SAFETY DATA SHEET

(Safety Data Sheet)

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Federal Agency on Technical Regulating and Metrology

Information and Analysis Center Substances and Materials Safety
Federal State Unitary Enterprise All-Russian R&D Center of Information Standardization and Raw Materials and Substances Certification

Head _____ /A.D. Kozlov/

L.S.

NAME:

technical (pursuant to ND)	**Expandable polystyrene**
chemical (pursuant to IUPAC)	**Polyetenylbenzene**
trade	**Expandable polystyrene of EPS, EPS-F, EPS-L1 grades**
SYNONYMS	**Polyvinylbenzene, polyphenylethylene**

OKP Code: 221416 **FEACN Code:** 3903190000

Designation and name of main normative, technical or informational document for products (State Standard (GOST), Technical Specifications (TS), Industrial Standard (OST), corporate standard (STO), (M)SDS, etc.)

TS 2214-033-05762341-2009 Expandable Polystyrene

DANGER CHARACTERISTICS:

Signal word: Warning

Short (verbal): An inflammable substance with low risk of hazardous exposure to an organism (pursuant to GOST 12.1.007). Polystyrene aerosol (dust) has a light irritating effect on skin, eyes and respiratory organs. Thermal destruction (combustion) products are dangerous for humans and environment (styrene, isopentane, etc.). Polystyrene dust is highly explosive.

Detailed: in 16 safety data sheet sections attached.

MAIN HAZARDOUS COMPONENTS	$OEL_{in\ working\ area}$, mg/m^3	Hazard class	CAS No.	EU no.
Polyethenylbenzene	10	4	9003-53-6	500-008-9
Isopentane	900/300	4	78-78-4	201-142-8

APPLICANT: JSC Plastic (name of organization) Uzlovaya, Tula Oblast (city)

Applicant's type: manufacturer, supplier, seller, exporter, importer
cross-out unnecessary words)

OKPO Code: 05762341 **Emergency telephone:** (48731) 2-43-57

Head of the Development and quality service of JSC Plastic: _____ (signature) /N.V. Anikina/ clarification

L.S.

IUPAC – means International Union of Pure and Applied Chemistry

GHS – means UN Recommendations ST/SG/AC.10/30 Globally Harmonized System of Classification and Labeling of Chemicals

OKP – means All-Russian Products Classifier

OKPO – means All-Russian Classifier of Enterprises and Organizations

FEACN – means Foreign Economic Activity Commodity Nomenclature

CAS No. – means number of a substance in Chemical Abstracts Service

EU No. – means substance number in the European Chemicals Agency register

OEL in working area – means occupational exposure limit, mg/m3 [3] (maximum single/weighted average)

Safety Data Sheet – means safety data sheet for chemical products (substance, mixture, material, industrial waste)

Safety data sheet is consistent with:

- UN Recommendations ST/SG/AC.10/30 GHS;
- EC Regulations 1907/2006 concerning Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), Annex II

Signal word: – consists of one or two words **Dangerous** or **Caution** (or **No)** pursuant to GOST 31340-2007 Warning Marking of Chemical Products. General Requirements

1. Identification of chemical products and manufacturer's and/or supplier's information

1.1. Identification of chemical products

1.1.1. Technical name:	Expandable polystyrene (hereafter - polystyrene) [1]
1.1.2. Summary of recommendations for use: (including restricted use)	EPS grade is used for manufacturing heat-insulating boards, automobile accessories, various packaging types, floating structures, decorative products. EPS-F grade is used for manufacturing heat-isolating boards and other technical products, EPS-L1 grade with improved gasifying ability is used for manufacturing gasifiable patterns in foundry production. [1]

1.2. Manufacturer's and/or supplier's information

1.2.1. Full official name of an organization:	Joint-Stock Company Plastic (JSC Plastic)
1.2.2. Address (postal):	house 1, Tulskaya Street, Uzlovaya, Tula Oblast, 301600 Russia
1.2.3. Telephone, including for emergency consultations and limited time:	(48731) 2-47-20, 2-43-57, 2-47-42
1.2.4. Fax:	(48731)2-45-45
1.2.5. E-mail:	post@plastic-uzl.ru

2. Hazard (hazards) identification

2.1. Level of hazard of chemical products in general: (data on hazard classification in accordance with Russian legislation (GOST 12.1.007) and GHS (following approval)	In terms of exposure to the organism, pursuant to GOST 12.1.007 polystyrene is referred to Hazard Class 4 (low-risk substances). Polymer aerosol (air-borne dust) has an irritating effect on skin, eyes and respiratory organs; has a sensitizing effect in case of frequent contacts with it during the manufacturing process. Processing and thermal destruction products are hazardous for humans and the environment. [1, 42,43]
2.2. Hygienic standards for products in general in the air of working area: ($OEL_{in\ working\ area}$. or $_{occupational\ exposure}$) Safe Reference Levels of Impact (SRLI)	For polystyrene aerosol (Polyetenylbenzene) OEL. - 10 mg/m^3, Hazard Class 4 pursuant to Hygienic Norm (GN) 2.2.5.1313. [43]

