



S A F E T Y D A T A S H E E T

(in compliance with Regulation (EC) No. 1907/2006 and Act No. 67/2010 Coll.)
BUTANE

Issued on: 04.04.2006

Last review: 03.01.2011

Version: 4

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

1.1 Identification of the substance/agent

BUTANE
Gases (petroleum).

Reg. No.: 01-2119474691-32-0027

CAS: 106-97-8; EC: 203-448-7

1.2 Application of the substance/agent

Fuel for gases appliances, gases motors and for technological purposes.

1.3 Identification of the company/enterprise

SLOVNAFT, a. s. Member of the MOL Group, Vlčie hrdlo 1, 824 12 Bratislava 214, Slovak republic
IČO: 31322832, Ing. L. Heribanová, ☎ ++0421(0)2/4055 2993, ludmila.heribanova@slovnaft.sk

1.4 Emergency telephone number

SLOVNAFT, a. s. Slovak Republic, Vlčie hrdlo 1, 824 12 Bratislava 214, Slovak republic

Company dispatching 1: ☎ ++421(0)2/4055 3344

E-mail: podnikovydispecing1@slovnaft.sk

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E-mail: tic@healthnet.sk; website: <http://www.healthnet.sk/tic/>

2. HAZARDS IDENTIFICATION

Butane is classified as a dangerous substance in compliance with the Act of the National Council of the Slovak republic No. 67/2010 Coll. on Chemical Substances and Chemical Agents and the European Directive 67/548/EEC and based on Regulation (EC) No. 1907/2006.

2.1 Classification of the substance or mixture

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

Flam. Gas 1	H220
Press. Gas	

2.1.2 Classification according to Directive 67/548/EEC or 1999/45/EC



F+; R12

2.1.3 Adverse physicochemical, human health and environmental effects

No relevant data available.

2.2 Label elements

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

Hazard pictograms (CLP)						
Signal word (CLP)	Danger					
Hazard statements (CLP)	H220 - Extremely flammable gas.					
Precautionary statements (CLP)	P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking. P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381 - In case of leaking gas fire, eliminate all ignition sources if safe to do so. P403 - Store in a well-ventilated place.					



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2.2.2 Labelling according to Directive 67/548/EEC or 1999/45/EC

Hazard symbols	 F+ - Extremely flammable				
R-phrases	R12 - Extremely flammable.				
S-phrases	S2 - Keep out of the reach of children. S9 - Keep container in a well-ventilated place. S16 - Keep away from sources of ignition - No smoking.				

2.3 Other hazards

No relevant data available.

3. COMPOSITION / INFORMATION ON INGREDIENTS**3.1 Substances**

Name	Product identifier		% (w/w) Concentration (range)	Classification according to Directive 67/548/EEC	Classification according to Regulation (EC) No. 1272/2008
	CAS No.	EC No.			
butane	106-97-8	203-448-7	> 90	F+; R12	Flam. Gas 1, H220 Press. Gas
isobutane	75-28-5	200-857-2	< 9	F+; R12	Flam. Gas 1, H220
isopentane; 2-methylbutane	78-78-4	201-142-8	0,831	F+; R12 Xn; R65 R66, R67 N; R51-53	Flam. Liq. 2, H225 Asp. Tox. 1, H304 STOT SE 3, H336 Aquatic Chronic 2, H411
propane	74-98-6	200-827-9	0,415	F+; R12	Flam. Gas 1, H220 Press. Gas
butene, mixed-1-and-2-isomers	107-01-7	203-452-9	0,212	F+; R12	Flam. Gas 1, H220 Press. Gas
2,2-dimethylpropane; neopentane	463-82-1	207-343-7	0,087	F+; R12 N; R51-53	Flam. Gas 1, H220 Press. Gas Aquatic Chronic 2, H411
butene 1-	106-98-9	203-449-2	0,035	F+; R12	Flam. Gas 1, H220 Press. Gas
isobutene	115-11-7	204-066-3	0,033	F+; R12	Flam. Gas 1, H220 Press. Gas
ethane	74-84-0	200-814-8	0,003	F+; R12	Flam. Gas 1, H220 Press. Gas
methane	74-82-8	200-812-7	0,001	F+; R12	Flam. Gas 1, H220

Full text of R-, H- and EUH-phrases: see section 16.

3.2 Mixtures

Not applicable.

