

## Butane

- n-Butane
- Methyleneethyl methane

**Formula** CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>

**Structure** 

**Description** Contains isobutane and n-butane, which are chemically similar. An colorless gas with a faint disagreeable odor.

**Uses** As producer gas, in manufacture of synthetic rubbers.

### Registry Numbers and Inventories.

<b>CAS</b>	106-97-8
<b>EC (EINECS/ELINCS)</b>	203-448-7
<b>EC Index Number</b>	601-004-01-8
<b>EC Class</b>	Extremely flammable; Carcinogenic Category 1; Mutagenic Category 2
<b>EC Risk Phrase</b>	R 12
<b>EC Safety Phrase</b>	S 9 16 33
<b>RTECS</b>	EJ4200000
<b>RTECS class</b>	Other
<b>UN (DOT)</b>	1075
<b>Merck</b>	13,1505
<b>Beilstein/Gmelin</b>	969129
<b>Beilstein Reference</b>	4-01-00-00236
<b>Swiss Giftliste 1</b>	G-1312
<b>Canada DSL/NDSL</b>	DSL
<b>US TSCA</b>	Listed
<b>Australia AICS</b>	Listed
<b>New Zealand</b>	Listed
<b>Japan ENCS (MITI)</b>	Listed
<b>Korea ECL</b>	Listed

**Odor Threshold** Odor threshold 50,000 ppm

### Properties.

<b>Formula</b>	C <sub>4</sub> H <sub>10</sub>
<b>Formula mass</b>	58.12
<b>Melting point, °C</b>	-138.4

<b>Boiling point, °C</b>	-0.45
<b>Vapor pressure, mm<sub>Hg</sub></b>	1556 (20 C)
<b>Vapor density (air=1)</b>	2.053
<b>Critical temperature</b>	153.2
<b>Critical pressure</b>	37.4
<b>Density</b>	0.60 g/cm <sup>3</sup> (20 C)
<b>Solubility in water</b>	0.061 g/L (20 C)
<b>Viscosity</b>	0.007 cp (20 C)
<b>Surface tension</b>	14.87 g/s <sup>2</sup> (20 C)
<b>Refractive index</b>	1.3326 (20 C)
<b>Partition coefficient, pK<sub>ow</sub></b>	2.89
<b>Thermal expansion</b>	0.002/K at 20 C
<b>Heat of fusion</b>	4.7 kJ/mol
<b>Heat of vaporization</b>	22.4 kJ/mol
<b>Heat of combustion</b>	-2634 kJ/mol

### Hazards and Protection.

<b>Storage</b>	Keep in a cool, dry, dark location in a tightly sealed container or cylinder. Keep away from incompatible materials, ignition sources and untrained individuals. Secure and label area. Protect containers/cylinders from physical damage.
<b>Handling</b>	All chemicals should be considered hazardous. Avoid direct physical contact. Use appropriate, approved safety equipment. Untrained individuals should not handle this chemical or its container. Handling should occur in a chemical fume hood.
<b>Protection</b>	Wear appropriate protective gloves, clothing and goggles. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.
<b>Respirators</b>	Self-contained breathing apparatus and safety goggles.
<b>Small spills/leaks</b>	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Do not direct water at spill or source of leak. Prevent spreading of vapors through sewers, ventilation systems and confined areas. Isolate area until gas has dispersed. CAUTION: When in contact with refrigerated/cryogenic liquids, many