2.3. Marking information (according to GOST 31340-07) Signal word: Warning [29]

2.3.1 Hazard description:

Inflammable substance. Skin and eyes contact causes irritation. Skin contact may cause an allergic reaction. [29]

2.3.2. Hazard preventive measures: Keep off ignition sources, sparkles, open fire. No smoking Use explosion safe equipment and lighting. Use personal protective equipment. Avoid inhaling polystyrene dust. In case of skin contact, wash with large amount of water with soap. In case of irritation or redness, apply for medical help. [29]

3. Composition (information on components)

3.1. General information on products 3.1.1. Chemical name: (pursuant to IUPAC)	Polyetenylbenzene [8]

3.1.2. Chemical formula:

Molecular: $[C_8H_8]$

Structural: $(-CH-CH_2-)_n$ with C_6H_5 [8]

3.1.3. General composition characteristics:
(taking into account grade assortment and specifying impurities and functional additives having effect on products hazard; way of preparation)

Polystyrene is a product of steam generator (Isopentane Fraction) advanced styrene granulation polymerization. EPS grade (EPS-N) - natural (letter N) without additives; EPS-F grade – self-extinguishing (letter F), contains antipyrene additive – 0.94%; EPS-L1 grade – contains an agent (letter L) – 0.62%, which enhances gasification. [1,7]

3.2. Components
(Name, CAS and EU numbers (if any), weight content, OEL or occupational exposure SRLI, hazard classes, references to data sources)

Components (name, CAS and EU numbers)	Weight content, %	OEL in working area, mg/m ^{3}	Hazard class	Data sources
Polystyrene CAS No. 9003-53- 6, EU No. 500-008-9	94.8 -93.6	10	4	[1,7,8,42,43]
Styrene CAS No. 100-42-5, EU No. 202-851-5	0.2	30/10	3	[2,7,10,39]
Isopentane CAS No. 78-78-4, EU No. 201-142-8	5-6.2	900/300	4	[5,7,8,41]

4. First aid measures

4.1. Symptoms

4.1.1. In case of poisoning via inhalation:

Continuous inhalation of aerosol (air-borne dust) of the product, residual monomer (styrene) or thermal destruction products (styrene, ethylbenzene, benzaldehyde, isopentane, carbon oxide) and their swallowing may lead to: dizziness, changed breathing rhythm, apnoea, asphyxia, coughing, narcotic condition symptoms (loss of coordination, light stupor, cramps, lowering of moving activity); headache, changed heart rate and blood pressure. [1,3,8,9]

4.1.2. In case of contact with skin:

Product contact with unprotected skin causes no or light reaction, however, constant exposure of dangerous substances (thermal destruction products) may lead to significant irritation of workers' skin: hyperemia, dryness, with a late effect of eczema. [3,8,9]

4.1.3. In case of contact with eyes:

Exposure to eyes mucous membranes of product aerosol (dust) causes no or light reaction (possible watering and light hyperemia); the aggregate exposure of hazardous compounds (thermal destruction products) to eyes mucous membranes may cause evident irritation: gripes, conjunctival hyperemia [3,8,9]

4.1.4. In case of oral poisoning (via swallowing):

No data on symptoms in case of accidental swallowing of products are available. [3,8,9]

4.2. First aid measures rendered to injured

4.2.1. In case of poisoning via inhalation: Ensure fresh air, remove tight clothes, keep in rest, warm milk with sodium carbonate or Borjomi, oil inhalations. [3,9]

4.2.2. In case of contact with skin: Wash with warm water with soap, put on Vaseline or other protective preventative dermatological ointment, softening cream. [3,8,9]

4.2.3. In case of contact with eyes: Wash with running water (preferably fine salt isotonic solution). [3,8,9]

4.2.4. In case of oral poisoning: Wash stomach with large quantity of water, use saline purge. [3,9]

4.2.5. Counter indications: No data

4.2.6. First aid means (first aid kit): Cotton wool, eye wash glass, sedative, activated carbon, Vaseline oil, 3% hydrogen peroxide solution. Aqueous ammonia, silicone cream, sodium sulfate. [3,7,9]

5. Fire-Explosion safety measures and means

5.1. General characteristic of fire and explosion hazard: Polystyrene is an inflammable substance, puts on fire when contacted fire, emits large amount of smoky fire while burning. Air-borne polystyrene dust is explosive. [1]

