

**Production Association Belorusneft
Belarusian Gas Processing Plant**

**MATERIAL SAFETY
DATA SHEET**

Isopentane fraction

Material Safety Data Sheet

Safety Data Sheet MSDS BGPP:	400051902	012	2015
---------------------------------	------------------	------------	-------------

Valid until **01.10.2020**

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

NAMES:

technical (as per TNLA)	Isopentane fraction
----------------------------	---------------------

chemical (as per IUPAC)	Hydrocarbons C2-C6
----------------------------	--------------------

trade	Isopentane fraction of A and B grades
-------	---------------------------------------

synonyms	No synonyms
----------	-------------

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

TU BY 400051902.020-2015. Isopentane fraction. Technical data sheet.

OKP RB Code:	FEACN Code:	Register of Hazardous Chemical and Biological Substances No. and date:
241411200 232022000	2901100002	

HAZARD CHARACTERISTIC:

signal word: Dangerously

Brief description (in words): Flammable liquid, flammable and explosive hazardous, with a particular characteristic odor. Extremely flammable by sparks and flames. Vapors form explosive mixtures with air. According to the level of exposure on a human body is a low-hazard substance.

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
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 Belorusneft.
(full organization name)

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

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

Emergency telephone numbers: (+375232) 71-25-45 (24-hour); (+3752340) 2-22-78

Developer enterprise: BelNIPIneft, Production Association Belorusneft, 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 _{da./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 PRODUCT AND INFORMATION ON THE MANUFACTURER OR SUPPLIER

Chemical product name:	Isopentane fraction
Components:	Butane, pentane (isomeric mixture) [1]
Applied raw materials:	Wide fraction of light hydrocarbons
Brief recommendations for application:	Designed for further processing in the petrochemical industry or for the use as a fuel component [1]
Full official name of the company:	State 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:	Isopentane fraction is a flammable liquid, fire and explosion hazardous, a low-risk product that has a specific characteristic odor and by level of exposure on a human body is referred to Hazard Class 4 [1], [2].
Health-based exposure limit in the air of working area:	MPC <small>daily average/max. single</small> 300/900 mg/m ³ [32]

Label elements

Labels	Signal word	Brief hazard characteristic
	«Danger»	An extremely flammable liquid. Vapors form explosive mixtures with air. May cause sleepiness and dizziness.

Safety measures: Keep away from sources of ignition, heat, sparks, open fire. No smoking. Use explosion-proof equipment and lighting. Avoid vapor inhalation [7].

3. COMPOSITION (INFORMATION ON COMPONENTS)

Chemical name (acc. to IUPAC): Hydrocarbons C2 – C6

Chemical formula A mixture of hydrocarbons whose main component is isopentane.

General characteristic of the composition: Two grades of isopentane fraction are set depending on the mass fraction of the components [1]:
(taking into account grade assortment and the indication of impurities and functional additives that affect the hazard of product):

Indicator name	Standard content, %	
	A	B
1 Mass fraction of the components, %: The sum of C2-C4 hydrocarbons, max.	1.5	6
Isopentane, max.	97.5	80
Normal-pentane, max.	2.5	18
The sum of C6 hydrocarbons and higher, max.	0.3	1
The sum of unsaturated hydrocarbons, max.	0.5	1
2 Mass fraction of the total sulphur, %, max.	0.003	0.01
3 Free alkali content	N/D	N/D
4 Free water and mechanical impurities content	N/D	N/D

Components:

Component name	Number		MPC _{daily} average/max. single mg/m ³	Hazard class
	CAS	EC		
Isopentane	78-78-4	201-142-8	300/900	4
Normal-pentane	109-66-0	203-692-4	300/900	4
Normal-butane	106-97-8	203-448-7	300/900	4

Hazard characteristic: F+; R8/11/38
EC classification (67/548/EEC directive)

Hazardous properties Isopentane fraction vapors have an irritating, narcotic effect (at high concentrations), cause headache, sleepiness and dizziness [1], [2].

