



# Butene (1-)

## Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

Reference number: EIGA017

Issue date: 16/01/2013 Revision date: 01/10/2025 Supersedes version of: 20/11/2024 Version: 1.4

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

#### 1.1. Product identifier

|                        |                                 |
|------------------------|---------------------------------|
| Product form           | : Substance                     |
| Name                   | : Butene (1-)                   |
| EC Index-No.           | : 601-012-00-4                  |
| EC-No.                 | : 203-449-2                     |
| CAS-No.                | : 106-98-9                      |
| REACH registration No. | : 01-2119456615-34              |
| Product code           | : 000010021785                  |
| Formula                | : C <sub>4</sub> H <sub>8</sub> |

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

##### 1.2.1. Relevant identified uses

|                              |                                                                                                                                                                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relevant identified uses     | : Industrial use. Perform risk assessment prior to use.<br>Test gas/Calibration gas.<br>Chemical reaction / Synthesis.<br>Laboratory use.                                                                                   |
| Use of the substance/mixture | : Aerosol propellant<br>Formulation of mixtures with gas in pressure receptacles.<br>Using gas as feedstock in chemical processes.<br>Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid. |

##### 1.2.2. Uses advised against

|                      |                                                                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Uses advised against | : Consumer use.<br>Uses other than those listed above are not supported, contact your supplier for more information on other uses. |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------|

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

Linde Gas GmbH  
Carl-von-Linde-Platz 1  
A-4651 Stadl-Paura  
Austria  
T +43 50 4273  
[office@at.linde-gas.com](mailto:office@at.linde-gas.com)

#### 1.4. Emergency telephone number

|                  |                                                                   |
|------------------|-------------------------------------------------------------------|
| Emergency number | : UMCO/NCEC: +44 1865 407333 (English); +49 89 220 61012 (German) |
|------------------|-------------------------------------------------------------------|

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

|                  |                                      |      |
|------------------|--------------------------------------|------|
| Physical hazards | Flammable gases, Category 1A         | H220 |
|                  | Gases under pressure : Liquefied gas | H280 |

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Full text of H- and EUH-statements: see section 16

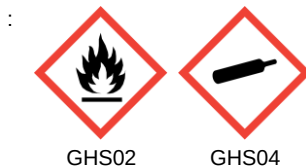
### Adverse physicochemical, human health and environmental effects

No additional information available

## 2.2. Label elements

### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



GHS02

GHS04

Signal word (CLP)

: Danger

Hazard statements (CLP)

: H220 - Extremely flammable gas.  
H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)

- Prevention : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Response : 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

Other hazards

: Asphyxiant in high concentrations. These high concentrations are within the flammability range. Contact with liquid may cause cold burns/frostbite. The substance/mixture has no endocrine disrupting properties.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

| Name        | Product identifier                                                                                 | %   | Classification according to Regulation (EC) No. 1272/2008 [CLP]<br>ATE, EUH-statements, M-Factors |
|-------------|----------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------|
| Butene (1-) | CAS-No.: 106-98-9<br>EC-No.: 203-449-2<br>EC Index-No.: 601-012-00-4<br>REACH-no: 01-2119456615-34 | 100 | Flam. Gas 1A, H220<br>Press. Gas (Liq.), H280                                                     |

Full text of H- and EUH-statements: see section 16

Contains no other components or impurities which will influence the classification of the product.

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- First-aid measures after skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

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First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.  
First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

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

Most important symptoms and effects, both acute and delayed : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. See section 11.

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

None.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media : Dry powder. Carbon dioxide. Shutting off the source of the gas is the preferred method of control. Water spray or fog. Be aware of the risk of formation of static electricity with the use of CO2 extinguishers. Do not use them in places where a flammable atmosphere may be present.  
Unsuitable extinguishing media : Do not use water jet to extinguish.

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

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.  
Specific hazards : Exposure to fire may cause containers to rupture/explode.  
Hazardous combustion products : Carbon monoxide.

### 5.3. Advice for firefighters

Specific methods : Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.  
Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.  
If possible, stop flow of product.  
Use water spray or fog to knock down fire fumes if possible.  
Move containers away from the fire area if this can be done without risk.  
Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.  
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.  
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters. EN 15090 Footwear for firefighters. EN 443 Helmets for fire fighting in buildings and other structures.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

## SECTION 6: Accidental release measures

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

#### 6.1.1. For non-emergency personnel

Emergency procedures : Act in accordance with local emergency plan. Try to stop release. Evacuate area. Eliminate ignition sources. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Stay upwind. See section 8 of the SDS for more information on personal protective equipment.

