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

1.1 Product identifier

Trade name	:	Methane
REACH Registration Number	:	01-2119474442-39-0000, 01-2119474442-39-0004
Substance name	:	Methane
EC-No.	:	200-812-7

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

Use of the Substance/Mixture	:	Manufacture, Fuel use - Industrial

1.3 Details of the supplier of the safety data sheet

Manufacturer	:	Borealis AB S-444 86 Stenungsund, Sweden Telephone: +46 303 86000 Borealis Polymers Oy FI-06101 Porvoo, Finland Telephone: +358 9 394900
Supplier	:	Borealis AG Trabrennstrasse 6-8, 1020 Vienna, Austria Telephone: +43 1 22400 0
E-mail address	:	sds@borealisgroup.com

1.4 Emergency telephone number

+1 760 476 3962 (3E), Access code: 336296

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable gases, Category 1A	H220: Extremely flammable gas.

Gases under pressure, Refrigerated liquefied gas	H281: Contains refrigerated gas; may cause cryogenic burns or injury.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Danger

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

Precautionary statements :

Prevention:

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.

Response:

P336 + P315 Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.

Storage:

P403 Store in a well-ventilated place.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Substance name : Methane

EC-No. : 200-812-7

Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)	M-Factor, SCL, ATE
methane	74-82-8 200-812-7	>= 80 - <= 100	
hydrogen	1333-74-0 215-605-7	>= 1 - < 10	
ethane	74-84-0 200-814-8	>= 0 - < 1	
ethylene	74-85-1 200-815-3	>= 0 - < 1	
carbon monoxide	630-08-0 211-128-3	>= 0 - < 0,3	

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : Move out of dangerous area.
In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

If inhaled : Move to fresh air.
Do not leave the victim unattended.
Keep patient warm and at rest.
If unconscious, place in recovery position and seek medical advice.
Oxygen or artificial respiration if needed.
Seek medical advice.

In case of skin contact : Remove/ Take off immediately all contaminated clothing.
If clothing already frozen and stuck to the skin:
Do not remove contaminated clothing.
Wash frost-bitten areas with plenty of lukewarm water.
Do not rub affected area.
Seek medical advice.

In case of eye contact	:	Remove contact lenses. Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing. Seek medical advice.
If swallowed	:	Not probable: The product evaporates readily.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms	:	Inhalation may provoke the following symptoms: Drowsiness Suffocation Skin contact may provoke the following symptoms: Frostbite

4.3 Indication of any immediate medical attention and special treatment needed

Treatment	:	Treat frost-bitten areas as needed.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	Dry powder Carbon dioxide (CO2) Foam Water mist
Unsuitable extinguishing media	:	Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting	:	Incomplete combustion may produce: Carbon monoxide Vapours may form explosive mixtures with air.

5.3 Advice for firefighters

Special protective equipment for firefighters	:	Wear self-contained breathing apparatus and protective suit.
Further information	:	Attempt to stop leakage without personal risk. If conditions permit, let fire burn itself out. Cool containers/tanks with water spray.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Keep people away from and upwind of spill/leak.
Vapours can cause suffocation by reducing oxygen available for breathing.
Use personal protective equipment.
Eliminate all ignition sources if safe to do so.
Attempt to stop leakage without personal risk.
See chapter 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so.
Prevent product from entering environment and drains.
Observe the risk of explosion.
If major spillage occurs, contact the proper local authorities.

6.3 Methods and material for containment and cleaning up

Allow to evaporate.
Ensure adequate ventilation, especially in confined areas.

6.4 Reference to other sections

For personal protection see section 8., For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Refill and handle product only in closed system. Prevent leaks by checking valves, pipelines and joints regularly.
Advice on protection against fire and explosion	:	Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Ensure adequate ventilation. Risk of explosion if heated under confinement. Vapours may form explosive mixtures with air. High risk of fire in case of leakage. Do not pressurise, cut, weld, braze, solder, drill, or grind on containers.
Hygiene measures	:	Avoid and prevent all spillage, contact and exposure. Ensure adequate ventilation.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep containers tightly closed in a cool, well-ventilated place. Keep product and empty container away from heat and

sources of ignition. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Advice on common storage : Keep away from incompatible materials.
See chapter 10.