4. FIRST AID MEASURES**General measures**

In case of indisposition or labour injury immediately call a professional health service. Show the signs of danger and R and S sentences from the safety data sheet to a doctor. Inform the doctor on provided first aid. Do not evoke vomiting in any case. If the affected person vomits, turn him/her on side (position of the head on its side) in order to prevent suffocating with vomits.

At inhalation

Symptoms: Gas has narcotic effects on a man. They are accompanied with a stinging pain in the chest, with a headache, indisposition, euphoria and disorientation. Assure fresh air for the stricken person, keep calm and heat. In case of apneusis provide an artificial breathing. Turn him/her to the position with the head on its side in order to prevent suffocating with vomits in case of vomiting. Immediately seek medical advice.



SAFETY DATA SHEET

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At skin intervention

Symptoms: Feel of greasiness, or slight skin glow. Wash carefully with soap and large volume of water
-immediately remove contaminated clothes. If the irritation of skin has occurred (erubescence etc.), visit a doctor.

At eye intervention

Symptoms: Eye-burn. Wash out carefully several minutes (10-15) using a large volume of water
-seek medical advice.

At swallowing

Swallowing impossible of in case gases.

Special means necessary for the first aid

Not stated.

5. FIREFIGHTING MEASURES

5.1 Suitable fire-fighting agents

Extinguishing powder, light, middle-weight and heavy fire-fighting foam.

5.2 Unsuitable fire-fighting agents

Direct water flow.

5.3 Special danger in case of fire

In a case of fire, hazardous carbon oxides can occur (CO, CO₂), which combined with the air create an explosive mixture, heavier-than-air.

5.4 Special protective means in case of fire

According to the fire extent use an isolating breathing apparatus. Protective clothes.
Complete protection, if necessary.

5.5 Additional data

Not stated.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal protection

Close and label a danger zone. Evacuation of persons. The brigade members shall use an isolating breathing apparatus. In case the bleeding happens in a closed area, assure intensive ventilation and switch off the power.

6.2 Protection of the Environment

Prevent spreading of leaked substance to the water streams and sewerage. Use all measures for closing or sealing of the accident source.

6.3 Cleaning methods

Evaporation itself commensurable. If gas evades, ensure sufficient amount of fresh air.

6.4 Additional data

Not stated.

7. HANDLING AND STORAGE

Keep the principles stated in Regulation of the Ministry of Interior of the Slovak republic No. 96/2004 Coll. if performing the handling and storage.

7.1 Handling

Equipment used for handling shall be watertight, fitted with fire-fighting agents for immediate intervention. It is necessary to provide intensive ventilation by natural circulation or by technical equipment in closed rooms. A workplace shall be kept clear and emergency exits shall be unobstructed. It is forbidden to eat, drink and smoke during the handling.

7.2 Storage

Keep Regulation of the Ministry of Interior of the Slovak Republic No. 94/2004 Coll. stating technical requirements put on fire safety at construction and using of buildings.



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7.3 Requirements on storage rooms and containers

Stored in compressive tanks marked symbols F+.

Repository must suit juridical dictation for storage of liquefied combustible gases classified for parties explosive II. A.

7.4 Special conditions for storage

Service overpressure: 0,1-0, 5MPa. Service temperature: max. 40°C. Filling: max. 85% volume.

Premises storage and manipulation it is advisable mark with particular grade explosive ad effectual STN EN 60079-10. Repository to must suit requirements generic provisions of STN 65 6480 a STN 65 6482.

7.5 Special application

Not stated.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values

Technical pilot value (TPV) exposure workforce carcinogenic and mutagenic factoring to the value according to Government Regulation of Slovak republic No. 356/2006 and 301/2007 Coll.:

Chemical name	Technical norm	Short-time exposure
Isobutane and n-butane with butadiene ≥ 0.1 % weight.	1 000 ppm 2 400 mg/m ³	Cat. carc. 1, Cat. mut. 2, 5 x TPV 15 min. 5 x pro gang with timing relationship 1 hour.
1,3-butadiene	5 ppm, 11mg/m ³	Cat. carc. 1, Kat. mut. 2, 5x TPV, 15 min.5x pro gang at 1hour

According to the Government Regulation of SR No. 356/2006 and 301/2007 Coll. on occupational protection of health of employees against risks connected with exposure by carcinogenic and mutagenic factors, there are given no limit restrictions for propane-butane consisting of 1,3-butadiene lower than 0.1 % weight.

8.2 Exposure inspections

8.2.1 Exposure inspection on the workplace

Ensure good ventilation.

