

## Safety data sheet

### Butane n-, liquefied under pressure

Creation date : 28.01.2005  
Revision date : 21.10.2013

Version : 1.1

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

##### 1.1. Product identifier

###### Product name

Butane n-, liquefied under pressure

###### Trade name

Gas Art. 431 n-Butane 2.5/3.5

EC No (from EINECS): 203-448-7

CAS No: 106-97-8

Index-Nr. 601-004-00-0

Chemical formula C<sub>4</sub>H<sub>10</sub>

REACH Registration number:

01-2119474691-32

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

###### Relevant identified uses

Industrial and professional. Perform risk assessment prior to use.

###### Uses advised against

Consumer use.

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

###### Company identification

Linde Gas GmbH, 4651 Stadl-Paura, Austria

E-Mail Address office@at.linde-gas.com

##### 1.4. Emergency telephone number

Emergency phone numbers (24h): +43 50 4273

#### SECTION 2: Hazards identification

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

###### Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)

Press. Gas (Liquefied gas) - Contains gas under pressure; may explode if heated.

Flam. Gas 1 - Extremely flammable gas.

###### Classification acc. to Directive 67/548/EEC & 1999/45/EC

F+; R12

Extremely flammable.

###### Risk advice to man and the environment

Liquefied gas.

Contact with liquid may cause cold burns/frost bite.

##### 2.2. Label elements

###### - Labelling Pictograms



###### - Signal word

Danger

###### - Hazard Statements

H280 Contains gas under pressure; may explode if heated.

H220 Extremely flammable gas.

##### - Precautionary Statements

###### Precautionary Statement Prevention

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

###### Precautionary Statement Response

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 Eliminate all ignition sources if safe to do so.

###### Precautionary Statement Storage

P403 Store in a well-ventilated place.

###### Precautionary Statement Disposal

None.

##### 2.3. Other hazards

Contact with liquid may cause cold burns/frost bite.

#### SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

##### 3.1. Substances

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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 General Information:

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

###### First Aid Inhalation:

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

###### First Aid Skin / Eye:

For liquid spillage - flush with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. Immediately flush eyes thoroughly with water for at least 15 minutes.

###### First Aid Ingestion:

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Ingestion is not considered a potential route of exposure.

#### 4.2. 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. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. Irregular cardiac activity.

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

None.

### SECTION 5: Fire fighting measures

#### 5.1. Extinguishing media

##### Suitable extinguishing media

Water fog. Dry powder.

##### Unsuitable extinguishing media

Do not use a solid water stream.

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

##### Specific hazards

Exposure to fire may cause containers to rupture/explode.

##### Hazardous combustion products

If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:

Carbon monoxide, Carbon dioxide.

#### 5.3. Advice for fire-fighters

##### Specific methods

If possible, stop flow of product. Move container away or cool with water from a protected position. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Prevent water used in emergency cases from entering sewers and drainage systems.

##### Special protective equipment for fire-fighters

Use self-contained breathing apparatus and chemically protective clothing. Clothing for fire-fighters conforming to EN 469 will provide a basic level of protection from chemical incidents. EN 469:2005: Protective clothing for firefighters. Performance requirements for protective clothing for firefighting.

### SECTION 6: Accidental release measures

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

Use self-contained breathing apparatus and chemically protective clothing. Evacuate area. Ensure adequate air ventilation. Eliminate ignition sources. Consider the risk of potentially explosive atmospheres. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

#### 6.2. Environmental precautions

Try to stop release.

#### 6.3. 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

Only experienced and properly instructed persons should handle gases under pressure. The substance must be handled in accordance with good industrial hygiene and safety procedures. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Take precautionary measures against static discharges. Purge air from system before introducing gas. Keep away from ignition sources (including static discharges). Do not smoke while handling product. Assess the risk of a potentially explosive atmosphere and the need for explosion-proof equipment. Ensure equipment is adequately earthed. Consider the use of only non-sparking tools. Ensure the complete gas system has been (or is regularly) checked for leaks before use. Refer to supplier's handling instructions. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Protect containers from physical damage; do not drag, roll, slide or drop. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Leave valve protection caps 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 container 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 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 container contents.

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

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

#### 7.3. Specific end use(s)

None.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

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**Exposure limit value**

Value type	(a)	value	Note
TLV (ACGIH)		1.000 ppm	2011
Austria - MAK		1.900 mg/m <sup>3</sup>	2011

**8.2. Exposure controls****Appropriate engineering controls**

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. Keep concentrations well below occupational exposure limits. Gas detectors should be used when quantities of flammable gases/vapours may be released. Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation. The substance is not classified for human health hazards or for environment effects and it is not PBT or vPvB so that no exposure assessment or risk characterisation is required. For tasks where the intervention of workers is required, the substance must be handled in accordance with good industrial hygiene and safety procedures.

**Personal protective equipment****Eye and face protection**

Protect eyes, face and skin from liquid splashes. Wear a face-shield when transfilling and breaking transfer connections. Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Full-face mask recommended

**Guideline:**

EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking

**Skin protection****Hand protection**

Advice: Wear cold insulating gloves.

Guideline: EN 511 Protective gloves against cold.

Advice: Wear working gloves and safety shoes while handling containers.

**Body protection**

Protect eyes, face and skin from contact with product. Keep suitable chemically resistant protective clothing readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

**Guideline:**

EN 943: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Performance requirements for gas-tight (Type 1) chemical protective suits for emergency teams

**Other protection**

Wear flame resistant/retardant clothing. Take precautionary measures against static discharges. Wear working gloves and safety shoes while handling containers. EN ISO 20345 Personal protective equipment - Safety footwear.

**Respiratory protection**

Keep self contained breathing apparatus readily available for emergency use., Use SCBA in the event of high concentrations, The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD., When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used.

