

**Production Association Belorusneft
Belarusian Gas Processing Plant**

**MATERIAL SAFETY
DATA SHEET**

Liquefied Hydrocarbon Fuel Gases

Material Safety Data Sheet

Safety Data Sheet MSDS RB:	400051902	006	2014
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National Register NRMSDSRB No.: 7516030 11 01307 as of 14.02.2014	Valid until 14.02.2019
Deputy Head of the Scientific Research Institute of Fire Safety and Emergencies of the Ministry of Emergency Situations of Belarus	
L.S. /signed/	A. P. Lushchik

APPROVED
 Director General
 Production Association
 Belorusneft
 /signed/ A.A. Lyakhov
 08.01.2014.

/SEAL/

"Ministry of Emergency Situations of Belarus
 Scientific Research Institute of Fire Safety and Emergencies"

/SEAL/

"Republic of Belarus
 Production Association
 BELORUSNEFT"

NAMES:

technical (as per ND)	Liquefied hydrocarbon fuel gases
chemical (as per IUPAC)	Hydrocarbons C1-C4
trade name	Liquefied hydrocarbon fuel gases – industrial propane (PT), automotive propane (PA), automotive propane-butane (PBA), mixture of industrial propane & butane (SPBT), industrial butane (BT)
synonyms	Mixture of hydrocarbons C1-C4; liquefied mixture of hydrocarbon gases; mixture of saturated and unsaturated hydrocarbon gases, liquefied petroleum gases, gases of C1-C4 fractions

IDENTIFICATION AND NAME OF NORMATIVE DOCUMENTS (GOST, STB, TU, ISO, etc.)

STB 2262-2012 Liquefied Hydrocarbon Fuel Gases. Specification.
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NPC Code: 232021200	FEACN Code: 2711129700 2711139700 2711121900 2711129400 2901100000 2711139100	No. and date:
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HAZARD CHARACTERISTIC: MPC average daily/maximum permissible, mg/m³: **300/900** | Hazard Class: **4**

Brief description (in words): flammable colorless gases; heavier than air; ignited by sparks and flames, may form explosive mixtures with air in open spaces; may accumulate in low unventilated areas; insoluble in water; may be oxidized, sulphurized, nitrated

Detailed description: see 16 sections of this MSDS

MAIN HAZARDOUS COMPONENTS:	MPC av. daily/max. permissible, mg/m ³ :	Hazard Class:
Ethane, propane, propylene, butane, butylene	300/900	4
Methane	-/7000	4
Ethylene (ethene)	-/10	4

Applicant (approving organization):

Production Association Belorusneft
(name of organization)

9, Rogachevskaya St., Gomel 246003.
(address of organization)

Type of applicant: producer, supplier, distributor, exporter, importer (strike out whichever does not apply).

Emergency phones: (+375232) 71-25-45 (24-hour) (+3752340) 2-28-78

Developer enterprise: BelNIPIneft, Production Association Belorusneft, Gomel

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

Product name:	Liquefied Hydrocarbon Fuel Gases																		
Grades of liquefied hydrocarbon fuel gases	Depending on the main component, there are following grades of liquefied gases [1]: <table><thead><tr><th>Grade</th><th>Main Component Name</th><th>OKRB Code</th></tr></thead><tbody><tr><td>PT</td><td>Industrial Propane</td><td>23.20.21.200</td></tr><tr><td>PA</td><td>Automotive Propane</td><td>23.20.21.200</td></tr><tr><td>PBA</td><td>Automotive Propane-Butane</td><td>23.20.21.200</td></tr><tr><td>SPBT</td><td>Mixture of Industrial Propane & Butane</td><td>23.20.21.200</td></tr><tr><td>BT</td><td>Industrial Butane</td><td>23.20.21.200</td></tr></tbody></table>	Grade	Main Component Name	OKRB Code	PT	Industrial Propane	23.20.21.200	PA	Automotive Propane	23.20.21.200	PBA	Automotive Propane-Butane	23.20.21.200	SPBT	Mixture of Industrial Propane & Butane	23.20.21.200	BT	Industrial Butane	23.20.21.200
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BT	Industrial Butane	23.20.21.200																	
Components:	Methane, ethane, ethylene, propane, propylene, butane, butylene [1]																		
Source materials used:	Petroleum Gas, NGL																		
Product Use:	Liquefied Hydrocarbon Fuel Gases (hereinafter referred to as Liquefied Gases) are used as fuel for domestic and commercial fuel, automotive fuel for motor transport, as well as for industrial purposes [1]																		
Manufacturer/Supplier full name:	State Production Association Belorusneft																		
Mailing address:	9, Rogachevskaya Street, Gomel, Republic of Belarus, 246003																		
Director General:	Aleksander Lyakhov (+375232) 71-25-23																		
Chief Engineer:	Vladimir Goshkis (+375232) 71-01-76																		
Emergency telephone numbers:	(+375232)71-25-45 (+3752340)2-22-78																		
Fax number:	(+375232) 79-34-35																		

