



MATERIAL SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

SDS # : A02348

GAZ NATUREL LIQUEFIE (GNL)

Date of the previous version: not applicable

Revision Date: 2013-09-25

Version 1

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

1.1. Product identifier

Product name	GAZ NATUREL LIQUEFIE (GNL)
REACH Registration Name	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, fuels.
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1.3. Details of the supplier of the safety data sheet

Supplier	TOTAL MARKETING SERVICES 24, cours Michelet. 92800 PUTEAUX. FRANCE Tel: +33 (0)1 41 35 40 00 Fax: +33 (0)1 41 35 82 88
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For further information, please contact:

Contact Point	HSE
E-mail Address	rm.mkefr-fds@total.com

1.4. Emergency telephone number

+33 1 49 00 00 49 (24h/24, 7d/7)
 France - ORFILA (INRS) Tél : +33 (0)1 45 42 59 59
 In France : - PARIS : Hôpital Fernand Widal 200, rue du Faubourg Saint-Denis 75475 Paris Cédex 10 , Tel : 01.40.05.48.48. -
 MARSEILLE : Hopital Salvator, 249 bd Ste Marguerite 13274 Marseille cedex 5, Tel : 04.91.75.25.25. - LYON : Hopital Edouard
 Herriot, 5 place d'Arsonvol, 69437 Lyon cedex 3, Tel : 04.72.11.69.11. - NANCY : Hopital central, 29 Av du Mal De Lattre de
 Tassigny, 54000 Nancy, Tel : 03.83.32.36.36 ou le SAMU : Tel (15)

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

REGULATION (EC) No 1272/2008

For the full text of the H-Statements mentioned in this Section, see Section 2.2.

Classification

Flammable gases - Category 1 - H220



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Gases under pressure - Refrigerated liquefied gas - H281

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

Labelled according to REGULATION (EC) No 1272/2008

EC-No 232-343-9



Signal Word

DANGER

Hazard Statements

H220 - Extremely flammable gas

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

Precautionary Statements

P102 - Keep out of reach of children

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

Physical-Chemical Properties

Extremely flammable.

May form explosive mixtures with air.

Accidental intense heating (in case of fire for example) of a container filled with this gas can lead to bursting and spreading of the product whose vapours may ignite causing deflagration or explosion .



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Properties Affecting Health

In the gaseous phase: may have a slight anaesthetic effect and/or an asphyxiating effect as it reduces the oxygen content in the air. Contact with product may cause frostbite.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Chemical nature Natural gas, gaseous hydrocarbon C1-C4.

Chemical Name	EC-No	REACH registration No	CAS-No	Weight %	Classification (Dir. 67/548)	Classification (Reg. 1272/2008)
Natural gas	232-343-9	EXEMPT	8006-14-2	100	F+;R12	Flam. Gas 1 (H220) Press. Gas

Additional information

Note K: The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w 1,3- butadiene (Einecs No 203-450-8). If the substance is not classified as a carcinogen or mutagen, at least the precautionary statements (P102-)P210-P403 should apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI to Regulation (EC) No 1272/2008.

Chemical Name	EC-No	REACH registration No	CAS-No	Weight %	Classification (Dir. 67/548)	Classification (Reg. 1272/2008)
Methane	200-812-7	EXEMPT	74-82-8	>75	F+;R12	Flam. Gas 1 (H220)
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 R-phrases mentioned in this Section, see Section 16

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

IN CASE OF SERIOUS OR PERSISTENT CONDITIONS, CALL A DOCTOR OR EMERGENCY MEDICAL CARE.

Remove casualty to fresh air as quickly as possible.

Cut off the electric power supply if this operation causes no sparks in the area containing vapors from the product.

Turn off the valves of the container or storage.

Ensure adequate ventilation and check that a safe, breathable atmosphere is present before entry into confined spaces.

Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Consult a physician. Early ophthalmologic evaluation is recommended in case of cold burns to the eyes.