	materials become brittle and are likely to break without warning.
<b>Stability</b>	Extremely
<b>Incompatibilities</b>	Incompatible with strong oxidizing agents such as nitric acid.
<b>Fire.</b>	
<b>Flash Point, °C</b>	-71
<b>Autoignition, °C</b>	405
<b>Upper exp. limit, %</b>	8.5
<b>Lower exp. limit, %</b>	1.8
<b>Fire fighting</b>	DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED. SMALL FIRES: Dry chemical or carbon dioxide. LARGE FIRES: Water spray or fog. Move containers from fire area if you can do it without risk. FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
<b>Fire potential</b>	EXTREMELY FLAMMABLE.
<b>Hazards</b>	Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Ruptured cylinders may rocket.
<b>Combustion products</b>	When heated, emits acrid fumes.
<b>NFPA Health</b>	1
<b>Flammability</b>	4
<b>Reactivity</b>	0
<b>Health.</b>	
<b>Exposure limit(s)</b>	600 ppm
<b>Poison_Class</b>	-
<b>Exposure effects</b>	Rapid breathing and rapid heart rate are common. In severe cases abnormally low blood pressure, apnea, and cardiac arrest develop. Various disturbances including headache, dizziness, mood disturbances, numbness of the extremities, sleepiness, mental confusion, poor judgement and coordination, and memory loss may occur. Prolonged or severe hypoxia results in unconsciousness. Prolonged asphyxia may produce CNS injury. Hemiparesis has been reported with volatile substance abuse.

	Cerebral edema with brainstem herniation may occur. Seizures have been reported following intentional inhalation.
<b>Ingestion</b>	Nausea, vomiting, and gastrointestinal hemorrhage may develop.
<b>Inhalation</b>	Hyperventilation may develop.
<b>Skin</b>	Dermal exposure may cause frostbite injury. Severe tissue burns have been reported.
<b>Eyes</b>	Decreases in night vision, visual acuity, and visual fields (tunnel vision) may occur. Frothy mucous may be seen.

**First aid**

<b>Ingestion</b>	This compound is a gas, therefore inhalation is the first route of exposure.
<b>Inhalation</b>	<p>IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used.</p> <p>CAUTION: Exposure of skin to compressed gases may result in freezing of the skin. Treatment for frostbite may be necessary. Remove the victim from the source of contamination.</p>
<b>Skin</b>	<p>IMMEDIATELY wash affected areas gently with COLD water (and soap, if necessary) while removing and isolating all contaminated clothing. Dry carefully with clean, soft towels. If symptoms such as inflammation or irritation develop, IMMEDIATELY call a physician or go to a hospital for treatment.</p>
<b>Eyes</b>	<p>First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. If symptoms (such as redness or irritation) develop, immediately transport the victim to a hospital.</p>

**Transport.**

<b>UN number</b>	1075
<b>Response guide</b>	<a href="#">115</a>

**Hazard class** 2.1



**USCG CHRIS Code** BUT

**USCG**

<b>Compatatibility Group</b>	31 Paraffins
<b>Std. Transport #</b>	4905706 4905422 4905702
<b>IMO Gas Code</b>	B

**BUTANE****0232**

November 2003

CAS No: 106-97-8  
 RTECS No: EJ4200000  
 UN No: 1011  
 EC No: 601-004-00-0

n-Butane  
 (cylinder)  
 $C_4H_{10}$   
 Molecular mass: 58.1

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
<b>FIRE</b>	Extremely flammable.	NO open flames, NO sparks, and NO smoking.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with powder, carbon dioxide.
<b>EXPLOSION</b>	Gas/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Use non-sparking handtools.	In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.
<b>EXPOSURE</b>			
<b>Inhalation</b>	Drowsiness. Unconsciousness.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
<b>Skin</b>	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves. Protective clothing.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention.
<b>Eyes</b>	ON CONTACT WITH LIQUID: FROSTBITE.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
<b>Ingestion</b>			

**SPILLAGE DISPOSAL****PACKAGING & LABELLING**

Evacuate danger area! Consult an expert! Remove all ignition sources. Ventilation. NEVER direct water jet on liquid. Personal protection: self-contained breathing apparatus.

**EU classification**  
 F+ Symbol  
 R: 12  
 S: (2-)9-16-33  
 Note: C  
**UN classification**  
 UN Hazard Class: 2.1

**EMERGENCY RESPONSE****SAFE STORAGE**

Transport Emergency Card: TEC (R)-20S1011  
 NFPA Code: H1; F4; R0

Fireproof. Cool.