2. HAZARDS IDENTIFICATION

General hazard statement: Liquefied gases are explosive and flammable low-toxic products having specific characteristic odor, and by level of effects on human body are referred to Hazard Class 4 [1], [2].
Liquefied gases vapors are heavier than air and may accumulate in low and unventilated areas [1].

Allowable workplace exposure limits:

MPC daily average/max. single (saturates C1-C10): 300/900 mg/m³ [1], [33]

Hazard labels:



DANGER.
Extremely flammable gas [8].

Safety measures:

Keep away from sources of ignition, heat, sparks, open fire.
No smoking [8].

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name (acc. to IUPAC): Hydrocarbons C1 – C4

CAS No. 74-98-6
106-97-8

Commonly used synonyms: Mixture of hydrocarbons C1-C4; liquefied mixture of hydrocarbon gases; mixture of saturated and unsaturated hydrocarbon gases, liquefied petroleum gases, gases of C1-C4 fractions - Industrial Propane (PT); Automotive Propane (PA); Automotive Propane-Butane (PBA); Mixture of Industrial Propane & Butane (SPBT)

Components [1]:

Component description	Standard content, %				
	PT	PA	PBA	SPBT	BT
Combined methane, ethane and ethylene	not regulated				
Combined propane and propylene, min.	75	-	-	not regulated	
including propane	-	85 ±10	50 ±10	-	-
Combined butanes and butylenes	not regulated			-	-
- maximum	-	-	-	60	-
- minimum	-	-	-	-	60
Combined unsaturated hydrocarbons, max.	-	6	6	-	-

Hazard identification: By level of effects on human body are referred to Hazard Class 4 [1].

EC No. 200-827-9

MPC_{short-term/daily average}, mg/m³

Ethane, propane, propylene, butane, butylene: 300/900 mg/m³
Methane: -/7000 mg/m³
Ethylene (ethene) - / 10 mg/m³ [1], [33]

Transport Hazard Class: 2 [9]

Hazard characteristics: Narcotic effect of liquefied gases on human body (signs of narcotic effect include general weakness and dizziness followed by causeless exhilaration and unconsciousness).
Slight exceeding of maximum allowable concentrations of liquefied gas vapors in the air causes oxygen debt in humans; significantly exceeded concentrations may cause lethal suffocation.
When contacting the human body, the liquefied hydrocarbon gases may cause cryogenic burns [1], [2].

4. FIRST AID MEASURES

Routes of exposure: High concentrations of liquefied gas vapors in the air are dangerous when inhaling or contacting with skin and eyes [1], [3].

Signs and symptoms observed: Dizziness, shortness of breath, headache, skin redness and itching, lacrimation, smarting eyes [1], [11], [23].
Liquefied gas vapors may cause suffocation when concentration in the air is significant [1].
Strong cooling effect may cause severe frostbites. Contact of liquefied gas drops with eyes may cause loss of vision [1], [23].
Clinical signs of acute intoxication: excitation, dizziness, headache, sleepiness, altered breathing [11], [23].
Fire and explosion may cause burns and injuries [23].

