### Material Safety Data Sheet

**Included in the Register**

Safety Data Sheet Registration No. 48418772 24 31340 from July 18, 2013
Valid until July 18, 2016

Federal Agency on Technical Regulating and Metrology
"Safety of Substances and Materials"
Information-Analytical Center
"VNICSVMV" Federal State Unitary Enterprise

<table>
<thead>
<tr>
<th>Director</th>
<th>(signature)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.D. Kozlov</td>
<td>Place of seal</td>
</tr>
</tbody>
</table>

**NAME:**
- Technical (according to regulatory document): Fraction of Aromatic Hydrocarbons
- Chemical (according to IUPAC): None
- Trade: Fraction of Aromatic Hydrocarbons
- Synonym: None

**All-Russian Classification of Products Code:** 241140
**Foreign Economic Activity Commodity Nomenclature Code:** 2707509000

Symbol and name of the product main regulatory, technical or information document (GOST, TU, All-Union Standard, STO, (M)SDS, etc.)

| TU 2411 - 036 - 48418772 - 2013 Fraction of Aromatic Hydrocarbons |

**HAZARD STATEMENT:**

**Signal Word:** Danger

**Brief (verbal):** According to the most dangerous component (benzene), the fraction is the highly hazardous substance. It has a narcotic effect. Harmful if inhaled, swallowed, and in contact with skin and eyes. Flammable combustible liquid. Pollutes the environment.

**Detailed:** see attached 16 paragraphs of Safety Data Sheet.

<table>
<thead>
<tr>
<th>MAIN HAZARDOUS COMPONENTS</th>
<th>MAC w. a., mg/m³</th>
<th>Hazard Class</th>
<th>CAS-No.</th>
<th>EC-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (vapors)</td>
<td>15/5</td>
<td>2</td>
<td>71-43-2</td>
<td>200-753-7</td>
</tr>
<tr>
<td>Toluene (vapors)</td>
<td>150/50</td>
<td>3</td>
<td>108-88-3</td>
<td>203-625-9</td>
</tr>
<tr>
<td>Xylene (vapors of isomers mixture)</td>
<td>150/50</td>
<td>3</td>
<td>1330-20-7</td>
<td>215-535-7</td>
</tr>
</tbody>
</table>

**APPLICANT:** "Uralorgsintez" OJSC, Perm Krai, Tchaikovsky municipal district, Olkhovskoye rural settlement

**Type of applicant:** Manufacturer, Supplier, Vendor, Exporter, Importer

**RNCBO Code:** 48418772

**Emergency Phone Number:** (34241) 7-14-02

**Head of the applicant organization:** ______________________

/___.S. Kovalenko__

Place of seal
IUPAC – International Union of Pure and Applied Chemistry


OKP: - All-Russian Classification of Products Code:

RNCBO: - Russian National Classifier of Businesses and Organizations

FEACN - Foreign Economic Activity Commodity Nomenclature Code:

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

EC-No. - number of the substance in the registry of the European Chemicals Agency

MAC w. a. – Maximum allowable concentration of a chemical in the working area, mg/m$^3$ (short-term exposure limit / shift-average MAC)

Safety Data Sheet – Material Safety Data Sheet of chemicals (substance, mixture, material, industrial waste)

Safety Data Sheet responds to:
- ST/SG/AC.10/30 "GHS"

Signal Word – one of two words “Danger” or “Warning” (or "None") is stated, according to GOST 31340-2007 "Labeling of chemicals. General requirements".
1. Identification of the chemical production and of the manufacturer and/or supplier

1.1. Identification of the chemical production

1.1.1 Technical Name: Fraction of Aromatic Hydrocarbons [1]

1.1.2. Brief recommendations for use: Fraction of aromatic hydrocarbons is used for petroleum resins, aromatic and petroleum solvents with high solubility of both nonpolar and polar polymers compounds, as well as for the needs of the national economy and export supplies. [1]

1.2. Identification of the manufacturer and/or supplier

1.2.1 Full legal name of the organization: "Uralorgsintez" Open Joint Stock Company

1.2.2 (Post) Address: 617761, Perm Krai, Tchaikovsky municipal district, Olkhovskoye rural settlement

1.2.3. Phone number, also emergency phone number and time limits: (34241) 7-14-02 (7.00 am - 4.00 pm, Moscow time) – chief engineer

1.2.4. Fax: (34241) 7-15-75

1.2.5. E-mail: UOS:UOS.ru

2. Hazard(s) Identification

2.1. Hazard rate of the chemical production: Fraction of aromatic hydrocarbons refers to Hazard Class 2: highly hazardous substances by the degree of exposure (for the most dangerous component - benzene), in accordance with GOST 12.1.007. [1, 2, 3, 4, 6]

2.2. Hygienic standards for product in the working area: Maximum allowable concentration in the air of the working area: 15/5 mg/m³ of benzene, 150/50 mg/m³ toluene, and 150/50 mg/m³ of xylene in accordance with HS 2.2.5.1313. [1,4]

