

Product	LIQUEFIED PETROLEUM GAS PURIFIED NORMAL BUTANE, BUTANE	Date:	2017/5/19
		Edition:	10

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

1.1. Product identifier

- **Trade name:** LIQUEFIED PETROLEUM GAS PURIFIED NORMAL BUTANE; BUTANE
- **Chemical name:** butane; n-butane
- **Index no.:** 601-004-00-0
- **EC no.:** 203-448-7
- **CAS no.:** 106-97-8
- **Registration No.:** 01-2119474691-32-0026
- **Product code:** 1000281; 1000567

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

- **Relevant identified uses:** Industrial: distribution of substance, use as a fuel, manufacture of substance
Professional: use as a fuel, use as propellant
Consumer: use as a fuel
- **Uses advised against:** The uses that are in the list above are relevant. Other uses are not recommended unless an assessment that proves that the related risks are controlled has been conducted before starting that use

1.3. Details of the supplier of the safety data sheet

- **Manufacturer/supplier:** **INA-Industrija nafte, d.d.**

Address: Av. Većeslava Holjevca 10
pp 555, 10002 Zagreb, HRVATSKA

Phone: 00-385-1-6450-842 / 00-385-1-6451-075 (24 h)

Fax: 00-385-1-6452-050

e-mail: sds@ina.hr

- **Responsible person:** **SD & HSE Sector**
Mirela Mavrinac, B.Sc. Tel. 00-385-1-6450-803
Hrvoje Raukar, B.Sc.

1.4. Emergency Telephone Number

- **Emergency Service Telephone Number:** **112**
National Protection and Rescue Directorate 00-385-1-3650-011
Nehajska 5, 10000 Zagreb 00-385-1-3650-084
e-mail: info@duzs.hr 00-385-1-3650-082
00-385-1-3650-083
- **Medical Information Telephone Number:** **00-385-1-23-48-342**

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2. HAZARDS IDENTIFICATION

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; H280

2.2. Substance or mixture labelling

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

Hazard pictograms:



GHS02 GHS04

 Signal word: **Danger**

Hazard statements (H):	H220	Extremely flammable gas
	H280	Contains gas under pressure; may explode if heated.

Precautionary statements (P):	P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
	P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
	P381	Eliminate all ignition sources if safe to do so.
	P403	Store in a well-ventilated place

2.3. Other hazards

Note U.

3. COMPOSITION / INFORMATION ON INGREDIENTS

-Substance:	X		Mixture:		
- Components contributing to product hazardoussness:					
Substance name	Substance identification			[%]	Classification according to Regulation (EC) No 1272/2008 (CLP/GHS)
	CAS no.	EC no.	Registration no. (REACH)		
n-butane	106-97-8	203-448-7	01-2119474691-32-0026	>97	Flam. Gas 1, H220 Press. Gas
i-butane	75-28-5	200-857-2	01-2119485395-27-0018	<2,5	Flam. Gas 1, H220 Press. Gas

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propane	74-98-6	200-827-9	01-2119486944-21-0037	<0,2	Flam. Gas 1, H220 Press. Gas
isopentane	78-78-4	201-142-8	-	<0,3	Flam. Liq. 1; H224 Asp. Tox. 1; H304 STOT (SE) 3; H336 Aquatic Chronic. 2; H411
Pentane	109-66-0	203-692-4	-		Flam. Liq. 2; H225 Asp. Tox. 1; H304 STOT (SE) 3; H336 Aquatic Chronic. 2; H411

4. FIRST AID MEASURES

- **General information:** No data available.

