MATERIAL SAFETY DATA SHEET
Recorded in the Register of December 10, 2013
Valid before December 10, 2016
Rosstandart

Data analytical centre “Safety of materials and substances” Head Signed A.A. Toporkov
FSUE “VNITsSMV” Seal

Seal: Data analytical centre “Safety of materials and substances” FSUE “VNITsSMV” (illegible) All-Russian Science and Research Standardization Centre, Federal State Unitary Enterprise OGRN 1027700169144. Moscow

NAME:
technical (in normative documentation) Benzene-Toluene fraction (bentol)
chemical (in IUPAC) No
trade
synonyms Benzene-Toluene fraction (bentol)
No

National product classification code: Customs commodity code:
2 4 1 5 4 1 2 9 0 2 9 0 0 0 0 0

Designation and name of main normative, technical or informational document for products (GOST, TU, OST, (M)SDS etc.)
TU 2415-020-53505711 -2010 “Benzene-Toluene fraction (bentol)”

HAZARD STATEMENT:
Signal word: Hazardous
Short (wording): Flammable liquid, fire and explosion hazard. Highly dangerous substance according to the degree of impact on the body. An irritant, skin-resorptive, sensitizing and narcotic effects. Probability of a carcinogenic effect. It can contaminate natural environments.
Detailed: in 16 attached sections of the data sheet.

<table>
<thead>
<tr>
<th>MAIN HAZARDOUS COMPONENTS</th>
<th>MPCw.a., mg/m³</th>
<th>Class of hazard</th>
<th>CAS No.</th>
<th>EC No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>15/5</td>
<td>2</td>
<td>71-43-2</td>
<td>200-753-7</td>
</tr>
<tr>
<td>Methylbenzene (toluene)</td>
<td>150/50</td>
<td>3</td>
<td>108-88-3</td>
<td>203-625-9</td>
</tr>
</tbody>
</table>

APPLICANT: CJSC Sibur Khimprom city of Perm
____________________ (company’s name) __________________________ (city)

Applicant’s type: manufacturer, supplier, vendor, exporter, importer
(delete as applicable)

OKPO code: 53505711 Hotline phone: (342) 290-87-05

Head of the applicant company: /Signed/ G.M. Shilov
(print name)
Seal

Seal: Sibur Khimprom, OGRN 1025901207804 INN 5905018996 RPP 69051001, Russia, city of Perm. Closed Joint Stock Company Sibur Khimprom
IUPAC – International Union of Pure and Applied Chemistry

GHS – recommendations of UN ST/SG/AC. 10/30 Globally Harmonized System of Classification and Labelling of Chemicals

RCP – Russian Classification of Production

OKPO – Russian Business and Organization Classification

Customs code – Commodity Nomenclature for Foreign Economic Activities

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

EC No. – number of the substance in the Register of European chemical agency

MPCw.a. – Maximal Permissive concentration in working area, mg/m$^3$ (maximal one-time/shift- average)

Safety Data Sheet – Safety data sheet for chemicals (substance, mixture, material, wastes of industrial production)

The Safety Data Sheet is in compliance with:

- recommendations of UN ST/SG/AC. 10/30 “GHS”;
- EC Regulation No.1907/2006 concerning Registration, Evaluation, Authorisation and Restriction of Chemicals, Annex II.

Signal word – one of two words “Hazardous” or “Caution” (or “None”) is specified according GOST 31340-2007 “Safety marking of chemicals. General Requirements”
1. MATERIAL IDENTIFICATION AND INFORMATION ON MANUFACTURER AND/OR SUPPLIER

1.1 Technical name:
Benzene-toluene fraction (bentol) (hereinafter - Product) [1].

1.2 Application recommendations and restrictions:
The Product is used as solvent and to extract benzene and toluene. In intended application – no restrictions[1].

