

**Production Association Belorusneft
Belarusian Gas Processing Plant**

**MATERIAL SAFETY
DATA SHEET**

Isobutane fraction

Gomel, 2015

Material Safety Data Sheet

Safety Data Sheet MSDS BGPP	400051902	010	2015
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Valid until 01.10.2020

APPROVED
 Director General
 Production Association
 Belarusneft
/signature/ A.A. Lyakhov
 01.10.2015.
/SEAL/
 «Republic of Belarus
 Production Association
 BELORUSNEFT»

NAMES:

technical (as per TNLA)	Isobutane fraction
chemical (as per IUPAC)	Hydrocarbons C1-C5
trade name	Isobutane fraction of premium, A,Б,B grades
synonyms	Mixture of hydrocarbons C1-C4, liquefied mixture of hydrocarbon gases, mixture of saturated and unsaturated hydrocarbon gases, gases of C1-C4 fractions

DESIGNATION AND NAME OF TECHNOLOGICAL REGULATIONS (GOST, STB, TDS, etc.)

TU BY 400051902.017-2015. Isobutane fraction. Technical data sheet.

OKP RB Code:

241411200
232021700

FEACN Code:

2901100001

2711139100

2711139700

Register of Hazardous Chemical and
Biological Substances No. and date:

HAZARD CHARACTERISTICS

signal word: hazardous

Brief description (in words): flammable liquid gas; heavier than air; ignited by sparks and flames, may form explosive mixtures with air; may accumulate in low unventilated areas; insoluble in water.

Detailed description: see 16 sections of this MSDS

MAIN HAZARDOUS COMPONENTS:

Component name	CAS No.	EC No.	MPC average daily/maximum permissible, mg/m ³ :	Hazard Class
isobutane	75-28-5	200-857-2	300/900	4
propane	74-98-6	200-827-9	300/900	4
normal butane	106-97-8	203-448-7	300/900	4
isopentane	78-78-4	201-142-8	300/900	4
normal pentane	109-66-0	203-692-4	300/900	4

Applicant (approving organization): RUE Production Association Belarusneft.
(full organization name)

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

Type of applicant: producer, supplier, distributor, ~~exporter~~, ~~importer~~ (cross-out the unnecessary).

Emergency phones: (+375232) 71-25-45 (twenty four - seven); (+3752340) 2-22-78

Developer enterprise: BelNIPIneft, Production Association Belarusneft, Gomel

TNLA – Technical Normative Legal Acts (STB, GOST, TU, etc.).

IUPAC – Nomenclature of Organic Compounds of International Union of Pure and Applied Chemistry.

OKP RB – State Classification of Products of the Republic of Belarus.

FEACN – Foreign Economic Activity Commodity Nomenclature.

RHCBS – Register of Hazardous Chemical and Biological Substances

MPC_{d.a./o.t.} – Maximum Permissible Concentration (daily average/one-time) in the air of work area.

CAS No. – substance number in the index of Chemical Abstracts Service

EC No. – substance number in the index of European Chemicals Agency

1. IDENTIFICATION OF THE CHEMICAL PRODUCTS AND INFORMATION ABOUT MANUFACTURER OR SUPPLIER


Product name:	Isobutane fraction
Composition	Propane, Butane, isobutane [1]
Applied raw materials	Wide fraction of light hydrocarbons
Brief recommendations for application:	Designed for further processing in the chemical and petrochemical industry, or for use as a fuel [1]
Full official name of the company	Republican Unitary Enterprise «Production Association «Belorusneft», Belarusian Gas Processing Plant
Mailing address:	9, Rogachevskaya Street, Gomel, 246003, Republic of Belarus
Director General:	Alexander Andreevich Lyakhov (+375232) 71-25-23
Chief Engineer:	Vladimir Davidovich Goshkis (+375232) 79-35-60
Emergency telephone numbers:	(+375232) 71-25-45 (+3752340) 2-22-78
Fax number:	(+375232) 79-34-35

2. HAZARD(S) IDENTIFICATION

Chemical products hazard level in general: Isobutane fraction is flammable liquefied gas, fire and explosion hazardous low-toxic (low-risk) product that has a specific characteristic odor and by level of effects on the human body is referred to Hazard Class 4 [1], [2].
Fraction vapors are heavier than air and may accumulate in low and unventilated areas [1], [14].

Health-based exposure limit in the air of working area: MPC daily average/max permissible. 300/900 mg/m³ [32]

Hazard labels:  «DANGER» Extremely flammable gas [7].

