause frostbite.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. SUBSTANCE

Chemical nature Natural gas, C1-C4 hydrocarbon gas

For the full text of the R-phrases mentioned in this section, see section 16.

Substance name	EC No.	REACH Registration No.	CAS No.	% (mass)	Classification (Dir. 67/548)	Classification (Reg. 1272/2008)
Natural gas	232-343-9	EXEMPT	8006-14-2	100	F+; R12	Flam. Gas (H220) Press. Gas
Methane	200-812-7	EXEMPT	74-82-8	>75	F+;R12	Flam. Gas 1 (H220) Press. Gas
Ethane	200-814-8	EXEMPT	74-84-0	<15	F+;R12	Flam. Gas 1 (H220) Press. Gas
Butane	203-448-7	EXEMPT	106-97-8	<5	F+;R12	Flam. Gas 1 (H220) Press. Gas
Propane	200-827-9	EXEMPT	74-98-6	<5	F+; R12	Flam. Gas 1 (H220) Press. Gas

For the full text of the H-statements mentioned in this section, see section 16.

4. FIRST AID MEASURES

4.1. DESCRIPTION OF FIRST AID MEASURES

General advice

IF SYMPTOMS ARE SERIOUS OR PERSIST, CALL A DOCTOR OR SEEK EMERGENCY MEDICAL TREATMENT.

Move the victim to fresh air as quickly as possible.

Interrupt the electricity supply if doing so will not generate sparks in the area where the product's vapour has spread.

Close the valves of the container or storage tank.

Ensure that there is adequate ventilation and check that the atmosphere is breathable and safe before entering confined spaces.

Eye contact

IN THE EVENT OF CONTACT WITH THE EYES: carefully rinse with water for at least 15 minutes.

Remove contact lenses if present and easy to do so. Continue rinsing.

Seek medical attention. If the eyes have been burned by the cold, an ophthalmological examination should be performed as quickly as possible.

Skin contact

Treat the affected areas as for thermal burns.

Immediately rinse with plenty of water for at least 15 minutes. Immediately remove any soiled or spattered clothing if it is not adhered to the skin.

Do not attempt to heat the area directly (e.g. by rubbing, with a hot bath).

Seek medical attention for serious burns – in such cases, the victim must be taken to hospital right away.

Inhalation

In the event of exposure to high concentrations of vapour, smoke or aerosols, move the victim to fresh air, outside the contaminated area, and ensure that they rest and are kept warm.

If symptoms persist, seek medical attention. Artificial respiration and/or oxygen may be required.

Ingestion

Ingestion is not anticipated.

4.2. MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Eye contact	Direct contact with this liquefied gas may burn the eyes.
Skin contact	Contact with the product may cause frostbite.
Inhalation	Inhaling the vapour may cause drowsiness and dizziness. The symptoms of excessive exposure are lightheadedness, headaches, fatigue and nausea, and may go as far as loss of consciousness or even respiratory arrest.
Ingestion	Ingestion is not anticipated.

4.3. INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

Advice for doctors Treat according to the symptoms.

5. FIREFIGHTING MEASURES**5.1. EXTINGUISHING MEDIA**

Suitable extinguishing media	Use a powder extinguisher for small fires, or a medium- or high-expansion foam generator (lower water content).
Unsuitable extinguishing media	Do not use water as an extinguishing medium because it could spread the fire and increase the LNG's evaporation rate. Water should only be used as a means of protection against the heat flow.

5.2. SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Special risk	It is dangerous to extinguish the flame if it will not be possible to stop the leak quickly. The fire should only be extinguished once the valve has been closed, or if extinguishing the fire would make it possible to close the valve. Accidentally exposing a receptacle containing this liquid to intense heat (e.g. in the event of a fire) may cause the receptacle to break and the product to spread – its vapours may then ignite, which could cause an explosion. Incomplete combustion and thermal decomposition release gases with varying toxicity levels, such as CO, CO ₂ , different hydrocarbons, aldehydes, and soot. When these substances are present in high concentrations or in a confined space, it is very dangerous to inhale them.
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5.3. ADVICE FOR FIREFIGHTERS

Special protective equipment for firefighting personnel	Protect personnel with water curtains. If the fire is large, or is in a confined or poorly-ventilated space, wear a fire proximity suit and a self-contained breathing apparatus (SCBA) with a full-face mask.
Other information	Cool the tanks and all parts that are exposed to the fire by spraying them with plenty of water. Remove combustible materials and, if possible, exposed tanks.

