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

1.1. Product identifier

- **Trade name:** BUTANE – BUTENE (C4/C4)
- **Chemical name:** Petroleum gases, liquefied, sweetened, C4 fraction
- **Index no.:** 649-117-00-4
- **EC no.:** 295-463-0
- **CAS no.:** 92045-80-2
- **Registration no.:** 01-2119541680-43-0002
- **UFI:** Not applicable.
- **Form:** -
- **Product code:** 1000908

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

- **Relevant identified uses:** **Industrial:** manufacture of substance, formulation & (re)packing of substances, use in polymer production, use in polymer processing, use as a fuel.
  Professional: use as a fuel.
  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. V. 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

Sustainable Development and Health, Safety and Environment **Phone:** 00-385-1-6450-803

- **email address of a competent person responsible for the safety data sheet:** sds@ina.hr

1.4. Emergency Telephone Number

- **Emergency Service Telephone Number:** **112**

Ministry of the Interior	00-385-1-6192-929
Directorate for civil protection	00-385-1-4551-792
Operative centre for civil protection	00-385-1-4814-911
e-mail: occz@civilna-zastita.hr	

- **Medical Information Telephone Number:** **00-385-1-23-48-342**

SECTION 2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EC) No 1272/2008 (CLP):

Flam. Gas 1; H220

Press. Gas; H280

Full text of H-phrases: see section 16.

2.2. Label elements

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

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):	P201	Obtain special instructions before use.
	P202	Do not handle until all safety precautions have been read and understood.
	P210	Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
	P243	Take precautionary measures against static discharge.
	P280	Wear protective gloves/protective clothing/eye protection/face protection.
	P308+ P313	IF exposed or concerned: Get medical advice/attention.
	P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
	P410+ P403	Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

Note K – substance classification as carcinogen or mutagen is not necessary if it is possible to prove that substance contains <0,1% 1,3-butadiene.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

-Substance:	X		Mixture:		

- Components contributing to product hazardousness:

Substance name	Substance identification			[%]	Classification according to Regulation (EC) No 1272/2008 (CLP)
	CAS no.	EC no.	Registration no. (REACH)		
Petroleum gases, liquefied, sweetened, C4 fraction	92045-80-2	295-463-0	01-2119541680-43-0002	100	Flam. Gas 1, H220 Press. Gas

Contains <0,1% 1,3-butadiene (CAS 106-99-0, EC 295-450-8)

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

- general information: Before administering first aid to the affected persons, isolate the accident area from sources of ignition, including the disconnection from the power supply. Before entering the enclosed space, check the atmosphere and provide ventilation. Use appropriate personal protective equipment (see Section 8).

- after inhalation: Remove the affected person from the contaminated area to fresh air and place in a position that facilitates breathing. In case of dizziness, nausea, headache, and permanent complaints immediately seek medical attention.

  In case of fainting transport in lateral position to hospital, paying attention to the free passing of the air thorough the respiratory tract.

  In case of difficulty in breathing or respiratory arrest, open airways, initiate resuscitation (heart massage and artificial respiration) and immediately seek medical attention.

- after skin contact: Frostbite may occur. Do not remove clothing from the frostbite area, do not rub, massage, or press on the damaged skin area. Rinse the affected area with lot of water for at least 15 minutes. Seek medical attention immediately.

- after eye contact: Frostbite may occur. Remove contact lenses (if used by affected person) and wash with water for at least 15 minutes. Seek medical attention immediately.

- after ingestion: Not considered as possible exposure route. In case of contact with product, frostbite is possible on lips and in mouth.

- personal protective equipment for first aid responder: Rescuers must wear breathing apparatus, lifebelt, and rope, and follow rescue instructions.

4.2 Most important symptoms and effects, both acute and delayed

- after inhalation: Headache, dizziness, dullness. Higher concentration or longer exposure can cause fainting and suffocation.

- after skin contact: Compressed gas causes frostbites.

- after eye contact: Compressed gas causes frostbites.

- after ingestion: Not considered as possible exposure route, may cause frostbite on lips and in mouth.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically. In case of contact with the product in liquid form, treat frostbite. Only qualified medical personnel should administer oxygen.

SECTION 5. FIREFIGHTING MEASURES

5.1 Extinguishing media

- SUITABLE: Large fires: Water spray, water mist or air foam (for plashes of liquified gas). Small fires: Dry powder or CO_2 or air foam (for plashes of liquified gas). In emergency: sand or earth.
- UNSUITABLE: Water jet (possibility of fire spreading), simultaneous use of water and foam because water destroys foam.