Safety measures:  Keep away from sources of ignition, heat, sparks, open fire. No smoking. [7].

3. COMPOSITION(INFORMATION ON COMPONENTS)

Chemical name (acc. to IUPAC): Hydrocarbons C1 – C5

Chemical formula

A mixture of hydrocarbons with isobutane as main component

General characteristics of the composition: (taking into account grades assortment and the indication of impurities and functional additives that affect the risk of products)

Four grades of isobutane fraction are set depending on the mass fraction of the components [1]:

Indicator name	Standard content			
	Premium	A	B	B
1 Mass fraction of the components, %: The sum of C1-C2 hydrocarbons	not regulated	not regulated	not regulated	not regulated
Propane, max.	1.3	1.5	4.5	8.0
Isobutane, max.	98.0	97.0	90.0	70.0
Butelene sum , max.	0.5	0.5	0.5	not regulated
normal-butane, max.	0.7	2.0	6.0	not regulated
C5 hydrocarbons sum and higher, max.	abs.	abs.	0.5	1.0
2 Mass fraction of hydrogen sulphide and mercaptan sulfur, %, max.	0.005	0.005	0.005	0.01
3 Free water content and alkali	abs.	abs.	abs.	abs.

Components:

Component name	Number		MPC <small>short-term/daily average</small> , mg/m ³	Hazard class
	CAS	EC		
isobutane	75-28-5	200-857-2	300/900	4
propane	74-98-6	200-827-9	300/900	4
normal butane	106-97-8	203-448-7	300/900	4
isopentane	78-78-4	201-142-8	300/900	4
normal pentane	109-66-0	203-692-4	300/900	4
hydrogen sulphide	7783-06-09	231-977-3	10	2

Hazard characteristic:
EU classification (67/548/EEC directive)

F+; R12

Hazard properties:

A significant excess of maximum permissible concentration of liquefied gas vapors in the air leads to the onset of oxygen deficiency in humans, with significant excess concentrations a human can die of suffocation. Liquefied gases contacting the skin of the human body, cause frostbite resembling burn [1], [2].

3. COMPOSITION (INFORMATION ON INGREDIENTS)

Chemical Name (acc.

to IUPAC):

Hydrocarbons C1 – C5

Chemical formula

A mixture of hydrocarbons with isobutane as main component

General characteristics of the composition:

Four grades of isobutane fraction are installed depending on the mass fraction of the components [1]:

(taking into account grades assortment and the indication of impurities and functional additives that affect the risk of products)

Indicator name	Standard content, %			
	Premium	A	B	B
1 Mass fraction of the components, %: The sum of C1-C2 hydrocarbons	not regulated	not regulated	not regulated	not regulated
Propane, max.	1.3	1.5	4.5	8.0
Isobutane, max.	98.0	97.0	90.0	70.0
Butelene sum , max.	0.5	0.5	0.5	not regulated
Normal butane, max.	0.7	2.0	6.0	not regulated
C5 hydrocarbons sum and higher, max.	abs.	abs.	0.5	1.0
2 Mass fraction of hydrogen sulphide and mercaptan sulfur, %, max.	0.005	0.005	0.005	0.01
3 Free water content and alkali	abs.	abs.	abs.	abs.

Components:

Component name	Number		MPC _{short-term/daily average} , mg/m ³	Hazard class
	CAS	EC		
isobutane	75-28-5	200-857-2	300/900	4
propane	74-98-6	200-827-9	300/900	4
normal butane	106-97-8	203-448-7	300/900	4
isopentane	78-78-4	201-142-8	300/900	4
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hydrogen sulphide	7783-06-09	231-977-3	10	2

Hazard characteristic:

EU classification (67/548/EEC directive)

F+; R12

Hazardous properties:

A significant excess of maximum permissible concentration of liquefied gas vapors in the air leads to the onset of oxygen deficiency in humans, with significant excess concentrations a human can die of suffocation.

Liquefied gases contacting the skin of the human body, cause frostbite resembling burn [1], [2].