4. FIRST AID MEASURES

Routes of exposure on human body:	Isopentane fraction vapors at high concentrations in the air are dangerous when inhaling or contacting with skin and eyes [1], [3].
Signs and symptoms observed:	A person being in the area that contains isopentane fraction vapors experiencing headache, sleepiness, dizziness, weakness, cough, throat irritation, nausea, dryness, itching, and redness of the skin. Isopentane fraction vapors cause lacrimation, smarting eyes, stomachache [1].
First aid measures:	Call an ambulance. Fresh air, recovery position, warming, 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 the victim in fresh air and in warmth. Use cotton soaked with liquid ammonia to bring to consciousness. Give hot drinks. If breathing has altered, apply artificial respiration. Immediately call an ambulance. [1], [10], [15], [22].
- After isopentane fraction contact with clothing:	In case of contact with clothing, change it into fresh clothing. Remove the contaminated clothing immediately to prevent the body from contacting.
- After contacting the skin:	After skin contact, rinse the affected area using water. If it is necessary, seek for medical assistance.
- Burn:	Apply microbicidal dressing. Take the victim to healthcare center [10].
- After eye contact:	Open wide the palpebral fissure and rinse with running water and immediately call an ambulance [10].
-If swallowed (accidentally):	Abundant water drinking, activated carbon, saline purge. Keep at rest, call an ambulance.
First aid supplies:	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. FIRE AND EXPLOSION SAFETY MEANS AND MEASURES

General characteristic: Flammable liquid, fire and explosion hazardous [1], [3], [4], [14].
Easy ignited by spark or flame. Vapors form explosion hazardous mixtures with air. Explosion hazardous mixtures can be formed of residues in empty containers. [4], [5].

Fire and explosion hazardous characteristics:

Indicators name	Butane	Pentane (isomeric mixture)
Flash-point ° C	minus 60	minus 40
Self-ignition ° C	372	258
Concentration limit of flame spread in the air,% (vol.): lower upper	1.4 9.3	1.4 7.8
Mixture explosion group	T2	T3
Mixture explosion category	IIA	IIA

Suitable extinguishing media: If ignition occurs use the following extinguishing media:
- dry chemical powder, carbon dioxide (CO₂) - in confined spaces;
- total flooding if ignition occurs - air-mechanical and chemical foams [1].

Prohibited extinguishing media: No data [4].

Personal protective equipment for fire fighters: Fire-fighting suit with SPI-20 self-rescuer. Fire-entry suit [13], [23].

Specific extinguishing methods: Do not approach containers. Cool containers with water at maximum distance [4].

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

General measures: Use 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 area 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 isopentane fraction 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 apparatuses. [1], [22]. Use respirators, safety goggles with lateral lockers, gloves [10].
Operating procedure in case of fire or leakage:	Stop working in hazardous area. Small leakage: eliminate observing safety precautions. Do not touch the spilled material. It is necessary to cover up with sand the leakage area if isopentane fraction leakage occurred and after that collect the sand with oil product and place it to a leak-proof metal container. Dike spillage area and prevent the material from entering water reservoirs. Use PPE [16], [17].
Environmental protection:	Ensure maximum sealing of containers, utility lines, pump units and other equipment, adhere strictly to operating procedures. Ensure periodic monitoring of hydrocarbon content in the air of working area and analyze the industrial effluents for petroleum products content [1], [3]. Ensure leak-proof loading and unloading, provide stationary hosing devices and automation systems for loading and unloading operations [1], [3]. In places where isobutane fraction contamination of reservoirs is possible should be installed 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. Use water mist and air-mechanical and chemical foams to extinguish fire at a maximum possible distance [4], [9].
Inactivation:	Cover up with sand the leakage area than collect the sand with oil product and place it to a leak-proof metal container [6], [9].

