MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Product Name: Liquefied Natural Gas

Synonyms: Liquefied Natural Gas (LNG), Methane
Product Description: Complex mixture of petroleum hydrocarbons

LNG is used as a fuel for ship's and trucks. For transport reasons the natural gas is made liquid at a temperature of -161 ºC.

Identification Company loading/ unloading:

Gate terminal B.V. (Maasvlakte)
Harbor number 9880
Trade Register (or local equivalent): 24385944
Visit Address: Maasvlakteweg 991 3199 LZ Maasvlakte Rotterdam
Postal Address: P.O. Box 77, 3230 AB Brielle
Telephone : 0031 (0) 181 799000
The Netherlands
www.gateterminal.com

Gate terminal is an import LNG terminal with loading capabilities.

2. HAZARD IDENTIFICATION

Physical state: Liquid
Colour: Colourless
Odour: Odourless

Vapour is flammable

H & P warning for Vapour:

H 220:Flammable gas

P 210: Keep away from heat/sparks/open flames/hot surfaces and other sources of ignition. -No smoking.

Emergency overview

Flammable	Very flammable after vapourization to gaseous phase
Potential health effects:	See section 11
Potential environmental effects:	See section 12
Likely routes of exposure:	Eye, skin contact and inhalation
Acute Eye,skin contact:	Liquid or cold gas contact with skin or eyes could cause freeze burns frostbite or permanent eye damage. After vapourization burning gas can cause burns.
Inhalation:	Cold gas inhalation can cause cryogenic burns to the respiratory damages and even asphyxiation

Warning:
The burning of any hydrocarbon as a fuel in an area without ventilation may result in a hazardous level of combustible products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Medical Conditions Aggravated by Exposure:
Individuals with pre-existing conditions of the heart, lungs, and blood may have increased susceptibility to symptoms of asphyxia.

3. Composition and ingredients

Typical composition

Chemical name		Minimum	Benchmark LNG	Maximum	Cas-no
Methane (CH_4)- concentration	vol %	82	91	100	74-82-8
Ethane (C_2H_6) - concentration	vol %	0	5	14	74-84-0
Propane (C_3H_8) - concentration	vol %	0	3	4	74-98-6
Butane (C_4H_{10}) - concentration	vol %	0	1	3	106-97-8
Pentane (C_5H_{12}) - concentration	vol %	0	0	1	109-66-0
Nitrogen (N_2) - concentration	vol %	0	0	2	7727-37-9
LNG liquid density	kg/m^3	440	460	480	
NG (gas) density	kg/m^3	0.72	0.81	0.86	
Gas / Liquid ratio	$m^3(g)/m^3(l)$	570	570	630	

A complex mixture of light gases separated from raw natural gas consisting of aliphatic hydrocarbons having carbon numbers in the range of C1 through C4 predominately methane (C1) and ethane (C2).

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentration applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. FIRST AID MEASURES

Eye Contact: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately

Skin Contact: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately

Ingestion: As this product is a gas, refer to the inhalation section.

Inhalation: Remove person to fresh air. If the person is not breathing, give artificial respiration. If breathing is difficult, give oxygen. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek immediate medical attention.

Medical Providers: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours

5. FIRE FIGHTING MEASURES

Flash Point Method:	Extremely Flammable Gas
Auto-ignition Point:	482-632°C
Lower Flammability Limit (%):	3.8 – 6.5
Upper Flammability Limit (%):	13 – 17

Fire and Explosion Hazards:
Liquid releases flammable vapors at well below ambient temperatures readily form a flammable mixture with air. Dangerous fire and explosion hazard when exposed to heat, sparks, or flame.

Extinguishing Media:
Dry chemical powder, carbon dioxide; class C, B, or A extinguisher. However, fire should not be extinguished unless flow of gas can be immediately stopped.
Do not use a waterjet to extinguish a fire.

Fire Fighting Instructions:
Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. If spill or leak has not ignited, determine if water spray may assist in dispersing gas or vapor to protect personnel attempting to stop the leak.