#### 6.1.2. For emergency responders

Emergency procedures : Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. See section 5.3 of the SDS for more information.

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### 6.2. Environmental precautions

Try to stop release.

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

Methods and material for containment and cleaning up : Ventilate area.

### 6.4. Reference to other sections

See also sections 8 and 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Safe use of the product

- : Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
- Purge air from system before introducing gas.
- Take precautionary measures against static discharge.
- Keep away from ignition sources (including static discharges).
- Consider the use of only non-sparking tools.
- Ensure equipment is adequately earthed.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Only experienced and properly instructed persons should handle gases under pressure.
- Consider pressure relief device(s) in gas installations.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Do not smoke while handling product.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid suck back of water, acid and alkalis.
- Do not breathe gas.
- Avoid release of product into work area.

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
- Leave valve protection caps, when provided, in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- If user experiences any difficulty operating valve discontinue use and contact supplier.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to transfer gases from one cylinder/container to another.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Do not remove or deface labels provided by the supplier for the identification of the content of the container.
- Suck back of water into the container must be prevented.
- Open valve slowly to avoid pressure shock.

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

Conditions for safe storage, including any incompatibilities

- : Segregate from oxidant gases and other oxidants in store.
- All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.
- Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Container valve guards or caps, when provided, should be in place.
- Containers should be stored in the vertical position and properly secured to prevent them from falling over.
- Stored containers should be periodically checked for general condition and leakage.
- Keep container below 50°C in a well ventilated place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible materials.

### 7.3. Specific end use(s)

None.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

#### 8.1.1 National occupational exposure and biological limit values

No additional information available

#### 8.1.2. Recommended monitoring procedures

No additional information available

#### 8.1.3. Air contaminants formed

No additional information available

#### 8.1.4. DNEL and PNEC

| Butene (1-) (106-98-9)                   |                        |
|------------------------------------------|------------------------|
| DNEL/DMEL (Workers)                      |                        |
| Long-term - systemic effects, inhalation | 769 mg/m <sup>3</sup>  |
| Long-term - local effects, inhalation    | 1530 mg/m <sup>3</sup> |
| PNEC (additional information)            |                        |
| Additional information                   | None established.      |

#### 8.1.5. Control banding

No additional information available

### 8.2. Exposure controls

#### Appropriate engineering controls

##### Appropriate engineering controls:

Provide adequate general and local exhaust ventilation. Product to be handled in a closed system. Gas detectors should be used when flammable gases/vapours may be released. Consider the use of a work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available).

#### Personal protection equipment

##### Personal protective equipment:

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered: PPE compliant to the recommended EN/ISO standards should be selected.

#### Eye and face protection

##### Eye protection:

Wear goggles when transfilling or breaking transfer connections. Standard EN 166 - Personal eye-protection - specifications

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### Skin protection

#### Hand protection:

Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher. Recommended types include wrist gloves from leather or synthetic material with equivalent performance, fabric gloves, fabric gloves with leather palms. Wear cold insulating gloves when transfilling or breaking transfer connections. Standard EN 511 - Cold insulating gloves, performance level 1 or higher. Recommended types include insulated gauntlets or gloves specifically selected to prevent liquid penetration and ingress of cryogenic liquids and to provide mechanical resistance. Fluoroelastomer (Viton®) (FKM)

### Respiratory protection

#### Respiratory protection:

Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres. Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

### Thermal hazards

#### Thermal hazard protection:

None in addition to the above sections.