4. FIRST AID MEASURES

Routes of exposure:	High concentrations of liquefied gas vapors in the air are dangerous when inhaling or contacting skin and eyes [1], [3].
Signs and symptoms observed:	<p>A person inhaling air with a small fraction of isobutane vapor content is experiencing oxygen deficiency, and at high concentrations may die of suffocation [1].</p> <p>Prolonged inhalation of isobutane vapor fraction in concentrations that exceed the maximum permissible concentration a little, experiences dizziness, nausea, headache, and weakness, and during the air inhalation with a significant excess of maximum permissible concentration may experience suffocation. A consequence of chronic poisoning is a disorder of central nervous system [1].</p> <p>Strong cooling effect may cause severe frostbites. Liquefied gas contacting eyes may cause loss of vision [1], [22].</p> <p>Clinical signs of acute intoxication: excitation, dizziness, headache, sleepiness, altered breathing [11], [22].</p>
First aid measures:	Call an ambulance. Fresh air, quiescence, warmth, fresh clothes. Flush skin and eyes with water [22].
- Intoxication after inhaling:	Remove the victim to fresh air. Put him on his back, free the victim of hindering breath clothes. Keep him on fresh air and in warm. Use cotton soaked with liquid ammonia to bring to consciousness. Give hot drinks. If breathing has altered, apply artificial respiration. Immediately seek for medical assistance. [1], [10], [15], [22].
- Liquid phase of liquefied hydrocarbons contact with clothing:	In case of contact with clothing, change into fresh clothing. Remove contaminated clothing immediately to prevent the body from contacting with liquid phase.
- liquid phase contact with skin:	After skin contact, rinse the affected area immediately using water. It is necessary to grease the affected site with the burn ointment.
- Frostbite:	Apply dry sterile bandage to the affected skin areas, remove the victim to a warm place. Give him warm drinks. Take the victim to healthcare center [10].

- Eye contact: Open wide the palpebral fissure and rinse with running water immediately and seek for medical assistance [10].

First aid equipment: First aid kit: 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. MEASURES AND MEANS OF FIRE AND EXPLOSION SAFETY

General description: Flammable gas, fire and explosion hazardous [1], [3], [4], [14]. Ignited by spark or flame. The vapors are accumulated in low areas and in explosive concentrations form explosive mixtures with air. Gas cylinders (containers) may explode if heated. The explosive mixtures can be formed of residues in empty containers [4], [5].

Fire and explosion hazard indicators:

Indicator name	Propane	Butane	Isobutane
Flash-point °C	minus 96 (designed)	minus 96 (designed)	minus 76 (designed)
Self-ignition °C	470	372	460
Concentration limit of flame spread in the air, % (vol.): lower upper	1.7 10.9	1.4 9.3	1.3 9.8
Mixture explosiveness group	T1	T2	T1
Mixture explosiveness category	IIA	IIA	IIA

Recommended fire extinguishing media: In case of fire, the following fire extinguishing media are used: dry chemical powder, carbon dioxide (CO₂) - in confined spaces;
- Total flooding in case of fire - phlegmatizing gas compositions [1].

Prohibited fire extinguishing media: Do not extinguish fire unless the gas flow can be stopped immediately [4].

Personal protective equipment for fire fighters: Self rescuer device SPI-20. Fire-entry suit [13] [23].

Specific extinguishing methods: No specific methods [1].

6. MEASURES FOR THE PREVENTION AND ELIMINATION OF ACCIDENTS AND EMERGENCIES AND THEIR CONSEQUENCES

General measures:	The use of fire-proof, explosion-proof, leak-proof and antistatic equipment. Ensure compliance with operating procedures. The use of spark-proof tools. Equip all industrial premises with explosion-proof supply-and-exhaust ventilation systems. Ensure monitoring of hydrocarbons content in the air of the working areas using portable or fixed automatic devices. Perform analysis of industrial effluents for petroleum products content. [1], [3], [15].
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 use isolated hose gas masks with compressor, breathing apparatus. [1], [22]. Use respirators, safety goggles with lateral lockers, gloves [10].
Operating procedure in case of leakage, pouring, material spreading:	Stop working in hazardous area. At small leak eliminate it observing safety precautions. At large leak set fire to leaking gas after consultation with the experts of the Ministry of Emergency Situations and let it burn out under the control of water jets. Isolate the affected area until gas dissipates. Do not touch the spilled material. Dike spillage area and prevent the material from entering water reservoirs. Use PPE [16], [17].
Environmental protection measures :	Ensure maximum sealing of containers, utility lines, pumping units 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]. In places where isobutane fraction contamination of reservoirs is possible should be built catching devices and accessories to localize and collect the spilled product.
Firefighting procedure:	Do not approach containers. Cool containers with water at a maximum possible distance. Do not extinguish fire in case of leak is present. Use fine sprayed foam to extinguish at a maximum possible distance [4], [9].
Containment and clean up:	Use water fog spray to disperse (isolate) liquefied gas vapors. Drench spillage area should be covered with air-filled foam or inert material [6], [9].