5.2. Fire and explosion hazard indicators:
(indicators list pursuant to GOST 12.1.044 and GOST R 51330.0)

Self-ignition point **(435–475)°C.**
Decomposition temperature **(200–250)°C.**
Lower explosive limit concentration (LELC) for a polymer with particles size:
-less than 200 mcm **12.5 g/m^3,**
- no LELC for size more than 315 mcm up to concentration of **916 g/m^3.**
Explosive limits of:
-emitted styrene combined with air - (1.1–5.2)% vol.
Flash point of emitted isopentane vapors at the polystyrene heating speed (10-12)°C/min (46–63)°C.
Flame point of emitted isopentane vapors (70–109)°C.
Flame propagation speed 36.7 cm/min.
Burning rate 2.19 kg/min m^2. [1,12]

Polystyrene burning products toxicity indicator (H_{CL50})-

Hazard class	H_{CL50} g/m , at the exposition time of, min			
	5	15	30	60
low-risk	over 210	over 150	over 120	over 90

[18]

5.3. Danger caused by burning and/or thermal destruction products: When heated over 200 °C – partial destruction with emission of styrene, isopentane fraction and sometimes small quantities of ethyl benzene, benzaldehyde, carbon oxide vapors. [1]
Processing and thermal destruction products have a negative effect on humans in case of exceeding of their OEL in the air of working area:
- styrene OEL in working area =30/10 mg/m^3

- isopentane OEL. =900/300 mg/m
- ethylbenzene OEL.=150/50 mg/m ^{3}
- benzaldehyde OEL. =5 mg/m ^{3}
- carbon oxide OEL. =20 mg/m

Fire and explosion hazard indicators of substances emitted as a result of thermal destruction of polystyrene:

indicator	styrene	isopentane	carbon oxide	ethylbenzene	benzaldehyde
Self-ignition point, °C	490	427	610	432	205
self-ignition point, °C	43	50	-	-	-
flame point, °C	30	52	-	24	64
temperature flame limits: C			-		
lower	25	60		18	-
upper	59	30		45	-
explosive concentration limits, % vol.:					
lower	1.1	1.3	12.5	0.9	1.4
upper	5.2	7.6	74	3.9	-

[2,5,12]

5.4. Recommended fire-extinguishing means: Sand, vapor, carbon-dioxide and powder fire extinguishers, mist water with a wetting surfactant.
Stationary fire safety means – fire hydrants, sprinkle installations. [1,7,8]

5.5. Prohibited fire-extinguishing means: Water spraying is not recommended. [1,7]

5.6. Personal protective equipment used during fire-fighting operations: (firemen PPE) Oxygen isolating breathing apparatus KIP-8, chemical protective suit L-1. [13]
In case of emergencies, personnel shall use an A category filtering breathing mask or a small box respirator. [1]

5.7. Specific aspects of fire-fighting operations: In case of burning and thermal destruction of products, Subside gases and vapors generated as a result of burning and thermal destruction with mist water. [7]

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

6.1. Measures to prevent from hazardous effect on humans, environment, buildings, structures, etc. in case of emergencies and accidents

6.1.1. General required measures: In case of an emergency - a person, who identified an emergency, shall by shouting or using a telephone (portable radio) warn the staff, inform the fire department, paramilitary gas rescue squad, dispatcher.
The staff shall act pursuant to the Emergency Plan (EP).
Isolate the dangerous area within a radius of at least 200 m, remove persons, not involved in emergency liquidation. Put on protective clothes before entering the dangerous area.
Adhere to fire safety measures. No smoking! Remove fire and sparkles sources.
Render first aid to the injured. [1,7,14]

6.1.2. Personal protective equipment: (emergency response teams and staff) Oxygen isolating breathing apparatus KIP-8, chemical protective suit L-1. [13]
In case of emergencies, personnel shall use an A category filtering breathing mask or a small box respirator. [1]

6.2. Procedure of actions in the course of liquidation of emergencies and accidents

6.2.1. Actions in case of a leakage, spillage, spread: (including preventive measures ensuring environmental protection) Collect spread polystyrene mechanically into a special for further disposal in designated combustion furnaces for hard waste.
Use personal protective equipment: protective clothes (cotton overall, jumpsuit, suit, protective boots, combined hand-protection gloves, protective helmet), protective glasses, respirator U-2K-RU-60MA.
Ensure in the workshop functioning of forced and local exhaust ventilation. [7,14]

6.2.2. At fires actions:	Call firemen immediately after identification of a fire. While waiting for firemen, switch off ventilation, equipment, remove personnel not involved in accident liquidation. Use primary (vapor, carbon-dioxide, mist water with a wetting surfactant) and stationary – fire hydrants, sprinkler installations- fire means. Control content of hazardous substances in the air of working area, waste water, atmospheric air inhabited areas for compliance with hygienic standards. [1,7,14]