### Environmental exposure controls

#### Environmental exposure controls:

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

#### Other information:

Consider the use of flame resistant anti-static safety clothing. Standard EN ISO 14116 - Limited flame spread materials. Standard EN 1149-5 - Protective clothing: Electrostatic properties. Wear safety shoes while handling containers. Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

## SECTION 9: Physical and chemical properties

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

|                                                 |                                                                         |
|-------------------------------------------------|-------------------------------------------------------------------------|
| Appearance                                      |                                                                         |
| Physical state                                  | : Gas                                                                   |
| Colour                                          | : Colourless.                                                           |
| Form                                            | : Liquefied gas                                                         |
| Odour                                           | : Sweetish. Poor warning properties at low concentrations.              |
| Odour threshold                                 | : Odour threshold is subjective and inadequate to warn of overexposure. |
| Melting point                                   | : -185 °C                                                               |
| Freezing point                                  | : Not applicable                                                        |
| Boiling point                                   | : -6.26 °C                                                              |
| Flammability                                    | : Extremely flammable gas.                                              |
| Oxidising properties                            | : No oxidising properties.                                              |
| Explosive limits                                | : Not known.                                                            |
| Lower explosion limit                           | : 1.2 vol %                                                             |
| Upper explosion limit                           | : 10.6 vol %                                                            |
| Flash point                                     | : Not applicable for gases and gas mixtures.                            |
| Auto-ignition temperature                       | : 360 °C                                                                |
| Decomposition temperature                       | : Not applicable.                                                       |
| pH                                              | : Not applicable for gases and gas mixtures.                            |
| Viscosity, kinematic                            | : Not applicable for gases and gas mixtures.                            |
| Viscosity, dynamic                              | : 0.008 mPa·s                                                           |
| Solubility in water                             | : No reliable data available.                                           |
| Partition coefficient n-octanol/water (Log Kow) | : 2.4                                                                   |
| Partition coefficient n-octanol/water (Log Pow) | : Not applicable for gas mixtures.                                      |
| Vapour pressure                                 | : 2.6 bar(a)                                                            |
| Vapour pressure at 50°C                         | : 5.9 bar(a)                                                            |
| Critical pressure                               | : 4020 kPa                                                              |
| Density                                         | : Not applicable for gases and gas mixtures.                            |
| Relative density                                | : 0.63                                                                  |
| Relative vapour density at 20°C                 | : Not applicable.                                                       |
| Relative gas density                            | : 2                                                                     |

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Particle characteristics : Not applicable  
Not applicable for gases and gas mixtures.  
Nanoforms are not relevant for gases and gas mixtures.

### 9.2. Other information

#### 9.2.1. Information with regard to physical hazard classes

Tci : 3.3 %  
Critical temperature : 146 °C

#### 9.2.2. Other safety characteristics

Molecular mass : 56 g/mol  
Gas group : Press. Gas (Liq.)  
Additional information : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

Can form explosive mixture with air. May react violently with oxidants.

### 10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Avoid moisture in installation systems.

### 10.5. Incompatible materials

Air, Oxidisers. For additional information on compatibility refer to ISO 11114.

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

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

Acute toxicity : Toxicological effects not expected by inhalation from this product if occupational exposure limit values are not exceeded.  
Acute toxicity (oral) : Not classified  
Acute toxicity (dermal) : Not classified  
Acute toxicity (inhalation) : Not classified  
Skin corrosion/irritation : No known effects from this product.  
pH: Not applicable for gases and gas mixtures.  
Serious eye damage/irritation : No known effects from this product.  
pH: Not applicable for gases and gas mixtures.  
Respiratory or skin sensitisation : No known effects from this product.  
Germ cell mutagenicity : No known effects from this product.  
Carcinogenicity : No known effects from this product.  
Reproductive toxicity : Not classified  
Toxic for reproduction : Fertility : No known effects from this product.  
Toxic for reproduction : unborn child : No known effects from this product.  
STOT-single exposure : No known effects from this product.  
STOT-repeated exposure : No known effects from this product.  
Aspiration hazard : Not applicable for gases and gas mixtures.

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### Butene (1-) (106-98-9)

|                      |                                            |
|----------------------|--------------------------------------------|
| Viscosity, kinematic | Not applicable for gases and gas mixtures. |
| Hydrocarbon          | Yes                                        |

### 11.2. Information on other hazards

#### 11.2.1. Endocrine disrupting properties

No additional information available

#### 11.2.2. Other information

Other information : The substance/mixture has no endocrine disrupting properties.