7. CHEMICAL PRODUCTS STORAGE AND HANDLING DURING LOADING AND UNLOADING

Protective measures and means of protection:	Equip production units with supply-and-exhaust ventilation system. Artificial lighting must be explosion-proof and handling with open fire is prohibited on the territory of the production unit for isobutane fraction production, storage and flowing through. The use of PPE, personal hygiene should be observed.
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Environmental protection measures:	<p>Conduct regular monitoring of hydrocarbons content in the air of working area [1], [3].</p> <p>Ensure maximum sealing of containers, utility lines, pumping units and the other equipment and adhere strictly to operating procedures.</p> <p>Ensure periodic monitoring of hydrocarbon content in the air of working areas in production premises and open spaces. Use, portable and stationary automatic devices (analyzers, signaling devices), approved for use in the established procedure for the control. Industrial effluents must be analyzed on the content of oil products in accordance with the methodological guidance on the analysis of refineries, gas processing and petrochemical plants industrial effluents approved in accordance with the established procedure. [1]</p>
Recommendation on safe transportation:	<p>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], [1], [3], [9], [19].</p>
Storage and handling conditions:	<p>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].</p> <p>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], [33].</p> <p>Overpressure in vessels after drainage of liquefied gas must be not less than 0.05 MPa (380 mm Hg) [4].</p> <p>Store cylinders (vessels) away from open flame [23]. Liquefied gas in containers must be stored on racks, pallets or stacks, in covered storage areas, under a canopy or on leveled sites away from direct sunlight and precipitation [1], [4].</p>
Useful life:	<p>Storage life for all grades of liquefied gases is 6 months from the date of shipment [1].</p>
Incompatible materials:	<p>Do not store in the same premises the material that is 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.);</p>

flammable and combustible liquids (gasoline, benzene, carbon disulphide, acetone, turpentine, toluene, xylene, kerosene, organic oils); flammable and combustible solids (celluloid, red phosphorus, naphthalene, safety matches); substances capable of causing ignition (bromine, nitric and sulfuric acids, chromic anhydride, potassium permanganate); flammable substances (cotton, hay, cotton wool, hemp, brimstone, peat, not freshly burned charcoal, soot of plant and animal origin etc.) [9].

Materials used for containers:

Metal (steel) [6] [9].

Newly made metal containers must have oil-resistant and vapor-resistant protective internal coating complying with electrostatic sparking safety requirements [6], [9].

Further information:

Transit container should be sealed. Artificial lighting and all the used electric equipment must be explosion-proof. Containers, vessels, utility lines and pumping units must be grounded [1], [3].

7. HAZARDOUS EXPOSURE CONTROL MEANS AND PERSONAL PROTECTION EQUIPMENT

Parameters subject to mandatory monitoring (MPC average daily/max. single):

300/900 mg/m³ [1], [32].

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 premises.

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 [13].

Respiratory system and eyes 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 canisters and filter gas masks SR-200 with SR-298AH canisters. At high concentrations and during the work in closed containers, vessels etc., use self-contained hose masks PSH-1, PSH-2, as well as breathing apparatus ASV-2, AP-96 and AIR-500 [1]. Use respirator, safety goggles, hard hat and gloves [6], [9], [10].

Hand protection:

Combined, canvas cloth and rubberized, oil-and-frost resistant gloves [14].

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Gas [1], [2], [12].
 Color: Colorless [2], [12].
 Odor: Specific, characteristic [2].

Solvability Water-insoluble

Physical and chemical properties of the components that make up isobutane fraction [4], [12], [22]:

Indicator name	Propane	Butane	Isobutane
Flash-point ° C	minus 96 (designed)	minus 69 (designed)	minus 76 (designed)
Self-ignition point ° C	470	372	460
Concentration limit of flame spread in the air,% (vol.): lower upper	1.7 10.9	1.4 9.3	1.3 9.8
Molecular weight	44.096	58.123	58.12
Density, kg / m ³	579 (at -40° C)	578.9 (at 20° C)	2.672 (at 0° C)
Air density kg / m ³	1.56	2.0665	-
Vapor viscosity, Pa*sec.	2*10 ⁵ (at -40° C)	73.9*10 ⁵ (at 20° C) 2.5*10 ⁵ (at -20° C)	73.9*10 ⁵ (at 20° C)
Melting point, ° C	-187.6	-138.35	-
Boiling point, ° C	-42.06	-0.5	-11.72
Combination heat kJ / mol	-103.8	-126	-134.5
Combustion heat kJ / mol	-2044	-2657	-2649
coefficient of compressibility	0.281	0.274	-