Decomposition products may include the following materials:

- carbon dioxide
- carbon monoxide
- nitrogen oxides
- hydrogen.
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Special protective: Fire-fighters should wear appropriate protective equipment and self-contained breathing equipment for fire-fighters apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE

Activate facility emergency plan.
Evacuate non-essential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible to evaluate the direction of product travel. Vapor cloud may be white, but color will dissipate as cloud disperses – fire and explosion is still present.

Personal precautions.

Accidental releases pose a serious fire or explosion hazard. Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Consider the use of water spray to disperse vapors. Isolate the area until gas has dispersed. Ventilate and gas test area before entering. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions.

Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

7. HANDLING & STORAGE

LNG is handled and stored in closed lines and full containment tanks. For roadtrucks the tank is double walled vacuum isolated.

Put on appropriate personal protective equipment (see Section 8).

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed.

Avoid contact with eyes, skin and clothing. Avoid breathing gas.

Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate.

Do not enter storage areas and confined spaces unless adequately ventilated.

Store and use away from heat, sparks, open flame or any other ignition source.

Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Use non-sparking tools.

8. EXPOSURE CONTROL, PERSONAL PROTECTION

Engineering Controls:	Use adequate ventilation to keep vapor concentration of this product below occupational exposure and flammability limits, particularly in confined spaces. Use explosion proof equipment and lighting in classified/controlled areas.
Hygiene measures:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Personal protection	
Respiratory :	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. The gas can cause asphyxiation without warning by replacing the oxygen in the air. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Eye Protection:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
Skin:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Environmental exposure :	Emissions from ventilation or work process equipment should be checked to ensure they controls comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. PHYSICAL & CHEMICAL PROPERTIES

Appearance:	A colorless gas. Cold vapor cloud may be white but the lack of visible gas cloud does not indicate absence of gas. A colorless liquid under pressure.
Odor:	Odorless when pure.

Boiling point:	-162°C
LNG liquid density	440-480 kg/m3
NG (gas) density	0.72 -0.86 kg/m3
Gas / Liquid ratio	570 -630 m3(g)/m3(l)

10. STABILITY & REACTIVITY

Chemical stability : The product is stable.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose the product to heat or sources of ignition.

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials.

Hazardous decomposition: Under normal conditions of storage and use, hazardous decomposition products should not be produced. When vapour burns the following decomposition products can be produced: Carbon monoxide, carbon dioxide, and non-combustible hydrocarbons (smoke).

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur

11. TOXICOLOGICAL INFORMATION

Acute toxicity	No data available.
Chronic toxicity	No data available.
Carcinogenicity Classification	No data available.
Mutagenicity	No data available.
Reproductive toxicity	No data available.

12. ECOLOGICAL INFORMATION

Liquid release is only expected to cause localized, non-persistent environmental damage, such as freezing. Biodegradation of this product may occur in soil and water. Volatilization is expected to exist entirely in the vapor phase in ambient air.

13. DISPOSAL INFORMATION

Disposal should be in accordance with applicable regional, national and local laws and regulations. Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION.

14. TRANSPORT INFORMATION

Proper Ship Name:	Natural Gas Refrigerated Liquid (Cryogenic liquid with high methane content)
Hazard Class:	2.1
Identification Number:	UN1972
Shipping Label:	Flammable Gas

15. REGULATORY INFORMATION

IMDG Liquid natural gas	class 2.1
RID	class 2.1
ADR cas number Methane	74-82-8

16. OTHER INFORMATION

THIS INFORMATION RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PROCESS. SUCH INFORMATION IS TO THE BEST OF THIS COMPANY'S KNOWLEDGE AND BELIEVED ACCURATE AND RELIABLE AS OF THE DATE INDICATED. HOWEVER, NO REPRESENTATION, WARRANTY OR GUARANTEE IS MADE AS TO THE ACCURACY, RELIABILITY OR COMPLETENESS. IT IS THE USER'S RESPONSIBILITY TO SATISFY THEMSELVES AS TO THE SUITABILITY AND COMPLETENESS OF SUCH INFORMATION FOR HIS OWN PARTICULAR USE.