Avoid contact with eyes, skin and clothing, and long-term exposure to vapors.

Provide sufficient cleaning of personal protection means after finishing or interrupting of work activity.

Contaminated protective clothing replace by clean one.

8.2.1.1 Respiratory system protection

Filter A2AX (brown color), counter to organic vapors and steams low-boiling organic materials with boiling point under and up 65°C (cyclohexane, diethylether, acetone, toluene, xylem).

8.2.1.2 Protection of hands

Gloves from the material PVC, with thermal insert, resistant to toward thermal strains.

It is recommended to use protective cream on hand.

8.2.1.3 Protection of eyes

Protecting shield or protecting shield with a hard hat.

Close-fitting protective goggles with a side shield.

8.2.1.4 Skin protection

Fireproof, antistatic protective clothes, antistatic protective shoes.

8.3 Environmental exposure inspections

Not stated.

9. PHYSICAL AND CHEMICAL PROPERTIES ^{4), 7)}

9.1 General information

Physical status:	condensed gas
Colour:	toneless
Aroma:	inodorous



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9.2 Information related to health, safety and the Environment

Thaw temperature (°C):	-138
Boiling point (°C):	-0,5
Flash point (°C):	unapplied is on gases
Ignition point (°C):	365 - 405
Minimum ignition energy (mJ):	0,25
Lower limit explosive (vol.%):	1,5
High limit explosive (vol.%):	9,1
Temperature class:	T2
Explosive group:	II.A
Depression saturated vapours at 20°C (kPa):	250
Relative vapours density:	2,02
Relative liquid density:	0,57
Vapor density at 20°C (kg.m ⁻³):	0,2672
Solubility in 100 cm ³ waters (cm ³):	unlisted
Minor weight (g. mol ⁻¹):	58,124
Temperature flame (°C):	2 187
Heat value (MJ.kg ⁻¹):	45,635 - 45,720
Additional data:	not stated.

10. STABILITY AND REACTIVITY

10.1 Conditions of the substance stability

Storage in a special container, liquefied by compression, eventually with temperature.

10.2 Conditions to be avoided

Elevated temperature, sources fire.

10.3 Materials to be avoided

Vapors create an explosive mixture with the air. Strong oxidizer and combustible materials.

10.4 Hazardous decomposition products

Carbon oxides (CO₂, CO). Combined with the air create an explosive mixture, heavier-than-air.

10.5 Additional information

Not stated.

11. TOXICOLOGICAL INFORMATION

11.1 Acute toxicity

11.1.1 Oral toxicity: Not tested.

11.1.2 Inhalation toxicity: Not tested. Butane may in high concentrations effects depressive on CNS, may recall stifle, LC₅₀ rat: Butane: 658 mg/1/4h, LC₅₀ mouse: Butane: 680 mg/1/2h⁴⁾. Isobutane will cause distressed breathing till suffocation⁹⁾.
LC₅₀ mouse: Isobutane: 52 mg/kg/1h⁴⁾. Isobutene in high concentrations effects depressive on CNS, may recall stifle⁴⁾. LC₅₀ rat: Isobutene: 620 g/m³/4h⁴⁾.
LC₅₀ mouse: Isobutene: 415 g/ m³/2h⁴⁾.

11.1.3 Dermal toxicity: Not tested. Isobutane in form liquid at contact may recall chemical burns⁴⁾.
Butane in liquid form at make-contact may recall burn or chilblains⁴⁾.

11.1.4 Eye contact: Not tested.

11.2 Later and chronic effects

11.2.1 Allergy: Not tested.

11.2.2 Carcinogen effects: 1,3-butadiene is classified than calculated carcinogen at men with adequate evidence at experimental animals⁴⁾.

11.2.3 Mutagenity: Not tested.

11.2.4 Reproduction toxicity: Not tested.

11.2.5 Narcosis: Not tested.



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11.3 Additional information

Not stated.

12. ECOLOGICAL INFORMATION**12.1 Ecotoxicity**Not tested. It is assumed that action n-butane and isobutene on has not harmful effects aquatic life ⁴⁾.**12.2 Mobility**Not tested. It is assumed low to middle mobility for butane, and high mobility for isobutene ⁴⁾.**12.3 Stability and degradability**Not tested. Isobutene and butane are volatile materials hence main fatale in environs is transpiration. Butane and isobutene are liable biodegradable ⁴⁾.**12.4 Bioaccumulation potential**Not tested. Butane is assuming no bioaccumulation, low bioconcentration is expected for isobutene ⁴⁾.**12.5 Other negative effects**

Not stated.

