SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

- Trade name: **PETROLEUM BENZENE**
- Chemical name: Benzene
- Registration number REACH: 01-2119447106-44-0029
- UFI code: irrelevant for substances
- Index number: 601-020-00-8
- CAS number: 71-43-2
- EC number: 200-753-7

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Identified uses

Intermediate product for the production of chemical elements used during its whole life cycle under strictly controlled conditions.

1.2.2. Non-recommended uses

Substance was registered as a isolated intermediate product used during its whole life cycle under strictly controlled conditions and as such no other form of manipulation is allowed.

1.3. Details of the supplier of the safety data sheet

producer: ORLEN Unipetrol RPA s.r.o., Záluží 1, 436 70 Litvínov, Czech Republic

ID No.: 27597075
☎: +420 476 161 111
fax: +420 476 619 553
info@orlenunipetrol.cz
www.orlenunipetrolrpa.cz

Other contacts:

- Director of the Monomers and Chemicals Unit: ☎: +48 242 566 615 Dorota.Smolarek@orlen.pl
- Key Account Manager: ☎: +48 691 991 378 Marta.Rosul@orlen.pl
- Head of Customer Service Department: ☎: +420 476 162 006 Lucie.Markova@orlenunipetrol.cz
- Person professionally qualified to compile a SDS: reach.unirpa@orlenunipetrol.cz

1.4. Emergency telephone number

- ORLEN Unipetrol RPA s.r.o. ☎:+420 476 163 111 (NON STOP)
- Toxicological Information Center (TIS) ☎:+420 224 919 293 (NON STOP)
  Na bojišti 1, 120 00 Prague 2, Czech Republic ☎:+420 224 915 402 (NON STOP)
  e-mail: tis@vfn.cz
- Transport Information & Accident System (TRINS) ☎:+420 476 163 111 (NON STOP)

Note: Emergency telephone numbers for EU countries are listed in section 16.

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

The product is classified as hazardous pursuant to CLP Regulation (EC) No. 1272/2008 CLP:

FLAMMABLE LIQUID, CATEGORY 2	**Flam. Liq. 2, H 225**
CARCINOGENIC, , CATEGORY 1A	**Carc. 1A, H 350**
MUTAGENIC, CATEGORY 1B	**Muta. 1B, H 340**
TOXIC FOR SPECIFIC TARGET ORGANS - REPEATED EXPOSURE, CATEGORY 1	**STOT RE 1, H 372**

ASPIRATION HAZARD, CATEGORY 1	**Asp. Tox. 1, H 304**
SEVERE DANGER OF EYE DAMAGE / IRRITATION, CATEGORY 2	**Eye Irrit. 2, H 319**
SKIN CORROSION / IRRITATION, CATEGORY 2	**Skin. Irrit. 2, H 315**
HAZARDOUS TO THE AQUATIC ENVIRONMENT, CATEGORY CHRONIC 3	**Aquatic Chronic 3, H 412**

Note: The full text of the H-sentence and / or EUH-sentences is stated in Section 16.

2.2. Label elements

Product identifiers		**PETROLEUM BENZENE** BENZENE Index number: 601-020-00-8
Warning hazard symbol		
Signal word		**DANGER**
H-phrases (standard hazard phrases)	H225 H304 H315 H319 H340 H350 H372 H412	Highly flammable liquid and vapour. May be fatal if swallowed and enters airways. Causes skin irritation. Causes serious eye irritation. May cause genetic defects. May cause cancer. Causes damage to organs through prolonged or repeated exposure. Harmful to aquatic life with long lasting effects.
P-statements (precautionary statements)	P202 P210 P243 P280 P303+P361+P353 P301+P310 P331 P273 P501	Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take action to prevent static discharges. Wear protective gloves/protective clothing/eye protection/face protection. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. DO NOT induce vomiting. Avoid release to the environment. Dispose of contents/container as hazardous waste.
Additional information		Only for professional users.
		ORLEN Unipetrol RPA s.r.o. Záluží 1, 436 70 Litvínov, Czech Republic ☎: +420 476 161 111, +420 476 163 111

2.3. Other hazards

The liquid quickly evaporates, its vapours are highly flammable and form an explosive mixture with air. The vapours are heavier than air, and so they amass and spread near the ground, and in case of a random leak may initiate a fire or explosion even far from the source. The product is practically non-soluble in water, stays on the surface and so may form an explosive mixture with air above the water surface. The danger of explosion and subsequent fire is thus also present in case of a leak into the sewage system.