1.3 Full official name and address of the company in charge of manufacture, import and release of chemical products:
CJSC Sibur Khimprom
98 Promyshlennaya Str., Perm, Russian Federation, 614055

1.4 Telephone (including emergency line):
(342) 290-87-05 (24-hour) - operator (342) 290-89-01 (7.00 to 15.00 – Moscow time) – Chief Engineer

1.5 Fax:
(342) 290-83-72, 290-86-60

1.6 E-mail:
mail@siburperm.ru

2 HAZARDS IDENTIFICATION

2.1 Hazard rate of the product in general:
In terms of effect on human body the product (by the most toxic ingredient – benzene) is classified according to GOST 12.1.007 as the 2nd class of hazard – highly hazardous substances [1,5]. The Product is fire/explosion hazardous, highly flammable liquid [1,9,10].

2.2 Hygienic standards for the product generally the air of working area:
None for the product in general [1,2].

2.3 Labelling data:

2.3.1 Hazard summary:

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Signal word</th>
<th>Short description of hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Hazard Symbol" /></td>
<td>Hazard</td>
<td>Highly flammable liquid. The vapors form explosive mixtures with air. Harmful by inhalation, ingestion and skin contact. May cause cancer. Causes irritation when in contact with skin and eyes. May cause allergic reaction when in contact with skin. May cause drowsiness and dizziness.</td>
</tr>
</tbody>
</table>

2.3.2 Hazard prevention measures:
Keep in a tight container. Keep away from ignition sources. Use explosion-proof equipment and lighting. When handling the product do not smoke, drink or eat. Use personal protection for respiratory organs, eyes, skin. Wash your hands thoroughly after work. When in contact with skin, immediately take off all contaminated clothing, wash exposed skin with water. If you feel unwell, seek medical aid. Store in a cool, well-ventilated place [17] (see sections 4,6,7,13).
3 COMPOSITION (INFORMATION ON INGREDIENTS)

3.1 General description:
Side product in manufacture of styrole [1].

3.2 Components:
(weight ratio, MPC w.a., class of hazard, link to the data source)

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight ratio, %</th>
<th>MPC w.a., mg/m^3</th>
<th>Class of hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (CAS 71-43-2; EC 200-753-7)</td>
<td>20.0-50.0</td>
<td>15/5</td>
<td>2</td>
</tr>
<tr>
<td>Toluene (Methylbenzene) (CAS 108-88-3; EC 203-625-9)</td>
<td>50.0-80.0</td>
<td>150/50</td>
<td>3</td>
</tr>
<tr>
<td>Ethylbenzene (CAS 100-41-4; EC 202-849-4) and styrole (CAS 100-42-5; EC 202-851-5)</td>
<td>not more 6.0</td>
<td>150/50</td>
<td>4</td>
</tr>
</tbody>
</table>

4 FIRST-AID MEASURES

4.1 Symptoms:
4.1.1 Poisoning by inhalation
Excitation alternating with drowsiness, headache, dizziness, shortness of breath, nausea, vomiting, loss of motion coordination, continuous tremor, gradually weakening and alternated with convulsions, later developing immobility [9]. Sore throat, cough, in severe cases - seizures, hallucinations, loss of consciousness [10].

4.1.2 Skin:
Redness, dryness, itching [8].

4.1.3 Eyes:
Smarting, watery eyes [8,10].

4.1.4 Poisoning by ingestion:
Vomiting, sore throat, pains along the esophagus, stomach-ache [9].

4.2 First aid depending on the harmful effect:
4.2.1 Poisoning by inhalation:
Fresh air, rest and warmth. With the weakening or complete cessation of breathing - artificial respiration. After first aid, seek medical advice[1].

4.2.2 Skin and eye contact:
Wash with water for 15 minutes. Seek medical advice [1].

4.2.3 Stomach contact (if accidentally ingested):
Drink a lot of water, absorbent carbon, sodium sulphate (1 spoon per glass of water). After first aid, it is required to seek medical advice [1].

4.2.4 Burns:
Apply an aseptic bandage [8]. Seek medical advice.

4.2.5 Poisoning by combustion products:
Fresh air and oxygen breathing. Provide resting. If breathing stops start artificial respiration. Call a doctor [12].