7.3 Specific end use(s)

Specific use(s) : For industrial use only.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
carbon monoxide	630-08-0	TWA	20 ppm 23 mg/m3	2017/164/EU
Further information	Indicative			
		STEL	100 ppm 117 mg/m3	2017/164/EU
Further information	Indicative			
		TWA	20 ppm 23 mg/m3	2004/37/EC
Further information	Carcinogens or mutagens			
		STEL	100 ppm 117 mg/m3	2004/37/EC
Further information	Carcinogens or mutagens			

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
Methane				
Remarks:	Not applicable, No adverse effects			

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Methane		
Remarks:	Not applicable, (gaseous)	

8.2 Exposure controls

Engineering measures

Application in a closed system
Provide adequate ventilation.
Use personal protective equipment.

Personal protective equipment

Eye protection	:	Safety goggles or face-shield. Equipment should conform to EN 166
Hand protection		
Remarks	:	Cold-insulating gloves (e.g. nitrile rubber). Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact). The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.
Skin and body protection	:	Wear suitable protective clothing. Leather boots Safety shoes
Respiratory protection	:	In case of insufficient ventilation: Self-contained breathing apparatus. Vapours can cause suffocation by reducing oxygen available for breathing.

Environmental exposure controls

General advice	:	Prevent further leakage or spillage if safe to do so. Prevent product from entering environment and drains. Observe the risk of explosion. If major spillage occurs, contact the proper local authorities.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	:	Refrigerated liquefied gas
Colour	:	clear
Odour	:	odourless
Odour Threshold	:	No data available
Melting point	:	-183 °C
Boiling point	:	-161 °C
Upper explosion limit / Upper flammability limit	:	Upper flammability limit 15 %(V) methane Upper flammability limit 76 %(V) hydrogen
Lower explosion limit / Lower flammability limit	:	Lower flammability limit 5 %(V)

		methane Lower flammability limit 4 %(V) hydrogen
Flash point	:	Not applicable, (gaseous)
Decomposition temperature	:	Heating or fire can release toxic and irritating gases.
pH	:	No data available
Viscosity		
Viscosity, dynamic	:	0,112 mPa.s (27 °C)
Viscosity, kinematic	:	No data available
Solubility(ies)		
Water solubility	:	24,4 mg/l (25 °C)
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	log Pow: 1,09 (20 °C)
Vapour pressure	:	4.520 kPa (-83 °C)
Relative density	:	0,4228 (-83 °C)
Density	:	0,423 g/cm³ (-83 °C)
Relative vapour density	:	0,6
Particle size	:	Not applicable

9.2 Other information

Explosives	:	Not applicable The substance contains no chemical groups with those properties.
Oxidizing properties	:	Not applicable The substance contains no chemical groups with those properties.
Self-ignition	:	537 °C
Evaporation rate	:	No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Conditions to avoid : Keep away from heat and sources of ignition.
Observe the risk of explosion.

10.5 Incompatible materials

Materials to avoid : Oxidizing agents
Halogenated compounds

10.6 Hazardous decomposition products

In case of fire hazardous decomposition products may be produced such as:
Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).

SECTION 11: Toxicological information

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

Acute toxicity

Based on available data, the classification criteria are not met.

Components:

methane:

Acute oral toxicity : Remarks: Not applicable (gaseous)
study technically not feasible

Acute inhalation toxicity : LC50: > 20 mg/l
Remarks: Acute toxicity: low.

Acute dermal toxicity : Remarks: Not applicable (gaseous)
study technically not feasible

ethylene:

Acute oral toxicity	:	Remarks: No data available
Acute inhalation toxicity	:	LC50 (Rat): > 65,4 mg/l, > 57000 ppm Test atmosphere: gas
Acute dermal toxicity	:	Remarks: No data available

Skin corrosion/irritation

Based on available data, the classification criteria are not met.

Components:

methane:

Result	:	No skin irritation
Remarks	:	Contact with liquid or refrigerated gas can cause cold burns and frostbite.

ethylene:

Remarks	:	study technically not feasible (gaseous) Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Serious eye damage/eye irritation

Based on available data, the classification criteria are not met.