2.3. Labeling Information (according to )

2.3.1. Hazard description:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Signal Word</th>
<th>Brief Hazard Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame</td>
<td>Danger</td>
<td>Flammable liquid. Vapors form explosive mixtures with air.</td>
</tr>
<tr>
<td>Skull and Crossbones</td>
<td></td>
<td>Fatal if swallowed.</td>
</tr>
<tr>
<td>Health Danger</td>
<td></td>
<td>Can cause cancer. Suspected of causing genetic defects. Causes damage to target organs.</td>
</tr>
<tr>
<td>Exclamation Mark</td>
<td></td>
<td>In case of contact with skin causes irritation. In case of eye contact causes florid irritation.</td>
</tr>
<tr>
<td>None</td>
<td></td>
<td>Harmful to the aquatic environment</td>
</tr>
</tbody>
</table>

[1, 2, 5, 7]
2.3.2. Danger prevention measures:

Safe handling precautions:
- Keep in tightly closed containers;
- Keep away from sources of ignition, sparks, and flames. No smoking;
- Before use, one should be trained to work with this product.
- Use gloves and eye / face protection (goggles) in accordance with GOST 12.4.011 and typical industry sector norms;
- Use explosion-proof equipment and lighting;
- Keep away from static electricity;
- Use sparkproof tools;
- No smoking, drinking, or eating while using the product;
- After work, wash your hands thoroughly.

Measures to eliminate emergencies:
- Extinguish with inert gas, chemical and air-filled foams, CO₂, use sand, dry chemicals, blanket, asbestos cloth;
- In case of contact with skin, take off all contaminated clothing immediately, and wash the exposed skin with water.
- If irritation occurs, seek medical attention.
In case of eye contact: rinse cautiously with water for several minutes. Remove contact lenses, if you use them and if it is easy to do. Continue rinsing.
- If irritation persists, seek medical attention.
- If swallowed, rinse mouth and immediately seek medical attention (excessive drinking, sodium sulfate (1 tbsp. to a glass of water), paraffinum liquidum (200 ml) with activated carbon; gastric lavage).
Wash hands after handling. In case of suspicion of the possibility of exposure, seek medical attention.

Safe storage conditions:
- Store in a cool, well-ventilated place.
- Store locked up. [1, 6, 7]

3. Composition (Information on Ingredients)

3.1. Product Information

3.1.1. Chemical Name (according to IUPAC)
None. Mixture of aromatic hydrocarbons. [1]

3.1.2 Chemical Formula
No formula; the product is a mixture of aromatic hydrocarbons. [1]

3.1.3. General characteristics of the composition: (including product mix and an indication of functional additives and impurities that affect the hazard chance of the product; production process)
Fraction of aromatic hydrocarbons, obtained by treatment of liquid products of pyrolysis, crude benzene and byproducts of petrochemical industries, is a mixture of hydrocarbons of aromatic and unsaturated structures. [1]
3.2. Components
(names, CAS-numbers and EC-numbers (if any),
part by weight, working area MAC or SRLI, hazard classes, references to data sources)

<table>
<thead>
<tr>
<th>Components (name)</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>% WT</th>
<th>MAC w.a., mg/m³</th>
<th>Hazard Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>benzene</td>
<td>71-43-2</td>
<td>200-753-7</td>
<td>(~4 - 8)</td>
<td>15/5</td>
<td>2</td>
</tr>
<tr>
<td>toluene</td>
<td>108-88-3</td>
<td>203-625-9</td>
<td>(~ 20 - 25)</td>
<td>150/50</td>
<td>3</td>
</tr>
<tr>
<td>xylene</td>
<td>1330-20-7</td>
<td>215-535-7</td>
<td>(total ~10-15)</td>
<td>150/50</td>
<td>3</td>
</tr>
</tbody>
</table>

Information sources: [1, 3, 10]

4. First-aid Measures

4.1. Symptoms

4.1.1. In case of poisoning by inhalation:
Fraction of aromatic hydrocarbons has a narcotic effect, ability to penetrate through intact skin, causing its irritation, and it also causes increased sensitivity of the organism. In low concentrations, repeated exposure causes a change in the composition of blood and affects the blood-forming organs.