4.3 Contraindications:
It is prohibited to use castor oil, milk, alcohol. Do not induce vomiting! [1]. Adrenaline and adrenolytic drugs are contraindicated [11,18].

4.4 First aid means (first aid kit):
Sodium sulphate, absorbent carbon, sterile bandages, band-aids, boiled water.
5 FIRE-FIGHTING MEASURES

5.1 General description of fire/explosion hazard:
The Product is highly flammable liquid [1]. The vapours form explosive mixtures with air. The fire can cause burns and injuries [8]. Fire/explosion safety in production must be provided according to requirements of GOST 12.1.004, GOST 12.1.010 [6,20].

5.2 Fire/explosion hazard indices:
Closed Flash Point: -4 °C; ignition temperature: 615 °C; temperature limits of flame propagation (ignition): low limit is -4 °C, upper limit is 25 °C; concentration limits for flame propagation of benzene and toluene mixture (1:1) at 60 °C: 1.37 - 7.05% by volume [1]. Category and group of explosion hazard of the Product vapours mixture with air - IIA acc. to GOST R 51330.11 and T1 acc. to GOST R 51330.5 accordingly.

5.3 Hazard caused by combustion products and/or thermal destruction:
During combustion it may form toxic gases - carbon oxides [8,9,10]. Mild poisoning: without loss of consciousness or short fainting, drowsiness, nausea and sometimes vomiting; average severity: loss of consciousness, after recovering this state - general weakness, memory loss, movement disorders, seizures; severe degree: prolonged loss of consciousness, clonic or tonic convulsions, involuntary urination and defecation (for carbon monoxide) [12].

5.4 Suitable extinguishers:
Chemical and mechanical air-foam, water atomized powders, inert gases, sand [1].

5.5 Forbidden extinguishers:
Water jets[7].

5.6 Personal protective clothing for fire-fighting:
Fire-proof clothing with self-rescue device SPI-20: [8].

5.7 Special requirements for fire-fighting:
Extinguish the fire from a maximum distance. Cool the water tanks from a maximum distance [8].

6 ACCIDENTAL RELEASE MEASURES

6.1 Measures to prevent impact on people, environment, buildings etc. in emergencies
6.1.1 Necessary general-purpose actions:
Isolate the fire area within a radius of at least 200 m. Adjust this distance acc. to the results chemical survey. Evacuate unauthorized people. Enter the danger zone wearing protective equipment. Observe fire safety precautions. No smoking. Eliminate sources of fire and sparks. Adhere to the upwind side. Avoid low areas. Provide first aid to the injured. Send people from the centre of contamination for the medical examination [8].

6.1.2 Personal precautions: (emergency response teams and personnel)
For emergency teams - insulating protective outwear suit KIH-5 completed with insulating mask IP-4M or breathing apparatus ASV-2 [8].
Personal protection means for personnel – see para.8.3.
6.2 Procedure for clean up in case of accidental release or emergency

6.2.1 Actions in case leakage, spilling (including precautions providing environmental protection):
Inform the sanitary and epidemiological inspection bodies. Do not touch the spilled material. Eliminate leaks with caution. Pump the contents into a good corrosion-protected container or container for draining observing the conditions of mixing fluids. Call the fire and gas service to the accident site. Block off the spillage by earthworks. Avoid the substance to get into waterways, sewers. Use water spray to insulate vapors [8].

6.2.2 Fire-fighting procedure:
Do not approach the burning tanks. Cool containers with water from a maximum distance. Extinguish by water mist, air-filled and chemical foams from a maximum distance. Evacuating people from nearby buildings, taking into account the direction of movement of toxic combustion products [8].