6. ACCIDENTAL RELEASE MEASURES**6.1. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES**

General information	Evacuate personnel to a safe place and set up a safety perimeter. Alert the emergency services. SHUT OFF THE LNG SUPPLY if it is possible to do so. Remove all ignition sources
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(no smoking, torches, sparks or flames in the immediate area). Suspend all work with open flames, stop all vehicle movement and turn off all devices that may give off sparks or flames. Interrupt the electricity supply if doing so will not generate sparks in the area where the product's vapour has spread.

VENTILATE THE AREA THOROUGHLY. Remove combustible materials and, if possible, exposed tanks.

In the event of a two-phase leak, avoid skin contact with the liquid.

Do not stop or wait inside the gas cloud – instead, always stay behind the source. The vapour cloud may look like a whitish fog that could disappear depending on the air humidity level.

Do not restore the normal situation until it is absolutely certain that it is safe to do so.

Advice for non-emergency personnel Immediately evacuate personnel to a safe place. Remove all ignition sources (no smoking, torches, sparks or flames in the immediate area). For personal protective equipment, see section 8.

Advice for emergency responders Take all the necessary measures to protect emergency responders from the risks of fire, explosion and inhalation: one important precaution is to use breathing apparatus.

Use personal protective equipment: a protective helmet with a visor and neck protection (so that the head is fully protected), tightly-fitting boots and gloves, and overalls (with the legs of the trousers outside the boots). These must be made of non-melting, fire-resistant materials.

Remove all ignition sources.

6.2. ENVIRONMENTAL PRECAUTIONS

General information Raise the alarm if the product is released towards a combined space (e.g. sewers).

6.3. METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Methods for cleaning up If there is a leak that has not caught fire, stop it by closing the valve as soon as possible. Ensure that there is adequate ventilation.

6.4. REFERENCE TO OTHER SECTIONS

Personal protective equipment See section 8 for more details.

Other information See section 13 for more details.

7. HANDLING AND STORAGE

7.1. PRECAUTIONS FOR SAFE HANDLING

Recommendations for safe handling This gas is produced, stored, transported and distributed UNDER PRESSURE, IN LIQUID STATE. It is not handled directly in normal distribution conditions, because when it is used, it is constantly contained inside closed systems until its final destruction by combustion. THE PRIMARY PRECAUTIONS TO TAKE CONSIST IN ENSURING THAT THE GAS REMAINS CONTAINED AND IN ONLY USING EQUIPMENT THAT IS APPROPRIATE FOR THE PRODUCT, ITS PRESSURE AND ITS TEMPERATURE.

Ensure that there is adequate ventilation. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Take precautionary measures against static discharge.

NEVER PERFORM WELDING ACTIVITIES ON A RECEPTACLE CONTAINING LNG. NEVER PERFORM WORK THAT COULD COMPROMISE THE CONTAINMENT OF FIXED STORAGE FACILITIES OR RECEPTACLES.

Storage tanks must be inspected, cleaned and maintained in accordance with strict procedures. These tasks may only be performed by qualified personnel (whether internal or external), particularly the atmosphere check (explosiveness, breathable atmosphere). For personal protective equipment, see section 8.

Technical measures Ensure that there is adequate ventilation.
Design facilities in such a way as to prevent spills from spreading (tanks, retention basins and siphons in runoff water systems must be designed with this in mind)).
Take precautionary measures against static discharge. Before transfers, check that all equipment is earthed.

Fire and explosion prevention No smoking.
Transfers and vehicle loading and unloading may only be performed by specially-trained personnel following appropriate procedures.
Design facilities in such a way as to prevent gas build-up. Never heat tanks or pipes containing gas with an open flame.

Hygiene measures Do not smoke while handling this product.
The product should be handled in line with good industrial hygiene practices and according to the safety instructions.

7.2. CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Technical measures/ Storage conditions STORE THIS LIQUEFIED GAS IN LINE WITH THE APPROPRIATE REGULATIONS, BASED ON THE TYPE OF STORAGE AND THE QUANTITIES BEING STORED. All electrical equipment, including the lighting systems in rooms where the product may be kept, must be adjusted to take account of the hazard, in accordance with the European ATEX Directives.

If possible, store outdoors or in a well-ventilated place. Keep away from heat and ignition sources. Prevent the accumulation of static charge.

Do not store near combustible and combusting materials.

Materials to avoid Strong oxidants, halogens.

Packaging materials Only use cylinders and tanks that comply with regulations on pressurised or cryogenic equipment and that are intended for use with this liquefied gas.