7. CHEMICAL PRODUCTS STORAGE AND HANDLING DURING LOADING AND UNLOADING OPERATIONS

Protective measures:	Equip industrial premises with supply-and-exhaust ventilation system. It is prohibited to use open fire on the territory of industrial premises where isopentane fraction is produced, stored and dispensed. Artificial lighting must be explosion-proof. Use personal protective equipment, observe personal hygiene rules. Conduct regular monitoring of hydrocarbons content in the air of working area [1], [3].
Environmental protection measures:	Ensure maximum sealing of containers, utility lines, pump units and other equipment, adhere strictly to operating procedures. Ensure periodic monitoring of hydrocarbon content in the air of working areas in industrial 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].

Recommendations on safe transportation:	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], [3], [9], [19].
Storage and handling conditions:	Store in horizontal and spherical high-pressure sealed metal vessels, both fixed and portable. The vessels must not contain bottom water above the minimum level ensured by design of water drainage device [1], [4], [22]. Isopentane fraction is loaded in tanks, steel cylinders and other containers certified in accordance with Regulations on construction and safe operation of pressure vessels [1], [33]. Store cylinders (vessels) away from open flames [23]. Isopentane fraction in containers should 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].
Useful life:	6 months from the date of shipment [1].
Materials used for containers manufacture:	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].
Incompatible materials:	Do not storage in the same place: with explosive substances, that can explode because of their properties, cause a fire with explosive effect; gases: non-flammable non-toxic, toxic, flammable, flammable toxic; flammable solids that can be easily ignited from external ignition sources and actively burn; self-igniting substances, that under normal conditions of storage and transportation may spontaneously heat up and self-ignite; substances that emit flammable gases in contact with water; oxidizing substances, which are not combustible, but contribute to the combustibility of the other substances and release oxygen during combustion; Organic peroxides and hydroperoxides that are combustible, may act as oxidizing substances, dangerously interact with other substances; toxic substances; radioactive substances; acids; alkalies; different caustic and corrosive substances; solid and liquid combustible substances with a flashpoint temperature more than 61 °C; substances, that become caustic and corrosive in the presence of moisture; slightly toxic substances and becoming toxic or irritant in case of fire or during the reaction with other substances [4].
Further information:	Transit container should be sealed. Artificial lighting and all the used electric equipment must be explosion-proof. Containers, vessels, utility lines and pump units must be grounded [1], [3].

8. HAZARDOUS EXPOSURE CONTROL MEANS AND PERSONAL PROTECTION EQUIPMENT

Parameters subject to mandatory monitoring (MPC average daily/max. single):	300/900 mg/m ³ [1], [32].
Measures to ensure and control over the specified	Ensure maximum sealing of containers, utility lines and other equipment, strict adherence to operating procedures, supply-and-

parameters:	exhaust ventilation of industrial premises. Use portable and fixed automatic devices (analyzers, indicators) to monitor the air in working area [1].
Personal protective equipment:	Working clothes and footwear according to industry standards for free provision of personal protective equipment [13].
Respiratory system and eye protection:	At low concentrations that slightly exceed MPC (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 during the work in closed containers, vessels etc., use self-contained hose masks PSH-1, PSH-2, as well as breathing apparatuses (BA) ASV-2, AP-96 and AIR-5500 [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:	Liquid [1], [2], [12].
Color:	Colorless [2], [12].
Odor:	Specific characteristic [2].
Solvability	Insoluble in water

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

Indicator names	Butane	Pentane (isomeric mixture)
Flash point °C	minus 60	minus 40
Self-ignition point °C	372	258
Concentration limit in air,% (vol.):		
lower	1.4	1.4
upper	9.3	7.8
Molecular weight	58.123	72.15
Density, kg/m ³	578.9 (at 20°C)	621.4
Relative density (air), kg/m ³	2.0665	-
Vapor viscosity, Pa·s	73.9·10 ⁵ (at 20°C) 2.5·10 ⁵ (at -20 °C)	240 (at 20°C)
Melting point, °C	-138.35	-
Boiling point, °C	-0.5	36
Formation heat, kJ/mol	-126	-146.4
Combustion value, kJ/mol	-2657	-3272
Minimum ignition energy, mJ	0.25	0.22
Maximum explosion pressure kPa	843	850