7 HANDLING AND STORAGE OF CHEMICAL PRODUCT

7.1 Safety precautions while handling
7.1.1 Security and collective protection equipment (including fire and explosion safety measures)
Production of the Product shall comply with safety rules PB 09-540-03. The following safety signs according to GOST R 12.4.026: P02 “Never use open flame and no smoking”, W01 “Fire hazardous. Inflammable substances” shall be used. Pre-explosive concentration of the product vapors in the air is determined by fixed automated alarms. For the purposes of collective protection the equipment and utilities must be sealed. Production and laboratory facilities, where the product is handled, must be equipped with forced ventilation system. Handle the Product in compliance with duly approved safety regulations. All work with the Product must be carried out away from heat sources and sparks. Electrical and artificial lighting should be made explosion-proof. Use personal protective equipment, fire fighting primary means should be available in the premises [1,28].

7.1.2 Environmental protection measures:
Protection of the environment during production, transportation and storage of the Product is provided by sealing of equipment, containers, elimination of emissions to air, soil, water [1].

7.1.3 Recommendations for safe transportation:
Product is transported in tank-wagons of the consignor (consignee) or leased in accordance with the “Regulations concerning the Carriage of Dangerous Goods by Rail”. in tank trucks in accordance with the " Regulations concerning the Carriage of Dangerous Goods by Road" as well as the requirements of GOST 1510. The degree (level) of filling of the tare is calculated considering full capacity (lifting capacity) and the volumetric expansion of the product at the possible temperature difference on the way. After filling the container with the Product, the container is tightly closed in accordance with the requirements of regulatory or technical documents for container and seal in accordance with GOST 18677 or GOST 18680. The packaging must conform to the requirements of GOST 26319. When performing filling, draining, cleaning-up vehicles and storages observe the instructions and rules of occupational safety, industrial hygiene and fire safety approved in the established procedure [1,16].

7.2 Storage
7.2.1 Terms and conditions of safe storage: (including the warranty shelf life, expiry date)
The Product is stores according to the requirements of GOST1510. The manufacturer guarantees compliance of the Product to the requirements of specifications if the transportation and storage rules are observed within 1 year from the date of manufacture[1].

7.2.2 Incompatible substances and materials for storage:
Avoid contact with oxidizers, acids, bases, inflammables, highly flammable liquids [9,10,20].

7.2.3 Materials recommended for tare and packaging:
Steel tank-wagons or tank-cars [1].

7.3 Precautions and storage in household
Not used in household
8. EXPOSURE CONTROLS/PERSOMAL PROTECTION

8.1 Parameters subject to control and their limit values biologically safe for the personnel:
MPC_{w,a} (benzene) = 15_{max.o.t/5_s.a.} mg/m^3, vapors, K, +, 2 class of hazard;
MPC_{w,a} (methylbenzene) = 150_{max.o.t/50_s.a.} mg/m^3, vapors, 3 class of hazard [1,2]

8.2 Set parameters assurance and control measures:
Forced-air ventilation system, sealing of equipment, containers for storage and transportation, control of the vapor concentration in the air of the working area at intervals specified in Annex 9 R 2.2.2006 [1,27].

8.3 Personal protection means for personnel:
8.3.1 General recommendations:
Avoid direct contact with the Product, use PPE. Observe personal hygiene rules. Pregnant women and persons under 18 years of age are not allowed working with the Product. Workers should pass preliminary (when hiring) and periodic medical examinations [1,13,15,18].

8.3.1 Respiratory protection:
Respiratory protection in emergencies are filtering industrial gas mask with box DOT 600 or BKF [1].

8.3.3 Eye protection:
Safety glasses with side shields acc. to GOST R 12.4.230.1 [9,10,19].

8.3.4 Hand protection:
Protective gloves acc. to GOST 12.4.246 [9,10,19].

8.3.5 Protective clothes:
Suit of cotton fabric, leather boots, safety helmet, helmet liner [19].

9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Physical state (aggregate state, color, odour):
Colorless or slightly yellow liquid with pronounced odour [1,9,10].