Components:

methane:

Result	:	No eye irritation
Remarks	:	Contact with liquid or refrigerated gas can cause cold burns and frostbite.

ethylene:

Remarks	:	study technically not feasible (gaseous) Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Respiratory or skin sensitisation

Skin sensitisation

Based on available data, the classification criteria are not met.

Respiratory sensitisation

Based on available data, the classification criteria are not met.

Components:

methane:

Remarks	:	study technically not feasible (gaseous)

ethylene:

Remarks	:	study technically not feasible (gaseous)

Germ cell mutagenicity

Based on available data, the classification criteria are not met.

Components:

methane:

Genotoxicity in vitro	:	Test Type: Microbial mutagenesis assay (Ames test) Method: OECD Test Guideline 471 Result: negative Remarks: In vitro tests did not show mutagenic effects
Genotoxicity in vivo	:	Remarks: No data available

ethylene:

Genotoxicity in vitro	:	Test Type: Ames test Metabolic activation: with and without metabolic activation Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay) Result: negative Remarks: In vitro tests did not show mutagenic effects
Genotoxicity in vivo	:	Test Type: Micronucleus test Species: Rat Result: negative

Carcinogenicity

Based on available data, the classification criteria are not met.

Components:

methane:

Remarks	:	This information is not available.

ethylene:

Species	:	Rat
Application Route	:	Inhalation
Exposure time	:	106 weeks
Activity duration	:	6 h
Frequency of Treatment	:	5 days/week
NOAEL	:	3.000 ppm
Method	:	OECD Test Guideline 453
Result	:	negative
Remarks	:	IARC evaluation:

Group 3: Not classifiable as to its carcinogenicity to humans

Reproductive toxicity

Based on available data, the classification criteria are not met.

Components:

methane:

Effects on fertility	:	Remarks: This information is not available.

ethylene:

Effects on fertility	:	Species: Rat Application Route: inhalation (gas) General Toxicity - Parent: No observed adverse effect level: 5.737 mg/m³ General Toxicity F1: No observed adverse effect level: 5.737 mg/m³ Method: OECD Test Guideline 421
Effects on foetal development	:	Species: Rat General Toxicity Maternal: NOAEC: 5.737 mg/m³ Developmental Toxicity: NOAEC: 5.737 mg/m³ Method: OECD Test Guideline 421

STOT - single exposure

Based on available data, the classification criteria are not met.

Components:

methane:

Remarks	:	study scientifically unjustified (gaseous)

STOT - repeated exposure

Based on available data, the classification criteria are not met.

Components:

methane:

Exposure routes	:	Inhalation
Remarks	:	study scientifically unjustified (gaseous)
Exposure routes	:	Ingestion
Remarks	:	study scientifically unjustified (gaseous)
Exposure routes	:	Skin contact
Remarks	:	study scientifically unjustified (gaseous)

Repeated dose toxicity

Components:

ethylene:

NOAEC	:	10000 ppm
Application Route	:	Inhalation
Method	:	OECD Test Guideline 413
Application Route	:	Dermal
Remarks	:	study technically not feasible (gaseous)
Application Route	:	Oral
Remarks	:	study technically not feasible (gaseous)

Aspiration toxicity

Based on available data, the classification criteria are not met.

11.2 Information on other hazards

Endocrine disrupting properties

Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Further information

Product:

Remarks	:	Components of the product may be absorbed into the body by inhalation.

SECTION 12: Ecological information

12.1 Toxicity

Components:

methane:

Toxicity to fish	:	147,54 mg/l Exposure time: 96 h

		Test Type: Short term Method: QSAR
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia (water flea)): 69,43 mg/l Exposure time: 48 h Test Type: Short term Method: QSAR
Toxicity to algae/aquatic plants	:	12,32 mg/l Exposure time: 96 h Method: QSAR
Toxicity to microorganisms	:	Remarks: No data available
Toxicity to fish (Chronic toxicity)	:	7,66 mg/l Exposure time: 30 d Method: QSAR Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	3,886 mg/l Exposure time: 30 d Method: QSAR Remarks: No data available
ethylene:		
Toxicity to fish	:	LC50 : 126 mg/l Exposure time: 96 h Method: QSAR Remarks: Aquatic toxicity is unlikely. (gaseous)
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia (water flea)): 62 mg/l Exposure time: 48 h Method: QSAR Remarks: Aquatic toxicity is unlikely. (gaseous)
Toxicity to algae/aquatic plants	:	EbC50 (Scenedesmus capricornutum (fresh water algae)): 30,3 mg/l Exposure time: 96 h Test Type: Growth inhibition Method: QSAR
Toxicity to microorganisms	:	Remarks: No data available
Toxicity to fish (Chronic toxicity)	:	NOELR: 22,083 mg/l Exposure time: 32 d