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Skin contact	Treat affected areas as thermal burns. Wash off immediately with plenty of water. Immediately remove all stained or splashed clothing that is not adhering to the skin. Do not attempt to warm up the affected parts directly (friction, warm bath...). Seek medical attention in all cases of serious burns. In this case, the casualty should be sent immediately to hospital.
Inhalation	In case of exposure to intense concentrations of vapours, fumes or spray, transport the person away from the contaminated zone, keep warm and allow to rest. If symptoms persist, call a physician. Artificial respiration and/or oxygen may be necessary.
Ingestion	Not an expected route of exposure.

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

Eye contact	Direct contact with liquefied gas can result in eye burns.
Skin contact	Contact with product may cause frostbite.
Inhalation	Vapors may cause drowsiness and dizziness. Symptoms of overexposure are dizziness, headache, tiredness, nausea, unconsciousness, cessation of breathing.
Ingestion	Not an expected route of exposure.

4.3. Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	Treat symptomatically.
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5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media	Dry powder. Carbon dioxide (CO ₂). Water spray.
Unsuitable Extinguishing Media	The use of foam is ineffective. Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Special Hazard	It is dangerous to extinguish a burning flame if it is impossible to stop the leak rapidly. Extinction of the flame should only be carried out by closing off the valve, in situations where this is possible. Accidental intense heating (in case of fire for example) of a container filled with this gas can lead to bursting and spreading of the product whose vapours may ignite causing deflagration or explosion . Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot. These may be highly dangerous if inhaled in confined spaces or at high concentration.
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5.3. Advice for fire-fighters

Special protective equipment for fire-fighters	Use water curtains to protect the personnel. In case of a large fire or in confined or poorly ventilated spaces, wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
Other information	Cool down any tanks and surfaces exposed to fire by spraying abundantly with water. Remove combustible material and, if possible, all exposed reservoirs.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

General Information	Evacuate personnel to safe areas. Alert emergency personnel. Shut off the gas supply. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop all work that requires a naked flame, stop all vehicles, stop all machines and equipment that may cause sparks or flames. Cut off the electric power supply if this operation causes no sparks in the area containing vapors from the product. VENTILATE EXTENSIVELY. Remove combustible material and, if possible, all exposed reservoirs. If the product is leaking in two phases, avoid skin contact with the liquid product. Do not stay in the gas cloud, stay upwind of the source. Ensure that there is no remaining risk before resuming normal operations.
Advice for non-emergency personnel	Immediately evacuate personnel to safe areas. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). For personal protection see section 8.
Advice for emergency responders	Take all appropriate steps to avoid fire, explosion and inhalation hazards to the rescuers including the use of breathing apparatus. Use personal protective equipment: Work helmet with peak and neck cloth (full head protection), Impervious gloves and boots, Coverall (with trousers legs over boots). These should be made of infusible and fireproof material. Remove all sources of ignition.

6.2. Environmental precautions

General Information	In case of gas cloud formation: spray water to contain, direct and dissipate the gas cloud.
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6.3. Methods and materials for containment and cleaning up

Methods for cleaning up	In case of a leak with no fire, stop the leak by closing the valve. Ensure adequate ventilation.
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6.4. Reference to other sections

Personal Protective Equipment	See Section 8 for more detail.
Waste treatment	See section 13.

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7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Advice on safe handling

This gas is produced, stored, transported and distributed UNDER PRESSURE AS A LIQUID. Under normal conditions of distribution, it is never handled directly because it is continuously confined in closed systems until its final destruction by combustion during use. FIRST PRECAUTIONS CONSIST IN ENSURING IT IS CAREFULLY CONFINED. Ensure adequate ventilation. Keep away from heat, sparks and open flame. No smoking. Take precautionary measures against static electricity. Never weld a gas container. NEVER UNDERTAKE ANY OPERATION THAT MAY AFFECT THE SAFE CONTAINMENT OF THE FIXED STORAGE TANKS OR CONTAINERS. The inspection, cleaning and maintenance of storage containers require the application of strict procedures and must be entrusted to qualified personnel (internal or external). For personal protection see section 8.