## IMPORTANT DATA

**Physical State; Appearance**

ODOURLESS, COLOURLESS COMPRESSED LIQUEFIED GAS.

**Physical dangers**

The gas is heavier than air and may travel along the ground; distant ignition possible, and may accumulate in low ceiling spaces causing deficiency of oxygen. As a result of flow, agitation, etc., electrostatic charges can be generated.

**Occupational exposure limits**

TLV: (aliphatic hydrocarbons gases, Alkane C1-C4) 1000 ppm (as TWA) (ACGIH 2005).

MAK: 1000 ppm, 2400 mg/m<sup>3</sup>; Peak limitation category: II(4);

Pregnancy risk group: IIc; (DFG 2003).

**Routes of exposure**

The substance can be absorbed into the body by inhalation.

**Inhalation risk**

On loss of containment this liquid evaporates very quickly displacing the air and causing a serious risk of suffocation when in confined areas.

**Effects of short-term exposure**

Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the central nervous system.

## PHYSICAL PROPERTIES

Boiling point: -0.5-C

Melting point: -138-C

Relative density (water = 1): 0.6

Solubility in water, g/100 ml at 20-C: 0.0061

Vapour pressure, kPa at 21.1-C: 213.7

Relative vapour density (air = 1): 2.1

Flash point: -60-C

Auto-ignition temperature: 365-C

Explosive limits, vol% in air: 1.8-8.4

Octanol/water partition coefficient as log Pow: 2.89

## ENVIRONMENTAL DATA

## NOTES

Check oxygen content before entering area.

Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

Information except physical properties also apply for Isobutane (CAS 75-28-5).

High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death.

Card has been partly updated in October 2005. See section Physical properties.

## ADDITIONAL INFORMATION

## LEGAL NOTICE

Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible for the use which might be made of this information

# 国際化学物質安全性カード

ICSC番号:0232

ブタン

ブタン  
BUTANE  
n-Butane  
(圧力容器)(液化)  
 $C_4H_{10}$   
分子量:58.1

CAS登録番号:106-97-8  
RTECS番号:EJ4200000  
ICSC番号:0232  
国連番号:1011  
EC番号:601-004-00-0

災害/ 暴露のタイプ	一次災害/ 急性症状	予防	応急処置/ 消火薬剤
火災	引火性がきわめて高い。	裸火禁止、火花禁止、禁煙。	供給源を遮断する。それが不可能でかつ周辺に危険が及ばなければ、燃え尽きるにまかせろ。その他の場合は、粉末消火薬剤、二酸化炭素を用いて消火する。
爆発	気体/空気の混合気体は爆発性である。	密閉系、換気、防爆型電気および照明設備。液状であれば、帯電を防ぐ(例えばアースを使用)。防爆用工具を使用する。	火災時:水を噴霧して圧力容器を冷却する。 安全な場所から消火作業を行う。
身体への暴露			
吸入	嗜眠、意識喪失。	密閉系および換気。	新鮮な空気、安静。人工呼吸が必要なことがある。医療機関に連絡する。
皮膚	液体に触れた場合:凍傷。	保温用手袋、保護衣。	凍傷の場合:多量の水で洗い流し、衣服は脱がせない。 医療機関に連絡する。
眼	液体に触れた場合:凍傷。	顔面シールド。	数分間多量の水で洗い流し(できればコンタクトレンズをはずして)、医師に連れて行く。
経口摂取			
漏洩物処理	貯蔵	包装・表示	
<ul style="list-style-type: none"> <li>危険区域から立ち退く!</li> <li>専門家に相談する!</li> <li>すべての発火源を取り除く。</li> <li>換気。</li> <li>液体に向けて水を噴射してはならない。</li> <li>個人用保護具:自給式呼吸器。</li> </ul>	<ul style="list-style-type: none"> <li>耐火設備(条件)。</li> <li>涼しい場所。</li> </ul>	<ul style="list-style-type: none"> <li>EU分類</li> <li>記号:F+</li> <li>R:12</li> <li>S:(2-)9-16-33</li> <li>Note:C</li> <li>国連危険物分類(UN Hazard Class):2.1</li> </ul>	
重要データは次ページ参照			
ICSC番号:0232		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	