## SECTION 12: Ecological information

### 12.1. Toxicity

Assessment : Classification criteria are not met.  
Hazardous to the aquatic environment, short-term : Not classified  
(acute)  
Hazardous to the aquatic environment, long-term : Not classified  
(chronic)  
Not rapidly degradable

### Butene (1-) (106-98-9)

|                                 |          |
|---------------------------------|----------|
| LC50 96 h - Fish [mg/l]         | 19 mg/l  |
| EC50 48h - Daphnia magna [mg/l] | 11 mg/l  |
| EC50 72h - Algae [mg/l]         | 6.5 mg/l |

### 12.2. Persistence and degradability

### Butene (1-) (106-98-9)

|            |                            |
|------------|----------------------------|
| Assessment | Not readily biodegradable. |
|------------|----------------------------|

### 12.3. Bioaccumulative potential

### Butene (1-) (106-98-9)

|                                                 |                                  |
|-------------------------------------------------|----------------------------------|
| Partition coefficient n-octanol/water (Log Pow) | Not applicable for gas mixtures. |
| Partition coefficient n-octanol/water (Log Kow) | 2.4                              |

### 12.4. Mobility in soil

### Butene (1-) (106-98-9)

|            |                                                                                                                                 |
|------------|---------------------------------------------------------------------------------------------------------------------------------|
| Assessment | Because of its high volatility, the product is unlikely to cause ground or water pollution.<br>Partition into soil is unlikely. |
|------------|---------------------------------------------------------------------------------------------------------------------------------|

### 12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

### 12.6. Endocrine disrupting properties

Other adverse effects : No known effects from this product.  
Assessment : The substance/mixture has no endocrine disrupting properties.

### 12.7. Other adverse effects

Other adverse effects : No known effects from this product.



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Effect on the ozone layer : No effect on the ozone layer.  
Effect on global warming : No known effects from this product.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Ensure that the emission levels from local regulations or operating permits are not exceeded. Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.eu> for more guidance on suitable disposal methods. Do not discharge into any place where its accumulation could be dangerous. Return unused product in original container to supplier.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 \*: Gases in pressure containers (including halons) containing hazardous substances.

#### 13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

### SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

| ADR                                                                                 | IMDG                                                                                | IATA                                                                                | ADN                                                                                   | RID                                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>14.1. UN number or ID number</b>                                                 |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| UN 1012                                                                             | UN 1012                                                                             | UN 1012                                                                             | UN 1012                                                                               | UN 1012                                                                               |
| <b>14.2. UN proper shipping name</b>                                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| BUTYLENE (1-BUTYLENE)                                                               | BUTYLENE                                                                            | Butylene                                                                            | 1-BUTYLENE                                                                            | 1-BUTYLENE                                                                            |
| <b>Transport document description</b>                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| UN 1012 BUTYLENE (1-BUTYLENE), 2.1, (B/D)                                           | UN 1012 BUTYLENE, 2.1                                                               | UN 1012 Butylene, 2.1                                                               | UN 1012 1-BUTYLENE, 2.1                                                               | UN 1012 1-BUTYLENE, 2.1                                                               |
| <b>14.3. Transport hazard class(es)</b>                                             |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| 2.1                                                                                 | 2.1                                                                                 | 2.1                                                                                 | 2.1                                                                                   | 2.1                                                                                   |
|  |  |  |  |  |
| <b>14.4. Packing group</b>                                                          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Not applicable                                                                      | Not applicable                                                                      | Not applicable                                                                      | Not applicable                                                                        | Not applicable                                                                        |
| <b>14.5. Environmental hazards</b>                                                  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Dangerous for the environment: No                                                   | Dangerous for the environment: No<br>Marine pollutant: No                           | Dangerous for the environment: No                                                   | Dangerous for the environment: No                                                     | Dangerous for the environment: No                                                     |
| No supplementary information available                                              |                                                                                     |                                                                                     |                                                                                       |                                                                                       |

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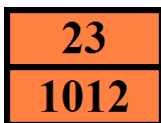
according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

### 14.6. Special precautions for user

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment, Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency, Before transporting product containers: - Ensure there is adequate ventilation, - Ensure that containers are firmly secured, - Ensure valve is closed and not leaking, - Ensure valve outlet cap nut or plug (where provided) is correctly fitted, - Ensure valve protection device (where provided) is correctly fitted.