7. Rules of storage and handling of chemical products during loading-unloading works

7.1. Chemical products handling safety measures

7.1.1. Safety measures and collective protective means: (including the set of fire and explosion safety measures)	Manufacturing and processing of polystyrene shall be carried out pursuant to the requirements of operating procedures, process charts and working instructions. Forced input-exhaust ventilation of production facilities with 5-6-fold of air exchange to maintain OEL in the working area. At places of possible emission of styrene, isopentane fraction vapors and dust generation – local exhaust ventilation with 8-fold air exchange. *No smoking during storage and processing of polystyrene!* Control over availability of gas-and-air isopentane mixture near the floor and in its hollows. Wet cleaning at least once per shift. Use of equipment made of non-sparkling material. Avoid open fire use. Earth connection of apparatuses and pipelines protecting from static electricity. Installation of alarms of pre-explosion concentrations and emergency ventilation. Use of personal protective equipment by workers. [1,7,8]
7.1.2. Environmental protection measures:	Adherence to handling, storage and transportation rules. Sealing capacity of technological equipment, prevention from leakages, spillages, spread of products, emergencies. Avoidance of emission of products to the atmosphere and sewage system; decontamination of waste water; air control. [1.7]
7.1.3. Recommendations on safe movement and transportation:\	When polystyrene is transported using pneumatic transport, the latter shall be equipped with a device to remove static electricity, fire-protective screens. [7] Polystyrene packed in bags, soft containers are transported using all vehicles covered according to the transportation rules applicable to such vehicle. If transported by railway-car-by-car dispatches taking into account the maximum capacity of a car. Loading and fixing bags and soft containers based on Technical Terms of Cargo Fixing. Adhere to fire safety rules. [1]

7.2. Chemical products storage rules

7.2.1. Safe storage conditions and terms: (including guaranteed storage period, shelf life)	Store in a covered, ventilated dry warehouse premise at the temperature not exceeding 25 °C, where no heating devices are allowed to be switched on. Packed polystyrene shall not be exposed to direct sunlight. Avoid use of open fire. The warehouse shall have unblocked driveways and accesses to bags and containers. The guaranteed storage period for polystyrene from the manufacturing date thereof in a package sealed by the manufacturer and unopened by the consumer shall be: -at the temperature not exceeding 15 °C – 3.5 months; - at the temperature not exceeding 25 °C – 3 months. Upon expiration of the guaranteed storage period, polystyrene shall be re-checked for compliance of quality values with TS requirements and if positive may be used as intended. [1]
7.2.2. Substances and materials incompatible for storage:	Oxidizers. [8]
7.2.3. Recommended packaging materials and containers:	Paper 3–5-layers bags of NM type with an internal PE inserted bag, polypropylene bags. Polystyrene weight shall be (25±0.5) kg per bag. Soft specialized containers for bulk products with a PE inserted bag. Polystyrene weight shall be (500±5) kg per container. [1]
7.3. Safety measures and household storage rules:	Not for household use.

8. Means of controlling over hazardous exposure and personal protective equipment

8.1. Characteristics of the working area subject to supervision (OEL in working area or occupational exposure SRLI):	In premises, where polystyrene is processed, control over product components and products of its thermal destruction shall be carried out: $OEL_{in\ working\ area}$ =10 mg/m^3 (polystyrene); $OEL_{in\ working\ area}$ =30/10 mg/m^3 (styrene); $OEL_{in\ working\ area}$ =150/50 mg/m^3 (ethylbenzene); $OEL_{in\ working\ area}$ =900/300 mg/m^3 (isopentane); $OEL_{in\ working\ area}$ =5 mg/m^3 (benzaldehyde); $OEL_{in\ working\ area}$ =20 mg/m^3 (carbon oxide) [1,2,5,8]
8.2. Measures ensuring keeping hazardous substances content at permissible levels:	Forced and input-exhaust ventilation. At places of possible emission of styrene vapors and isopentane fraction – local exhaustion ventilation. Sealing capacity of equipment. Mandatory control over content of volatile substances vapors in the air of production facilities. [1,7]

8.3. Personnel's personal protective equipment

8.3.1. General recommendations:	Primary (upon hiring) and regular (annually) medical examinations of workers. Protection of respiratory organs, eyes, skin. Provision of workers with healthful and dietary meals. Adherence to instructions and rules of occupational safety, occupational hygiene and fire safety. Avoid eating, drinking and smoking during work. Wash hands well before meals. Take warm shower after work. [1,3,7,9]

8.3.2. Protect respiratory organs (RPE types):	Filtering gas mask of A make or a small box respirator, dust protecting Lepestok type gas mask. [1,19,20]
8.3.3. Protective clothes (fabric, type):	Protective clothes (cotton jumpsuits, overalls, suits), leather boots, rubber gloves, combined hand-protection gloves, protective glasses, earplugs, silicone cream. [1,21,22,23,24,25,26]
8.3.4. Personal protective equipment for household use:	Not for household use.