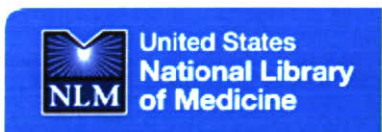
# 国際化学物質安全性カード

ブタン

ICSC番号:0232

重 要 テ ー タ	<p><b>物理的状态; 外観:</b> 無色、無臭の圧縮液化ガス。</p> <p><b>物理的危険性:</b> この気体は空気より重く、地面あるいは床に沿って移動することがある。遠距離引火の可能性はある。天井が低い場所では滞留して酸素欠乏を引き起こすことがある。流動、攪拌などにより、静電気が発生することがある。</p> <p><b>化学的危険性:</b></p> <p><b>許容濃度:</b> TLV: (脂肪族炭化水素ガス(アルカンC1~C4)として) 1000 ppm (TWA) (ACGIH 2006)。</p> <p>MAK: 1000 ppm, 2400 mg/m<sup>3</sup>; ピーク暴露限度カテゴリー: II(4); 妊娠中のリスクグループ: D (DFG 2006)。(訳注: 詳細は DFG の List of MAK and BAT values を参照)</p>	<p><b>暴露の経路:</b> 体内への吸収経路: 吸入。</p> <p><b>吸入の危険性:</b> 容器を開放すると液体がきわめて急速に気化し、閉ざされた場所では空気を追い出し、窒息の危険を生じる。</p> <p><b>短期暴露の影響:</b> この液体が急速に気化すると、凍傷を引き起こすことがある。中枢神経系に影響を与えることがある。</p> <p><b>長期または反復暴露の影響:</b></p>
物理的性質	<ul style="list-style-type: none"> <li>・沸点: -0.5°C</li> <li>・融点: -138°C</li> <li>・比重(水=1): 0.6</li> <li>・水への溶解度: 0.0061 g/100 ml(20°C)</li> </ul>	<ul style="list-style-type: none"> <li>・蒸気圧: 213.7 kPa(21.1°C)</li> <li>・相対蒸気密度(空気=1): 2.1</li> <li>・引火点: -60°C</li> <li>・発火温度: 365°C</li> <li>・爆発限界: 1.8~8.4 vol%(空气中)</li> <li>・log Pow (オクタノール/水分係数): 2.89</li> </ul>
環境に関するデータ		
注		
<ul style="list-style-type: none"> <li>・物理的性質を除く情報は、イソブタン[CAS番号 75-28-5]にも適用される。</li> <li>・区域内に入る前に酸素濃度を測定する。</li> <li>・空気中の濃度が高いと酸素の欠乏が起こり、意識喪失または死亡の危険を伴う。</li> <li>・圧力容器が漏出しているときは、気体が液状で漏れるのを防ぐため、洩れ口を上にする。</li> </ul> <p style="text-align: center;">Transport Emergency Card(輸送時応急処理カード): TEC(R)-20S1011 NFPA(米国防火協会)コード: H(健康危険性)1; F(燃焼危険性)4; R(反応危険性)0</p>		
付加情報		
ICSC番号:0232 更新日: 2003.11		
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## Full Record

**Butane [USAN]**  
**RN: 106-97-8**



### Structure Descriptors

#### InChI

InChI=1/C4H10/c1-3-4-2/h3-4H2,1-2H3

[Download](#) | [View Full InChI](#)

#### Smiles

C(CC)C

[Download](#)

### Names and Synonyms

#### Name of Substance

- [i](#) Butane
- [i](#) Butane [USAN]
- [i](#) n-Butane

#### Synonyms

- [i](#) A 21
- [i](#) A 21 (lowing agent)
- [i](#) Butane
- [i](#) Butanen [Dutch]
- [i](#) Butani [Italian]
- [i](#) Butyl hydride
- [i](#) CCRIS 2279
- [i](#) Diethyl
- [i](#) EINECS 203-448-7
- [i](#) HC 600
- [i](#) HC 600 (hydrocarbon)
- [i](#) HSDB 944
- [i](#) LPG
- [i](#) Liquefied petroleum gas
- [i](#) Methylethylmethane
- [i](#) R 600
- [i](#) R 600 (alkane)
- [i](#) n-Butane