Technical measures

Ensure adequate ventilation. Design installations (machinery and equipment) to prevent burning product from spreading (tanks, retention systems, interceptors (traps) in drainage systems). Take precautionary measures against static electricity. Ensure all equipment is electrically grounded before beginning transfer operations.

Prevention of fire and explosion

Do not smoke. All transfers, loading and unloading from vehicles must be carried out only by specifically trained personnel and in compliance with applicable procedures. OPERATE ONLY ON COLD AND DEGASSED TANKS IN VENTILATED PREMISES (TO AVOID RISK OF EXPLOSION). Immediately seek for the cause of the occurrence of the characteristic odor. Use only soapy water or suitable products to search for leaks. NEVER USE A NAKED FLAME. Design installations to avoid the possibility of the gas accumulating. Never heat a tank, a bottle or pipes holding gas with an open flame.

Hygiene measures

Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures/Storage conditions

STORE THIS GAS IN COMPLIANCE WITH APPLICABLE REGULATIONS, AS APPROPRIATE FOR THE TYPE OF STORAGE USED AND THE QUANTITIES STORED. All the electric installations, including the lighting of rooms that may contain this product, must be adapted to the risk area, in compliance with the European ATEX directives. Store in cool/well-ventilated place. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Do not store near combustible materials.

Materials to Avoid

Strong oxidizing agents, Halogens.



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Packaging material Use only bottles and tanks that comply with regulations for pressure devices or cryogenic equipment, intended for this gas.

7.3. Specific end uses

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits Ingredients with workplace control parameters

Legend See section 16

8.2. Exposure controls

Occupational Exposure Controls

Engineering Measures When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.
Do not enter empty storage tanks until measurements of available oxygen have been carried out.

Personal Protective Equipment

General Information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

Respiratory protection Maintain adequate ventilation.
In an emergency or for exceptional short-lasting jobs in an atmosphere polluted by the product, it is necessary to wear protective respiratory equipment.

Eye Protection If splashing is likely, full head and face protection (protective shield and/or safety goggles) should be used. (EN 166).

Skin and body protection If necessary: Wear cold insulating gloves/face shield/eye protection.
Face shield, protective clothing, as applicable, and anti-static safety boots.

Hand Protection If necessary: Cold insulating gloves.

Environmental exposure controls

General Information No information available.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties



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Appearance	Liquefied gas
Color	colorless
Physical State @20°C	Gas
Odor	Characteristic

<u>Property</u>	<u>Values</u>	<u>Remarks</u>	<u>Method</u>
pH		Not applicable	
Boiling point/boiling range	-166 - -157 °C -267 - -251 °F		
Flash point	< -58 °C < -72 °F		
Evaporation rate		No information available	
Flammability Limits in Air			
upper	15 %		
Lower	5 %		
Vapor Pressure		No information available	
Vapor density		No information available	
Relative density	0.54 - 0.66	@ 0 °C	
Density	420 - 470 kg/m ³	@ -162 °C (Liquid)	
Water solubility	0.024 - 0.061	Not applicable	
Solubility in other solvents		No information available	
logPow	<= 2.8		
Autoignition temperature	410 °C 770 °F		
Viscosity, kinematic		No information available	
Explosive properties	May form explosive mixtures with air		
Oxidizing Properties	Not applicable		
Possibility of hazardous reactions	Rapid Phase Transition when exposed to water (RPT)		

9.2. Other information

Freezing Point	-183 °C -297 °F
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10. STABILITY AND REACTIVITY

10.1. Reactivity

General Information	No information available.
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10.2. Chemical stability

Stability	Stable under recommended storage conditions.
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10.3. Possibility of hazardous reactions

Hazardous Reactions	Rapid Phase Transition when exposed to water (RPT).
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10.4. Conditions to Avoid

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition.
Take precautionary measures against static discharges.