The product is hazardous if inhaled. This means that in case of consumption and subsequent vomiting, there is a risk of aspiration (entering the lungs) and a risk of chemical pneumonia (lung swelling), which may lead to death. The product is additionally classified as carcinogenic and mutagenic. Chronic exposure can lead to damage to the bone marrow, blood production disorders and leukaemia. The disease can develop even years after the last exposure.
Produkt does not meet the criteria for PBT (P-persistent, B-bioaccumulative, T-toxic) or vPvB (vP-very persistent, vB-very bioaccumulative) substances. Product assessments for PBT / vPvB criteria see Subsection 12.4. ("Results of PBT and vPvB assessment").
The substance is not included in the candidate list pursuant to Article 59 (Paragraph 1) of the REACH Directive.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Name of the substance:	BENZENE
Concentration [% hm.] :	min. 99.9
Index number (index):	601-020-00-8
CAS number:	71-43-2
EC number:	200-753-7

IMPURITIES	*NAME:*	*IDENTIFIER :*

The product does not contain any impurities, stabilizing additives or other components, which would have an impact on its classification.

Note: The substance does not contain a nanoform.
Note: Harmonized classification: Specific concentration limits (SCL), M-factor (M-) and Acute toxicity estimate (ATE) were not determined for this substance.
Registration documentation: and Acute toxicity estimate (ATE) =LD_{50} stated in the section 11.1.; M-factor (M-) – NOEC a LC_{50} stated in the section 12.1.;

3.2. Mixtures

Not applicable, the product is a substance.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

4.1.1. General instructions

When providing first aid, ensure your own safety.
Call the emergency medical services (155 CZ, 112 EU) and follow their instructions until they arrive.
Provision of first aid must always focus on checking for consciousness, breathing, and blood circulation.
In case of loss of consciousness and breathing, check if the airway is clear (pull out the lower jaw slightly). If the airway is clear, immediately start CPR (chest compressions) and artificial respiration in a 30:2 ratio. It is also possible to perform only chest COMPRESSIONS without artificial respiration if you are not trained or if for reasons of personal safety you are unwilling to perform artificial respiration.
If the subject is unconscious and breathing NORMALLY (REGULARLY), place them in the recovery position. When in doubt, if you are not sure if the person is breathing (for example, there is a long pause between breaths), act as if the person were not breathing.
If the person is unconscious or has spasms, do not administer anything by mouth, just place the person in the recovery position.
A patient's condition can improve very quickly, so never take your eyes off the patient and keep checking on consciousness and breathing.

4.1.2. When inhaled

Transport the patient to fresh air, do not let them get cold and ensure specialized medical help.

4.1.3. Skin contact
Remove contaminated clothing and shoes. Thoroughly wash the affected areas with water (ideally tepid) and with soap, and keep rinsing for at least 15 minutes. Ensure specialized medical help.

4.1.4. Contact with eyes
Immediately start washing eyes while wide open under flowing tepid water, continue for at least 15 minutes. If the patient has contact lenses, remove them before washing eyes. Ensure specialized medical help.

4.1.5. When ingested
If the patient is not unconscious, wash their mouth with water, but DO NOT INDUCE VOMITING! If the patient is vomiting on their own, keep their head below their hips so that they do not inhale their vomit. Ensure specialized medical help as soon as possible.

4.2. Most important symptoms and effects, both acute and delayed

Based on the exposure dosage, the substance can cause headache, nausea, sleepiness, dizziness, irritation of airways together with coughing or even problems breathing up to complete loss of breath, spasms and unconsciousness. In case of consumption may cause spontaneous vomiting with a risk of the substance entering the lungs (aspiration) and chemical pneumonia, which may lead to death. Direct contact with eyes or skin may lead to irritation. Prolonged exposure of the skin to the substance may lead to ungreasing and crackles.