- **First aid procedures**

- after inhalation: Remove the affected person from the contaminated area to fresh air. In the case of dizziness, nausea, headache and persisting difficulties, immediately seek medical attention. In case of unconsciousness, move the affected person to hospital in lateral position, ensuring clear airways. In case of difficulty breathing or respiratory arrest, open the airways, start with resuscitation (heart massage and artificial respiration) and immediately seek medical attention.
- after skin contact: Immerse the frostbite into warm water with a temperature of 37°C - 42°C (NOT hot water !). DO NOT remove clothing! Seek medical attention.
- after eye contact: May cause medium irritation. Remove contact lenses. Flush the eyes with water for at least 15 minutes. Wash the lenses after removal and prior to returning them. Immediately seek medical attention.
- after ingestion: Not applicable.
- **Note to person administering first aid/ physician:** May cause central nervous system depression. Only trained medical personnel may administer oxygen. Possibility of heart rhythm disorder.

5. FIRE FIGHTING MEASURES

- **Extinguishing media**

- SUITABLE: Foam, water spray, dry powder, CO₂.
- NOT SUITABLE: Water jet.

- **Firefighting measures for special hazards:** Shut down gas supply, if it can be done safely. Eliminate all sources and chances of ignition. Evacuate non-emergency personnel from the area. Notify the fire brigade and the police.

- **Special firefighting measures:** Use water spray or foam to cool the fire site, containers and tank trucks. Close gas valves and outlets.

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- **Special fire fighter protective equipment:** Wear protective clothing for firefighters (intervention suit) in accordance with HRN EN 469 and a self-contained open-circuit compressed air breathing apparatus in accordance with HRN EN 137.
- **Special hazards arising from the substance or mixture:** Combustion produces carbon monoxide (CO) and carbon dioxide (CO₂). Butane is heavier than air and may cause explosion and fire remote from the point of escape.
- **Advice for firefighters:** No data available.
- **Additional information:** No data available.

6. ACCIDENTAL RELEASE MEASURES

- **Personal precautions:** Use protective equipment listed in Section 8, and immediately evacuate unprotected persons from the affected area. Vapours are heavier than air and may reduce the oxygen level, posing a suffocation risk. Ensure good ventilation of areas at risk. Eliminate all sources of ignition, avoid sparking and take precautionary measures against static electricity. Monitor oxygen concentration in the air.
- **Environmental precautions:** Butane is a suffocating gas, odourless and colourless, extremely flammable. It is heavier than air therefore it can spread through channels, drainage systems, cellars and similar areas away from the accident site and cause explosion and fire. See Section 10.
- **Methods for cleaning-up and recovery:** Stop the leak as soon as possible, if it can be done safely. If not, keep the gas confined by dispersed water and allow it to evaporate. Notify Emergency Service at 112. Prevent it from entering places where it may accumulate (sewage system, dents and the like).
- **Additional warnings:** Discharged liquid soon turns into a gas and forms explosive mixture with air! When the concentration drops below explosion limits at the point of escape, initiate intervention.

7. HANDLING AND STORAGE

- **Handling**
- **safety precautions:** Use product only in well-ventilated areas. Keep away from sources of heat and ignition. Use non-sparking tools. Decant only at properly marked and equipped areas in accordance with relevant regulations. Take special care of connection points to prevent possible leaks. Strictly follow occupational safety and fire safety measures.
- **safe handling advice:** Do not smoke, eat or drink in a room with a hazardous substance. Avoid inhalation, and contact with skin and eyes. Use personal protection equipment listed in Section 8.

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- Storage: technical measures and storage conditions:

- **SUITABLE:** Pressurised closed containers made and equipped according to special regulations concerning butane. Store in well-ventilated place, explosion-proof.
- **TO BE AVOIDED:** Avoid storing with flammable chemicals (oxidants, acids). Do not keep sparking tools and machines in storage area.

- Packaging materials

- **RECOMMENDED:** Original manufacturer's container with valid certificate.
- **NOT SUITABLE:** Any other.

- Special use: No data available.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Exposure limit values

Hazardous substance (CAS No.)	Occupational exposure limit values/short term values (OEL/STEL)		Biological limit values
	ppm	mg/m ³	
Butane (106-97-8)	600 / 750	1450 / 1810	-
Isopentane (78-78-4)	1000 / -	3000 / -	-
Pentane (109-66-0)	1000 / -	3000 / -	-

- Monitoring procedures: Monitoring of oxygen concentration and hazardous substances in the air, according to regulations.