#### Systematic Name

- [i](#) Butane
- [i](#) Butane, pure

[i](#) n-Butane**Superlist Name**[i](#) Butane[i](#) Butane or butane mixtures [UN1011] [Flammable gas][i](#) UN1011[i](#) n-Butane**Registry Numbers****CAS Registry Number**[i](#) 106-97-8**System Generated Number**[i](#) 000106978**Classification Codes****Classification Code**[i](#) Aerosol propellant**Superlist Classification Code**[i](#) TWA (800 ppm)**Formulas****Molecular Formula**[i](#) C4-H10**Locators****File Locator**

PubMed Cancer

[i](#) Cancer Citations from PubMed

CCRIS

[i](#) NCI Chem Carcino Res Info Sys

DART

[i](#) Developmental and Reprod.Tox.

DSL

[i](#) Domestic Sub. List of Canada

EINECS

[i](#) EU Inv of Exist. Comm. Chem Sub

EMIC

[i](#) Env. Mutagen Info. Center

Haz-Map

[i](#) Occ. Exposure to Haz. Agents

HSDB

[i](#) Hazardous Substances Data Bank

PubMed

[i](#) Biomedical Citations From PubMed

MeSH

[i](#) Medical Subject Headings File

RTECS

[i](#) Reg. of Toxic Eff. of Chem. Sub.

PubMed Toxicology

[i](#) Toxicology Citations From PubMed

TOXLINE

[i](#) NLM TOXLINE on TOXNET

TSCAINV

[i](#) EPA Chem. Sub. Inventory

PubChem

[i](#) PubChem

Household Products

[i](#) Household Products Database

USA.gov

[i](#) USA.gov Search Engine

WebWISER

[i](#) Wireless Info Sys for Emerg Resp

TOXMAP

[i](#) NLM Enviro. Health e-Maps**Superlist Locator**

CGB

[i](#) DOT Coast Guard Bulk Haz. Mat.

DOT

[i](#) DOT Hazardous Materials

GRAS

[i](#) FDA Sub. Generally Rec. as Safe

HPV

[i](#) EPA High Production Vol. Chem.

INER

[i](#) EPA Pesticide Inert Ingredients

MA	<a href="#">i</a> Massachusetts Right-to-know Sub.
NJ	<a href="#">i</a> New Jersey Right-to-know Sub.
PAFA	<a href="#">i</a> FDA Substances added to food
PA	<a href="#">i</a> Pennsylvania Right-to-know Sub.
REL	<a href="#">i</a> NIOSH Rec. Exposure Limits
TLV	<a href="#">i</a> ACGIH Threshold Limit Values
WHMI	<a href="#">i</a> Workplace Haz. Mat. Information

**Internet Locator**

EPA SRS	<a href="#">i</a> EPA Substance Registry System
EPA Envirofacts	<a href="#">i</a> EPA Master Chemical Integrator
NIOSH ICSC	<a href="#">i</a> NIOSH Intl. Chem. Safety Cards
NIOSH Pocket Guide	<a href="#">i</a> NIOSH Pocket Guide to Chem Haz
NIST WebBook	<a href="#">i</a> NIST Chemistry WebBook
SRC CHEMFATE	<a href="#">i</a> Syracuse Res. Corp. CHEMFATE
OSHA Chem	<a href="#">i</a> OSHA Chemical Sampling Info
NTP DBS	<a href="#">i</a> NTP Database Search
ChEBI	<a href="#">i</a> Chem Entities of Biological Interest
NJ-HSFS	<a href="#">i</a> New Jersey Haz. Sub. Fact Sheets