4.3. Indication of any immediate medical attention and special treatment needed

Immediate medical help is necessary in case of consumption or if the substance enters the lungs.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Appropriate extinguishing media: low expansion foam, spray or water fog.
Inappropriate extinguishing media: direct water stream.
Extinguishing small fire: dry-powder or carbon dioxide (CO_2) extinguisher, dry sand or extinguishing foam.

5.2. Special hazards arising from the substance or mixture

The vapours are heavier than air, and so they amass and spread near the ground, and in case of a random leak may initiate a fire or explosion even far from the source. This danger is imminent especially in places below the ground or in enclosed places. Toxic or irritating fuels containing monoxide, carbon dioxide or unburned hydrocarbon might be produced during burning.

5.3. Advice for firefighters

Minimize the penetration of extinguishing medium contaminated by the substance into the sewage, surface or underground waters or into the soil. There is a danger of explosion and subsequent fire in case of a leak into the sewage.
Use water spray to keep the containers cool in order to prevent an explosion caused by the heat.
Do not use foam and water at the same time because water dissolves the foam.
Protective equipment for fire fighters: full protective gear and self-contained close-circuit breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Enclose the place and prevent the access to the area in danger. Remain on the windward side. There is a danger of fire in case of accidental release of this substance, therefore remove all possible ignition sources, do not smoke and do not manipulate with open fire. If possible, ensure a sufficient ventilation of enclosed spaces. Prevent contact with the substance and its vapours. Use proper personal protective equipment (as indicated in Subsection 8.2) when removing the effects of the emergency event/accident. Evacuate people from the whole area in danger for large accidents. There is a danger of vapours explosion in case of substance initiation in places below the ground or in enclosed places (including sewage).

6.2. Environmental precautions

Prevent further leaking and enclose the leaking place. Prevent leakage of the substance into the sewage, surface

and underground waters by covering sewage inlets. Inform the relevant authorities if rivers, lakes or sewage systems have been contaminated during the leak. Do not allow the substance to enter into soil/subsoil.

6.3. Methods and material for containment and cleaning up

Safely drain the leaked substance. There is a danger of fire during a leak; therefore only explosion-proof luminaries and electrical equipment and non-sparking tools must be used. Absorb the remains into an appropriate non-flammable porous/absorbent material (e.g. sand, dirt, siliceous earth, vermiculite) and transport for disposal in sealed containers. Dispose in compliance with valid legal regulation for wastes (see Subsection 13). Use water spray to reduce vapours in the air.

For large leaks into water use floating barrage and collect the substance from surface using surface skimmers (separators) or cover the leaked substance with sorbent and remove saturated sorbent from the surface by scraping or draining. Consult a professional before using dispersing agents.

6.4. Reference to other

For recommended personal protective aids – see Subsection 8.2. ("Exposure controls").
For recommended manner of removing waste – see Section 13 ("Disposal considerations").

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

The product is produced and must be used during its whole life cycle under strictly controlled conditions defined in Regulation (EC) No 1907/2006 REACH. All these conditions must be kept in order to ensure safe handling and to prevent the exposure of people and the environment, with the exception of accidents and emergency events.

General safety and hygienic measures*:* Use only in sufficiently aired places that do not contain any ignition sources, take all necessary measures to prevent static energy discharges. Do not use compressed air for emptying, filling or any other handling. Please bear in mind that even empty containers can contain remains of flammable vapors; therefore do not perform activities such as welding, cutting or grinding near these containers.

Please keep the rules of personal hygiene. Take off contaminated pieces of clothing. Do not eat, drink or smoke during work! Wash your hands and exposed parts of body thoroughly with soap and water after work and before meal and possibly treat with suitable reparation lotion. Do not wear contaminated clothing, shoes or protective equipment in the catering area.