9.2 Density at 20 °C, not less than:
0.867-0.873 [1].

9.3 Boiling point:
94.7 °C [7,26].

9.4 Solubility in water
Insoluble [7].

10 STABILITY AND REACTIVITY

10.1 Chemical stability:
In normal conditions – stable substance [9,10].
10.2 Reactivity:
Under certain conditions (catalyst, temperature, etc.) it is oxidized, nitrated, alkylated, hydrogenated, sulfonated, halogenated. At high temperature, in the presence of oxygen it is combusted forming carbon oxides [9,10].

10.3 Conditions to be avoided:
Heating. Handling with open flame [1,8,9,10].

11 TOXICOLOGICAL INFORMATION

11.1 General description of effect:
In terms of effect on human body the product (by the most toxic ingredient – benzene) is classified according to GOST 12.1.007 as the 2nd class of hazard – highly hazardous substances. By the degree of impact on the human body the Product (by the most toxic component of benzene) is in accordance with GOST 12.1.007 to 2 hazard class - acutely substances. Irritant, skin-resorptive, sensitizing actions. Has narcotic effect in high concentrations [1,18].

11.2 Routes of exposure:
Inhalation, oral, in contact with skin and eyes [8,9,10].

11.3 Target organs and systems:
Central and peripheral nervous system, respiratory system, the gastrointestinal tract, liver, kidneys, spleen, blood system, skin, eyes [1,9,10].

11.4 Information on human health hazard in direct contact with chemicals as well as the consequences of such exposure:
- **Inhalation:**
Causes irritation to the upper respiratory tract [9,10].
- **Skin and eye contact:**
Causes irritation [9,10].
- **Ingestion:**
Causes toxic poisoning [9,10].
- **Sensibilizing effect:**
Causes [1,9,10].
- **Skin-resorptive effect:**
Causes [1,9,10].
- **Cumulativeness:**
Mild [10].

11.5 Information about dangerous long-term effects on the body:
Gonadotropic effect - yes [9].
Mutagenic effect - yes [9,10].
Embryotropic effect - yes [9,10].
Teratogenic effect - yes [9].
Carcinogenic effect – yes (for benzene). According to the IARC, benzene belongs to group I (the substance is definitely carcinogenic to humans) [9].

11.6 Acute toxicity:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Route, exposure time (h)</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL₅₀, mg/kg</td>
<td>1175-6400</td>
<td>Intragastrically</td>
<td>Rat</td>
</tr>
<tr>
<td>DL₅₀, mg/kg</td>
<td>4700-5000</td>
<td>Intragastrically</td>
<td>Mouse</td>
</tr>
<tr>
<td>DL₅₀, mg/kg</td>
<td>299</td>
<td>Abdominally</td>
<td>Mouse</td>
</tr>
<tr>
<td>CL₅₀, mg/m³</td>
<td>65000</td>
<td>4</td>
<td>Rat</td>
</tr>
<tr>
<td>CL₅₀, mg/m³</td>
<td>24000-45000</td>
<td>2</td>
<td>Mouse</td>
</tr>
</tbody>
</table>
For methylbenzene:

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Route, exposure time (h)</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL₅₀, mg/kg</td>
<td>1960</td>
<td>intravenously</td>
<td>rat</td>
</tr>
<tr>
<td>DL₃₀, mg/kg</td>
<td>2600-7500</td>
<td>intragastrically</td>
<td>rat</td>
</tr>
<tr>
<td>DL₅₀, mg/kg</td>
<td>1126</td>
<td>abdominally</td>
<td>mouse</td>
</tr>
<tr>
<td>DL₅₀, mg/kg</td>
<td>8390-18090</td>
<td>application on skin</td>
<td>rat</td>
</tr>
<tr>
<td>CL₅₀, mg/m³</td>
<td>45000-53600</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CL₅₀, mg/m³</td>
<td>30000-35000</td>
<td>2</td>
<td>mouse</td>
</tr>
</tbody>
</table>

The minimum lethal oral dose for humans - 50 mg/kg [9,10].