Chronic poisoning occurs as a result of prolonged contact with even very small concentrations of the product and is mainly characterized by lesions of the blood and blood-forming organs, weakness, fatigue, sleep disturbance, irritability, liver disease, low immunity. Chronic poisoning can lead to death. [1, 2, 6, 11]

4.1.2. In case of contact with skin:
In case of contact with skin - redness, dryness, itching, cracking and dermatitis.
Maximum permissible level of a harmful substance on the skin:
benzene – 0.002 mg/cm², cancerogenic, Hazard Class 4;
toluene - 0.002 mg/cm², Hazard Class 4. [2, 6, 11]

4.1.3. In case of eye contact:
In case of eye contact - redness, pain, tearing, conjunctivitis. [2, 6]

4.1.4. In case of poisoning by the oral route (if swallowed):
Severe vomiting, pain in the stomach, abdominal pain, respiratory distress, increased heart rate, convulsions, loss of consciousness, paralysis of the respiratory center and respiratory arrest. [2, 6, 11]

4.2. First aid measures

4.2.1. In case of poisoning by inhalation:
In case of mild poisoning - fresh air, rest, warmth. Remove cumbersome clothing. If unconscious, put the injured in a recumbent position with the slightly inverted head. Inhalation of ammonia spirit (from a cotton pellet). In case of sharp reduction or cessation of breathing immediately begin mouth-to-mouth or mouth-to-nose artificial respiration, or using a respirator under the supervision of medical personnel (release the mucus from the mouth prior to the procedure); continue without interruption until the full recovery of spontaneous breathing. Emergency hospitalization. [2, 6]

4.2.2. In case of contact with skin:
Remove contaminated clothing. Wash with soap and grease with softening cream. If necessary, seek medical attention. [1, 2]

4.2.3. In case of eye contact:
Rinse the eyes thoroughly under running water for at least 15-20 minutes at a wide-open eye fissure. Consult a doctor. In the future - seeing an ophthalmologist. [1, 2]
### 4.2.4. In case of poisoning by the oral route:

If product gets into the stomach, give the injured some activated charcoal, 2-3 tablespoons of paraffinum liquidum. Do not induce vomiting! (danger of vomit mass entry in the airways and development of toxic pneumonia). Hospitalization. [2]

### 4.2.5. Contraindications:

Do not induce vomiting and administer emetics. Adrenaline and adrenoceptive agents are contraindicated. [2, 6]

### 4.2.6. First-aid equipment (first aid kit):


### 5. Fire-fighting Measures

#### 5.1. General characteristics of the fire and explosion hazard:

Fraction of aromatic hydrocarbons is a combustible flammable liquid, flammable and explosive. Vapors are capable of forming explosive mixtures with air. It is warming in depth when burning, forming ever-increasing homothermal layer. Combustion emits toxic fumes: carbon oxides, sulfur oxides. [1, 9]

#### 5.2. Fire and explosion hazard indicators: (nomenclature according to GOST 12.1.044 and GOST R 51330.0)

Refers to the group and category of explosive mixtures – IIA – T 2.

Fire and explosion hazard indicators:
- self-ignition temperature 536°C,
- flash temperature -10 0°C.
- temperature and volume limits of ignition:
  - lower temperature limit: 0°C, lower explosion limit: 1.3%.
  - upper temperature limit: 30°C, upper explosion limit: 6.7%. [1, 12, 13, 14]

#### 5.3. Hazards arising from the products of combustion and / or thermal degradation:

During combustion the toxic substances, carbon and sulfur oxides, are formed. Carbon dioxide, with a significant content of it in the air, causes narcotic effect and irritates the mucous membranes of the eyes. High concentrations of carbon dioxide are associated with the reduced content of oxygen in the air which causes choking. According to Health Standards the MAC of carbon monoxide in the working area of 20 mg/m³ is allowed.

Inhalation of air with high sulfur oxides content leads to acute bronchitis, shortness of breath, blueing and partial loss of consciousness. Allowable concentration of sulfur dioxide is set at 20 mg/m³. [3, 9]

#### 5.4. Suitable Extinguishing Media:

In case of the fraction of aromatic hydrocarbons combustion keep containers cool with water from a maximum distance. Extinguishing media: PSB and PSB-3 fire powders, water spray, chemical and air air-filled foam, carbon dioxide, inert gases, sand, asbestos cloth. In case of subsurface suppression use fluorodetergent foam liquids. In case of total flooding use carbon dioxide, extinguishing vapor. [1, 9, 15]

#### 5.5. Unsuitable Extinguishing Media:

Do not apply a solid water jet, as product may emerge, increasing the area of the fire. Use water spray only. [9, 15]

#### 5.6. Fire-fighting Personal protective equipment: (firefighters PPE)

In case of fire - fire retardant suit complete with SPI-20 self-rescuers. At concentrations slightly above the MAC (if exposure limits are exceeded up to 100 times), - clothing, PFM-1 industrial gas mask of small dimensions with PZU universal protective cartridge, air supplied self-contained individual protection kit. Oil-and-petrol resistant gloves, gloves made of dispersion of butyl rubber, special shoes, goggles (Section 8). [1, 6, 15]
5.7. Fire-fighting specificity: Fraction vapors form explosive mixtures with air that spread away from the leak spot. Containers may explode when heated. In the empty containers the residues can form explosive mixtures. Above the surface spills the flammable vapor concentration is formed. [15]

6. Measures to prevent and eliminate accidents and emergencies and their consequences

6.1. Measures to prevent harmful effects on people, environment, buildings, etc., in case of accidents and emergency situations