7.2. Conditions for safe storage, including any incompatibilities

The product is produced and must be used during its whole life cycle under strictly controlled conditions defined in Regulation (EC) No 1907/2006 REACH. All these conditions must be kept in order to ensure safe storing and to prevent the exposure of people and the environment, with the exception of accidents and emergency events. Storage containers must be closed, tightly, properly labeled and grounded. Recommended material suitable for containers is soft or stainless steel. Do not store near incompatible materials, such as oxidizers. We recommend keeping the liquid under inert gas (e.g. under a slight nitrogen pressure).

In case of accidental release the handling and storage place and methods of handling the substance must correspond to working with flammable substances with a potential to damaging waters and soils.

7.3. Specific end use(s)

The substance is registered as a isolated intermediate product produced and used under strictly controlled conditions (see Section 16), and therefore must be handled as such. Instructions including a proposal for mapping and documenting strictly controlled conditions on workplace are available on the website of the European Chemicals Agency ECHA - REACH guidance.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. Occupational exposure limit values

The following Permissible Exposure Limits (PELs) and Maximum Allowable Concentrations (NPK-P)

of Chemicals in the Atmosphere of Workplaces within the Czech Republic are set by the Government Regulation No. 361/2007 Coll., determining conditions of occupational health protection, as amended:

Name	CAS number	PEL [mg.m^{-3}]	NPK-P [mg.m^{-3}]	Note
Benzene	71-43-2	1,65 / 0,66*	10	B - a biological exposure test (BET) in urine or blood is introduced for the substance D - penetration of the factor through the skin is significantly applied during exposure I - irritates mucous membranes (eyes, respiratory tract) or the skin M - mutagen in germ cells category 1A and 1B (with sentence H340) P - serious late effects cannot be ruled out for the substance (with phrase H372, H373) K - carcinogen category 1A and 1B (with sentence H350, H350i)

Decomposition products:	*NAME / CAS NUMBER:*	*PEL [mg.m^{-3}]*	*NPK-P [mg.m^{-3}]*	-
	Carbon monoxide / 630-08-0	*23*	*117*	-

*Note *: Limit value of 1.65 mg/m3 valid until 05/04/2026. Limit value 0.66 mg/m3 from 05/04/2026.*

Note 1: An explanation of the meaning of the PEL and NPK-P abbreviations is in section 16.

Note 2: Occupational exposure limit values for EU countries are listed in section 16.

Union exposure limit:

Name	CAS number	OEL [ppm]	STEL [ppm]	Note
Benzene	71-43-2	0,5 / 0,2*	0,66	-

*Note *: Limit value of 0,5 ppm valid until 05/04/2026. Limit value 0,2 ppm from 05/04/2026.*

Note: An explanation of the abbreviations is in section 16.

8.1.2. DNEL/DMEL values

According to Article 2 (8) of Regulation (EC) No 1907/2006 REACH the isolated intermediates are not subject to the obligation to assess chemical safety and to prepare a chemical safety report within the meaning of Article 14 of this Regulation and therefore no DNEL / DMEL values have been set for this product by the manufacturer of the intermediates.

8.1.3. PNEC values

According to Article 2 (8) of Regulation (EC) No 1907/2006 REACH the isolated intermediates are not subject to the obligation to assess chemical safety and to prepare a chemical safety report within the meaning of Article 14 of this Regulation and therefore no PNEC values have been set for this product by the manufacturer of the intermediates.

8.1.4. Recommended monitoring of the concentration in the workplace

Gas chromatography (GC) with a flame ionizing detector (FID) or a mass spectrometer (MS) in accordance with technical norms ČSN EN 689 and ČSN EN 482.

8.2. Exposure control

8.2.1. Technical protective measures for limiting the exposure of people and the environment

The product is produced and must be used during its whole life cycle under strictly controlled conditions defined in Regulation (EC) No 1907/2006 REACH (see Section 16). Exposure control of unwanted exposure of humans and the environment shall be secured by keeping the substance under strict control using technical aids and procedural and control technologies, which reduce emissions and consequent exposure, with the objective to prevent releases of the substance vapors in the air, penetration of the substance to water and soil and possible exposure of people. Areas, where the substance is handled and stored, shall be furnished with impermeable floors and catchment basins for the cases of emergency

leaks of the substance. It is necessary to secure general and local ventilation and an efficient exhaust system.