11.7 Dose (concentration) having minimal toxic effects and other numerical values characterizing the effects of chemicals on human health:

For benzene:
DLch. – 0.25 mg/kg, intragastrically, 6 mon., rat (change in the central nervous system and organs of hematopoiesis);
DLac. – 0.32 mg/kg, intragastrically, one-time, rat (increase in the platelet count and decrease of lymphocytes in peripheral blood);
LCch. - 0.6 mg/m³, inhal., 3 mon, rat (change of immunological parameters);
Lim ac - 1100 mg/m³, inhal., 4 h, rat (morphological change of blood);
LCodor. – 2.8 mg/m³, inhal., human;
Subthreshold limit ₑₑₑ - 1.5 mg/m³, inhal. (change the bioelectric activity of the cerebral cortex);
LCref. - 300-1000 mg/m³, inhal., 40 min., rabbit (change the flexion reflex) [9].

For methylbenzene:
Lim ch - 15 mg/m³, inhal., 4 mon, rat (general toxical action);
Lim ir - 150 mg/m³, human;
Lim ₑₑₑ - 1 mg/m³, human;
Lim olf -9.4 mg/m³ [10].

12 ECOLOGICAL INFORMATION

12.1 General characteristics of the impact on the environment (air, water, soil):
When released into the air basin, waters and soil the Product has toxic effect on biological objects. It has toxic effect on fish, daphnia, algae. At concentrations of 5-25 mg/L it does not disturb the self-purification processes of water bodies [9]. At a concentration of 34 mg/L toluene inhibits photosynthesis and respiration in marine phytoplankton communities; at a concentration of 50 mg/L inhibits nitrification processes [10].

12.2 Environment impact pathways:
Harmful effects of the Product on the environment can occur only in cases of emergency, when there is the possibility of getting into the air and water basins or soil [1].

12.3 Observed adverse effects:
Characteristic smell, change of organoleptic properties of water, disturbed self-purification processes of water bodies [9,10].
12.4 The most important characteristic of impact on environment:
12.4.1 Hygienic regulations for natural environments:

For benzene:

- **MPC_{air} = 0.3/0.1 mg/m^3, ac.**, 2 class of hazard [3,9].
- **MPC_{water} = 0.001 mg/l, c. san.-tox.**, 1 class of hazard [4,9].
- **MPC_{soil} = 0.3 mg/kg, air-migration [9,14].**
- **MPC_{fishery} = 5 mg/l, tox.**, 4 class of hazard [9].

For methylbenzene:

- **MPC_{air} (max. one-time) = 0.6/- mg/m^3, refl.**, 3 class of hazard [3,10].
- **MPC_{water} = 0.024 mg/l, org. odor.**, 4 class of hazard [4,10].
- **MPC_{soil} = 0.3 mg/kg, air-migration [10,14].**
- **MPC_{fishery} = 0.5 mg/l, org.**, 3 class of hazard [10].

12.4.2 Ecotoxicity:

For benzene:

<table>
<thead>
<tr>
<th>Value</th>
<th>Exposure time, (h)</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity for fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>5.8</td>
<td>96</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>9.2</td>
<td>96</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>34.4</td>
<td>96</td>
</tr>
<tr>
<td>Toxic effect on daphnia Magna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>EC (growth inhibition), ml/l</td>
<td>&gt;1400</td>
<td>Sccnedesmus quadricauda (Green)</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>525</td>
<td>48</td>
</tr>
<tr>
<td>Detected effect on model ecosystems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC (growth inhibition), ml/l</td>
<td>96</td>
<td>16</td>
</tr>
</tbody>
</table>

For methylbenzene:

<table>
<thead>
<tr>
<th>Value</th>
<th>Exposure time, (h)</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity for fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>5.4</td>
<td>96</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>25</td>
<td>48</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>13-59.3</td>
<td>96</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>7.3</td>
<td>96</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>13</td>
<td>96</td>
</tr>
<tr>
<td>CL_{50}, ml/l</td>
<td>26</td>
<td>96</td>
</tr>
<tr>
<td>Acute toxicity for daphnia Magna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC_{50}, ml/l</td>
<td>313</td>
<td>48</td>
</tr>
<tr>
<td>Toxic effect on algae (in culture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC_{50}, ml/l</td>
<td>245</td>
<td>24</td>
</tr>
<tr>
<td>EC_{50}, ml/l</td>
<td>&gt;433</td>
<td>96</td>
</tr>
</tbody>
</table>

[9].