First aid measures: Call an ambulance. Fresh air, recovery position, warming, fresh clothes. Flush skin and eyes with copious quantities of water [23].
- Intoxication after inhaling: Remove to fresh air. Flush nasal tract and throat with 2% solution of baking soda. Keep warm. Use cotton soaked with liquid ammonia to bring to consciousness. Give hot drinks. If breathing has altered, apply artificial respiration. Seek urgent medical advice. [1], [10], [15], [22].

- Contact of liquid phase of liquefied hydrocarbons with clothing: In case of contact with clothing, change into fresh clothing. Remove contaminated clothing immediately to prevent the human body from contacting with liquid phase.

- Skin contact with liquid phase: After skin contact, rinse the affected area using warm water and soap.

- Frostbite: Apply dry sterile bandage to the affected skin areas, remove the victim to warm place. Give warm drinks. Take the victim to healthcare centre [11].

- Eye contact: Immediately rinse with warm water and seek ophthalmologist's advice [11].
- First aid supplies: First aid kit shall include: ammonia (liquid ammonia) – 25 ml, bandages – 5 pcs., Vaseline – 1 tube, absorbent cotton – 150 g, Epsom salt – 300 g, iodine tincture – 20 ml, activated carbon – 100 mg, potassium permanganate – 20 g, hydrogen peroxide (3% solution) – 100 g, sodium bicarbonate – 200 g, boric acid – 20 g [10].

5. FIRE-FIGHTING MEASURES

- General description: Flammable gases [1], [9].
Ignited by spark or flame. Liquefied gases form explosive mixtures with air at concentrations of propane vapors between 2.3-9.5%, normal butane vapors between 1.8-9.1% (by volume) at pressure 0.1MPa (1 atm.) and temperatures between 15-20°C.
Containers may explode if heated. Explosive mixtures form in empty vessels [1], [23].

Fire and explosion characteristics [5]:

Characteristics Name	Component Name						
	Methane	Ethane	Ethylene	Propane	Propylene	Butane	Butylene
1	2	3	4	5	6	7	8
Autoignition temperature, °C	535	515	435	470	455	405	384
Vapors inflammability limits, % of volume	-in the air: 5.28÷14.1 in oxygen: 5.1÷61	-in the air: 2.9÷15 in oxygen: 3÷66	-in the air: 2.7÷34 in oxygen: 2.9÷80	-in the air: 2.3÷9.4 in oxygen: 2.3÷55	-in the air: 2.4÷11 in oxygen: 2.1÷53	-in the air: 1.8÷9.1 in oxygen: 1.8÷49	1.6÷10
Formation heat, kJ/mol	-74.8	-84.68	52.5	-103.8	20.4	-126	-0.1
Combustion heat, kJ/mol	-802	-1576	-1318	-2044	-1919	-2567	-2542.6
Minimum ignition energy, mJ	0.28	0.24	0.12	0.25	0.24	0.25	0.27
Minimum explosive oxygen content, % by vol. - when diluted with carbon dioxide	11	13.8	12.1	14.3	14.6	14.9	14
- when diluted with nitrogen	11	11.3	10	11.6	11.9	12	11.6

1	2	3	4	5	6	7	8
Maximum normal flame speed, m/s:	0.338	0.476	0.735	0.39	0.51	0.45	0.43
Minimum phlegmatizing concentration							
- carbon dioxide:	24	34	42	32	30	29	33
- nitrogen:	37	46	52	45	43	41	45
Flash point, °C:	-	-	-	-96(est.)	-	-69(est.)	-
Maximum explosion pressure, kPa	706	675	830	843	648	843	-
Thermal decomposition possible:	yes, results in carbon oxides formation						

- : no reference data available

Suitable extinguishing media:	PSB (ПСБ) powder, carbon dioxide CO ₂) may be used for small fires. Smothering, water cooling – for large fires. Extinguishing and cooling shall be performed at a maximum possible distance [1], [5], [23].
Unsuitable extinguishing media:	Do not extinguish fire unless flow of gas can be stopped immediately (do not extinguish unless leak can be stopped safely) [23].
Personal protective equipment for fire fighters:	Fire-fighting suit with SPI-20 self-rescuer. Fire-entry suit [23].
Specific extinguishing methods:	No data [1].