#### Overland transport

Classification code (ADR) : 2F  
Special provisions (ADR) : 662  
Limited quantities (ADR) : 0  
Excepted quantities (ADR) : E0  
Packing instructions (ADR) : P200  
Mixed packing provisions (ADR) : MP9  
Portable tank and bulk container instructions (ADR) : (M), T50  
Tank code (ADR) : PxBN(M)  
Tank special provisions (ADR) : TA4, TT9  
Vehicle for tank carriage : FL  
Transport category (ADR) : 2  
Special provisions for carriage - Loading, unloading and handling (ADR) : CV9, CV10, CV36  
Special provisions for carriage - Operation (ADR) : S2, S20  
Hazard identification number (Kemler No.) : 23  
Orange plates :



Tunnel restriction code (ADR) : B/D

#### Transport by sea

Limited quantities (IMDG) : 0  
Excepted quantities (IMDG) : E0  
Packing instructions (IMDG) : P200  
Tank instructions (IMDG) : T50  
EmS-No. (Fire) : F-D  
EmS-No. (Spillage) : S-U  
Stowage category (IMDG) : E  
Stowage and handling (IMDG) : SW2  
Properties and observations (IMDG) : Flammable hydrocarbon gas. Explosive limits: 1.6% to 10%. Heavier than air (2.0).

#### Air transport

PCA Excepted quantities (IATA) : E0  
PCA Limited quantities (IATA) : FORBIDDEN  
PCA limited quantity max net quantity (IATA) : FORBIDDEN  
PCA packing instructions (IATA) : FORBIDDEN  
PCA max net quantity (IATA) : FORBIDDEN  
CAO packing instructions (IATA) : 200  
CAO max net quantity (IATA) : 150kg  
Special provisions (IATA) : A1  
ERG code (IATA) : 10L

#### Inland waterway transport

Classification code (ADN) : 2F  
Special provisions (ADN) : 662  
Limited quantities (ADN) : 0  
Excepted quantities (ADN) : E0  
Carriage permitted (ADN) : T  
Equipment required (ADN) : PP, EX, A  
Ventilation (ADN) : VE01

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Number of blue cones/lights (ADN) : 1

### Rail transport

Classification code (RID) : 2F  
Special provisions (RID) : 662  
Limited quantities (RID) : 0  
Excepted quantities (RID) : E0  
Packing instructions (RID) : P200  
Mixed packing provisions (RID) : MP9  
Portable tank and bulk container instructions (RID) : T50(M)  
Tank codes for RID tanks (RID) : PxBN(M)  
Special provisions for RID tanks (RID) : TU38, TE22, TA4, TT9, TM6  
Transport category (RID) : 2  
Special provisions for carriage - Loading, unloading and handling (RID) : CW9, CW10, CW36  
Colis express (express parcels) (RID) : CE3  
Hazard identification number (RID) : 23

### 14.7. Maritime transport in bulk according to IMO instruments

IBC code : Not applicable.

## SECTION 15: Regulatory information

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

#### 15.1.1. EU-Regulations

##### REACH Annex XVII (Restriction List)

| EU restriction list (REACH Annex XVII) |               |                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference code                         | Applicable on | Entry title or description                                                                                                                                                                                                                                                                                                                                                                         |
| 40.                                    | Butene (1-)   | Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not. |

##### REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

##### REACH Candidate List (SVHC)

Contains no substance(s) listed on the REACH Candidate List

##### PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)

##### POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

##### Ozone Regulation (1005/2009)

Not listed on the Ozone Depletion list (Regulation EU 2024/590)

##### VOC Directive (2004/42)

Restrictions on use : None.

##### Seveso Directive (Disaster Risk Reduction)

Seveso Directive : 2012/18/EU (Seveso III) : Listed.

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| Seveso III Part II (Named dangerous substances)                            | Qualifying quantity (tonnes) |            |
|----------------------------------------------------------------------------|------------------------------|------------|
|                                                                            | Lower-tier                   | Upper-tier |
| Liquefied flammable gases, Category 1 or 2 (including LPG) and natural gas | 50                           | 200        |

### Explosives Precursors Regulation (EU 2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

### Drug Precursors Regulation (EC 273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

### 15.1.2. National regulations

Ensure all national/local regulations are observed.

Safety data sheet in accordance with commission regulation (EU) No 2020/878.

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work

Directive 2016/425/EEC on personal protective equipment

Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)

Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.