[10].
12.4.3 Migration and transformation in the environment due to biodegradation and other processes (oxidation, hydrolysis etc.):
Transforms in the environment. Stable in abiotic conditions [9,10]. Transformation products are benzyl alcohol and benzoic acid [10].

For benzene:
Biodegradation in biotic conditions t 1/2 within 16-28 days in groundwater and river waters. Maximum concentration that does not affect the biochemical processes of water bodies at constant exposure for a long time: MC_safe 25 mg/l. Biological dissimilation 10-20 % (difficult);
BOD_{full} = 1.15 mg O_2/mg of substance;
BOD_5 = 0.55 mg O_2/mg of substance;
COD = 3.07 mg O_2/mg of substance [9].

For methylbenzene:
Biological dissimilation is difficult (10-20 %), BD = 10 %;
BOD_{full} = 1.1 mg O_2/mg of substance;
BOD_5 = 0.19 mg O_2/mg of substance;
COD = 1.87 mg O_2/mg of substance [10].

For benzene:

12.5 Additional information
Threshold concentration in terms of affecting organoleptic properties of water by odour: TC_{org. od} 5 mg/l [9].

For methylbenzene:
Threshold concentration in terms of affecting organoleptic properties of water: TC_{org. od} = 0.5 mg/l (by odour); TC_{org. taste} = 1.1 mg/l (by taste).
Threshold concentration in terms of affecting general sanitary condition of water body: TC_{gen} = 25 mg/l. Odor in fish flesh is felt at concentration 0.25 mg/l [10].

13 WASTES (RESIDUES) DISPOSAL CONSIDERATION

13.1 Recommendations on safe treatment of chemical wastes (residues):
Safety measures when handling wastes are similar to those used when handling the Product. Observe precautions for handling flammable liquids, avoid contact of wasted with open flames (sections 5, 7, 8, 9).

13.2 Information on removal and disposal of wastes according to the current national legislation:
Collection and disposal of the industrial wastes shall be in accordance with SanPiN 2.1.7.1322. The wastes are disposed by combusting [9,10,21].

13.3 Methods and places of disposal (destruction) of wastes and contaminated package (tare):
The tare is allowed to be used again after removal of the residue [16].

14 TRANSPORT INFORMATION

14.1 UN number in accordance with the UN recommendations:
1993 [1,25]

14.2 Proper shipping and/or transport name:
Benzene-toluene fraction (bentol) [1,22]. HIGHLY FLAMMABLE LIQUID, N.O.S. [25].
14.3 Types of transport:
Road and rail transport [1].

14.4 Hazard classification of cargo:
Class 3, Classification code 3012, hazard sign 3 [1,22].

14.5 Transportation labelling:
Handling instructions “Keep away from sun rays”, “Sealed package” are acc.to GOST 14192 [1,23]. Sign “Flammable”[24].

14.6 Packing group
(in accordance with the UN recommendations on carriage of dangerous goods)
II [25].

14.7 Information on danger during transportation by road:

DANGER SIGN

Highly flammable liquids
Symbol (flame): black and white; background is red; figure 3 is in the right corner

Hazard identification No. 33, UN number is 1993 [1,24].

14.8 Emergency cards:
(railway, marine and other types of transportation)
No.328 [1,8,22].

14.9 Information on danger for international freight traffic:
Agreement on International Goods Transport by Rail: classification code 3012, classification code F1, Hazard code No. 33, Danger sign No. 3 [22]. ADR/RID: class of hazard 3, classification code F1, Hazard identification No.33, Danger sign No. 3 [24].

