



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

### 1.1. Product identifier

Product Name: Liquefied Bio-Gas (LBG)  
Chemical name: Bio-gas (methane)  
Alternative names: liquid bio-gas, Liquefied Bio-Methane (LBM), bio-LNG  
CAS / EC no 74-82-8 / 200-812-7  
REACH: Bio-gas is exempted from REACH registration (according to REACH Annex IV - V)  
CLP index no.: 601-001-00-4 (methane: CLP Annex VI: harmonised classifications)

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

Fuel for transportation and energy generation

### 1.3. Details of the supplier of the safety data sheet

NGGM (Nederlandse Groen Gas Maatschappij B.V.; Dutch Green Gas Company)  
P.O. Box 320 (NL-2700 AH Zoetermeer, The Netherlands)  
Phone number: (+31) (0) 79 361 3668  
Email: office@nggm.nl, website: www.nggm.nl

### 1.4. Emergency telephone number

UK: **+44 (0)844 892 0111** 24 hours per day: **Only available for medical professionals in the UK**  
Poison information Service UK  
US: **+1-800-222-1222** 24 hours per day (everyone)  
American Association of Poison Control Centers  
Others: **+31 (0)79 361 3668** 24 hours per day (NGGM)

## 2. HAZARDS IDENTIFICATION

### 2.1. Classification of the substance

#### Classification of the substance in accordance with EC/1272/2008 (CLP: EU-GHS)

Flammable Gas cat. 1: H220: Extremely flammable gas  
Refrigerated liquefied gas: H281: Contains refrigerated gas; may cause cryogenic burns or injury

#### Classification of the substance in accordance with 67/548/EG (dangerous substance directive: DSD)

F+: R12 Extremely flammable

### 2.2. Label elements



**DANGER** H220: Extremely flammable gas  
H281: Contains refrigerated gas; may cause cryogenic burns or injury



Precautionary statements:

P210: Keep away from heat/ sparks/open flames/ hot surfaces. — No smoking. P282: Wear cold insulating gloves, face shield and eye protection. P336: Thaw frosted parts with lukewarm water. Do not rub affected area. P315: Get immediate medical advice. 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**

The product is stored and transported at - 120 to - 145 °C at 3.5 - 10 barg. Vapours may exclude oxygen and cause dizziness or asphyxiation (suffocation) without warning. Although methane is lighter than air, vapours from liquefied bio-gas may be heavier than air for a short period after being released, and spread along the ground and may enter and collect in basements and other lower areas, before they eventually rise. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. LBG is extremely flammable and may form explosive mixtures with air.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

**3.1. Substances**

CAS. no.	Substance name	%	EC. no.	Classification CLP	Classification DSD
74-82-8	Methane	96 - 98	200-812-7	Flam. Gas cat. 1 Refr. liquef. gas	F+; R12
7727-37-9	Nitrogen	0 - 4%	231-783-9	Refr. liquef. gas	none
124-38-9	Carbon dioxide	0 - 4%	204-696-9	Refr. liquef. gas	none

**4. FIRST AID MEASURES**

**4.1. Description of first aid measures**

- Inhalation**      Move to fresh air. Keep patient warm and at rest. Oxygen or artificial respiration if needed. Seek medical advice immediately.
- Ingestion**      Unlikely (gas)
- Skin contact**    Thaw frosted parts with lukewarm water. Do not rub affected area. Do not remove clothing. Seek medical advice immediately.
- Eye contact**    Rinse immediately with plenty of water for at least 15 minutes. Keep on rinsing until medical assistance is obtained.
- Information for medical personnel**    No specific treatment. Treat symptomatic.

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

- Inhalation**      dizziness, unconsciousness, suffocation
- Ingestion**      not likely / no symptoms known
- Skin contact**    frost bites are most likely symptoms
- Eye contact**    frost bites are most likely symptoms



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

Nu further specific information.

### **5. FIREFIGHTING MEASURES**

#### **5.1. Extinguishing media**

Use extinguishing media suitable against surrounding fire or the cause of fire: water (spray), powder, foam, carbon dioxide.

#### **5.2. Special hazards arising from the substance or mixture**

Extremely flammable, explosive with air, container can explode in heat or flames. Vapours may exclude oxygen and cause dizziness or asphyxiation (suffocation) without warning. Although methane is lighter than air, vapours from liquefied bio-gas may be heavier than air for a short period after being released, and spread along the ground and may enter and collect in basements and other lower areas, before they eventually rise.