8.2.2. Individual protective measures

If an accident or extraordinary event causes increased exposure, employees must have access to personal protective measures (PPM) for the protection of airways, eyes, hands and skin, depending on the nature of the performed activities. Suitable protection for airways must also be available where it is not technically possible to ensure the adherence of exposition limits identified for the work environment or ensure that exposure via airways will not affect the health of people. During non-stop use of these measures during permanent work, it is necessary to include safety breaks if the nature of the PPM requires them. All PPM need to be kept in usable condition and damaged or contaminated ones need to be immediately replaced**.**

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE)

(the specific type of protective equipment must be chosen according to the type of activity being carried out and the quantity and concentration of the dangerous substance / mixture at the workplace)

- *Respiratory protection:* Protective mask compliant with EN 140 with a filter that is suitable against organic gases, insulation breathing apparatus (use the mask in case of insufficient ventilation and / or local exhaustion and product leakage);
- *Eye/face protection:* Protective chemical goggles compliant with EN 166 or, in the case of an increased risk of burning, protective face shield;
- *Hand protection:* chemically resistant gloves tested according to EN 374, e.g. the following materials are suitable:

	Glove material	*Material thickness*	*Penetration time*
Regular work activities (staining risk)	nitrile	0.4 mm	10 minutes
Leak / accident liquidation	Viton	0.7 mm	480 minutes

- *Protection of other body parts:* Antistatic, inflammable protective clothes, antistatic shoes;
- *Thermal risk:* Not relevant for the given manner of the use.

8.2.3. Environmental exposure controls

Avoid product leakage to the environment with all available means. See section 6.2.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

The information is taken from the registration dossier of substance (RD) unless otherwise stated.

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Physical state		Liquid		at 20°C, 101,3 kPa
Colour		Colorless		
Odour		Aromatic		
Odour threshold	[ppm]	4.68	HSDB	RD does not specify
Melting point/freezing point	[°C]	5.49		at 101,3 kPa
Boiling point or Initial boiling point / boiling range	[°C]	80.09		at 101,3 kPa
Flammability (solid, gas, liquid)		Irrelevant		RD – DW/su
Upper flammability / explosive limits	[%]	7.8		
Lower flammability / explosive limits	[%]	1.2		

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Flash point	[°C]	-11		at 101,3 kPa
Auto-ignition temperature	[°C]	498		at 101,3 kPa
Decomposition temperature	[°C]	does not decompose at normal usage temperatures		
pH		Irrelevant		RD does not specify
Kinematic viscosity	[mm^2/s]	-		RD does not specify
Solubility in water	[g/l]	1.88		at 23.5°C
Partition coefficient: n-octanol/water	[log Kow]	2.13		at 20°C
Vapour pressure	[kPa]	10		at 20°C
		100		at 79.7°C
Density	kg/m^3	880 - 888	own tests	at 15°C
Density	g/cm^3	0.8765		at 20°C
Relative vapour density	Air=1	2.8	HSDB search data	RD does not specify
Particle characteristics		Irrelevant		Not applicable - this is a liquid.

9.2. Other information

9.2.1 Information with regard to physical hazard classes

Flammable liquids and gases.

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Explosive properties		Substance is not explosive		RD - DW
Oxidising properties		None		RD- DW

9.2.2 Other safety characteristics

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Evaporation rate	Ether=1	2.8	HSDB	RD does not specify
Dynamic viscosity	[mPa.s]	0.604	RD	at 25°C
Solubility of gases in a liquid (Henry's Law Constant)	[$Pa\ m^3/mol$]	562	RD - QSAR	At 20°C

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

No threat of dangerous reactions during the identified use as an intermediate product and during storage and manipulation under strictly controlled conditions.

10.2. Chemical stability

Chemically stable when used as identified intermediate product and when stored and handled in accordance with strictly controlled conditions at usual temperatures.
The product is combustible if heated above the flash point.

10.3. Possibility of hazardous reactions

No danger of chemical reaction when used as identified intermediate product and when stored and handled in accordance with strictly controlled conditions at usual temperatures.