13. DISPOSAL CONSIDERATIONS**13.1 Material/agent/waste**Dispose product according to the Regulation of the Ministry of the Environment of the Slovak republic No. 284/2001 Coll. as amended specifying the Catalogue of Waste is categorized as follows: butane is not classified to the wastes catalogue, as it is vapor. Dangerous facilities wastes: **H3-A** (Act No. 409/2006, section 4).**13.2 Polluted packaging material**

Not stated.

14. TRANSPORT INFORMATION**General declaration**

For transport of materials the RID and ADR provisions about international road and railway transport of hazardous materials are valid.

UN No. 1011 (Butane)

Identification number of material dangerousness (ADR/RID)

Identification number riskiness matters 23

Class 2

Classification Code 2F

Limited Quantities LQ 0

Security marks 2.1

Sea transport (IMDG) Not applicable.

IMDG -code -

EmS -number -

Marine Pollutant -

Air transport (IATA) Not applicable.

IATA: -

Additional information:**15. REGULATORY INFORMATION**

Classification in compliance with Regulation EC No. 1272/2008 and Act No. 67/2010 Coll. on (Chemical Law).

Restriction in terms of annex XVII, Direction (ES) No. 552/2009 to Direction EP 1907/2006:

Hazards: dangerous substance, R12.

Constraints as annex XVII, points: 3, 40.

Note C:

Some organic substances may be marketed either in a specific isomeric form or as a mixture of several isomers.



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Restriction in terms of point 3:

1. Shall not be used in:
 - ornamental objects, intended to produce light or colour effects by means of different phases, for example in ornamental lamps and ashtrays,
 - tricks and jokes,
 - games for one or more participants, or any object intended to be used as such, even with ornamental aspects.
2. Without prejudice to paragraph 1, substances and preparations which:
 - present an aspiration hazard and are labelled with R65, and
 - can be used as fuel in decorative lamps, and
 - are placed on the market in packaging of a capacity of 15 litres or less, shall not contain a colouring agent, unless required for fiscal reasons, or perfume or both.
3. Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of dangerous substances and preparations, the packaging of substances and preparations covered by paragraph 2, where intended for use in lamps, must be marked legibly and indelibly as follows: **“Keep lamps filled with this liquid out of the reach of children”**.

Restriction in terms of point 40:

- 1 Shall not be used on their own or in the form of preparations in aerosol generators that are placed on the market for the general public for entertainment and decorative purposes such as the following:
 - metallic glitter intended mainly for decoration,
 - artificial snow and frost,
 - “whoopee” cushions,
 - silly string aerosols,
 - imitation excrement,
 - horn for parties,
 - decorative flakes and foams,
 - artificial cobwebs,
 - stink bombs,
 - etc.
2. Without prejudice to the application of other Community provisions on the classification, packaging and labelling of dangerous substances, the following words must appear legibly and indelibly on the packaging of aerosol generators referred to above: **“For professional users only”**.
3. By way of derogation, paragraphs 1 and 2 shall not apply to the aerosol generators referred to in Article 9a of Council Directive 75/324/EEC of 20 May 1975 on the approximation of the laws of the Member States relating to aerosol dispensers (4).
4. The articles referred to in paragraphs 1 and 2 shall not be placed on the market unless they conform to the requirements indicated.

Related Legislation:

Regulation (EC) No 1907/2006 of the EP and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing and European Chemicals Agency. Direction EP and Council (ES) No. 1272/2008 for 16. December 2008 at classification, labeling and packing substance and mixture, at change, completion and cancelled regulations No. 67/548/EHS and 1999/45/ES and at change and completion regulation (ES) No. 1907/2006. Directives Commission Directive 2009/2/EC of 15 January 2009 amending, for the purpose of its adaptation to technical progress, for the 31st time, Council Directive No. 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labeling of dangerous substances. Act No. 67/2010 Coll. of the National Council of the Slovak republic on chemical substances and chemical preparations (chemical act). Act of NR SR No. 409/2007 and 223/2001, Coll. on waste and on amendment and change of other acts. Regulation of the Ministry of the Environment of the Slovak republic (MŽP SR) No. 283/2001 Coll. on execution of some provisions of the Act on waste as amended. Regulation of the MŽP SR No. 284/2001 Coll. specifying the Catalogue of Waste as amended. Decree of the Government of the Slovak republic No. 355/2006 and 300/2007 Coll. on occupational protection of health of employees against risks connected with exposure by carcinogenic and mutagenic factors. Regulation of the MH SR No. 67/2002 Coll. by which the list of specific chemical substances and specific chemical preparations, whose putting on the market and using is limited or