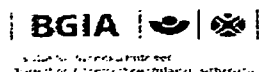
## Toxicity

Organism	Test Type	Route	Reported Dose (Normalized Dose)	Effect	Source
mouse	LC50	inhalation	680gm/m <sup>3</sup> /2H (680000mg/m <sup>3</sup> )		Farmakologiya i Toksikologiya Vol. 30, Pg. 102, 1967. <a href="#">Link to PubMed</a>
rat	LC50	inhalation	658gm/m <sup>3</sup> /4H (658000mg/m <sup>3</sup> )		Farmakologiya i Toksikologiya Vol. 30, Pg. 102, 1967. <a href="#">Link to PubMed</a>

## Physical Properties

Physical Property	Value	Units	Temp (deg C)	Source
Melting Point	-1.38E+02	deg C		EXP
Boiling Point	-0.5	deg C		EXP
log P (octanol-water)	2.89	(none)		EXP
Water Solubility	61.2	mg/L	25	EXP
Vapor Pressure	1820	mm Hg	25	EXP
Henry's Law Constant	0.950	atm-m <sup>3</sup> /mole	25	EST
Atmospheric OH Rate Constant	2.54E-12	cm <sup>3</sup> /molecule-sec	25	EXP

Physical property data is provided to ChemIDplus by [Syracuse Research Corporation](#).  
See all available property data for this compound, including references.



**GESTIS - Stoffdatenbank**  
GESTIS is the information system on hazardous substances of the  
Berufsgenossenschaften  
(German institutions for statutory accident insurance and prevention)

## n-Butane

Information is included to the following mainchapters:

Identification | Physical and chemical properties | Occupational health and first aid | Handling and usage | Regulations | Literature register

### IDENTIFICATION

n-Butane

Butan  
R 600

ZVG-Number : 10030  
CAS-Number : 106-97-8  
INDEX-Number : 601-004-00-0  
EC-Number : 203-448-7

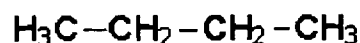
Substance classification :  
140110 Hydrocarbons, aliphatic, saturated  
139900 organic gases

State of aggregation : gaseous  
at 1013 mbar/20 degrees C

Colour : colourless  
Odour : nearly odourless

Characterisation :  
Extremely inflammable gas.  
Forms explosive mixtures with air.  
Practically insoluble in water.  
Gas is heavier than air.  
Evaporation of very cold liquid or expansion of the gas  
causes formation of cold mist spreading on the ground.

FORMULA :



C4-H10

Molar 58,12 g/mol  
Conversion factor : 1 ml/m<sup>3</sup> = 2,42 mg/m<sup>3</sup>  
at 1013 mbar/20 degrees C

n-Butane

**PHYSICAL AND CHEMICAL PROPERTIES**

Data is available for the following sections :

[Melting point](#) | [Boiling point](#) | [Density](#) | [Vapor pressure](#) | [Flash point](#) | [Ignition temperature](#) | [Explosion limits](#) | [Solubility](#) | [Hazardous reactions](#) | [Futher information](#)

**MELTING POINT**

Melting point : -138,29 Grad C

**BOILING POINT**

Boiling point : -0,50 Grad C

**DENSITY****VAPOUR DENSITY**

under standard conditions (0 Deg. C, 1013 mbar)

Value : 2,709 kg/m3

**DENSITY OF LIQUID PHASE AT BOILING POINT**

Value : 0,6011 kg/l

**RELATIVE VAPOUR DENSITY**Ratio of the density to dry air at  
the same temperature and pressure

Value : 2,113

**VAPOUR DENSITY**

Value : 2,514 kg/m3

at 1 bar

Temperature : 15 Grad C

**VAPOUR PRESSURE**

Vapour pressure : 2,081 bar

Temperature : 20 Grad C

Vapour pressure : 2,8 bar

Temperature : 30 Grad C

Vapour pressure : 4,9 bar

Temperature : 50 Grad C

**FLASH POINT**

Flash point : -60 Grad C

**IGNITION TEMPERATURE**

Ignition temperature : 365 Grad C

DIN 51794

Minimum ignition energy : 0,25 mJ  
Max. exper. safe gap (MESG) : 0,98 mm

Temperature T2

Explosion group : IIA

Minimum ignition energy : 0,25 mJ  
Max. exper. safe gap (MESG) : 0,98 mm

## EXPLOSION LIMITS

Lower explosion limit :