6. ACCIDENTAL RELEASE MEASURES

General measures:	<p>Use fireproof, explosion-proof, leak-proof and antistatic equipment. Ensure compliance with operating procedures.</p> <p>Do not use open fire inside any premises relating to production, storage and pumping of liquefied hydrocarbon gases. The said premises must be equipped with explosion-proof lighting, all work must be done using spark-proof tools.</p> <p>Ensure compliance with sanitary requirements according to GOST 12.1.005-88. Equip all industrial premises with supply-and-exhaust ventilation systems providing tenfold air exchange per hour.</p> <p>Ensure monitoring of hydrocarbons content in the air of the working areas using portable or fixed automatic devices (analyzers, indicators).</p>
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approved for use in accordance with established procedure.
Perform analysis of industrial effluents for petroleum products content in accordance with the Guidelines for Analysis of Industrial Effluents of Petroleum Processing Plants [1], [4].

Personal protection in case of fire or leakage:	At low concentrations of liquefied petroleum gas vapors (up to 0.5 per cent by volume), use RPG-67 Gas Filtering Respirator with A cartridge. At high concentrations and when working in closed containers, vessels, wells etc., use self-contained hose gas masks PSH-1, PSH-2 and DPA-5 with blowers [1], [23]. Use respirators, safety goggles, hard hats and gloves [15].
Operating procedure in case of accident or emergency:	Stop work in hazardous area. Remove all unnecessary persons. Keep upwind position. No smoking. Follow fire precautions. Eliminate all sources of ignition and sparking. Use personal protective equipment to enter hazardous areas. Small leak/spillage: eliminate observing safety precautions. Large leak/spillage: set fire to leaking gas in consultation with the experts of Ministry of Emergency Situations and let it burn itself out under the control of water jets. Isolate the affected area until gas dissipates. Do not touch spilled material. Provide first aid to injured persons. Send all persons from affected area to medical examination. Dike spillage area and prevent the material from entering water reservoirs. [17], [18], [23].
Environmental precautions:	Ensure maximum sealing of containers, utility lines, pumps and other equipment, adhere strictly to operating procedures. Ensure periodic monitoring of hydrocarbon content in the working area, analysis of industrial effluents for petroleum products content [1], [3]. Ensure leak-proof loading and unloading, provide stationary hosing devices, automation systems for loading and unloading operations [1], [3].
Firefighting procedure:	Do not approach containers. Cool containers with water at a maximum possible distance. Do not extinguish unless leak can be stopped safely. Use fine sprayed foam to extinguish at a maximum possible distance [23].
Containment and clean up:	Use water fog spray to disperse (isolate) liquefied gas vapors. Drench spillage area with air-filled foam or inert material [23].

7. STORAGE AND HANDLING

Protective measures and equipment:	Equip explosion-hazardous premises with supply-and-exhaust ventilation system. Artificial lighting must be blast-proof.
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Do not use open fire and/or tools that may produce sparks.
Use personal protective equipment, exercise proper personal hygiene.
Conduct monitoring of hydrocarbons content in the air of working area [1], [4].

Environmental exposure controls:	Ensure maximum sealing of process equipment, containers, utility lines, adhere strictly to operating procedures. In production facilities and open spaces, ensure periodic monitoring of hydrocarbon content in the air of working areas.
Precautions for safe movement and transportation:	By rail and road transport in accordance with Dangerous Goods Regulations in force for the relevant kind of transport, as well as the regulations on construction and safe operation of pressure vessels [1], [4], [7], [10], [20], [36].
Storage and handling conditions:	Store in horizontal and spherical high-pressure sealed metal vessels, both fixed and portable. Vessels must not contain bottom water above the minimum level ensured by design of water drainage device [1], [4], [22]. Liquefied gases must be stored in tanks, steel cylinders and other containers certified in accordance with Regulations on construction and safe operation of pressure vessels [1], [34]. Overpressure in vessels after drainage of liquefied gases must be not less than 0.05 MPa (380 mm Hg) [4]. Store cylinders (containers) away from open flames [23]. Equip all explosion-hazardous premises with supply-and-exhaust ventilation systems providing tenfold air exchange per hour. Liquefied gas in containers must be stored on racks, pallets or stacks, in covered storage areas, under a canopy or on graded sites protected from direct sunlight and precipitation [1], [4].
Guaranteed storage life:	Storage life for all grades of liquefied gases is 6 months from date of shipment (under normal conditions of storage and transportation) [1].
Incompatible materials:	Do not store in the same premises with materials capable of forming explosive mixtures (potassium nitrate, calcium nitrate, sodium nitrate, barium nitrate, potassium perchlorate, potassium chlorate etc.); combustion-supporting gases: oxygen and air in compressed or liquid state; substances liable to spontaneous combustion or capable of self-igniting by water and air (potassium, sodium, calcium, calcium carbide, calcium phosphide, sodium peroxide, barium peroxide, aluminum dust/powder, aluminum triethyl, diethyl aluminum chloride etc.);