9. Physical and chemical properties

9.1. Physical state: (aggregate condition, color, odor)	Solid substance in the form of unclear beads. Color is milky-white, non-painted. Odor is absent. [1,8]
9.2. Parameters characterizing main properties of chemical products, hazardous, in the first turn: (temperature values, pH, solubility, n-octanol/water ratio, etc.)	Flame point (435–475)°C Decomposition point (200–250)°C Melting point (120)°C Poured density (600–650) kg/m^3 Density (20–30) kg/m^3 At 20 °C is insoluble in water. Water absorption for 24 hours (0.3–1.2) % vol. Soluble in aromatic and chlorinated hydrocarbons, carbon bisulfides, ketones. Insoluble in alcohols, paraffin hydrocarbons, vegetable fats. Fire-hazardous properties of polystyrene are described In Section 5 hereof. [1,7,8]

10. Stability and reactivity

10.1. Chemical stability: (specify decomposition products for unstable products)	Under normal circumstances and proper storage is stable, chemically inert substance, having no negative effect on human health. Stable when exposed to concentrated acid solutions, except for nitric acid. [8]
10.2. Reactivity:	Oxidates, chlorates, nitratable, sulphonates. [8]
10.3. Conditions to avoid: (including hazardous signs due to the contact with incompatible substances and materials)	Exposure to high temperatures, open flame, contact with incompatible substances – oxidizing agents. [1,8]

11. Information on toxicity

11.1. General exposure characteristic: (assessment of the extent of exposure hazard (toxicity) to an organism)	At room temperature and under normal storage conditions, poses no threat to human health. During processing possible emission to the air of the working area of styrene vapors, isopentane fraction and small quantities of ethylbenzene, benzaldehyde, carbon oxide. [1,8] By exposure character is referred to hazard Class 4, low-risk (low-toxic) substance. [1,42,43]
11.2. Ways of exposure: (inhalation, oral, contact with skin and eyes)	Via respiratory organs, skin, mucous membranes of eyes and mouth and nose. [1,3,8,9]
11.3. Affected human organs, tissues and systems:	Central nervous system, respiratory system, lever, kidneys, cardio-vascular system, blood, skin, eyes, gastrointestinal tract. [3,8,9]
11.4. Data on exposures hazardous for health resulted from direct contact with a substance, as well as consequences of such exposures: (irritation of upper respiratory tracts, eyes, skin, including percutaneous action; sensibilisation)	Polystyrene causes irritation of mucous membranes of eyes; has a sensitizing effect in case of frequent contact in the production environment. Absorption through skin has not been studied. Main danger is due to the presence of styrene and isopentane fraction vapors, which may emit to air of the working area

	during polystyrene processing. [8] In case of continuous inhalation, styrene has a narcotic effect; causes irritation of skin, mucous membranes of eyes, nose, throat; causes central nervous system's and lever's functions disorder, affects blood-making organs. Has a sensitizing and skin absorption effects. [1,2,3,9,10] Isopentane fraction causes headache, , sleepiness, dizziness. [1,3,5]
11.5. Data on hazardous late effects on the organism: (impact on the reproduction function, cancer effect, cumulativeness, etc.)	For polystyrene: cancer effect: humans – not identified; animals - weak. Cumulativeness - weak. [8] For styrene (main emitted component): has following exposures: embryotrophic, gonadotrophic, teratogenic, mutagenic. Cancer effect is weak, cumulativeness is weal. [10]
11.6. Acute toxicity indicators: (DL_{50} (DL_{50}), way of administration (i/g, skin (s)), animal type; CL_{50} (CL_{50}), exposition time (hours), animal type)	For polystyrene: DL_{50}: over 5,000 mg/kg, i/g, in rats, mice; CL_{50}: not achieved. For styrene: in case of two-hour inhalation for mice LC_{50}=21,000 mg/m^3, in case of four-hour inhalation LC_{50}=9,500 mg/m^3; in case of four-hour inhalation for rats LC_{50}=11,800 mg/m^3. [10] For isopentane fraction: in case of two-hour inhalation for mice LC_{50}—150,000 mg/m^3, rats LC_{50}=270,000 mg/m^3; in case of four-hour inhalation for rats LC_{50}=280,000 mg/m3. [9]
11.7. Doses (concentrations), having minimal toxic effect:	Generally, no data on the product. [8] For styrene: Maximum concentration, which causes odor — 3.06 mg/m^3. [9] Styrene concentration 0.0011 mg/l, 16 days, mice - lever enlarging, kidney proteinosis. Styrene concentration 0.017–0.005 mg/l, 170 days, mice — weight loss, decreased exercise tolerance, lower number of leukocytes in blood. [8] For isopentane fraction: Maximum concentration, which causes odor -217 mg/m^3. [9]