8.2. Exposure controls

- Summary of risk management measures: The degree of protection and type of control depend on the possible exposure according to the risk assessment. Use adequate ventilation to maintain the concentration of explosive substances below the explosion limit. Educate and train the employees on potential hazards and control measures in performing regular activities. Stipulate a safe handling procedure.

8.2.1. Occupational exposure controls

- Description of operating procedure and technological control:

Provide good ventilation of work space and air supply of work space.

- Personal protective equipment

- respiratory tract protection: In the event of an increased gas concentration and a decreased oxygen concentration, use the self-contained breathing apparatus. In normal conditions, use a mask with the suitable filter (filter for the protective mask and semi-mask, protection against gas and evaporation of organic compounds with a boiling point up to 65°C), HRN EN 14387.

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- hand protection: Use protective gloves (HRN EN 374-3) of suitable material (nitrile or nitrile butyl rubber). In frequent contact with the hazardous substance, the resistance level to absorption of the gloves shall be >240 min. In case of handling liquefied butane, thermally insulated gloves shall be used in order to avoid frostbite.
- eye protection: Safety goggles for working with chemicals (HRN EN 166) or a face shield in case of handling liquefied butane.
- skin and body protection: Protective clothing (HRN EN ISO 13688, HRN EN 1149-5, HRN EN 14605 (type 3 and 4), HRN EN 1073-2, HRN EN ISO 13982-1:2005/A1:2011 TYPE 5, HRN EN 13034 TYPE 6, HRN EN 14126:2004/AC:2005) if there is a possibility of splashing.
- **Special hygienic and safety precautions:** The work place shall be equipped with a shower. No smoking or eating and drinking when handling the gas. Regularly control and monitor the accuracy and the use of personal protective equipment used when handling the hazardous chemical. Regularly wash and maintain personal protective clothing and equipment. The contaminated clothing may not be used and shall be replaced. In case of handling liquefied butane, personal protective equipment shall be used in order to prevent the occurrence of frostbite. Contaminated clothing and leather footwear shall not be reused, and shall be properly stored and disposed of.

8.2.2. Environmental exposure controls

- **Summary of risk management measures:** No data available.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information:

- state: gas; liquid under pressure
- colour: colourless
- odour: odourless

9.2. Important health, safety and environmental information:

- pH value (indicate conc. and temp.):
- boiling point/boiling range: °C No data available.
- flash point: °C -0,5 at 1 bar
- flammability (solid, gas): -60
- explosive properties: vol. % No data available.
- oxidizing properties: 1,9-8,5
- vapour pressure: kPa 385 maximum
- density at 15 °C: kg/m³ 585
- relative density: No data available.
- solubility (indicate solvent): g/L No data available.
- Solubility in water: mg/L 60,4 (from literature)

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- partition coefficient n-octanol / water	logPow	1,815 (from literature)
- viscosity (kinematic) at xx °C:	mm ² /s	No data available.
- vapour density at 15°C:	kg/m ³	No data available.
- volatility:		No data available.

9.3. Other data:

- melting point/freezing point:	°C	-138
- disintegration temperature:	°C	No data available.
- auto ignition temperature:	°C	405
- conductivity:	pS/m	No data available.

10. STABILITY AND REACTIVITY

- Reactivity:	Stable under recommended handling and storage conditions.
- Chemical stability:	Stable under recommended handling and storage conditions. Does not polymerise
- Possibility of hazardous reactions:	Butane is an asphyxiant, colorless and odorless. It is highly flammable and explosive. The released liquid rapidly turns into gas and creates an explosive mixture with air! It is heavier than air and may spread through channels, drainage systems, cellars and similar locations away from the accident site and cause an explosion and fire.
- Conditions to avoid:	Eliminate all sources of ignition, heat and open flame.
- Incompatible materials:	Strong oxidants.
- Hazardous decomposition products:	Butane combustion produces harmful gases – carbon monoxide (CO) and carbon dioxide (CO ₂) that contribute to atmospheric pollution.