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prohibited, is issued as amended. Regulation of the MH SR No. 471/2006 Coll. amending Regulation of the MH SR No. 67/2002 Coll. by which the list of specific chemical substances and specific chemical preparations, whose putting on the market and using is limited or prohibited, is issued as amended. Regulation of the Ministry of Interior of the SR No. 94/2004 Coll, which takes place technical requirements on the fire protection at building and at use buildings. Regulation of the Ministry of Interior of the SR No. 96/2004 Coll. stating principles of fire safety at handling and storage of combustible liquids, heavy fuel oils and vegetable and animal fats and oils.

16. OTHER INFORMATION

Reviewed chapters:

1.3 -address, 1.4 -tel. number, 8 -Decree of the Government of the SR 356/2006 Coll., 16 -legislation (rev. 1).
1-16 content and graphic modification according to Regulations EP and Councils ES nos.1907/2006 (rev. 2).
15 -restriction in terms of Direction (ES) No. 552/2009 to Direction EP 1907/2006 (revision 3).
1,2,3,15,16-classification under the CLP Regulation EC č.1272/2008 and Law No. 67/2010 Z.z. (revision 4).

Other R-, H- sentences:

R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65 Harmful: may cause lung damage if swallowed.
R66 Repeated exposure may cause skin dryness or cracking.
R67 Vapours may cause drowsiness and dizziness.
H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H336 May cause drowsiness or dizziness.
H411 Toxic to aquatic life with long lasting effects.

Addendums:

Workers manipulating with the product on a regular basis must be trained during introductory and regular trainings on the hazards and risk prevention. The training scope and schedule is given by local and national regulations. Employees must behave to prevent all potential risks.

Legend:

BCF -Bioconcentration factor.
IDLH -Immediately Dangerous to Life or Health.
EC₅₀ -Ecotoxicological lethal concentration, which in effect is 50% of the tested population.
LC₅₀ -Lethal concentration, which in effect is 50% of the tested population.
LD₅₀ -Lethal dose, which in effect is 50% of the tested population.
LOAEL -The lowest dose / concentration of a substance that has caused harmful effects.
NOAEL -The highest dose / concentration of a substance which did not produce harmful effects.
STOT SE -Specific target organ toxicity - single exposure.
STOT RE -Specific target organ toxicity - repeated exposure.

Used Literature:

- 1.) Material Safety Data Sheet, Slovnaft, a.s. Quality control, Vendor inspection documentation.
- 2.) Overview of industrial toxicology Organic substances, author: MD Jozef Marhold, PhD., 1986.
- 3.) Sax's Dangerous properties of industrial materials, Ninth Edition, 1995.
- 4.) CHEM-BANKTM -Databanks of potentially hazardous chemicals (Silver Platter Information -Croner), March 2003, Vol. Id.: RT27, PP-0018-0064 (RTECS -Registry of Toxic Effects of Chemical Substances; OHMTADS -Oil and Hazardous Materials -Technical Assistance Data System; CHRIS -The Chemical Hazards Response Information System; HSBDB -Hazardous Substances Data Bank; IRIS -Integrated Risk Information System; TSCA -Toxic Substance Control Act Inventory; NPG -NIOSH Pocket Guide (NIOSH -National Institute for Occupational Safety and Health) ERG2000 Emergency Response Guide 2000 Database.
- 5.) Fire and safety technical characteristic values of hazardous materials - composite authors of Dr.rer.nat. Hans-Dieter Steinleitner.
- 6.) International Chemical Safety Cards, National Institute for Occupational Safety and Health, 2004.



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- 7.) Catalogue dangerous materials NebLat, Aktual s.r.o., 2003.
- 8.) Simulation program Pro/ II with Provision, Simulation Sciences Inc., 2003.
- 9.) Isobuthane, ICSC: 0901, International Program of Chemical Safety, INCHEM, November 1998.

Additional notices:

Details mentioned herein relate to the product as it is delivered. Provisions stated herein describe the product with regard to necessary safety measures - they do not guarantee final characteristics of the product - but they are based on our present knowledge. The producer does not assume responsibility for incorrect application of the product in consideration of the above-mentioned safety measures.

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