6.1.1. Necessary actions of a general nature:

- Isolate the danger area within a radius of at least 200 m.
- Remove outsiders. Enter the danger area wearing the protective equipment. Keep upwind. Avoid low areas.
- Comply with fire safety measures. Do not smoke. Eliminate sources of fire and sparks. Provide first aid to the victims. Send people away from the damage center for medical care. [15]

6.1.2. Personal protective equipment: (for emergency crews and personnel)

- For chemical reconnaissance team and incident commander - PDU-3 (for 20 minutes).
- For emergency crews – KIH-5 insulating protective suit complete with the IP-4M insulating mask or ASV-2 breathing apparatus. In case of fire - fire retardant suit complete with SPI- 20 self-rescuers. Respiratory protection - filter respirator mask with MAG full-face respirator and DOT filter according to GOST 12.4.121. When operating in closed containers, reservoirs, wells, etc. - insulating hose masks of PSh-1, PSh-2B, DPA-5 brands with forced air supply. Oil-and-petrol resistant gloves, gloves made of dispersion of butyl rubber, special shoes. [1, 15, 26]

6.2. Procedure for elimination of accidents and emergencies

6.2.1. Actions in case of leaks, spills, spillage: (including precautions to ensure the protection of the environment)

- Do not touch the spilled product. Take measures to stop the flow of product.
- Eliminate leaks with safety precautions. Pump the contents into a working container protected from corrosion or in a drain bowl in compliance with the conditions of fluids mixing. Block off the spills with earthen rampart. Don't let the substance enter into reservoirs, basements, sewers. Use water spray to dissipate (for insulation) of vapors. In case of fraction of aromatic hydrocarbons spillage the drenched parts of machines should be rubbed dry, and the product spilled on the ground or floor should be filled with sand, which must be collected in separate containers and removed. Removal and disinfection should be carried out in accordance with SanPiN 2.1.7.1322. [1, 15, 16]

6.2.2. Actions in case of fire:

- Immediately take measures to eliminate fire, report to the fire department. Do not approach the burning tanks. Keep containers cool with water from a maximum distance. Extinguish with water mist, air-filled and chemical foams from a maximum distance. Apply extinguishing media (Section 5). Evacuate people from nearby buildings, taking into account the direction of movement of toxic combustion products. In case of fire in the room - turn the ventilation off and prevent access of air. [1, 15]
7. Terms of chemical products storage and handling during loading and unloading

7.1. Chemical Product Handling Safety Measures

7.1.1. Security measures and collective protection equipment: (including fire and explosion safety measures system)

All production facilities must be equipped with forced ventilation to meet the working area MAC, and regular monitoring of the concentration of substances in the air of the working area. In the places of fraction of aromatic hydrocarbons storage and usage the treatment with open fire is prohibited; electrical installations, electric networks and artificial lighting must be explosion-proof. When working with the product usage of instruments that spark when struck is not allowed. Machinery and apparatus for loading and unloading processes should be sealed. Tanks and pipes for the storage and transportation of the product must be protected from static electricity and secondary effects of lightning. Do not allow derogation from the production process rules. Workplaces must be equipped with the primary firefighting means. Abide by the rules of occupational health and personal hygiene, use personal protective equipment. Production facilities must be equipped with the first aid kits. [1, 17, 18, 19]

7.1.2. Measures for environmental protection:

Maximum sealing of process equipment and containers during transportation, air monitoring, industrial waste monitoring, gas emissions incineration. Exception of relief to atmosphere. In the production and application of the product the production control of environment factors and harmful substances in the external environment should be organized. [1, 15, 21]

7.1.3. Recommendations for safe movement and transportation:

Transportation of fraction of aromatic hydrocarbons is carried out in bulk in accordance with GOST 1510, in rail car tanks with top discharge or with universal drain device, as well as by pipeline and in tankers in accordance with the rules for transport of dangerous goods by the given transport, established in the prescribed manner. Running into tanks and reservoirs should be made taking into account the thermal expansion on the route and at the destination point. [1, 15, 21]

7.2. Chemical Product Storage

7.2.1. Terms and conditions of safe storage: (including the warranty period of storage, shelf life)

The storage of fraction of aromatic hydrocarbons is performed in accordance with GOST 1510, in sealed steel tanks in compliance with fire safety regulations, at an open site, under conditions of natural temperature of HIL stock. The reservoirs in which the fraction is stored and transported must be protected from static electricity. Avoid contact with fire, sparks, flame; protect from combustion.