10.4. Conditions to avoid

Ignition sources, avoid proximity or contact with hot surfaces, flames, electrostatic charges or sparks, high temperature, sunshine.

10.5. Incompatible materials

Oxidizers. Strong acids. Halogens (Fluorine, Chlorine, Bromine, Iodine).

10.6. Hazardous decomposition products

During heat decomposition at high temperatures are produced - complete combustion, with an excess of oxygen forms: carbon dioxide (CO2) and water vapour; partial combustion, např. požár, forms also: carbon monoxide (CO), soot and cracked products: aldehydes, ketones.

SECTION 11: TOXIKOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

11.1.1. Toxicological effects of the substance

HAZARD CLASS	DATA FROM REGISTRATION DOCUMENTATION		EVALUATION
	DESCRIPTION	RESULT	
Acute toxicity	Oral (rat): Dermal: Inhalation:	LD_{50} > 2 000 mg/kg LD_{50} > 5 000 mg/kg LC_{50}(4h) > 20 mg/l	Does not meet the classification criteria
Skin corrosion/irritation	OECD 404 (rabbit)	Adverse effects were found - irritating	Meets the classification criteria (H 315)
Serious eye damage/irritation	Tests (rabbit)	Adverse effects were found - irritating	Meets the classification criteria (H 319)
Sensitisation	OECD 406	No adverse effects were found	Does not meet the classification criteria
Germ cell mutagenicity	OECD 471 OECD 474 OECD 475	Negative effects were noted. The available data in animals and humans indicate that benzene and/or its metabolites are indirect genotoxicants rather than direct mutagens (Schnatter et al. 2020).	Meets the classification criteria (H 340)
Carcinogenicity	long-term animal testing and epidemiological studies	LOAEL: 25 mg/kg bw/day; chronic, rat; NOAEC: 1.6 mg/m³ (2 ppm); chronic, 40 hours/week; human; Adverse effects were found (animal tumors, leukemia).	Meets the classification criteria (H 350)
Reproductive toxicity		Developpmental toxicity tests: (NOAEC=32 mg/m^3) Fertility tests: (NOAEC=960 mg/m^3, rat) (LOAEL): 50mg/kg bw/day (subchronic, rat);	Does not meet the classification criteria

HAZARD CLASS	DATA FROM REGISTRATION DOCUMENTATION		EVALUATION
	DESCRIPTION	RESULT	
		No adverse effects were warranted	
STOT-single exposure		No toxic effects were noted in the acute toxicity tests	Does not meet the classification criteria
STOT-repeated exposure	OECD 408	LOAEL: 25 mg/kg bw/day; chronic, rat; NOAEC: 1.6 mg/m³; chronic, 40 hours/week; human; the product has undesirable cardiovascular and haematological effects in repeated inhalation and oral exposure substance has the given characteristic	Meets the classification criteria (H 372)
Aspiration hazard		The product is hydrocarbon with a kinematic viscosity ≤ 20.5 $mm^2.s^{-1}$ at 40°C	Meets the classification criteria (H 304)

11.1.2. Information on likely routes of exposure

There is no danger of exposure for identified use as an intermediate product and when stored and handled in compliance with strictly controlled conditions. Inhalation and skin contact might be a significant way of exposure during emergency events and accidents.

11.1.3. Delayed and immediate effects as well as chronic effects from short and long-term exposure

Depending on the exposure dose the substance can cause headache, nausea, drowsiness, dizziness, airways irritation together with cough or difficulties with breathing or even apnea, convulsions and unconsciousness. In humans high concentrations of benzene vapours are irritating to the mucous membranes of the eyes, nose, and respiratory tract. In case of consumption it may cause spontaneous vomiting with a risk of the substance entering the lungs (aspiration) and chemical pneumonia, which may lead to death. Direct contact with eyes or skin may lead to irritation (not considered to be corrosive). Prolonged exposure of the skin to the substance may lead to ungreasing and crackles. The substance can trigger heritable genetic changes and cause or help cause cancer.

11.1.4. Interactive effects

There are no interactions for identified use.