11. TOXICOLOGICAL INFORMATION

- Information on toxicological effects:

- Acute toxicity

- oral (LD ₅₀):	No data available.
- inhalation (LC ₅₀):	658 mg/L (4 hours, rat)
- dermal (LD ₅₀):	No data available.

- Irritation/Corrosion

- skin:	Compressed air causes frostbites. Contact with liquid or rapidly expanding gas causes frostbites.
- eyes:	Compressed air causes frostbites.
- respiratory tract:	No data available.

- Sensitisation

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- skin:	No data available.
- respiratory tract:	No data available.
- Aspiration hazard:	No data available.
- Other classic effects: (e.g. unconsciousness, particularly toxic metabolites, etc.):	High concentrations cause drowsiness, headache, dizziness, and if oxygen level drops below 17% it can cause fainting, suffocation and/or depression of the CNR. Contact with compressed gas can cause frostbites. Higher concentrations may lead to hypoxia and have cardiotoxic effects, with fatal outcome if oxygen concentration drops below 14%.
- Permanent effects due to acute or chronic exposure:	Causes damages to CNS. Long-term: High concentration or longer exposure period may cause fainting and suffocation.
- Special effects	
- mutagenicity:	No data available.
- carcinogenicity:	No data available.
- fertility decrease:	No data available.
- harmful effect on unborn child:	No data available.
- toxicity to reproduction:	No data available.
- other (e.g. endocrine disruptors):	No data available.
- STOT (SE):	No data available.
- STOT (RE):	No data available.
- Prohibitions and restrictions:	No data available.
- Other:	No data available.

12. ECOLOGICAL INFORMATION

12.1. Toxicity

- to aquatic organisms:	LC ₅₀ = 27,98 mg/L (96 h, fish) LC ₅₀ = 69,43 mg/L (48 h <i>Daphnia sp.</i>) EC ₅₀ = 16,47 mg/L (96 h, green algae)
- to ground organisms:	No data available.
- to plants and land animals:	No data available.

12.2. Persistence and degradability

- biodegradation:	No data available.
- other degradation processes:	No data available.
- degradation in wastewater:	No data available.

12.3. Bioaccumulative potential

- bio-concentration factor (BCF):	No data available.
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12.4. Mobility in soil

Method: No data available.

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|--|--|
| - Known or predicted distribution in environmental compartments: | It is not likely that soil and water pollution will occur due to high volatility.
Due to lesser density remains on surface where it evaporates quickly. |
| - surface tension: | No data available. |
| - absorption/desorption: | No data available. |
| - other physical and chemical properties: | See section 9. |

12.5. Results of PBT and vPvB assessment

- | | |
|-------------------------------------|--------------------|
| - data from chemical safety report: | No data available. |
|-------------------------------------|--------------------|

- | | |
|-------------------------------------|--------------------|
| 12.6. Other adverse effects: | No data available. |
|-------------------------------------|--------------------|

13. DISPOSAL CONSIDERATIONS

- | | |
|-----------------------------------|--|
| - Waste codes: | Not applicable. |
| - Waste treatment methods: | Not applicable. There is no classic waste. |
| - Waste from residues: | Not applicable. There is no classic waste. |
| - Contaminated packaging: | Close the empty containers and return to producer. |
| - Relevant provisions: | Act on Sustainable Waste Management, Regulation on waste catalogue, Ordinance on waste management. |