15 NATIONAL AND INTERNATIONAL REGULATORY INFORMATION

15.1 National legislation
15.1.1 Laws of the Russian Federation:

15.1.2 Documentation regulating the requirements for human and environment protection:
Certificate of State Registration
series VT No. 000039 dated 21.04.1994;
15.2 International legislation
15.2.1 Warning marking in EU countries:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-</td>
<td>11</td>
<td>Highly flammable substance</td>
</tr>
<tr>
<td>R-</td>
<td>45 4</td>
<td>Harmful hazardous substances</td>
</tr>
<tr>
<td>8</td>
<td>39/23/24/25</td>
<td>May cause cancer</td>
</tr>
<tr>
<td>R-</td>
<td>8</td>
<td>May seriously disturb the main functions of body by prolonged exposure</td>
</tr>
<tr>
<td>S-</td>
<td>16</td>
<td>Keep away from the ignition sources — no smoking</td>
</tr>
<tr>
<td>S-</td>
<td>25</td>
<td>Avoid contact with eyes</td>
</tr>
<tr>
<td>S-</td>
<td>29</td>
<td>Do not drain into sewage system</td>
</tr>
<tr>
<td>S-</td>
<td>45</td>
<td>In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)</td>
</tr>
<tr>
<td>S-</td>
<td>36/37/39</td>
<td>Wear suitable protective clothing and gloves, protective means for face and eyes</td>
</tr>
</tbody>
</table>

16 OTHER INFORMATION

16.1 Revised sections
(SDS registration No. 53505711.24.24236 revised and issued in view of expiry of period of validity according to GOST 30333-2007 “Material Safety Data Sheet. General requirements.”

16.2 List of data sources used for preparation of this Safety Data Sheet:
1. TU 2415-020-53505711-2010 Benzene toluene fraction (bentol). Specification
2. GN 2.2.5.1313-03 Maximum permissible concentrations (MPC) of harmful substances in the air of the working area.
3. GN 2.1.6.1338-03 Maximum permissible concentrations (MPC) of pollutants in the air of residential areas.
4. GN 2.1.5.2280-07 Maximum permissible concentrations (MPC) of chemicals in water bodies of drinking and social use.
5. GOST 12.1.007-76 SSBT. Harmful substances. Classification and general safety requirements.
8. Emergency cards for dangerous goods carried by the railways of the CIS, the Republic of Latvia, Republic of Lithuania, Republic of Estonia approved by the Council of Rail Transport of the member-states of the Commonwealth, Minutes of 30.05.08, No. 48.
10. Information card of Potentially Hazardous Chemical Substances (Register of PHCS) Methylbenzene. Series VT No. 000039.
13. GOST 12.0.004-90 SSBT. Organization of training on safety.
14. GN 2.1.7.2041-06 Maximum permissible concentrations (MPC) of chemicals in water.
15. Order of Ministry of Health and Social Development of the Russian Federation No.302n dated 12.04.2011 “On approval of lists of harmful and (or) hazardous production factors and works under which mandatory, preliminary
and periodic medical examinations (checkups) are performed and Procedure of mandatory, preliminary and periodic medical examinations (checkups) of the workers engaged in heavy work and work with harmful and (or) hazardous working conditions”.

16 GOST 1510-84 Oil and oil products. Labelling, packing, transportation and storage.
17 GOST 31340-2007 Warning labelling for chemicals. General requirements.
19 Order of Ministry of Health and Social Development of the Russian Federation No. 906n dated 11.08.2011 “On approval of standard guidelines of free issue of special clothing, footwear and other personal protective chemical production workers involved in work with harmful and (or) hazardous working conditions, as well as in the work carried out in special temperature conditions or related to pollution”.
20 GOST 12.1.004-91 SSBT. Fire safety. General requirements.
22 Alphabet index of dangerous goods accepted for carriage by rail. Annex No. 2 to the Regulation of transportation of dangerous goods by rail.
23 GOST 14192-96 Cargos labelling.
27 R 2.2.2006-05 Guideline for hygienic evaluation of working environment factors and labour process. Criteria and classification of working conditions.