12. Information on environmental impact

12.1. General characteristic of impact on environmental subjects: (atmospheric air, water, soil)	At room temperature and subject to compliance with required storage conditions, polystyrene poses no threat to the environment. [1] Violation of the technological process, storage and transportation conditions, unorganized placement and combustion of waste may lead to environmental contamination: air, water, soil. Burning polystyrene generates smoke and compounds hazardous for atmospheric air.
12.2. Ways of exposure to the environment:	Discharges to water have a negative effect on sanitary condition of water bodies, slow down biological cleansing of waste water, affect living processes in water reservoirs; presence in soil may lead to deterioration of the vegetable layer; Styrene being the decomposition product resulted from thermal destruction is toxic for aqueous organisms, and is low-toxic for warm blooded animals. [15]
12.3. Observed exposure signs:	Contamination signs are as follows: specific odor in

atmospheric air; changed water taste; death of fish and other aqueous organisms, deterioration of plants' appearance. Styrene at concentration of 0.25 mg/l tinctures to fish flesh unpleasant odor, at concentration of 10 mg/l reduces oxygen content in water and alters nitrification.

[15]

12.4. Most important characteristics of environmental impact

12.4.1. Hygienic standards: (permissible concentration in the air, water, including fishery waters, soil)

Components	MPC atm. air or SRLI atm. air, mg/m^3 (LNV[1], hazard class)	MPC water[2] or APL water, mg/l, (LNV, hazard class)	MPC fisheries[3] or SRLI fisheries mg/l (LNV, hazard class)	soil MPC or APL, mg/kg (LNV)	Data Sources
Polystyrene	SRLI - 0.35	*	*	-	[8.44]
Styrene	MPC: mpc/$_{mdc}$ 0.04/0.002 res. Hazard class 2	MPC – 0.02(k s.-t. Hazard Class 1	MPC-0.1 org. Hazard class 3	MPC-0.1 air-migration	[1,2,10,37,38,44]
Isopentane	MPC: mpc/$_{mdc}$ -100/25 Hazard class 4	-	-	-	[1,5,9,37,38]

Available fisheries data.:
* According to sanitary standards SanPiN of surface waters protection from contamination No. 4630-88, content of weighted substances shall not increase more than by: 0.25 mg/dm^3 for centralized or non-centralized utility and drinking water supply system, as well as for food facilities water supply and 0.75 mg/dm^3 for water for swimming, sports and recreation of population, as well as waters within the borders of inhabited areas. It is prohibited to discharge weighted substances with the speed of fallback exceeding 0.4 mm/sec in flowing water reservoirs and exceeding 0.2 mm/sec in water reservoirs.

[8,44]

12.4.2. Ecotoxicity indicators: (CL, EU for fishes, Daphnia magna, algae, etc.)

Generally, no data on the product. [8]

Styrene:
Fishes: CL_{50}= 9.1 mg/l, 94 h
Daphnia magna: CL_{50}= 27 mg/l, 24 h [10]

Isopentane:
Fish: LC_{50}= over 60 mg/l, Roach at 20.2 °C. [15]

12.4.3. Environmental migration and transformation due to biological decomposition and other processes (oxidizing, hydrolysis, etc.):

Transforms. Transformation products: styrene, isopentane. [8]

13. Recommendations on waste (residues) disposal

13.1. Precautions for handling waste generated in the course of application, storage, transportation, etc.

No special precautions for waste handling are required [1,7]

13.2. Data on places and ways of decontamination, disposal or liquidation of substance (material) waste, including containers (package):

Hard waste generated as a result of commissioning and stop of the equipment shall be shred and reused in production.

Hard waste of polystyrene unsuitable for secondary utilization shall be disposed of by combustion in furnaces for hard waste.
Packaging is reusable.

[1.7]

13.3. Recommendations on disposal of waste generated as a result of household use:

Not for household use.

14. Information on shipment (transportation)

14.1. UN No.: (according to UN recommendations on transportation of hazardous cargo (standard rules), last revision)

2211 [1,36,45]

14.2. Proper shipping name and/or transport name:

Proper cargo name – GRANULATED EXPANDABLE POLYMER, emitting inflammable vapors.

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[1] LNV - limiting harmful index. (tox. - toxicological; s.-t. means sanitary-toxicological; org. means organoleptic; refl. means reflectory; res. means resorptive; refl. res. means reflectory resorptive, fishery means fishery water (change of commodity properties of commercial aquatic organisms); gen. means general sanitary).
[2] Water bodies used for household and social needs.
[3] Fishery water bodies (including marine)