highly flammable and combustible liquids (gasoline, benzene, carbon disulphide, acetone, turpentine, toluene, xylene, kerosene, organic oils); highly flammable and combustible solids (celluloid, red phosphorus, naphthalene, safety matches); substances capable of causing ignition (bromine, nitric and sulfuric acids, chromic anhydride, potassium permanganate); inflammable substances (cotton, hay, cotton wool, hemp, brimstone, peat, charcoal - other than fresh-burned, soot of plant and animal origin etc.) [11].

Materials used for containers:	Metal (steel) [4]. Newly made metal containers must have oil-resistant and vapor-resistant protective internal coating complying with electrostatic sparking safety requirements [4].
Additional requirements concerning storage:	Artificial lighting and all used electric equipment must be blast-proof. Containers, vessels, utility lines and pumping units must be grounded [1], [4].

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Parameters subject to mandatory monitoring (MPC average daily/max. single):	300/900 mg/m ³ [1], [33].
Measures to ensure and control the specified parameters:	Ensure maximum sealing of containers, utility lines and other equipment, strict adherence to operating procedures, supply-and-exhaust ventilation of industrial facilities. Use portable and fixed automatic devices (analyzers, indicators) to monitor the air in working areas [1].
Personal protective equipment:	Working clothes and footwear according to industry standards for free provision of personal protective equipment [12], [14].
Respiratory and eye protection:	At low concentrations of liquefied petroleum gas vapors slightly above the liquefied gas exposure limit (up to 0.5 per cent by volume), use small-size filtering gas masks (PFMG) with DOT-460AH filters, and filtering gas masks SR-200 with SR-298AX filters. At high concentrations and work in closed containers, vessels etc., use self-contained hose gas masks PSH-1, PSH-2, as well as breathing apparatuses ASV-2, AP-96 and AIR-500 [1]. Use respirator, safety goggles, hard hat and gloves [15].
Hand protection:	Gloves: combined, canvas cloth and rubberized, oil-and-frost resistant.[11].

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Gas [1], [3], [5], [23].

Color: Colorless [5], [23].

Odor: Specific characteristic [23].

Physical, chemical
and usage
characteristics [1]:

Description	Standard value for grade:				
	PT	PA	PBA	SPBT	BT
MON, not less	89			-	
Mass fractions of components, %:					
- combined methane, ethane and ethylene	not regulated				
- combined propane and propylene. not less	75	-	-	not regulated	
incl. propane	-	85±10	50±10	-	-
- combined butane and butylene:	not regulated			-	-
- maximum	-	-	-	60	-
- minimum	-	-	-	-	60
- combined unsaturated hydrocarbons, max.	-	6	6	-	-
Liquid residue by volume at 20°C, max.	0.7	0.7	1.6	1.6	1.8
Saturated vapor excess pressure, MPa:					
at + 45 °C, max.	1.6				
at - 20 °C, min.	0.16	-	0.07	-	-
at - 30 °C, min.	-	0.07	-	-	-
Mass fraction of mercaptane sulfur, % max. including hydrogen sulfide, max.	0.013	0.01	0.01	0.013	0.013
	0.003				
Free water and alkali content	none				
Odor intensity index, not less	3				
Solubility in water	not soluble				
Remarks:	<p>1. Octane number shall be regulated in case when specific grade is used as automotive fuel.</p> <p>2. When using liquefied gases of grades PT and SPBT as automotive fuel, the MON shall be not less than 89.0, while mass fraction of unsaturated hydrocarbons shall be less than 6% and saturated vapor pressure shall exceed 0.07 MPa for grades PT and SPBT at temperatures -30°C and -20°C, respectively.</p>				