#### **5.3. Advice for fire-fighters**

Wear full (thermal) protective clothing and self-contained breathing apparatus with a full face piece operated in pressure-demand or other positive pressure mode. Keep people away from and upwind of spill/leak. Cool containers or tanks with water spray and suppress (knock down) gases, vapours and mists with a water spray jet from a safe distance or protected area. Do not direct water at spill or source of leak. In case of a leaking gas fire: Do not extinguish, unless leak can be stopped safely. Withdraw immediately in case of rising sound from venting safety devices or discolouration of tank.

### **6. ACCIDENTAL RELEASE MEASURES**

#### **6.1. Personal precautions, protective equipment and emergency procedures**

Take care of personal protection (see chapter 8). No action may be taken if a chance of personal injury exists or in case of insufficient training. Procedure:

- Immediately evacuate people in a radius of 100 meters, locate people upwind, isolate the surroundings. Keep out of low areas. Do not start motors or vehicles. Provide adequate ventilation. Do not use electrical ventilation (unless explosion proof). Avoid contact and inhalation. Keep ignition sources away.
- If possible without personal risk: attempt to stop leakage or turn leaking cylinder with the leak up to prevent escape of gas in liquid state, move containers from a fire area, prevent LBG from getting into waterways, drains and sewer (explosion hazard).
- Withdraw immediately in case of rising sound from venting safety devices or discolouration of tank. ALWAYS stay away from tanks engulfed in fire. See par. 5.3 before attempting to fight fires.

#### **6.2. Environmental precautions**

If possible without personal risk: attempt to stop or minimise the emission (explosive and green house gas). No further environmental precautions necessary (no other environmental risks expected).

#### **6.3. Methods and material for containment and cleaning up**

LBG evaporates rapidly and entirely. Ensure adequate ventilation.



## 7. Handling and storage

### 7.1. Precautions for safe handling

Take care of personal protection and hygienic measures (see chapter 8). Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Keep away from heat, ignition sources and open fire. No smoking. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be earthed. Recommended are closed systems for handling, process and storage. Ensure adequate ventilation. High risk of fire and explosions in case of leakage. Prevent leaks by checking valves, pipelines and joints regularly. See par. 15 for specific regulations regarding safety of pressure equipment and vessels and explosive or hazardous atmospheres.

### 7.2. Conditions for safe storage, including any incompatibilities

Store in accordance with the local regulations, in a separate, approved area. Keep containers or cylinders tightly closed in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons. Do not store together with incompatible materials (see par. 10.5) and self-igniting substances. Keep all ignition and heat sources away. Storage tanks have to be protected against collision by means of concrete or steel piles. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be earthed. Storage tanks need to have a pressure relief valve ending up at a minimum height of 2.50 meters. All electrical equipment in storage areas must be explosion-proof.

## 8. Exposure controls/personal protection

### 8.1. Control parameters

There are no official occupational exposure limits (OEL) for methane in the UK, US or NL. In some other European countries an official OEL for methane of 1000 ppm (8 hour time weighted average) is applicable. This is also the recommended limit value by ACGIH. Methane is an asphyxiant: on loss of containment the gas can cause suffocation by lowering the oxygen content of the air in confined areas. Because methane is also odourless it is possible to become unconscious and suffocate by inhalation of the gas, without realising it's presence.

### 8.2. Exposure controls

Control of professional exposure	Use in a closed system, provide adequate ventilation. Prevent leaks by checking valves, pipelines and joints regularly. Consider methane alarms and automatic (explosion proof) emergency ventilation in areas where methane could be (accidentally) released.
Hygienic measures	Avoid and prevent all spillages and releases, contact and exposure.
Protection of the respiratory system	Wear self-contained breathing apparatus in case of insufficient ventilation or emergency situations. Note that simple air-purifying respirators or dust masks do not protect from asphyxiation in an oxygen-deficient atmosphere.
Protections of the hands and skin	Wear suitable gloves: Cold-insulating gloves (e.g. nitrile rubber). Wear suitable thermal protective clothing/ over-all and rubber boots.
Protection of the eyes	Wear tightly fitting safety goggles. Face-shield



## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

Appearance	Methane is a colourless, odourless gas at standard temperature and pressure. It is provided in the liquefied form at very low temperature and elevated pressure.
odour	No odour
pH	Not applicable
Melting point	approx. - 182 °C
Boiling point	approx. - 161°C
Flash point	approx. - 88°C
Evaporation rate	LBG evaporates very fast
Flammability	extremely flammable
Explosion limits	5 - 15%.
Vapour pressure	4.66 x10+5 mm Hg at 25 °C
Vapour density	approx. 0.42 g/cm <sup>3</sup> at 25°C
Relative density	Methane is lighter than air, vapours from liquefied methane may be heavier than air for a short period after release.
Water solubility	approx. 24 mg/l at 25°C
Partition coefficient: n-octanol-water	Log Kow = 1.09
Auto-ignition temperature	> 400°C
Decomposition temperature	Not applicable
Viscosity	11.2 µPa s at 27 °C
Oxidising properties	No oxidising properties
Explosive properties	No explosive properties

## 10. STABILITY AND REACTIVITY

### 10.1. Reactivity

The product is not reactive

### 10.2. Chemical stability

The product is stable

### 10.3. Possibility of hazardous reactions

Within normal storage circumstances and upon normal usage no dangerous reactions will occur.