11.1.5. Toxicokinetics

Benzene is absorbed by all physiological routes (inhalation, dermal and oral), the inhalation route is considerably the most important route of exposure (DECOS, 2014). Absorbed benzene is rapidly distributed throughout the body and tends to partition into fatty tissues. The liver serves an important function in benzene metabolism.

Benzene can easily penetrate unprotected skin and enter into the body. For low doses it is quickly metabolized and eliminated in a form of metabolites in urine. For higher doses of exposure a large part of the absorbed dose of benzene is eliminated in exhaled breath.

Biological limit:
Benzene (S-Phenyl mercapturic acid): 0.05 mg/g creatinine in urine;
Benzene (t-Muconic acid): 1.5 mg/g creatinine in urine

11.1.6. Absence of specific dat

In accordance with Article 18 (3) of Regulation (EC) No 1907/2006 REACH only information corresponding to Annex VII of this Regulation are stated for transported isolated intermediate products above 100 t/year. Tests included in Annex VIII to X do not need to be stated.

11.2. Information on other hazards

The substance is not included in the candidate list pursuant to Article 59 (Paragraph 1) of the REACH Directive due to the characteristics that can compromise endocrine activities or due to any other reason according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Water environment	Fish	LC_{50} (96h) = 5.3 mg/l	Oncorhynchus mykiss
		NOEC (32d) = 0.8 mg/l	Pimephales promelas
	Invertebrates	EC_{50} (48h) = 10 mg/l	Daphnia magna
		NOEC (7d) = 3 mg/l	Ceriodaphnia dubia
	Algae	EC_{50} (72h) = 100 mg/l	Selenastrum capricornutum
		NOEC (72h) = 34 mg/l	Selenastrum capricornutum
Terrestrial environment	Soil organisms	NOEC (earthworms) = 0-63 mg/kg soil dw	Eisenia andrei
		LOEC (earthworms) = 97-172 mg/kg soil dw	Eisenia andrei
		LC_{25} (arthropods) = 63-99 mg/kg soil dw	Onychiurus folsomi
	Plants	LC_{25} = 73 mg/kg soil dw	Agropyron dasystachyum
Microbiological activity (STP)	Activated sludge	LC_{50} (24h) = 13 mg/l (inhibition test of activated sludge nitrification)	

Note: An explanation of the meaning of the abbreviations is in section 16.

12.2. Persistence and degradability

Product is easily biologically degradable. Results from OECD 301F tests showed that benzene met the criteria to be classed as readily biodegradable. Biodegradation in water in < 40 days.
Half-life in air (DT50): 13,4 days
Structural analysis of the benzene molecule indicates that it is not expected to undergo hydrolysis in the environment due to the lack of hydrolyzable functional groups.

12.3. Bioaccumulative potential

With regards to the fact that the value of the distribution coefficient n-octanol/water (log Kow) is lower than 3, no bioaccumulation of the product is expected (log Kow 2,13).
BCF: 13 l/kg ww

12.4. Mobility in soil

With regards to low value of the distribution coefficient n-octane/water (low Kow < 3) no sorption of the product into sediment or soil is expected.
The log Koc value predicted using KocWin (QSAR) is 1.848 (Koc is 70.47 L/kg at 20°C).

12.5. Results of PBT and vPvB assessment

Due to easy biological decompositon and the level of expected bioaccumulation it is reasonable to assume that benzene does not meet the criteria for P-persistent, B-bioaccumulative or for vP-very persistent, vB-very bioaccumulative.
Benzene fulfils the toxicity criterion (T) in the context of PBT assessment since it is classified as very toxic following repeated exposure toxicity (Cat 1) and is carcinogenic (Cat 1A) and mutagenic (Cat 1B) according to GHS/CLP.
Conclusion: The substance is not the PBT / vPvB (not all criteria are met).

12.6. Endocrine disrupting properties

The substance is not included in the candidate list pursuant to Article 59 (Paragraph 1) of the REACH Directive due to the characteristics that can compromise endocrine activities according to REACH Article 57(f) or

Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

12.7. Other adverse effects

Pursuant to Appendix 1 of the Water Act No. 254/2001 Coll., the product is considered a hazardous and harmful substance.