1,4 Vol.-%

33 g/m<sup>3</sup>

Upper explosion limit :

9,4 Vol.-%

231 g/m<sup>3</sup>

Maximum explosion pressure :

9,4 bar

## SOLUBILITY IN WATER

Concentration : 61 mg/l

Temperature : 20 Grad C

Concentration : 0,0298 ml/g H<sub>2</sub>O

## HAZARDOUS REACTIONS

### Hazardous chemical reactions :

The substance forms an explosive mixture with air.

Risk of explosion with:

Nickelcarbonyl/oxygen

Risk of inflammability resp. development of inflammable  
gas or vapour, risk of explosion:

Flames, sparks; oxydizing agents;

## FURTHER INFORMATION

critical temperature : 152,03 degree C

critical pressure : 37,96 bar

critical density : 0,228 kg/l

triple point temperature : -138,29 degree C

triple point pressure : 0,006736 mbar

global warming potential : 3

ozone depletion potential : 0

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The following **main sections** contain further information about this material.

Identification | Physical and chemical properties | Occupational health and first aid | Handling and usage | Regulations | Literature register

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n-Butane

## REGULATIONS

Data is available for the following sections :

Classification | Labelling | Workplace labelling | Water pollution class | Air pollution prevention |  
 Transport Regulations | Threshold limit values | Recommendations of MAK | Ordinance of failure |  
 Further regulations

### EUROPEAN CLASSIFICATION

F+; R12

### EUROPEAN LABELLING

Hazard symbol :



F+ Extremely flammable

Risk phrases (R-phrases) :

R 12

Extremely flammable

Safety advices (S-phrases) :

S (2)

Keep out of the reach of children (if sold to the general public)

S 9

Keep container in an well-ventilated place

S 16

Keep away from sources of ignition - No smoking

EC-Classification, 21st adaption directive 94/69/EEC

Quelle : 07558

### WORKPLACE LABELLING ACCORDING TO GERMAN ASR A1.3

Prohibition label :



No fire, open flame and smoking



No admittance for unauthorized persons

Warning label :

Caution - gas cylinder





Caution - explosive atmosphere

Precept label :



Use safety goggles



Wear safety shoes

## GERMAN WATER HAZARD CLASS

Substance No. : 561  
 non-hazardous to waters  
 Classification according to the Administrative Regulation  
 of Substances Hazardous to Water (VwVwS)

## TECHNICAL INSTRUCTION OF AIR POLLUTION PREVENTION (TA Luft)

Chapter 5.2.5 Organic Substances  
 Organic substances, except dusts.  
 The following values, specified as overall carbon, are in  
 all not allowed to be exceeded in exhaust gas:

Mass flow : 0,50 kg/h

or

Mass concentration : 50 mg/m<sup>3</sup>

At old units with an annual mass flow till 1,5 Mg/a,  
 specified as total carbon, the emissions in exhaust gas  
 are not allowed to exceed 1,5 kg/h.

## TRANSPORT REGULATIONS

UN-Number: 1011  
 Shipping name: Butane  
 Hazard Identification Number: 23  
 Class: 2.1 (Flammable Gases)  
 Packing Group: -



Danger Label: 2.1

Tunnel Restrictions:  
 Passage forbidden through tunnels of category B and C when  
 carried in tanks.  
 Passage forbidden through tunnels of category D and E.

**TRGS 900 - GERMAN OCCUPATIONAL EXPOSURE LIMIT VALUES**

1000 ml/m<sup>3</sup>  
2400 mg/m<sup>3</sup>

Peak limitation

Excursion factor 4

Duration 15 min, mean; 4 times per shift; interval 1 hour

Category II - Substances with systemic effects

Source : DFG

Quelle : 05350

**RECOMMENDATIONS OF MAK-COMMISSION**

This data is recommended by scientific experience and is not established law.