- no reference data

10. STABILITY AND REACTIVITY

Chemical stability:	Chemically stable [12].
Reactivity:	May be oxidized, halogenated, nitrated and sulfonated. In relation to water, acids and other substances normally chemically inert [12].
Conditions to avoid:	Open fire handling [1]. Heating during storage and transportation [10], [22].
Incompatible materials:	With explosive mixtures; gases: non-toxic non-flammable, toxic, flammable toxic; flammable liquids; flammable solids, self-igniting substances; oxidizing substances and organic peroxides; toxic substances; radioactive substances; caustic and corrosive substances; substances with a relatively low hazard during storage [4].
Useful life:	6 months from the date of shipment [1].

11. TOXICOLOGICAL INFORMATION

General characteristics:	Isopentane fraction is low-hazardous and the degree of exposure on a human body relates to Hazard Class 4 [1]. Toxicity of incomplete gases combustion products [1]. Toxic effect is normally determined mainly by oxygen deficiency. At high concentrations vapors of isopentane fractions have a narcotic effect, cause irritation of the respiratory tract and eyes [1].
Routes of exposure:	Inhalation, contact with eyes and skin, oral.
Affected organs, tissues and human systems:	Excitatory, respiratory and cardiovascular systems, eyes, skin.
Information on hazardous exposures on health by direct contact with the substance, and the consequences of these actions:	
- 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:	Irritates the skin. Frequent and prolonged contact with the skin causes, dryness that can lead to skin diseases, dermatitis.
Information on hazardous long-term effects on a human body: percutaneous, carcinogenic, mutagenic, embryotropic,	Not studied [21].

gonadotropic,
teratogenic effects

Sensibilization Not studied [21].

Cumulative effect: Weak [21].

Acute toxicity: $CL_{50} \square 50.000 \text{ mg/m}^3$, 2±4 hours, inhalation (mouse) [2].
 $DL_{50} \square 2.500 \text{ mg/kg}$, cutaneous application (animals) [2].
 $DL_{50} \square 5.000 \text{ mg/kg}$, intragastric application (animals) [2].
Index of potential inhalation toxicity < 3 (at 20°C), mice [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: Faint odor, forms film on the water surface [21].

Transformation in the environment: Transforms [10].

Environmental toxicity indicators: No data

Hygienic standards in the environment Butane: $MPC_{\text{max. single/average daily}} = 80/200 \text{ mg/m}^3$ [1], [10], [29], [30].
Pentane: $MPC_{\text{max. single/average daily}} = 25/100 \text{ mg/m}^3$ [1], [10], [29], [30].

13. DISPOSAL CONSIDERATIONS

Waste transportation: In a specially equipped transport, which prevents the loss of wastes and contamination of the environment on the route [16].

Wastes handling safe measures: 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 Placed in hermetically sealed metal containers and send to neutralization / disposal to a specialized enterprise in the prescribed manner. If necessary, controlled burning on a fire cite or centralized burning.

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: Isopentane fraction. Isopentane fraction of A and B grades [1].

UN No. 1265 [9].

Types of transport: Road and rail transport [1].

Hazardous goods classification: Class 3, classification code F1, classification code 3011 [6], [8], [9].

Hazard labels: Drawing No. 3 [9].



flammable liquid
Symbol (flame): black or white;
Background: red;
Figure “3” in bottom corner.

Hazard Identification No. 33 [6], [9].

Package group II [9]

Emergency card No. No. 301 [22]

Recommendations on transportation: In truck-mounted tanks with oil-resistant and vapor-resistant protective internal coating complying with electrostatic sparking safety requirements [1], [6], [19].
Rail tank cars of the consignor (consignee), designed to withstand pressures. 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: 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. No. 225-3 dd. 30.12.2014).
Law of the Republic of Belarus "On Waste Management" (Rev. No. 130-3 dd. 04.01.2014).
Law of the Republic of Belarus "On Protection of Consumers' Rights" (Rev. No. 106-3 dd. 04.01.2014.).
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. OTHER INFORMATION

This is the first edition of Material Safety Data Sheet.