	Cargo's transport name – expandable polystyrene. [1,31,45] Polystyrene designation consists of: - polymer name – expandable polystyrene; - letter type name (EPS, EPS-F, EPS-L1); - digital grade designation or non-diffused word (specified in case of delivery of non-diffused material); - numbers of valid TS. For instance: *Expandable polystyrene, EPS type, grade 1, TS 2214-033-05762341-2009.* *Expandable self-extinguishing polystyrene, EPS-F grade, non-diffused, grade 2, TS 2214-033-05762341- 2009.* *Expandable polystyrene, EPS-L1 type, grade 3, TS 2214-033-05762341-2009* [1]
14.3. Types of vehicles used:	Polystyrene is transported with all types of transport in covered vehicles with natural or forced ventilation in accordance with the cargo transportation rules applicable to such vehicle type. Transportation by railway is carried out by car-by-car dispatches, considering the maximum capacity of a vehicle, according to the Hazardous Cargo Railway Transportation Rules (HCRTR) in uniform covered cars, uniform or special containers of a consignor (consignee) or rented by railway, except for soft containers. [1]
14.4. Hazardous goods classification: (according to GOST 19433 and UN recommendations for hazardous cargo transportation)	Class 9 (other hazardous substances and products), classification code 9093, hazard sign number - 9 (symbol – seven vertical stripes in the upper half: black color; background; white; undercrossed digit 9 in the lower corner), according to Annex 6 to the HCRTR [1,36,45]
14.5. Transport Labeling: (manipulation signs; main; auxiliary and informational signatures)	Manipulation signs according to GOST 14192 Keep Away from Moist, Keep Away from Sun [1,17]
14.6. Package group: (according to UN recommendations for hazardous cargo transportation)	III (low-risk substance) [30,45]
14.7. Information on hazards in case of automobile transportation (Metabolism Efficiency Factor):	345K [27,31]
14.8. Emergency cards: (for railway, marine and other transportation)	No. 902 [35,36,45]
14.9. Information on hazards for international freight traffic (according to the Agreement on International Goods Transport by Rail, ADR, RID, IMDG Code, ICAO/IATA, etc. including data on hazards to the environment, including sea water pollutants)	Agreement on International Goods Transport by Rail: classification code 9093, MC classification code, hazard identification number 90 (substance hazardous for environment, other hazardous substances) hazard sign number 9 [30,45] ADR/RID : hazard class 9, MC classification code, hazard identification number 90, hazard sign – no. [31]

15. Information on national and international legislation

15.1. National legislation

15.1.1. Russian laws:	Law of the Russian Federation No. 187-FZ On Technical Regulation, dated 27.12.2002, Law of the Russian Federation No. 52-FZ On Sanitary and Epidemiological Welfare of Population, dated 30.03.1999, Law of the Russian Federation No. 7-FZ On Environmental Protection, dated 10.01.2002, Law No. 197-FZ Labor Code of the Russian Federation, dated 30.12.2001, Law No. 89-FZ On Industrial and Consumption Wastes, dated 24.06.1998, Law No. 116-FZ On Industrial Safety of Dangerous Industrial Facilities , dated 21.07.1997, Law No. 96-FZ On Protection of Atmospheric Air, dated 04.05.1999.
15.1.2. Documents regulating requirements to human and environmental protection: (certificates, hygiene certificates, etc.)	Sanitary and epidemiological opinion No. 71.TTs.04. 221.P.000092.01.10 dated 28.01.2010, issued by the Department of Russian Federal Consumer Rights Protection and Human Health Control Service for Tula Oblast.

15.2. International legislation

15.2.1. International conventions and agreements: (whether the products are regulated by Montreal Protocol, Stockholm Convention, etc.)	Montreal Protocol, Stockholm Convention are not applicable. [32,33]
15.2.2. Warning labeling valid in EU states: (hazard symbols, risk and safety phrases, etc.)	Risk phrases: R36-37-38 (thermal destruction leads to irritation of eyes, respiratory organs, skin). S 36-37-38-39 (in case of formation of thermal destruction products wear protective clothes, gloves and necessary protective means for eyes and respiratory organs). [11]

16. Additional information

16.1. Data on revision (re-edition) of the SDS (specify: first SDS edition or other with the major reason of SDS revision specified)	SDS was developed to replace SDS Reg. No. 05762341.22.23901 dated 08.10.2010 due to alternations to TS 2214-033- 05762341-2009.

16.2. List of data sources, used in preparation of this safety data sheet

1. TS 2214-033-05762341-2009 Expandable Polystyrene, with revisions No. 1-4
2. GOST 10003-90 Styrene
3. Hazardous Substances in Industry. Reference Book edited by N.V. Lazarev, E.N. Levina, Volume 1 – Moscow: Khimiya, 1976.
4. TS 6-05-1997-85 Tert-butyl perbenzoate
5. TS 0272-028-00151638-99 Isopentane fraction
6. GOST 10779-78 Polyvinyl Alcohol
7. Technical Regulations TR No. 1-02 Manufacturing of Expandable Polystyrene, approved by General Director of JSC Plastic on 26.02.2010
8. Informational card of a potentially hazardous chemical and biological substance Polystyrene, Series BT No. 000147, 28.11.1994
9. Hydrocarbons. Halogenated Hydrocarbons, reference book edited by V.A. Filov - Leningrad: Khimiya, 1990
10. Informational card of a potentially hazardous chemical and biological substance Phenylethylene, Series BT No. 000036, 13.04.1995
11. EU Directive dated 2001/59/EU, dated 06.08.2001
12. Fire and Explosive Hazard of Substances and Materials and Means of their Fire-Extinguishing, reference book edited by A.N. Baratov - M.: Khimiya, 1990
13. List of Procurement of Paramilitary Gas Rescue Squads of the Ministry of Chemical Industry. - M.: PH of the Ministry of Chemical Industry, 1976
14. Technology of Plastic Masses, E.A. Bratsykhin, - Leningrad: Khimiya, 1974