7.3. SPECIFIC END USE(S)

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. CONTROL PARAMETERS

Exposure limits Components with occupational exposure limits
Gaseous aliphatic hydrocarbons: alkanes (C1-C4)
US (ACGIH2009): TLV-8h. Average TLV-TWA over 8 hours: 1,000 ppm

Legend See section 16

8.2. EXPOSURE CONTROLS

Occupational exposure controls

Technical measures If working in a confined space (e.g. a vessel or tank), ensure that there is no risk of ignition, then check whether the atmosphere is breathable. Wear the recommended protective equipment.
Do not enter empty storage tanks until the amount of available oxygen has been measured.

Personal protective equipment

General information All necessary collective protection measures must be set up and applied before personal protective equipment is used.

Respiratory protection Ensure that there is adequate ventilation.
In the event of an emergency (accidental exposure) or when performing short-term, exceptional work in atmospheres where the product is present, a respiratory protection apparatus with an air supply must be worn.

Eye protection If spattering or blowouts are possible, full head and face protection (protective visor or safety goggles) must be worn.

Skin and body protection Wear insulating gloves to protect against the cold (that meet the requirements of standard EN 511)/ eye/face protection.
If necessary, a face visor, clothes covering the entire body and anti-static safety shoes may be worn.

Hand protection Wear insulating gloves to protect against the cold, which meet the requirements of standard EN 511.

Environmental exposure controls

General information No information available.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquefied gas
Colour	Colourless
Physical state at 20°C	Gas
Odour	Odourless

<u>Property</u>	<u>Values</u>	<u>Notes</u>
pH	Not applicable	
Boiling point/interval	-166°C to -157°C	
	-267°F to -251°F	
Flash point	< -58°C < -72°F	
Evaporation rate	No information available	
Explosive limits in air		
upper	15%	
lower	5%	
Vapour pressure	No information available	
Vapour density	No information available	
Relative density	0.54 - 0.66	at 0° C (gas)
Density	420 to 470 kg/ m ³	at -162°C (liquid)
Solubility in water	0.024 - 0.061 g/l	at 20°C
Solubility in other solvents	No information available	
log POW	<= 2.8	
Auto-ignition temperature	410°C	
	770°F	
Viscosity, kinematic	No information available	
Explosive properties	May form explosive mixtures with air	
Oxidising properties	Not applicable	
Possibility of hazardous reactions	Rapid phase transition (RPT) upon contact with water; shock wave.	

9.2. OTHER INFORMATION

Freezing point -183 °C
-297 °F

10. STABILITY AND REACTIVITY

10.1. REACTIVITY

General information No information available

10.2. CHEMICAL STABILITY

Stability Stable under the recommended handling and storage conditions.

10.3. POSSIBILITY OF HAZARDOUS REACTIONS

Hazardous reactions If containment is compromised: risk of ignition in the presence of air and risk of rapid phase transition (shock wave) upon contact with water.

10.4. CONDITIONS TO AVOID

Conditions to avoid Keep away from open flames, hot surfaces and ignition sources.
Prevent the accumulation of static charge.

10.5. INCOMPATIBLE MATERIALS

Materials to avoid Strong oxidants, halogens.

10.6. HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous decomposition products None under normal usage conditions.

11. TOXICOLOGICAL INFORMATION

11.1. INFORMATION ON TOXICOLOGICAL EFFECTS

Acute toxicity Local effects Product information

Skin contact Contact with the product may cause frostbite.

Eye contact Direct contact may cause burns to the eyes.

Inhalation May cause asphyxia if present in high concentrations. Symptoms may include loss of consciousness or mobility. The victim may not be aware of what is happening.

Possible narcotic effects if present in low concentrations. Symptoms may include lightheadedness, headaches, nausea, loss or coordination or even loss of consciousness.

Ingestion Ingestion is not anticipated.

Acute toxicity – Information about components

Chemical name	LD50 oral	LD50 dermal	LC50 inhalation
Natural gas			LC50 (15 minutes) > 800,000 ppm (rat)

Sensitisation

Sensitisation There is no data to indicate that the substance could potentially cause respiratory tract or skin sensitisation.

Specific effects

Carcinogenicity Does not contain compounds listed as carcinogenic.

Mutagenicity Does not contain compounds listed as mutagenic.

Toxicity for reproduction Does not contain compounds listed as toxic for reproduction.

Repeated-dose toxicity**Effects on target organs (STOT)****Other information****12. ECOLOGICAL INFORMATION****12.1. TOXICITY**

No classified hazards.

Acute aquatic toxicity – Product information**Acute aquatic toxicity – Component information****Chronic aquatic toxicity – Product information****Chronic aquatic toxicity – Component information****Effects on terrestrial organisms****12.2. PERSISTENCE AND DEGRADABILITY****General information**

The product is biodegradable.