1000 ml/m<sup>3</sup>  
2400 mg/m<sup>3</sup>

Limitation of exposure peaks :

Excursion factor 4

Duration 15 min, mean; 4 times per shift; interval 1 hour

Pregnancy : Group D

A classification according to groups A-C is not possible, because either there is no data available or the available data is insufficient for a final evaluation.

Quelle : 08079

**GERMAN ORDINANCE OF FAILURE**

Annex I - No.: 11

Threshold for operating range to § 1 sec. 1

- Record 1: 50000 kg

- Record 2: 200000 kg

Scope: extremely flammable, liquified gases (including liquid gas) and natural gas

**FURTHER REGULATIONS**

TRGS 200

Einstufung und Kennzeichnung von Stoffen, Zubereitungen und Erzeugnissen

Ausgabe Februar 2007

TRGS 201

Einstufung und Kennzeichnung von Abfällen zur Beseitigung beim Umgang

Ausgabe Juli 2002; BArbBl. 7-8/2002 S. 140-142

TRGS 400

Ermitteln und Beurteilen der Gefährdungen durch Gefahrstoffe am Arbeitsplatz: Anforderungen

Ausgabe März 1998; BArbBl. 3/1998 S. 53-56; mit Änderungen und Ergänzungen BArbBl. 3/1999 S. 62 53-64

**TRGS 440**

Ermitteln und Beurteilen von Gefährdungen durch  
Gefahrstoffe am Arbeitsplatz: Ermitteln von Gefahrstoffen  
und Methoden zur Ersatzstoffprüfung  
Ausgabe März 2001; BArbBl. 3/2001 S. 105-112; zuletzt  
geändert BArbBl. 3/2002 S. 68-70

**TRGS 555**

Betriebsanweisung und Unterweisung nach § 20 GefStoffV  
Ausgabe Dezember 1997; BArbBl. 12/1997 S. 49-58

**TRGS 402**

Ermittlung und Beurteilung der Konzentrationen gefährlicher  
Stoffe in der Luft in Arbeitsbereichen  
Ausgabe November 1997; BArbBl. 11/1997 S. 27-33

**TRGS 403**

Bewertung von Stoffgemischen in der Luft am Arbeitsplatz  
Ausgabe Oktober 1989; BArbBl. 10/1989 S. 71-72

**TRGS 420**

Ermitteln und Beurteilen der Gefährdungen durch Gefahrstoffe  
am Arbeitsplatz: Verfahrens- und stoffspezifische Kriterien  
(VSK) für die betriebliche Arbeitsbereichsüberwachung  
Ausgabe September 1999; BArbBl. 9/1999 S. 53-58; mit  
zuletzt geändert BArbBl. 1/2003 S. 58-60

**TRGS 500**

Schutzmaßnahmen: Mindeststandards  
Ausgabe März 1998; BArbBl. 3/1998 S. 57-59

BG-Vorschrift D 34 (VBG 21)  
"Verwendung von Flüssiggas"  
Fassung 1.10.93/1.01.97

Technische Regeln Druckbehälter (TRB)  
Technische Regeln Druckgase (TRG)

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The following **main sections** contain further information about this material.  
Identification | Physical and chemical properties | Occupational health and first aid | Handling and  
usage | Regulations | Literature register

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n-Butane

**OCCUPATIONAL HEALTH AND FIRST AID**

Data is available for the following sections :

Toxic effects | First aid

**TOXIC EFFECTS****Annotation :**

At present time the occupational health information for this substance is only available in german.  
Please consult our database in german.

**FIRST AID****Annotation :**

At present time the first aid information for this substance is only available in german.  
Please consult our database in german.

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The following **main sections** contain further information about this material.

[Identification](#) | [Physical and chemical properties](#) | [Occupational health and first aid](#) | [Handling and usage](#) | [Regulations](#) | [Literature register](#)

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