10.5. Incompatible Materials

Materials to Avoid Strong oxidizing agents, Halogens.

10.6. Hazardous Decomposition Products

Hazardous Decomposition Products None under normal use.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity Local effects Product Information

Skin contact . Contact with product may cause frostbite.

Eye contact . Direct contact with liquefied gas can result in eye burns.

Inhalation . Vapors may cause drowsiness and dizziness. Symptoms of overexposure are dizziness, headache, tiredness, nausea, unconsciousness, cessation of breathing.

Ingestion . Not an expected route of exposure.

Acute toxicity - Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Natural gas			LC50 (0.25h) > 800000 ppm (rat)

Sensitization

Sensitization There are no reports available to indicate that the substance has the potential to cause skin and respiratory sensitisation.

Specific effects

Carcinogenicity Contains no ingredient listed as a carcinogen.
Mutagenicity Contains no ingredient listed as a mutagen.
Reproductive toxicity Contains no ingredient listed as toxic to reproduction.
Repeated Dose Toxicity

Target Organ Effects (STOT)



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Other information

12. ECOLOGICAL INFORMATION

12.1. Toxicity

Not classified.

Acute aquatic toxicity - Product Information

Acute aquatic toxicity - Component Information

Chronic aquatic toxicity - Product Information

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Chronic aquatic toxicity - Component Information

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Effects on terrestrial organisms

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12.2. Persistence and degradability

General Information

Product is biodegradable.

12.3. Bioaccumulative potential

Product Information

The potential for bioaccumulation of the product in the environment is very low.

logPow

<= 2.8

Component Information

Chemical Name	log Pow
Natural gas - 8006-14-2	2.8

12.4. Mobility in soil

General Information

Due to its high volatility, this gas is unlikely to generate soil or water pollution.

Air

Released into the atmosphere, constituents are rapidly diluted and undergo photodegradation.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment

This substance is considered not to be PBT and vPvB.



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12.6. Other adverse effects

General Information No information available.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues / Unused Products If elimination of gas in containers or tanks is required, combustion with the aid of appropriate equipment (flare) is the most reliable method. This operation must be carried out only by specifically trained personnel and in accordance with appropriate procedures.

Contaminated packaging Empty containers may contain flammable or explosive vapors.

EWC Waste Disposal No. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used.

14. TRANSPORT INFORMATION

ADR/RID

UN/ID No	UN1972
Proper shipping name	Natural gas, refrigerated liquid
Hazard class	2
ADR/RID-Labels	2.1
Classification Code	3F
Tunnel Restriction Code	(B/D)
ADR Hazard Id (Kemmler Number)	223
Description	UN1972, Natural gas, refrigerated liquid, 2.1, (B/D)
Excepted Quantity	E0
Limited quantity	0

IMDG/IMO

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

ICAO/IATA Forbidden

ADN



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UN/ID No	UN1972
Proper shipping name	Natural gas, refrigerated liquid
Hazard class	2
Classification Code	3F
Description	UN1972, Natural gas, refrigerated liquid, 2.1
Excepted Quantity	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	Complies
TSCA	Complies
DSL	Complies
ENCS	-
IECSC	Complies
KECL	Complies
PICCS	-
AICS	Complies
NZIoC	Complies

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

Further information

15.2. Chemical Safety Assessment



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16. OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3

R12 - Extremely flammable

Full text of H-Statements referred to under sections 2 and 3

H220 - Extremely flammable gas

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

Abbreviations, acronyms

GLP = Good Laboratory Practice

bw = body weight

bw/day = body weight/day

Legend Section 8

+	Sensitizer	*	Skin designation
**	Hazard Designation	C:	Carcinogen
M:	Mutagen	R:	Toxic to reproduction

Revision Date: 2013-09-25

Revision Note: Not applicable.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

This safety data sheet serves to complete but not to replace the technical product sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfil his obligations. This list is not to be considered complete and exhaustive. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.

End of the safety data sheet