Supplier guarantees the quality of fraction of aromatic hydrocarbons within 6 months from date of manufacture, subject to terms of transportation and storage. [1, 18, 19, 21]

7.2.2. Chemicals and materials incompatible during the storage:

Avoid contact with oxidizing agents, flammable liquids, easily flammable substances. [16, 22]
7.2.3. Recommended materials for packaging:

Fraction of aromatic hydrocarbons is stored in accordance with GOST 1510, in steel tanks with internal oil-and-petrol resistant and steam-resistant protective coating that complies with the electrostatic spark safety requirements. [1, 21]

7.3. Safety measures and rules for storage at home:

Does not apply to domestic use

8. Hazardous exposure control means and personal protection equipment

8.1. Working area parameters that require monitoring (working area MAC or SRLI):

The maximum single maximum permissible concentration (MPC\textsubscript{single}) of hydrocarbons in the air of the working area (for benzene) - 15.5 mg/m\textsuperscript{3}. [1, 2]

8.2. Measures for keeping the content of harmful substances in permissible concentrations:

Handling, storage and transportation should be conducted using sealed, explosion-proof equipment. Health hygiene according to GOST 12.1.005 should be complied with in the industrial premises. All production facilities must be equipped with forced ventilation, providing a tenfold air change per hour. Strict compliance with the technological mode of production, storage and transportation. Use of PPE. [1, 17, 23]

8.3. Personal Protection Means for Personnel

8.3.1. General recommendations:

Workers should be trained for work safety, in accordance with GOST 12.0.004. Only persons who passed the required upon employment and periodic medical examinations in accordance with the procedure established by the Health Ministry of the Russian Federation are allowed to perform the work. Wear personal protective equipment, approved in the established order. Follow the personal hygiene and occupational safety rules, contain the work area clean and tidy. Do not eat at the workplace and do not smoke there. Avoid cluttering the aisles to fire equipment and communications. [6, 24, 25]

8.3.2. Respiratory Protection (RPE types)

At low concentrations - filtering respirators with MAG panoramic mask and DOT filter according to GOST 12.4.121. At high concentrations and working in closed containers, reservoirs, wells - insulating airline respirators. [1, 26]

8.3.3. Protective clothing (material, type):

Cotton suit, leather boots, combined mittens, goggles, protective helmet, helmet liner and gas mask. In Winter also wear jacket with warming lining, felt boots. In case of fire - fire retardant suit complete with SPI-20 self-rescuers. [1, 15, 25]

8.3.4. PPE for domestic use:

Does not apply to domestic use

9. Physical and Chemical Properties

9.1. Physical state: (aggregative state, color, odor)

Under normal conditions, the fraction of aromatic hydrocarbons is a transparent liquid. [1]
9.2. Parameters describing basic properties of chemical products, especially hazardous: (temperature indicators, pH, solubility, n-octanol/water coefficient, etc.)

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fractional composition:</td>
<td></td>
</tr>
<tr>
<td>- initial boiling point, °C, not lower</td>
<td>30</td>
</tr>
<tr>
<td>- 5% distilled over at temperature, °C</td>
<td>Not rated, definition is necessary</td>
</tr>
<tr>
<td>- 10% distilled over at temperature, °C, not higher</td>
<td>75</td>
</tr>
<tr>
<td>- 50% distilled over at temperature, °C, not higher</td>
<td>120</td>
</tr>
<tr>
<td>- 90% distilled over at temperature, °C, not higher</td>
<td>190</td>
</tr>
<tr>
<td>- final boiling point, °C, not higher</td>
<td>215</td>
</tr>
<tr>
<td>- Proportion of residue in flask, % (by volume), not more</td>
<td>2</td>
</tr>
<tr>
<td>2 Density, g/cm³</td>
<td>From 0.760 to 0.840</td>
</tr>
<tr>
<td>3 Solubility</td>
<td>Insoluble in water, soluble in organic solvents, fats.</td>
</tr>
</tbody>
</table>

10. Stability and Reactivity

10.1. Chemical stability: (for unstable products indicate degradation products)

Under normal conditions the product is stable. [2]

10.2. Reactivity:

Under normal conditions the product is chemically inert. Under certain conditions (temperature, catalysts, etc.) the product is halogenated, oxidized. At high temperature in the presence of oxygen burns evenly, forming CO₂ and H₂O, releasing large amount of heat. Under certain conditions with air the vapors form explosive mixtures. [2, 6]

10.3. Conditions to be avoided:

Exclude heat, pressure, work done by an open fire source, contact with oxidizing agents, acids, alkalis, flammable substances. [1, 2, 6]

11. Toxicological Information

11.1. General characteristics of exposure: (hazard (toxicity) assessment of health effects)

Fraction of aromatic hydrocarbons by the degree of health effects (for benzene) applies in accordance with GOST 12.1.007 to 2nd hazard class - highly hazardous substances. Has a narcotic effect, irritates the upper respiratory tract, eye mucus membranes and human skin, causes disorder of the nervous system. May adversely affect the function of reproduction. [1, 2, 15]

Through the respiratory system, gastrointestinal tract, skin, mucus membranes of the eyes. [1, 2]

Central and peripheral nervous system, gastrointestinal tract, liver, kidneys, blood system, skin and eyes. [1, 2]

- if inhaled: Has a narcotic effect, possibility of snuffles, cough, sore throat, chronic poisoning, changes of the composition of the blood, as well as functional changes in the central nervous system.

- by contact with eyes: Irritation, stinging, tearing.