14. TRANSPORT INFORMATION

- | | |
|---------------------------------------|---|
| - UN proper shipping name: | BUTANE |
| - UN number: | 1011 |
| - Transport hazard class(es) | |
| ADR/RID/ADN/ICAO/IATA: | 2 (F) gases |
| IMDG: | 2 (F) gases |
| - Packing group | |
| ADR/RID/ADN/IMDG/ICAO/IATA: | Not assigned to any packaging group. |
| - Environmental hazards | |
| ADR, RID, ADN, ICAO/IATA: | Soil and water contamination is not probable due to very rapid evaporation. |
| IMDG: | Soil and water contamination is not probable due to very rapid evaporation. |
| - Special precautions for user | |
| ADR | RID |
| Transport category: 2 | Transport category: 2 |
| Vehicle for tank carriage: FL | Tank code: PxBN(M) |
| Tank code: PxBN(M) | Label: 2.1 (+13) |
| Tunnel restriction code: B/D | Classification code: 2F |

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Label: 2.1

Classification code: 2F

Hazard identification: 23

Special provisions: 652, 657, 660, TA4, TT9, TT11, CV9, CV10, CV36, S2, S20.

ADN

Label: 2.1

Additional requirements/Remarks: 2;31

Dangers: 2.1

Equipment required: PP, EX, A

Classification code: 2F

Carriage permitted: YES

Type of tank vessel: G

Anti-explosion protection required: YES

Maximum degree of filling in %: 91

ICAO

Label: 2.1

Cargo IMP code: RFG

Passenger and cargo aircraft: not allowed

Cargo aircraft only: 150 kg per packaging

ERG code: 10L

Transport in liquid condition according to MARPOL Convention, Annex II and IBC Codex

Trade name: -

Pollution category (according to MARPOL, Annex II): -

Vessel type (according to IBC Code): -

Special and operative requirements (according to IBC Code): -

Hazard identification: 23

Special provisions: TU38, TE22, TA4, TT9, TM6, CV9, CV10, CV36, CE3.

IMDG

Subsidiary risk: /

Group of the cargo: P 200

Special provisions: -

EmS: F-D, S-U

Segregation group: Cat. E

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15. REGULATORY INFORMATION

- Applicable EU regulations:** EU Regulation No. 1906/2007 and No. 1272/2008 of the European Parliament and the Council; Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH); EU Regulation No. 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer; EU Regulation No 689/2008 of the European Parliament and of the Council of 17 June 2008 concerning the export and import of dangerous chemicals; EU Regulation No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants; Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
- Applicable national regulations:** Chemicals Act; Regulations on Hazardous Substance Exposure Limit Values during Work and Biological Limit Values; Regulations on Filling in the Material Safety Data Sheet.
- Chemical Safety Assessment carried out (CSA):** YES NO
- Authorization information:**
- Restriction information:**

16. OTHER INFORMATION

Revision indicators

Section:	Subject of change:
1	Name of the product
3	concentration of n-butane

Full text of H- phrases, EUH- and P-phrases:

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. 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.

Abbreviations and acronyms:

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ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS number	Chemical Abstract Service number
CLP	Classification, Labelling and Packaging of substances and mixtures
CSA	Chemical Safety Assessment
CSR	Chemical Safety Report
EC number	European Community number for identification of chemical substances commercially available in the EU
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code transport
LC50	Lethal concentration for 50% of tested organisms
LD50	Lethal concentration for 50% of tested organisms (medium lethal concentration)
OIN	Oil industry notes
PBT	Persistent, bioaccumulative and toxic
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
STOT (SE)	Specific Target Organ Toxicity (Single Exposure)
STOT (RE)	Specific Target Organ Toxicity (Repeated Exposure)
UVCB	Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials
vPvB	Very persistent and very bioaccumulative

Statement:

This SDS is in compliance with the EU Regulation No. 1907/2006 and No. 1272/2008 of the European Parliament and the Council. It contains important user health and safety and environmental protection information. The information provided herein is not a substitute for any specification of quality and should not be deemed as a guarantee of the adequacy and applicability of this product for any purpose whatsoever. All information provided herein is based on our current knowledge and compliant with applicable legal regulations. The user is responsible for adherence to relevant legal regulations.

Data source:

1. www.hzt.hr
2. <http://echa.europa.eu/hr>
3. LOA Category K – Other petroleum gases

APPENDIX: EXPOSURE SCENARIOS ACCORDING TO CHEMICAL SAFETY REPORT