12.3. BIOACCUMULATIVE POTENTIAL

Product information The product's bioaccumulative potential in the environment is very low.

log POW <= 2.8

Component information

Chemical name	log POW
Natural gas - 8006-14-2	2.8

12.4. MOBILITY IN SOIL

General information Since it is highly volatile, this liquefied gas is unlikely to pollute soil or water.

Air If released into the atmosphere, the components disperse quickly and photodegrade.

12.5. RESULTS OF PBT AND vPvB ASSESSMENT

PBT and vPvB assessment The substance does not meet the PBT and vPvB classification criteria.

12.6. OTHER ADVERSE EFFECTS

General information No information available.

13. DISPOSAL CONSIDERATIONS

13.1. WASTE TREATMENT METHODS

Waste from residues/unused products If gas needs to be removed from containers or tanks, burning it off with appropriate equipment (e.g. a torch) is the safest, most environmentally-friendly way to do so. This must be done by specially-trained personnel, using suitable equipment and applying appropriate procedures.

Contaminated packaging Empty packaging may contain flammable or explosive vapours.

Waste code according to the EWC According to the European Waste Catalogue, the waste code does not apply to the product itself, but to its application. The waste code must therefore be attributed by the user, depending on how the product is used.

14. TRANSPORT INFORMATION

ADR/RID

UN/ID No	UN1972
Proper shipping name	Natural gas, refrigerated liquid
Transport hazard class	2
ADR/RID hazard labels	2.1
Classification code	3F
Tunnel restriction code	(B/D)
Hazard identification number	223
Description	UN1972, Natural gas, refrigerated liquid, 2.1, (B/D)

IMDG/IMO

UN/ID No	UN1972
Proper shipping name	Natural gas, refrigerated liquid
Transport hazard class	2
EMS No	F-D, S-U
Description	UN1972, Natural gas, refrigerated liquid, 2.2, (-58°C c.c.)
Excepted quantities	E0
Limited quantity	0

ICAO/IATA

Prohibited

ADN

UN/ID No	UN1972
Proper shipping name	Natural gas, refrigerated liquid
Transport hazard class	2
Code de classification	3F
Description	UN1972, Natural gas, refrigerated liquid, 2.1
Excepted quantities	E0
Limited quantity	0
Ventilation	VE01

15. REGULATORY INFORMATION

15.1. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

European Union

REACH

This substance is exempt from registration according to Regulation (EC) No 1907/2006 (REACH).

International inventories

EINECS/ELINCS	Compliant
TSCA	Compliant
DSL	Compliant
ENCS	-
IECSC	Compliant
KECL	Compliant
PICCS	-
AICS	Compliant
NZIoC	Compliant

Legend

EINECS/ELINCS	European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
TSCA	United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL	Canadian Domestic Substances List/Non-Domestic Substances List
ENCS	Japan Existing and New Chemical Substances
IECSC	China Inventory of Existing Chemical Substances
KECL	Korean Existing and Evaluated Chemical Substances
PICCS	Philippines Inventory of Chemicals and Chemical Substances
AICS	Australian Inventory of Chemical Substances
NZIoC	New Zealand Inventory of Chemicals

Additional information

15.2. CHEMICAL SAFETY ASSESSMENT

16. OTHER INFORMATION

Full text of R-phrases mentioned in sections 2 and 3

R12 – Extremely flammable

Full text of H-statements mentioned in sections 2 and 3

H220 – Extremely flammable gas

H224 – Extremely flammable liquid and vapour

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

Abbreviations and acronyms

GLP = Good Laboratory Practice

bw = body weight

bw/day = body weight/day

Legend for section 8

+ Sensitising product

** Hazard designation

M : Mutagenic

* Skin designation

C : Carcinogenic

R : Toxic for reproduction

Date of revision: July 1, 2014

Revision: Initial version

This safety data sheet meets the requirements set down in Regulation (EC) No 1907/2006

This sheet is a complement to the technical usage instructions, but does not replace them. The information contained herein is based on the author's knowledge of the product in question, on the indicated date. It has been provided in good faith. Users are advised that there may be risks connected with using the product in ways other than those intended. Under no circumstances does this sheet exempt users from knowing and applying all the legislation and regulations governing their activities. Users shall be solely responsible for taking the precautions required in view of their use of the product. The examples of legal provisions given here were provided with the sole aim of helping users to fulfil the requirements to which they are subject. The list should not be considered exhaustive. Users must check whether they are subject to other requirements, stemming from legal provisions other than those listed here.

End of Safety Data Sheet