- by contact with skin: Redness, dry skin, possibility of dermatitis, eczemas.
11.5. Information on dangerous long-term health effects: (effect on the function of reproduction, carcinogenicity, cumulativeness, etc.)

Information on dangerous long-term health effects is presented for the most dangerous products - benzene:
Embryotropic - found,
Gonadotrophic - found,
Mutagenic - found,
Carcinogenic - moderate,
Teratogenic - found,
Cumulativeness - weak. [2]

Benzene has a carcinogenic effect to human health according to the IARC - group 1; has moderate carcinogenic effect to animals. According to dangerous effects toluene is similar to benzene. [2, 27]

11.6. Indicators of acute toxicity: (DL₅₀, way of exposure (introduction into the stomach, applied to the skin), animal species; CL₅₀, exposure time (h), animal species)

<table>
<thead>
<tr>
<th>Compound</th>
<th>Value</th>
<th>Way of Exposure / Exposure Time (h)</th>
<th>Animal Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>DL₅₀ (mg/kg)</td>
<td>1175 - 6400</td>
<td>introduction into the stomach</td>
</tr>
<tr>
<td></td>
<td>DL₅₀ (mg/kg)</td>
<td>4700 - 5000</td>
<td>introduction into the stomach</td>
</tr>
<tr>
<td></td>
<td>DL₅₀ (mg/kg)</td>
<td>299</td>
<td>intraperitoneally</td>
</tr>
<tr>
<td></td>
<td>CL₅₀ (mg/m3)</td>
<td>65 000</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CL₅₀ (mg/m3)</td>
<td>24000 - 4500</td>
<td>2</td>
</tr>
</tbody>
</table>

The minimum lethal concentration for humans by inhalation for 5 min. - 60 000 mg/m³.

<table>
<thead>
<tr>
<th>Compound</th>
<th>Value</th>
<th>Way of Exposure / Exposure Time (h)</th>
<th>Animal Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>DL₅₀ (mg/kg)</td>
<td>7000</td>
<td>introduction into the stomach</td>
</tr>
<tr>
<td></td>
<td>CL₅₀ (mg/m3)</td>
<td>30000-35000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CL₅₀ (mg/m3)</td>
<td>53600</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compound</th>
<th>Value</th>
<th>Way of Exposure / Exposure Time (h)</th>
<th>Animal Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylene</td>
<td>DL₅₀ (mg/kg)</td>
<td>1548</td>
<td>intraperitoneally</td>
</tr>
<tr>
<td></td>
<td>DL₅₀ (mg/kg)</td>
<td>4300</td>
<td>introduction into the stomach</td>
</tr>
<tr>
<td></td>
<td>CL₅₀ (mg/m3)</td>
<td>1280</td>
<td>1 min</td>
</tr>
<tr>
<td></td>
<td>CL₅₀ (mg/m3)</td>
<td>6670</td>
<td>4</td>
</tr>
</tbody>
</table>

11.7. Doses (concentrations) having minimal toxic effects:

Data are presented for benzene
Limchr - 0.25 mg/kg, introduction into the stomach, 6 months, rats (by changes in the central nervous system and the hemopoietic organs).
Threshold dose - single (acute) exposure - 0.32 mg/kg, introduction into the stomach, single, rats (by increasing the number of platelets and decreasing of lymphocytes in peripheral blood).
Chronic effect threshold dose - 0.6 mg/m³, inhalation, 3 months, rats (by change of immunological parameters).
Effect thresholds:
Lim ac - 1,100 mg/m³, inhalation, 4 h, rats (by morphological change of the blood);
Odor threshold limit - 2.8 mg/m³, inhalation, human;
SAceeg - 1.5 mg/m³, inhalation, human (by change of bioelectric activity of the cerebral cortex);
Reflective threshold limit - 300- 1,000 mg/m³, inhalation, 40 minutes. Rabbits (by change of flexion reflex). [2]

12.1. General characteristics of the impact on the environment:
Production, transportation and storage, industrial emissions, accidental leaks lead to pollution of atmospheric air, water bodies, soil.

12.2. Ways of exposure to the environment:
Entry into the environment may happen due to failure to comply with the rules of handling, storage, due to informal placement and burial or incineration of wastes and by emergencies.

12.3. Observed symptoms of exposure:
Changes the organoleptic properties of water giving it a smell. Forms a film on the water surface.