3. At temperatures -20°C and -30°C, saturated vapor pressure of liquefied gases shall be measured only in winter time.
4. It is allowed not to measure odor intensity, when mass fraction of mercaptane sulfur in liquefied gases of PT, SPBT and BT grades is 0.002% or more, and PA and PBA grades is 0.001% or more. When mass fraction of mercaptane sulfur is below the above limits, and odor intensity is less than 3 points, the liquefied gases must be odorized according to established procedure.

Physical and chemical properties of components of the gases [5], [11], [13], [38]

Parameter name	Component name						
	Methane	Ethane	Ethylene	Propane	Propylene	Butane	Butylene
Chemical formula	CH ₄	C ₂ H ₆	C ₂ H ₄	C ₃ H ₈	C ₃ H ₆	C ₄ H ₁₀	C ₄ H ₈
Molecular weight	16.04	30.07	28.05	44.096	42.08	58,123	56.11
Density, kg/m ³	0,7168 (at 0°C)	548.2 (liquid at -90°C)	570 (at -103,8°C)	579 (at -40°C)	599 (at -40°C)	578.9 (at 20°C)	619 (at 0°C)
Relative density (air), kg/m ³	0.55 (at 15.5°C)	1,0488	0.974	1.56	1,45	2.0665	1,93
Vapor viscosity, Pa·s	0.1·10 ⁵ (at 20°C)	1.8·10 ⁵ (-100°C)	1.8·10 ⁵ (at -100°C)	2·10 ⁵ (at -40°C)	3,8·10 ⁵ (at -100°C)	73.9·10 ⁵ (at 20°C) 2.5·10 ⁵ (at -20°C)	7,8·10 ⁵ (at -110°C)
Melting point, °C	-182.5	-183.3	-169.1	-187,6	-185.3	-138.35	-185.34
Boiling point, °C	-161.6	-88,63	-103.7	-42.06	-47.7	-0.5	-6.25
Formation heat, kJ/mol	-74,8	-84.68	52,5	-103,8	20.4	-126	-0.1
Combustion value, kJ/mol	-802	-1576	-1318	-2044	-1919	-2657	-2542.6
Flash point, °C (est.)	-	-	-	-96	-	-69	-
Self-ignition point, °C	535	515	435	470	455	405	384
Compression factor	0.288	0.285	-	0.281	-	0.274	-

- : no reference data available

10. STABILITY AND REACTIVITY

Chemical Stability:	Highly stable (7-30 days) [11].
Reactivity:	May be oxidized, halogenated, nitrated and sulfonated [13].
Conditions to avoid:	Exposure to open fire [1].

Heating during storage and transportation [10], [23].
Dropping and hitting of cylinders [10], [23].
Accumulation in low and unventilated areas [1], [23]

Incompatible substances (materials): Substances capable of forming explosive mixtures; combustion-supporting gases: oxygen and air in compressed or liquid state; substances liable to spontaneous combustion or capable of self-igniting by water and air; highly flammable and combustible liquids; highly flammable and combustible solids; substances capable of causing ignition; inflammable substances [11].

Useful life: 6 months from date of shipment (under normal conditions of storage and transportation) [1].

11. TOXICOLOGICAL INFORMATION

General characteristics: Toxicity of products resulting from incomplete combustion of gases [1].
Liquefied gases have low toxicity, specific characteristic odor, and by level of effects on human body are referred to Hazard Class 4 [1].

Routes of exposure:
- skin and eye contact: Inhalation, skin and eye contact [23].
Skin and eye irritation [22].
Skin redness and itching, lacrimation, smarting eyes [23].
Liquefied gases may cause cold burns when contacting with skin [1], [23].

- inhalation:
- effect on respiratory tract: Dizziness, suffocation, headache, loss of consciousness [1], [23].
Cause irritation

Percutaneous action; carcinogenicity; mutagenicity; embryotropic, gonadotrophic, teratogenic effect: Not studied [1].