#### 10.4. Conditions to avoid

Keep away from heat and high temperatures and ignition sources such as open flames, sparks, welding activities, smoking and static electricity discharges. Avoid (uncontrolled) contact with incompatible materials.

#### 10.5. Incompatible materials

Methane may react violently with chlorine dioxide, liquid oxygen, halogens and with strong oxidisers.

#### 10.6. Hazardous decomposition products

Carbon monoxide, carbon dioxide

### 11. TOXICOLOGICAL INFORMATION

#### 11.1. Information on toxicological effects

##### Possible acute effects on health

Not acute toxic: LC50 (inhalation) > 20,000 ppm

##### Irritation/ Corrosion

Skin contact: not irritant (liquefied gas can cause frost bites)

Eye contact: not irritant

##### Possible chronic effects on health

Sensibility No sensitizing effects known

Carcinogenicity: No carcinogenic activity known

Mutagenicity: No genotoxic activity known.

Reproductive toxicity No reproductive toxicity known

Specific target organ toxicity No information available

Aspiration hazard No information available

### 12. ECOLOGICAL INFORMATION

#### 12.1. Toxicity

LC/ EC/ IC 50: toxicity higher than water solubility, no toxicity expected until the solubility threshold.

#### 12.2. Persistence and degradability

Readily biodegradability expected (in water).

#### 12.3. Bioaccumulative potential

A low bioaccumulation is to be expected (BCF < 10)



#### 12.4. Mobility in soil

No exposure to soil expected, LBG will evaporate

#### 12.5. Results of PBT (Persistence, Bioaccumulation and Toxicity) assessment

The product does not meet the criteria for PBT or vPvB.

#### 12.6. Other adverse effects

None known

### 13. DISPOSAL CONSIDERATIONS

#### 13.1. Waste treatment methods

No waste is expected to be produced. Containers/ cylinders (whether or not empty) could be returned to the supplier or should be removed by a licensed waste disposal company in accordance with local legislation.

### 14. TRANSPORT INFORMATION

Transport legislation	UN-number	Shipping name	Class/ packing group
ADR/ ADN/ RID/ DOT IMDG/ IATA	1972	Methane, refrigerated liquid (cryogenic liquid) or Natural gas, refrigerated liquid (cryogenic liquid), with high methane content	2.1 (3F)

The Liquefied Bio-Gas (methane) is stored and transported at - 120 to - 145 °C at 3,5 to 10 barg. Loading and unloading installations have to be protected against collision by means of concrete or steel piles. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be earthed. During loading and unloading the following Personal Protective Equipment (PPE's) have to be used: insulated gloves, overall, safety glasses and face shield. Before transportation of this product, ensure:

- compliance with transport regulations and proper training of all involved personnel
- that cylinder valves are closed and not leaking and protection devices are correctly fitted
- that cylinders are firmly secured and adequate ventilation is provided.

### 15. REGULATORY INFORMATION

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

Methane is a strong green house gas. National or local provisions may be applicable regarding emissions to air and occupational safety. Check the competent national or local authority for more information.

Specific European legislation:

- The Pressure Equipment Directive (PED)
- The ATEX directives (concerning equipment and protective systems intended for use in potentially Explosive Atmospheres)
- SEVESO II directive (prevention & control of chemical accidents).



Specific US legislation and standards:

- OSHA regulations such as: standards 29 CFR: 1910.101 - Compressed gases (general requirements), 1926.407, Hazardous (Classified) Locations
- The ASME Code or API Standard 620 (design and construction of pressure vessels).

US NFPA 704 Rating:

- Health Hazard Rating: 1
- Fire Hazard Rating: 4
- Reactivity Hazard Rating: 0

NIOSH, Registry of Toxic Effects (RTECS) Identification Number: PA1490000

### **15.2. Chemical safety assessment**

Bio-gas, the origin of LBG, is exempted from REACH registration (according to REACH Annex V). A chemical safety assessment as required by REACH is therefore not mandatory and not available.

## **16. OTHER INFORMATION**

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