5.2 Special hazards arising from the substance or mixture:

Highly flammable and explosive substance. Vapours are heavier than air and may spread away from the site of accident and cause an explosion and fire.

- Hazardous combustion products: Incomplete combustion of hydrocarbons can produce smoke containing CO, CO_2.

5.3 Advice for firefighters:

- Firefighting measures for special hazards: Eliminate all sources of ignition.

Stop product leakage if it can be done in a safe manner, if not, leave the product to burn out and cool the containers and surroundings with water spray due to the risk of explosion.

Extinguish the fire from the maximum safe distance and evacuate persons from the fire area.

- Special firefighting methods: Use of water mist and water spray for cooling the surfaces exposed to heat and for protection of persons. Only persons trained in firefighting may use the water spray (sprayed water).
- Special protective equipment for firefighters: Self-contained open circuit compressed air breathing apparatus (HRN EN 137). Wear protective clothing for firefighters (intervention suit) in accordance with HRN EN 469.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

- Protective equipment: Use personal protective equipment listed in section 8 and remove unprotected persons from the affected area immediately.

- Accident prevention procedures:	Place a sign on visible location that entrance or work with open flame or sparking tools is forbidden. Measure oxygen concentration in the air. Detector for flammable gases may be used to check presence of flammable gases or vapours. Vapours are heavier than air and may reduce the oxygen level in the room, poising a suffocation risk. Ensure good ventilation of areas at risk. Eliminate all sources of ignition, avoid sparking and take precautionary measures against static electricity.
- Procedure in case of accident:	Stand upwind from the leak site. Stop the product leak as soon as possible if it can be done safely. Prevent gas penetration into places where its accumulation could be dangerous (sewage, recesses and similar). Provide ventilation. The product shall rapidly evaporate if an accidental discharge into the water occurs.
6.1.2. For emergency responders:	Isolate the discharge area. Ventilate the discharge area and allow the product to evaporate. Use personal protective equipment listed in Section 8 immediately evacuate unprotected persons from the affected area.
6.2 Environmental precautions:	Prevent product spread if this can be done in a safely manner. Prevent gas penetration into places where its accumulation could be dangerous (sewage, recesses and similar). Provide good ventilation. The product shall rapidly evaporate if an accidental discharge into the water occurs. Notify at 112.

6.3 Methods and material for containment and cleaning up

6.3.1. For bunding, covering and capping:	Stop or isolate the leak at the source if this can be done in a safely manner. Allow the product to evaporate. Ensure adequate ventilation.
6.3.2. For cleaning up:	Ventilate the discharge area and allow the product to evaporate.
6.3.3. Other information:	Discharged liquid very quickly turns into a gas and forms an explosive mixture with air! When the concentration drops below explosion limits at the point of escape, initiate intervention. Displays characteristics of cryogen liquid and many materials in contact with cooling – cryogen liquid become brittle and crack. May cause frostbites.

6.4 Reference to other sections: See sections 8 and 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 Safe handling advice: 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. Do not throw cylinders in order to avoid cylinder or valve damage. Do not handle cylinder in the presence of open flame. Do not check for leaks with open flame, only with soap (foam). Do not open valves on cylinders or special-purpose tanks with any tool (only with hands). Keep away from direct sunlight.

7.1.2 Advice on general occupational hygiene: It is forbidden to smoke, eat, drink, or keep food in a room where this product is handled. Keep personal clothes separated from work clothing and where this product is handled. Use personal protection equipment listed in Section 8. Avoid inhalation and contact with skin and eyes.

7.2 Conditions for safe storage, including any incompatibilities

- SUITABLE: Dedicated containers and metal (steel) pressurized cylinders according to regulations concerning storage and decanting of liquified petroleum gases. Store in open space or well-ventilated place, explosion-proof.

- TO BE AVOIDED: Storing in the area together with chemicals that can cause fire (oxidants, acids). Do not keep sparking tools and machines in storage area. Do not store or use cylinders in horizontal position i.e., position in which the liquid is coming out through gas phase opening.

- Packaging materials

- RECOMMENDED: Original manufacturer's container with valid certificate.

- NOT SUITABLE: Any other packaging material.

7.3 Specific end use(s):

Documentation for safe handling is available at each production location, and includes the selection of technical, administrative, and personal protective equipment in accordance with the risk-based management system.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Hazardous substance (CAS No.)	Occupational exposure limit values/short term values (OEL/STEL)		Biological limit values
	ppm	mg/m^3	
Petroleum gases, liquified	1000/1250	1750/2180	No data.