REFERENCES

1. TR BY 400051902.020-2015 Isopentane fraction. Technical regulations.
2. GOST 12.1.007-76 Occupational Safety Standards. Noxious Substances. Classification and General Safety Requirements.
3. GOST 1510-84 Petroleum and petroleum products. Labeling, Packing, Transportation and Storage.
4. A.Y. Korolchenko, D.A. Korolchenko, Fire-and-explosion hazard of substances and materials and fire extinguishing media, 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 for 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).
7. GOST 31340- 2007. Precautionary Labeling of Chemicals. General Requirements.
8. GOST 19433-88 Dangerous Goods. Classification and Labeling.
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
- 11 GOST 12.4.011-89 Occupational Safety Standards. Means of Staff Protection. General Requirements and Classification.
12. Petrochemist's Handbook. In 2 parts. Edited by S.K.Ogorodnikov- Leningrad, Khimiya, 1978. – 496 p.
13. GOST 12.4.103-83 Special safety clothing. Personal Means of Legs and Hands Protection. Classification.
14. M.G. Rudin, Oil Refiner's Pocket Guide. Leningrad, Khimiya, 1989. – 464 p.
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. Sanitariye 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

Equipment. Classification and Marking.

19. Regulations for the Safe Carriage of Dangerous Goods by Rail in the Republic of Belarus.

Minsk., 2004. -46 p.

20. GOST 12.4.068-79 Occupational Safety Standards System. Dermatological Personal Protective Equipment. Classification and General Requirements.

21. Harmful Chemicals. Natural Organic Compounds. Reference edition. Vol. 7 / ed. by V.A. Filov, Y.I. Museychuk, B.A. Ivin. Saint-Petersburg, SPHFA Publ., SPA "Mir i Semya-85." 1998. – 507 p.

22. Emergency cards for dangerous goods carried by railways of the CIS, Republic of Latvia, Republic of Lithuania, Republic of Estonia, adopted at the 48th session of the Council for Rail Transport of the Commonwealth of Independent States, as amended. 2008.

23. GOST 12.4.111-82 Occupational Safety Standards System. Men's Overalls for Oil and Oil Products Protection. Specifications.

24. GOST 12.4.112-82 Occupational Safety Standards System. Women's Overalls for Oil and Oil Products Protection. Specifications.

25. GOST 14192-96 Marking of Cargoes.

26. GOST 17.4.2.02-83 Nature Protection. Soils. Nomenclature of Suitability Characteristics of Disturbed Rich Soil Layer to be Backfilled.

28. Hygienic standards 2.1.5.10-20-2003 – Tentative Allowable Concentrations (TAC) of Chemicals at Domestic and Potable Water Bodies.

29. Hygienic standards 2.1.5.10-21-2003 – Maximum Permissible Concentrations (MPC) of Chemicals at Domestic and Potable Water Bodies.

30. Hygienic standards 2.1.5.10-29-2003 – Maximum Permissible Concentrations (MPC) and Tentative Safe Exposure Levels (TSL) of Chemicals at Domestic and Potable Water Bodies

31. Hygienic standards 2.1.7.12-1-2004 List of Maximum Permissible Concentrations (MPC) and Tentative Allowable Concentrations (TAC) of Chemicals in Soil.

32. Sanitary rules, regulations and hygienic standards "List of regulated workplace air pollutants" approved by the Decree of the Ministry of Health of the Republic of Belarus No.240 dd.

31.12.2008.

33. TKP 238-2010 (02190) Organization and carrying out of work in case of emergencies involving dangerous goods during transportation thereof on the territory of the Republic of Belarus.

34. Rates of maximum permissible concentrations of pollutants in ambient air, approved by the Decree of the Ministry of Health of the Republic of Belarus No. 186 dd. 30.12.2010 (as amended on 08.08.2013 No. 71).