12.4.1. Hygienic standards:
(allowable concentrations in atmospheric air, water, including fishery water bodies, soil)

<table>
<thead>
<tr>
<th>Components</th>
<th>MAC in air or RSIL in air, mg/m³ (LNV¹, hazard class)</th>
<th>MAC in water¹² or approximate permissible level in water, mg/l (LNV, hazard class)</th>
<th>MAC in fishery water bodies³ or RSIL in fishery water bodies, mg/l (LNV, hazard class)</th>
<th>MAC or approximate permissible concentration in soil, mg/kg LNV</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>MAC in water 0.001¹⁴ sanitary toxicological LNV hazard class 1</td>
<td>MAC 0.5 toxicological LNV hazard class 4</td>
<td>MAC in soil 0.3 air-migration LNV</td>
<td>²[28, 29, 30, 31]</td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td>MAC in water 0.24 organoleptic LNV hazard class 4</td>
<td>MAC 0.5 organoleptic LNV hazard class 3</td>
<td>MAC in soil 0.3 air-migration LNV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylene</td>
<td>MAC in water 0.05 approximate permissible level in water, mg/l, organoleptic LNV hazard class 3</td>
<td>Not identified</td>
<td>MAC in soil 0.3 translocation LNV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12.4.2. Indices of ecotoxicity:
(CL, EC for fishes, Daphnia Magna, algae, etc.)

<table>
<thead>
<tr>
<th>No Data for Products in General</th>
<th>Value</th>
<th>Species</th>
<th>Exposure Time (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>CL₅₀</td>
<td>5.8</td>
<td>Morone saxatilis (Sebastes)</td>
</tr>
<tr>
<td></td>
<td>CL₆₀</td>
<td>34.4</td>
<td>Carassius auratus (Crucian carp)</td>
</tr>
<tr>
<td></td>
<td>CL₇₀</td>
<td>9.2</td>
<td>Salmo gairdneri (Rainbow trout)</td>
</tr>
<tr>
<td></td>
<td>CL₂₀</td>
<td>10</td>
<td>Daphnia Magna</td>
</tr>
<tr>
<td></td>
<td>EC</td>
<td>&gt; 1400</td>
<td>(growth inhibition) Scenedesmus quadricauda (green)</td>
</tr>
<tr>
<td></td>
<td>CL₅₀</td>
<td>525</td>
<td>Chlorella vulgaris (chlorella)</td>
</tr>
<tr>
<td>Toluene</td>
<td>CL₅₀</td>
<td>23</td>
<td>Golden carp</td>
</tr>
<tr>
<td></td>
<td>CL₆₀</td>
<td>63</td>
<td>Minnow embryos</td>
</tr>
<tr>
<td></td>
<td>CL₇₀</td>
<td>29</td>
<td>Minnow one-day fry</td>
</tr>
<tr>
<td></td>
<td>CL₂₀</td>
<td>26</td>
<td>Minnow fry</td>
</tr>
</tbody>
</table>

¹ LNV - Limiting Nuisance Value (tox. - toxicological; s.-t. - sanitary toxicological; org. - organoleptic; refl. - reflective; res. - resorptive; refl.-res. - reflective resorptive, fish. - fishery (change of merchantability of commercial aquatic organisms); gen. - general sanitary).
² Water in the water bodies of drinking and household uses.
³ Water in the water bodies of commercial fishing importance (including marine).
### 12.4.3. Migration and transformation in the environment through biodegradation and other processes (oxidation, hydrolysis, etc.):

In the atmosphere and water volatile hydrocarbons migrate for the fairly long distances. Organic contaminants may increase absorption of hydrocarbons in water, toluene, and xylenes may be oxidized with ozone in water. The intensity of the photochemical oxidation of aromatic hydrocarbons increase in the presence of nitrogen oxides or particulate matters, on the surface of which the catalytic reactions take place.

The microorganisms can degrade aromatic hydrocarbons primarily in water and soil. Some microorganisms can survive and multiply in the petroleum fractions, destroying aromatic hydrocarbons.

Volatile aromatic hydrocarbons can relatively easy transfer from aqueous phase into the atmospheric air at the aeration, and then deposit on the surface.

### 13. Recommendations on Removal of Wastes (Residues)

13.1. Safety measures when handling wastes arising from use, storage, transportation, etc.

Compliance with measures for handling with combustible and flammable substances, avoid contact of wastes with an open flame, use of personal protective equipment. Safety measures when handling wastes are the same as for the main product (section 4, 6, 7).

13.2. Information about the places and methods of decontamination, recycling or disposal of waste of substance (material), including container (packaging):

Wastes are sent for recycling. If not appropriate for recycling, should be disposed at landfills of toxic industrial waste or locations agreed with the local environmental authorities in accordance with Sanitary Norms and Rules 2.1.7.1322. Tanks are freed from the product and water, then purged with inert gas (nitrogen, carbon dioxide), and steamed with water steam. [1, 16, 32]

13.3. Recommendations on removal of waste generated by the domestic use of products:

Does not apply to domestic use
14. Information on Transportation

14.1. UN number: (in accordance with UN recommendations on the transport of dangerous goods (model regulations), latest edition) 

14.2. Proper shipping name and / or transportation name: 

14.3. Types of used vehicles: 

14.4. Classification of dangerous goods: (according to GOST 19433 and UN recommendations on the transport of dangerous goods) 