1,3-butadiene (106-99-0)	1/-	2,2/-	No data.

- Monitoring procedures:

8.2. Exposure controls

- Summary of risk management measures: The degree of protection and the type of control depend on the possible exposure according to risk assessment. Use adequate ventilation to keep the concentration of explosive substances below the explosive limit. Educate and train workers about potential hazards and control measures when performing regular activities. Prescribe the procedure for safe handling. Measurement of oxygen and hazardous substances in the air, according to regulations.

8.2.1 Occupational exposure controls

- Description of operating procedure and technological control:

Provide good ventilation/air suction in work area. Provide decontamination sprinkler for eyes and face. Respect personal hygiene measures: wash hands after work, mandatory before eating, drinking, and/or smoking. Regularly maintain and wash clothing and equipment after use to remove dirt. Dispose contaminated clothing and equipment according to regulations. Maintain cleanliness according to good practice. Educate and train the employees on potential hazards and control measures. Test and maintain product handling equipment: e.g., personal protection equipment, ventilation system.

8.2.2 Personal protective equipment

- respiratory protection:	In case of insufficient ventilation use protective mask for the whole face (HRN EN 136/AC:2006) with filter for the protection against gases and evaporation of organic compounds with a boiling point up to 65°C (HRN EN 14387). In case of an increased gas concentration and a decreased oxygen concentration, it is mandatory to use self-contained open circuit compressed air breathing apparatus (HRN EN 137).
- hand protection:	Use protective gloves of persistent leak-proof material (nitrile or nitrile butyl rubber) in accordance with HRN EN 374. In frequent contact with the hazardous substance, the resistance level to absorption of the gloves shall be > 240 min.
- eye/face protection:	Protective goggles or a visor (HRN EN 166).
- 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).
- Special hygienic and safety precautions:	The workplace shall be equipped with a shower. No smoking or eating and drinking when handling the gas. Regularly control and monitor the functionality 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.

8.2.3 Environmental exposure controls

- Summary of risk management measures: No data available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

- physical state:		Gas; liquid under pressure
- colour:		Colourless.
- odour:		Mild and characteristic.
- odour threshold:		Not applicable.
- pH value (indicate conc. and temp.):		Not applicable.
- melting point/freezing point:	°C	-185 to -105,5 (from literature)
- boiling point/boiling range:	°C	-6,27 to -0,5 (from literature)
- flash point:	°C	-104 to -60 (from literature)
- evaporation rate:		No data available.
- flammability (solid, gas):		Extremely flammable gas.
- explosive limits:	vol. %	1,8 – 8,4 (from literature)
- vapour pressure:	Pa	480 (maximum)
- vapour density at 15°C:	kg/m^3	No data available.
- relative density:		No data available.
- density at 15°C:	kg/m^3	576 (maximum)
- solubility (indicate solvent):	g/L	No data available.
- solubility in water (at 20 - 25°C and pH 7):	mg/L	186,5 (from literature)
- partition coefficient n-octanol / water	logPow	Not applicable.
- auto ignition temperature:	°C	460 (from literature)
- decomposition temperature:	°C	No data available.
- kinematic viscosity at 40 °C:	mm^2/s	No data available.
- oxidizing properties:		Not applicable.
- conductivity:	pS/m	No data available.

9.2. Other information:

No data available.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity:	Stable under recommended handling and storage conditions.
10.2 Chemical stability:	Stable under recommended handling and storage conditions.
10.3 Possibility of hazardous reactions:	No data available.
10.4 Conditions to avoid:	Contact with air, heat sources, flame, sparking.
10.5 Incompatible materials:	Strong oxidants.

10.6 Hazardous decomposition products: None in normal operating conditions and in case of proper storage; however thermal decomposition may generate hazardous gases, including carbon-monoxide, (CO).

SECTION 11. TOXICOLOGICAL INFORMATION

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

- Acute toxicity

- oral (LD_{50}): Not classified.
- inhalation (LC_{50}): >23 mg/l (4 h, rat)
- dermal (LD_{50}): Not classified.

- Corrosion/Irritation

- skin: Compressed gas causes frostbites.

- Repeated dose toxicity No data available.

- Serious damage/irritation

- eyes: Compressed gas causes frostbites.

- Sensitisation

- skin: No data available.
- respiratory tract: No data available.

- Germ cell mutagenicity: Not classified.

- Carcinogenicity: Not classified.

- Reproductive toxicity: No data available.

- STOT (SE): No data available.

- STOT (RE): No data available.