- No reference data

10. STABILITY AND REACTIVITY

Chemical stability:	Chemically-stable [12].
Reactivity:	May be oxidized, halogenated, nitrated and sulfonated. With respect to water, acids and other substances normally chemically inert [12].
Conditions to avoid:	Exposure to open fire [1]. Heating during storage and transportation [10], [22]. Dropping and hitting of cylinders [10], [22]. Accumulation in low and unventilated areas [1], [22].
Incompatible with other substances (materials):	With 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; flammable and combustible liquids; flammable and combustible solids; substances capable of causing ignition; flammable substances [10].
Useful life:	6 months from the date of shipment [1].

11. TOXICOLOGICAL INFORMATION

General characteristics:	Toxicity of products resulting from incomplete combustion of gases [1]. Liquefied gases have low toxicity and by level of effects on the body are referred to Hazard Class 4 [1]. Toxic effect is normally determined mainly by oxygen deficiency. At high concentrations in the air due to the lack oxygen can cause a quick death because of suffocation. Vapors inhalation has a narcotic effect, cause respiratory irritation and eyes irritation. The liquid phase, contacting unprotected skin, human eyes can cause frostbite, resembling a burn. [1]
Routes of exposure: Affected organs, tissues and human systems	Inhalation, skin and eye contact.
Information about the exposure health risks by direct contact with the substance, and the consequences of these actions:	Excitatory and cardiovascular systems, lungs, eyes, skin.
- after inhalation:	Inhalation of vapors is accompanied by oxygen deficiency and has a narcotic effect. High concentrations can cause severe damage to the nervous system and heart function weakening.
- after eyes contact:	lacrimation, photophobia.
-after skin contact: Percutaneous action;	Contact with liquefied gas causes frostbite resembling burn Not studied [21].

carcinogenicity; mutagenicity; embryotropic, gonadotrophic, teratogenic effect: Sensitizing effect:	Not studied [21].
Cumulative effect:	Weak [21].
Acute toxicity:	CL ₅₀ >50.000 mg/m ³ , 2±4 hours, inhalation exposure, mouse [2]. DL ₅₀ >2.500 mg/kg, cutaneous application, animals [2]. DL ₅₀ >5.000 mg/kg, intragastric application, animals [2]. Index of potential inhalation toxicity < 3 (at 20°C), mouse [2].

12. INFORMATION ON ENVIRONMENTAL IMPACT

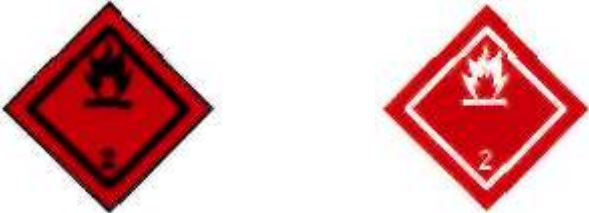
Ways of impact on the environment:	Failure to comply with the requirements of the rules for handling and storage; as a result of emergency situations [21].
Observable environmental impact:	Atmospheric air pollution [21].
Transformation in the environment:	Transforms. Biodegradable [10].
Ecotoxicity data:	No data
Hygienic standards in the natural environment location	Butane: MPC _{max. single/average daily} = 80/200 mg/m ³ [1], [10], [29], [30]. Isobutane: MPC _{max. single/average daily} = 6/15 mg/m ³ [1], [10], [29], [30]. Propane: MPC _{max. single/average daily} = 12/30 mg/m ³ [1], [10], [29], [30]. Pentane: MPC _{max. single/average daily} = 25/100 mg/m ³ [1], [10], [29], [30].

13. WASTES (BOTTOM PRODUCTS) DISPOSAL RECOMMENDATIONS

Waste transportation:	In a specially equipped transport, that prevents the loss of waste and contamination of the environment on the route [16].
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 [16], [17].
Information on disposal, recycling and/or disposal of wastes:	Material must be sent to a specialized enterprise for neutralization according to the established procedure. If necessary, controlled burning at local fire site or centralized burning. Creating the conditions for a full dispersion of gas residues.
Containers treatment (neutralization methods, possibility of reuse):	Contaminated containers must be washed using hot water with petroleum solvent, or steamed and dried [9], [16], [17].