Sensitizing effect: Confirmed [1].

Cumulative effect: Weak [1].

Acute toxicity: $CL_{50} > 500000 \text{ mg/m}^3$, 2±4 hours, inhalation (mouse) [2].
 $DL_{50} > 2500 \text{ mg/kg}$, cutaneous application (animals) [2].
 $DL_{50} > 5000 \text{ mg/kg}$, intragastric application (animals) [2].
Index of potential inhalation toxicity < 3 (at 20°C), mice [2].

12. ECOLOGICAL INFORMATION

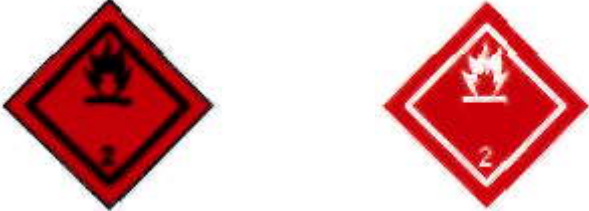
Ways of release in the environment:	Failure to comply with the requirements of the rules for handling and storage; as a result of emergency situations [22].
Observable environmental impact:	Atmospheric air pollution [22].
Transformation in the environment:	Biodegradable [11].
Hygienic standards in the environment (aliphatic saturated hydrocarbons C1-C10):	MPC _{max. single/average daily} = 25/10 mg/m ³ [37].

13. DISPOSAL CONSIDERATIONS

Waste transportation:	In a specially equipped transport, which prevents loss of waste and contamination of the environment on the route [17].
Measures for safe handling of waste:	Keep away from open flames. [10] Keep away from heat during storage and transportation, prevent cylinders from dropping and hitting [17], [18].
Information on disposal, recycling and/or disposal of waste (including upon expiration of shelf life, in case of degradation before the expiration date):	Material must be sent to a specialized enterprise for neutralization according to the established procedure.
Containers treatment (neutralization methods, possibility of reuse):	Contaminated containers must be washed using hot water with petroleum solvent, or steamed and dried [10], [17], [18].

14. TRANSPORT INFORMATION

UN No.	1965, 1978, 1011 [7], [10], [20], [23].
Proper shipping name:	Proper shipping name is specified in accordance with the regulations in force for the relevant transport (Liquefied mixture of hydrocarbon gases) [7], [10], [20].

Types of transport:	Road and rail transport [4].
Dangerous goods classification:	Class 2, subclass 2.1; classification code 2F, UN, classification reference 2111-2117 [7], [10], [20], [23].
Hazard labels:	Drawing No. 2.1 [10].
	
	Highly flammable gases
	Symbol (flame): black or white Background: red Figure "2" in bottom corner.
Emergency card number	206 [23]
Special provisions	Covers A, A01, A02, A0, A1, B1, B2, B, C mixtures
Hazard Identification No.	23 [7], [10], 20]
Recommendations on transportation:	To be transported in liquid state [7], [10], [20]. In truck-mounted tanks with oil-resistant and vapor-resistant protective internal coating complying with electrostatic sparking safety requirements [4]. Rail tank cars of the consignor (consignee), designed to withstand pressures that may form at temperature 50°C [7]. Rail tank cars, truck-mounted tanks must be sealed in accordance with the Regulations on carriage of goods applicable for rail and road transport [7], [10].
General cargo prohibited from carriage together with the material:	Transportation must be carried out in accordance with Dangerous Goods Regulations in force for the relevant kind of transport [7], [10].

15. REGULATORY INFORMATION

Law of the Republic of Belarus of 26 November 1992 No.1982-II "On Environmental Protection" (as amended by the Law of the Republic of Belarus of 22.01.2013, No.18-3).

Law of the Republic of Belarus of 20 July 2007 No.271-3 "On Waste Management" (as amended by the Law of the Republic of Belarus of 12.12.2012 No.6-3).

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This is the first edition of Material Safety Data Sheet.

The above data are based on the best of our knowledge currently available. They are intended to provide description of our products in terms of safety requirements, and do not imply any guarantee of certain properties of the product or use thereof.

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