Species: Oncorhynchus mykiss (rainbow trout)
Method: QSAR

Chronic Toxicity Value: 12,385 mg/l
Exposure time: 30 d
Method: QSAR

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOELR: 41,311 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Method: QSAR

Chronic Toxicity Value: 6,311 mg/l
Species: Daphnia sp. (water flea)
Method: QSAR

12.2 Persistence and degradability

Components:

methane:
Biodegradability : Water
Method: QSAR
Remarks: Readily biodegradable.

ethylene:
Biodegradability : Method: QSAR
Remarks: Readily biodegradable.

12.3 Bioaccumulative potential

Components:

methane:
Bioaccumulation : Bioconcentration factor (BCF): 1,38
Remarks: Bioaccumulation not expected: Partition coefficient (n-octanol/water) log Kow < 3.

Partition coefficient: n-octanol/water : log Pow: 1,09 (20 °C)

ethylene:
Bioaccumulation : Bioconcentration factor (BCF): 2,59
Remarks: Bioaccumulation not expected: Partition coefficient (n-octanol/water) log Pow < 3.

Partition coefficient: n-octanol/water : log Pow: 1,13 (20 °C)

12.4 Mobility in soil

Components:

methane:

Mobility	:	Medium: Soil Remarks: Not expected to adsorb on soil., Partition coefficient (n-octanol/water) log Kow < 3., The product evaporates readily.

ethylene:

Mobility	:	Remarks: Soil, Not expected to adsorb on soil., The product evaporates readily to air.

12.5 Results of PBT and vPvB assessment

Product:

Assessment	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

12.6 Endocrine disrupting properties

Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Product:

Additional ecological information	:	This product has no known ecotoxicological effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	Where possible recycling is preferred to disposal or incineration.

SECTION 14: Transport information

14.1 UN number or ID number

ADR	:	UN 1972
IMDG	:	UN 1972

14.2 UN proper shipping name

ADR	:	METHANE, REFRIGERATED LIQUID
IMDG	:	METHANE, REFRIGERATED LIQUID

14.3 Transport hazard class(es)

ADR	:	2
IMDG	:	2.1

14.4 Packing group

ADR

Packing group	:	Not assigned by regulation
Classification Code	:	3F
Hazard Identification Number	:	223
Labels	:	2.1
Tunnel restriction code	:	(B/D)

IMDG

Packing group	:	Not assigned by regulation
Labels	:	2.1
EmS Code	:	F-D, S-U

14.5 Environmental hazards

ADR

Environmentally hazardous	:	no

IMDG

Marine pollutant	:	no

14.6 Special precautions for user

Remarks : Other UN-Number: 1971 (METHANE, COMPRESSED)
The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

Category		Quantity 1	Quantity 2
P2	FLAMMABLE GASES	10 t	50 t

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of other abbreviations

2004/37/EC	:	Europe. Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work
2017/164/EU	:	Europe. Commission Directive 2017/164/EU establishing a fourth list of indicative occupational exposure limit values
2004/37/EC / STEL	:	Short term exposure limit
2004/37/EC / TWA	:	Long term exposure limit
2017/164/EU / STEL	:	Short term exposure limit
2017/164/EU / TWA	:	Limit Value - eight hours

Further information

Other information	:	Changes since the last version are highlighted in the margin. This version replaces all previous versions.
Issuer	:	Borealis, Group Product Stewardship
Sources of key data used to compile the Safety Data Sheet	:	International Chemical Safety Card, Methane, February 2000 (http://www.inchem.org/documents/icsc/icsc/eics0291.htm) International Chemical Safety Card, Hydrogen, April 2014 (http://www.inchem.org/documents/icsc/icsc/eics0001.htm) Chemical Safety Report, Methane, 2019

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