- Aspiration hazard: Not applicable.

- Information on likely routes of exposure: No data available.
- Symptoms related to the physical, chemical and toxicological characteristics: Higher concentration causes drowsiness, headache, fainting, due to lack of oxygen can also occur suffocation.
- Delayed and immediate effects as well as chronic effects from short and long-term exposure: Asphyxiator causes headache and drowsiness. High concentration or prolonged exposure may cause fainting and suffocation.

11.2. Information on other hazards

- Endocrine disrupting properties: No data available.
- Other information: No data available.

SECTION 12. ECOLOGICAL INFORMATION

12.1. Toxicity

- to aquatic organisms: No data available.

- 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):	Based on logKow <3 bioaccumulation is not expected.
12.4. Mobility in soil	**Method:** No data available.
- Known or predicted distribution in environmental compartments:	Quickly disperses in the atmosphere.
- 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. Endocrine disrupting properties:	No data available.
12.7. Other adverse effects:	No data available.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:	No data available.
- Waste codes:	Not applicable.
- Waste from residues:	Not applicable. There is no classic waste from this product.
- Contaminated packaging:	Close the empty containers and return to producer.
- Relevant provisions:	Act on Waste Management, Ordinance on waste management.

SECTION 14. TRANSPORT INFORMATION

14.1 UN number or ID number:	1075
14.2 UN proper shipping name:	PETROLEUM GAS, LIQUIFIED
14.3 Transport hazard class(es)	
ADR/RID/ADN/ICAO/IATA:	2
IMDG:	2
14.4 Packing group	
ADR/RID/ADN/IMDG/ICAO/IATA:	Not assigned to any packaging group.
14.5 Environmental hazards	

ADR, RID, ADN, ICAO/IATA:	When leaking from the tank, due to the cooling properties during spreading, it can endanger flora and fauna.
IMDG:	When leaking from the tank, due to the cooling properties during spreading, it can endanger flora and fauna.

14.6 Special precautions for user

ADR	RID
Transport category: 2 Vehicle for tank carriage: FL Tank code: PxBN(M) Tunnel restriction code: B/D Label: 2.1 Classification code: 2F Hazard identification: 23 Special provisions: 274,392,583,639,662,674, TA4,TT9,TT11,CV9,CV10,CV36,S2,S20.	Transport category: 2 Tank code: PxBN(M) Label: 2.1 (+13) Classification code: 2F Hazard identification: 23 Special provisions: 274,392,583,639,662,674,TU38, TE22,TA4,TT9,TM6,CW9,CW10,CW36.
ADN	**IMDG**
Label: 2.1 Additional requirements/Remarks: 2; 31 Dangers: 2.1 Equipment required: PP, EX, A Classification code: 2F Carriage permitted: T Type of tank vessel: G/1 Anti-explosion protection required: YES Maximum degree of filling in %: 91	Subsidiary risk: none Group of the cargo: E Special provisions: 274 EmS: F-D, S-U Segregation group: E
ICAO	
Label: 2.1 Cargo IMP code: RFG Passenger and cargo aircraft: not permitted Cargo aircraft only: 150 kg net per packaging ERG code: 10L	

14.7 Maritime transport in bulk according to IMO instruments

Trade name:	Not applicable.
Pollution category (according to MARPOL, Annex II):	Not applicable.
Vessel type (according to IBC Code):	Not applicable.
Special and operative requirements (according to IBC Code):	Not applicable.

15. REGULATORY INFORMATION

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

- Applicable EU regulations: Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (CLP); Commission Regulation (EU) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 (REACH).

- Applicable national regulations: Act on Chemicals; Ordinance on workers protection to dangerous chemicals exposure during work, exposure limit values and biological limit values; Act on Waste Management, Ordinance on waste management.

- Authorization information: -

- Restriction information: -

15.2 Chemical Safety Assessment

- Chemical Safety Assessment carried out (CSA): YES X NO

16. OTHER INFORMATION

Revision indicators

Section:	Subject of change:
9	Physical and chemical properties Aligned with Commission Regulation (EU) 2020/878.

Full text of H- phrases

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

Abbreviations and acronyms:

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)
UFI	Unique formula identifier (according to section 5. Part A of Annex VIII of Regulation (EU) no. 1272/2008)
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 REACH Consortium, Active Steward documents for Safety Data Sheet creation
4. Concawe Report: Hazard classification and labelling of petroleum substances in the European Economic Area – 2021

APPENDIX: EXPOSURE SCENARIOS ACCORDING TO CHEMICAL SAFETY REPORT