**Guideline:**

EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking

**Material:**

Filter AX

**Guideline:**

EN 14387: Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, marking

**Thermal hazards**

If there is a risk of contact with the liquid, all protective equipment should be suitable for extremely low temperatures.

**Environmental Exposure Controls**

Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

**SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties****General information**

**Appearance/Colour:** Colourless gas.

**Odour:** Sweetish. Poor warning properties at low concentrations. Stenchant often added

**Odour threshold:**

Odour threshold is subjective and inadequate to warn for over exposure.

**Melting point:** -138 °C

**Boiling point:** -0,5 °C

**Flash point:** Not applicable for gases and gas mixtures.

**Evaporation rate:** Not applicable for gases and gas mixtures.

**Flammability range:** 1,4 %(V) - 9,4 %(V)

**Vapour Pressure 20 °C:** 2 bar

**Relative density, gas (Air=1):** 2,1

**Solubility in water:** 88 mg/l

**Partition coefficient: n-octanol/water:** 2,89 logPow

**Autoignition temperature:** 365 °C

**Molecular weight:** 58 g/mol

**Critical temperature:** 152 °C

**Relative density, liquid (Water=1):** 0,6

**Critical pressure:** 37,96 bar

**9.2. Other 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**

Unreactive under normal conditions.

**10.2. Chemical stability**

Stable under normal conditions.

**10.3. Possibility of hazardous reactions**

May react violently with oxidants., Can form potentially explosive atmosphere in air.

**10.4. Conditions to avoid**

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Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

#### 10.5. Incompatible materials

Air, Oxidiser. May react violently with alkalis. For material compatibility see latest version of ISO-11114.

#### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Carbon dioxide, Carbon monoxide.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

##### Acute oral toxicity

No data available.

##### Acute inhalation toxicity

Value: LC50

Species: Rat

Exposure time: 4 h

Value in standard unit mg/l: 658 mg/l

##### Acute dermal toxicity

No data available.

##### Acute toxicity other routes

Ingestion is not considered a potential route of exposure.

##### Skin irritation

Not classified as an irritant

##### Eye irritation

Not classified as an irritant

##### Sensitization

No known effects from this product.

##### Repeated dose toxicity

No data available.

##### Assessment mutagenicity

There is no evidence of mutagenic potential.

##### Assessment carcinogenicity

No evidence of carcinogenic effects.

##### Assessment toxicity to reproduction

No indication of toxic effects.

##### Assessment teratogenicity

No indication of teratogenic effects.

##### Experiences with human exposure

Irregular cardiac activity.

Depression of central nervous system.

### SECTION 12: Ecological information

#### 12.1. Toxicity

No known ecological damage caused by this product.

##### Acute and prolonged toxicity fish

Species: Various (Freshwater)

Exposure time: 96 h

Value type: LC50

Value in standard unit mg/l: 24,11 mg/l

Method: Calculated

#### Acute toxicity aquatic invertebrates

Test type: Fresh water

Species: Water flea (Daphnia magna)

Exposure time: 48 h

Value type: LC50

Value in standard unit mg/l: 14,22 mg/l

Method: Calculated

#### Toxicity aquatic plants

Test type: Fresh water

Species: Algae

Exposure time: 96 h

Value type: EC50

Value in standard unit mg/l: 7,71 mg/l

Method: Calculated

#### 12.2. Persistence and degradability

##### Photo degradation

Half life (direct photolysis): 3,2 d

##### Stability in water

Half-life value: < 62,4 h

#### 12.3. Bioaccumulative potential

The substance has no potential for bioaccumulation.

#### 12.4. Mobility in soil

No data available.

#### 12.5. Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

#### 12.6. Other adverse effects

Not applicable.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

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. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods.

Gases in pressure containers (including halons) containing dangerous substances

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### SECTION 14: Transport information

#### ADR/RID

#### 14.1. UN number

1011

#### 14.2. UN proper shipping name

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**14.3. Transport hazard class(es)**

Class: 2  
Classification Code: 2F  
Labels: 2.1  
Hazard number: 23  
Tunnel restriction code: (B/D)  
Emergency Action Code: 2YE

**14.4. Packing group (Packing Instruction)**

P200

**14.5. Environmental hazards**

None.

**14.6. Special precautions for user**

None.

**IMDG****14.1. UN number**

1011

**14.2. UN proper shipping name**

Butane

**14.3. Transport hazard class(es)**

Class: 2.1  
Labels: 2.1  
EmS: F-D, S-U

**14.4. Packing group (Packing Instruction)**

P200

**14.5. Environmental hazards**

None.

**14.6. Special precautions for user**

None.

**14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

**IATA****14.1. UN number**

1011

**14.2. UN proper shipping name**

Butane

**14.3. Transport hazard class(es)**

Class: 2.1  
Labels: 2.1

**14.4. Packing group (Packing Instruction)**

P200

**14.5. Environmental hazards**

None.

**14.6. Special precautions for user**

None.

**Other transport information**

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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

**SECTION 15: Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

Seveso Directive 96/82/EC: Listed

**Water pollution class**

Not polluting to waters according to VwVwS from 17.05.99.

**15.2. Chemical safety assessment**

A CSA does not need to be carried out for this product.

**SECTION 16: Other information**

Ensure all national/local regulations are observed. Ensure operators understand the flammability hazard. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Contact with liquid may cause cold burns/frost bite.

**Advice**

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. Details given in this document are believed to be correct at the time of going to press.

**Further information**

Kühn-Birett: Merkblätter gefährliche Arbeitsstoffe, Hommel: Handbook of dangerous goods

Linde safety advice

No. 14 Handling liquefied petroleum gas

**End of document**