This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

### 15.2. Chemical safety assessment

A CSA has been carried out.

## SECTION 16: Other information

### Indication of changes:

Safety data sheet in accordance with commission regulation (EU) No 2020/878.

| Abbreviations and acronyms: |                                                                                                 |
|-----------------------------|-------------------------------------------------------------------------------------------------|
| ADN                         | European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways |
| ADR                         | ADR - Agreement concerning the International Carriage of Dangerous Goods by Road                |
| ATE                         | ATE - Acute Toxicity Estimate                                                                   |
| BLV                         | Biological limit value                                                                          |
| BOD                         | Biochemical oxygen demand (BOD)                                                                 |
| CAO                         | Cargo Aircraft only / Cargo Aircraft only                                                       |
| CAS-No.                     | Chemical Abstract Service number                                                                |
| CLP                         | CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008               |
| COD                         | Chemical oxygen demand (COD)                                                                    |
| CSA                         | CSA - Chemical Safety Assessment                                                                |
| DMEL                        | Derived Minimal Effect level                                                                    |
| DNEL                        | Derived-No Effect Level                                                                         |
| EC50                        | Median effective concentration                                                                  |
| EC                          | European Inventory of Existing Commercial Chemical Substances                                   |
| ED                          | Endocrine disruptor                                                                             |
| EINECS                      | EINECS - European Inventory of Existing Commercial Chemical Substances                          |
| EN                          | European Standard                                                                               |
| IARC                        | International Agency for Research on Cancer                                                     |

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### Abbreviations and acronyms:

|         |                                                                                                   |
|---------|---------------------------------------------------------------------------------------------------|
| IATA    | International Air Transport Association                                                           |
| IMDG    | International Maritime Dangerous Goods                                                            |
| IOELV   | Indicative Occupational Exposure Limit Value                                                      |
| LC50    | Median lethal concentration                                                                       |
| LD50    | Median lethal dose                                                                                |
| LOAEL   | Lowest Observed Adverse Effect Level                                                              |
| NOAEC   | No-Observed Adverse Effect Concentration                                                          |
| NOAEL   | No-Observed Adverse Effect Level                                                                  |
| NOEC    | No-Observed Effect Concentration                                                                  |
| N.O.S.  | Not Otherwise Specified                                                                           |
| OECD    | Organisation for Economic Co-operation and Development                                            |
| OEL     | Occupational Exposure Limit                                                                       |
| PBT     | Persistent Bioaccumulative Toxic                                                                  |
| PCA     | Passenger and Cargo Aircraft / Passenger and Cargo Aircraft                                       |
| PNEC    | Predicted No-Effect Concentration                                                                 |
| PPE     | PPE - Personal Protection Equipment                                                               |
| REACH   | Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 |
| RID     | Regulations concerning the International Carriage of Dangerous Goods by Rail                      |
| RMM     | RMM - Risk Management Measures                                                                    |
| STP     | Sewage treatment plant                                                                            |
| ThOD    | Theoretical oxygen demand (ThOD)                                                                  |
| TLM     | Median Tolerance Limit                                                                            |
| TRGS    | Technical Rules for Hazardous Substances                                                          |
| STOT-RE | Specific Target Organ Toxicity-Repeated Exposure                                                  |
| STOT-SE | Specific Target Organ Toxicity-Single Exposure                                                    |
| UFI     | Unique Formula Identifier                                                                         |
| UN      | UN - United Nations                                                                               |
| VOC     | Volatile Organic Compounds                                                                        |
| vPvB    | Very Persistent and Very Bioaccumulative                                                          |
| WGK     | Water Hazard Class                                                                                |

Training advice : Ensure operators understand the flammability hazard.

Other information : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP). Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

### Full text of H- and EUH-statements:

|                   |                                                     |
|-------------------|-----------------------------------------------------|
| Flam. Gas 1A      | Flammable gases, Category 1A                        |
| Press. Gas (Liq.) | Gases under pressure : Liquefied gas                |
| H220              | Extremely flammable gas.                            |
| H280              | Contains gas under pressure; may explode if heated. |

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The classification complies with  
DISCLAIMER OF LIABILITY

- : ATP 12
- : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.  
Details given in this document are believed to be correct at the time of going to press.  
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Safety Data Sheet (SDS), EU AT

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

**End of document**