14.5. Transport labelling: (handling marks; basic, additional and informational signs) 

14.6. Packaging group: (in accordance with UN recommendations on the transport of dangerous goods) 

14.7. Hazard information for road transportation (ADR): 

14.8. Emergency cards: (for rail, marine and other transportation) 

14.9. Hazard information for international goods transport: (according to SMGS, ADR, RID, IMDG Code, ICAO/IATA and others, including information on environmental hazards, including data on "marine pollutants") 

14.10. IMDG (International Maritime Dangerous Goods): 

If flash point is -10 C shipping description is: 
UN3295, Hydrocarbons, liquid, n.o.s., Class 3, Packing group I 
Must be consistent with shipping description: 
Hydrocarbons, liquid, n.o.s., UN3295 
Labels: Flammable liquid 
Packing instruction: P001 (for Packing group I) 
IBC code: Not applicable 
EmS: F-E, S-D 

Note: For UN3295: If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: not applicable. 
Marine pollutant: no. 
[41]
15. Information on the National and International Legislation

15.1. National Legislation

15.1.1. Laws of the Russian Federation:


15.1.2. Documents regulating the requirements for protection of humans and the environment:

(certificates, sanitation and epidemiological conclusions, etc.)

15.2. International Legislation

15.2.1. Warning marking, effective in EU:

(hazard symbols, risk and safety phrases, etc.)

Hazard statement - R-phrases:
R 45 - may cause cancer;
R 11 - highly flammable;
R 39/23/24/25 - toxic: there is a danger of very serious irreversible health effects if inhaled, in contact with skin and if enters the gastrointestinal tract;
R 48 - risk of serious damage to health by prolonged exposure;
R 52/53 - Harmful to water inhabitants, may cause long-term adverse effects in the aquatic environment.

Precautions - S-phrases:
S 16 - keep away from fire - do not smoke;
S 24/25 - avoid contact with skin, eye contact;
S 36/37/39 - wear protective clothing, gloves and eye protection;
S 38 - in conditions of poor ventilation use respiratory protection;
S 61 - avoid contact with the environment.

First aid - S-фразы:
S 26 - after contact with eyes rinse immediately with plenty of water and seek medical advice;
S 45 - in case of accidents or if you feel unwell, seek medical advice. [10, 40]

16. Additional Information

16.1. Information on the revision (reissue) of Safety data sheet:

(states: "First edition of safety data sheet" or other cases, indicating the main reasons for revising the Safety data sheet)

First edition of safety data sheet.
16.2. List of data sources used to compile the Safety Data Sheet

1. TU 2411 - 036 - 48418772 - 2013 Fraction of aromatic hydrocarbons
3. GOST 12.1.007-76 Noxious substances. Classification and general safety requirements
4. HS 2.2.5.1313 - 03 Maximum allowable concentrations (MAC) of noxious substances in the air of the working area.
5. Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
7. GOST 31340-2007 Labelling of chemicals. General requirements
10. ESIS (European chemical Substances Information System).
13. GOST R 51330.0-99 Explosionproof electrical apparatus. Part 0. General requirements
16. Sanitary Norms and Rules 2.1.7.1322 - 03 Hygienic requirements regarding dumping and decontamination of industrial and consumable waste
17. GOST 12.4.021-75 Occupational safety standards system. Ventilation systems. General requirements
21. GOST 1510-84 Petroleum and petroleum products. Labelling, packaging, transportation and storage.
22. GOST 12.1.004 - 91 Fire safety. General requirements.
23. GOST 12.1.005-88 General sanitary requirements to the air of the working zone.
24. GOST 12.0.004 - 90 Occupational safety standards system. Organization of training for labour safety.
25. Order of the Ministry of Health and Social Development of the Russian Federation No. 906n from 11.08.2011 "On approval of standard rules of free issue of special clothing, special footwear and other personal protective equipment to the chemical production workers involved in work with harmful and (or) hazardous working conditions, as well as works performed under special temperature conditions or pollution".
26. GOST 12.4.121 - 83 Occupational safety standards system. Filtering protective masks. Specifications
27. Sanitary Norms and Rules 1.2.2353-08 Carcinogenic factors and basic requirements for the prevention of carcinogenic risks.
28. HS 2.1.6.1338 - 03 Maximum allowable concentration (MAC) of harmful substances in the air of residential areas.
29. Additions and changes to HS 2.1.5.1315 - 03, HS 2.1.5.2280-07 Maximum allowable concentration (MAC) of chemicals in the water of facilities used for domestic drinking and recreation purposes.
30. Order of the Russian Federal Fisheries Agency from 18.01.2010 No. 20 "On approval of water quality standards for fishery water bodies, including standards of maximum allowable concentrations of harmful substances in the water of fishery water bodies".
31 HS 2.1.7.2041 - 06 Maximum allowable concentration (MAC) of of chemicals in soil.
34 Terms of transportation of dangerous goods by rail. Appendix No. 2. (ed. 18.05.2012)
35 European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) (Geneva, 2010).
36 GOST 14192-96 Labelling of goods.
37 GOST 19433-88 Dangerous goods. Classification and labelling.