15. Hazardous Organic Compounds in Industrial Waste Water, reference book edited by Y.M. Grushko, - Moscow: Khimiya, 1982
16. GOST 19433-88 Hazardous Freight
17. GOST 14192-96 Freight Labeling
18. GOST 12.1.044-89 Fire and Explosion Hazard of Substances and Materials
19. GOST 12.4.122-83 Occupational Safety Standards System. Filtering and Absorbing Boxes for Industrial Gas Masks. Technical Specifications.
20. GOST 12.4.028-76 Filtering Gas Masks
21. TS 6-16-2402-80 Earplugs
22. GOST 20010-93 Technical Rubber Gloves Technical Specifications
23. GOST 12.4.010-75 Occupational Safety Standards System. Personal Protective Equipment. Protective gloves. Technical Specifications
24. OST 18-21-81 Silica Hand Cream
25. GOST 27575-87 Men's Suits to Protect from General Industrial Contamination and Mechanical Exposures. Technical Specifications
26. GOST 27574-87 Women's Suits to Protect from General Industrial Contamination and Mechanical Exposures. Technical Specifications
27. Rules of Transportation of Dangerous Goods by Automobile Transport, Saint Petersburg, DEAN, 2000.
28. GOST R 12.4.230.1-2007 Occupational Safety Standards System. Personal Eyes Protective Equipment. General Technical Specifications
29. GOST 31340-2007 Warning Labeling of Chemical Products
30. Hazardous Goods Transportation Rules (4.2) to the Agreement on International Goods Transport by Rail, Organization for Cooperation Between Railways, 1998.
31. European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), Edition with amended structure UN, New York, Geneva, 2007
32. Montreal Protocol on Substances Destructing the Ozone Layer, UN, 1989
33. Stockholm Convention on Stable Organic Pollutants, UN, 2001.
34. GOST 30333-2007 Chemical Products Safety Data Sheet Labor Safety
35. Emergency Cards for Hazardous Goods transported by Rail of CIS, the Republic of Latvia, the Republic of Lithuania, the Republic of Estonia, approved by the Council for Railway Transport of Member States of the Commonwealth, Protocol No. 48, dated 30.05.2008 (as amended as of 21.11.2008 and 22.05.2009)
36. HCRTR - Hazardous Cargo Railway Transportation Rules (with approved amendments and alternations, dated 23.11.07, 30.05.08, 22.05.09, 14.05.2010, as amended by Minutes No. 56 of the Railway Transport Council of Commonwealth Member States on 17-18.05.12 and the effective date 01.09.2012)
37. GN 2.1.6.1338-03 Maximum Permissible Concentrations (MPC) of Atmospheric Air Pollutants in Inhabited Areas with Amendment No. 2.
38. GN 2.1.5.1315-03 Maximum Permissible Concentrations (MPC) of Chemical Substances in Aqueous Objects for Utilities and Drinking and Cultural and Household Use with Amendment No. 1.
39. International Chemicals Safety Chart ICSC: 0073 (styrene)
40. International Chemicals Safety Chart ICSC: 0225 (benzoyl peroxide)
41. International Chemicals Safety Chart ICSC: 1153 (isopentane)
42. GOST 12.1.007-76 Occupational Safety Standards System. Hazardous Substances. Classification and General Safety Requirements
43. GN 2.2.5.1313-03 Maximum Permissible Concentrations (MPC) of Hazardous Substances in the Air of the Working Area.
44. List of Fishery Standards: maximum permissible concentrations and safe reference levels of impact (SRLI) permissible of hazardous substances for water in fishery water reservoirs. - Russian Federation Research Institute of Fishery and Oceanography (VNIRO), Moscow, 1999
45. Alphabetical List of Hazardous Cargo Allowed for Railway Transportation. Annex 2 to the HCRTR.

Переводчик _____ ***Коновалов Сергей Георгиевич***

Город Москва.
Двадцать шестого июня две тысячи пятнадцатого года.

Я, Милевский Владислав Геннадиевич, нотариус города Москвы, свидетельствую подлинность подписи, сделанной переводчиком Коноваловым Сергеем Георгиевичем в моём присутствии. Личность его установлена.

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