14. TRANSPORT INFORMATION

Shipping name	Isobutane fraction. Isobutane fraction of Premium, A, B, B grades [1].
UN No.	1969 [9].

Types of transport:	Road and rail transport [1].
Dangerous goods classification:	Class 2, subclass 2.1; classification code 2F, classification code 2112-[6], [8], [9].
Hazard labels:	Drawing No. 2.1 [9].
	
	Flammable gases
	Symbol (flame): black or white; Background: red; Figure "2" in bottom corner.
Emergency card number	23 [6], [9].
Packing group:	no packing group [7]
Hazard Identification No.	No. 206 [22]
Recommendations on transportation:	To be transported in liquid state [1], [6], [19]. In truck-mounted tanks with oil-resistant and vapor-resistant protective internal coating complying with electrostatic sparking safety requirements. Rail tank cars of the consignor (consignee), designed to withstand pressure. Rail tank cars, wagons and trucks with gas must be sealed in accordance with the Regulations on carriage of goods applicable for rail and road transport [6], [9].
General cargo prohibited from joint transportation with the material:	The transportation must be carried out in accordance with Dangerous Goods Regulations in force for the relevant kind of transport [6], [9].

15. REGULATORY INFORMATION

Law of the Republic of Belarus "On Environmental Protection" (Rev. dd. 30.12.2014, No. 225-3).

Law of the Republic of Belarus "On Waste Management" (Rev. dd. 04.01.2014, No. 130-3).

Law of the Republic of Belarus "On Protection of Consumers' Rights" (Rev. dd. 04.01.2014, No. 106-3).

Law of the Republic of Belarus "On the Sanitary-Epidemiological Welfare of Population" GOST 30333-2007. Material Safety Data Sheet. General Requirements. Directive of substances: 67/548/EEC directive; 1999/45/EC directive

16. ADDITIONAL INFORMATION

This is the first edition of Material Safety Data Sheet.

REFERENCES

1. TR BY 400051902.018-2015 Isobutane fraction. Specification.
2. GOST 12.1.007-76 Occupational Safety Standards. Noxious Substances. Classification and General Safety Requirements.
3. GOST 1510-84 Petroleum and petroleum products. Marking, Packing, Transportation and Storage.
4. A.Y. Korolchenko, D.A. Korolchenko, Fire-and-explosion hazard of substances and materials and suppressants, in 2 parts. Moscow, «Pozhnauka», 2004. – p. 713, 775 pages.
5. Fire Safety Regulations of the Republic of Belarus, PPB of the Republic of Belarus B 1-2014, approved by the resolution of the Ministry of Emergency Situations of the Republic of Belarus on 15.03.2014 No. 3 (Rev. No.25 dd. 26.08.2014).
6. Regulations for the Carriage of Dangerous Goods by Rail, approved by the Fifteenth Meeting of the Council for Rail Transport of 05.04.1996 (with amendments and augments of 2009).
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9. Regulations for the Safe Carriage of Dangerous Goods by Road in the Republic of Belarus. Resolution of the Ministry of Emergency Situations of the Republic of Belarus of 08.12.2010 No.61 (as amended by Ministry of Emergency Situations dated 12.03.2015 No. 6).
10. Fire safety and industrial hygiene in the oil and gas production and gas processing industries. Rules and regulations. 1990
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12. Petrochemist's Handbook. In 2 parts. Edited by S.K.Ogorodnikov- Leningrad, Khimiya, 1978. – 496 p.
13. GOST 12.4.103-83 Occupational Safety Standards System. Personal Means of Legs and Hands Protection. Classification.
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15. V. N. Borisyuk, V. I. Ring et al. Safety rules and procedures for response to emergency situations involving dangerous goods carried by rail in the Republic of Belarus. Minsk, Tehnologiya, 1999. – 429 p.
16. Procedures for storage, transportation, disposal, dumping of toxic industrial wastes. Sanitarniye pravila.-Minsk., 1985.
17. Safe handling of waste. Collection of normative and methodological documents. I.A. Kopaysova, Ed. Saint-Petersburg, REC Petrokhimtekhnologiya. Firm Integral Co., Ltd. – 448 p.
18. GOST 12.4.034-2001 Occupational Safety Standards System. Respiratory Protective

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