WGK 3 = stark wassergefährdend

12.8. Other information

According to Article 18 (3) of Regulation (EC) no. 1907/2006 REACH the only information reported on transported isolated intermediates above 1000 t/year is to be in accordance with Annex VII of the Regulation. Tests specified in Annexes VIII to X do not have to be carried out.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

If product used as an intermediate and during storage and handling under strictly controlled conditions there is no waste .If the remainder of the product is to be disposed (eg unused or leaked product), the valid European Union and national legislature as well as locally valid regulations have to be complied with. Deliver the waste for disposal to a professionally qualified person /to facility with the appropriate authorization to manage waste.

Recommended waste classification pursuant to COMMISSION DECISION of 18 December 2014, amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council:

13.1.1. Catalogue number

Catalogue number for products that have become waste:

07 01 04* Other organic solvents, washing liquids and mother liquors.

16 03 05* Organic waste containing dangerous substances.

Catalogue number for leaked product absorbed into an absorption agent (e.g. vapex):

15 02 02* Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances.

Catalogue number for soil contaminated by leaked product:

17 05 03* Soil and stones containing dangerous substances.

13.1.2. Recommended waste removal method

Deliver the unusable remainder of the product for disposal to a professionally qualified person with the appropriate authorization.

Recommended removal method: Energy utilization (burning)

Landfill and biodegradation in case of soil contaminated by leaked product.

13.1.3. Recommended methods of contaminated containers disposal

Not relevant. Product is not packed, it is transported through piping and railroad cisterns.

13.1.4. Measures for limiting exposure when handling waste

Do not flush leaked product during an emergency event or accident into sewage. Proceed in accordance with instructions provided in Section 6 („Accidental release measures“) and in Subsection 8.2 („Limiting exposure“) and adhere to all valid legal regulations for the protection of people, air and water.

WARNING: *The stated information is of a recommendation character. It is related to the delivered, still unused material. Pursuant to the Waste Act all responsibilities for managing the waste, including its assignment based on its type and category, are responsibilities of the waste originator*.

SECTION 14: TRANSPORT INFORMATION

The listed information applies to road transport (ADR) and rail (RID) transport of dangerous goods:

14.1. UN number or ID number: 1114

14.2. UN proper shipping name: BENZENE

14.3. Transport hazard class(es): 3

14.4. Packing group: II

14.5. Environmental hazards: based on the criteria of the UN sample regulations, the product is not harmful to the environment

14.6. Special precautions for user: none

14.7. Maritime transport in bulk according to IMO instruments: the product is not designated for bulk transport pursuant to the International Maritime Organization (IMO) documents

14.8. Other information

Hazard identification number: 33
Classification code: F1
Labels: 3

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. European Union

Regulation of the European Parliament and Council (EC) No. 1907/2006 (REACH), as amended

REGISTRATION (TITLE II OF THE REACH REGULATION)

the product has been registered as transported isolated intermediate product produced and used under strictly controlled conditions (SCC)

AUTORISATION (TITLE VII OF THE REACH REGULATION)

isolated intermediate products are not subject to authorization obligation in accordance with Article 2(8)

RESTRICTION (TITLE VIII OF THE REACH REGULATION)

annex XVII – point 3., point 5., point 28, point 40. - restrictions are met by determining identified uses

ANNEX VII OF THE REACH REGULATION

According to Article 18 (3) of Regulation (EC) no. 1907/2006 REACH the only information reported on transported isolated intermediates above 1000 t/year is to be in accordance with Annex VII of the Regulation. Tests specified in Annexes VIII to X do not have to be carried out.

Regulation of the European Parliament and Council (EC) No. 1272/2008 (CLP), as amended

the product has been classified in compliance with the stated regulation, packaging and labeling obligations of dangerous chemicals only apply to the product if it is marketed in packaging subject to its labelling according to CLP regulation

Regulation of the European Parliament and Council (EC) No. 649/2012 on the export and import of dangerous chemicals, as amended

the product is subject to special import or export restrictions

15.1.2. Czech Republic

Act No. 350/2011 Coll. on Chemical Substances and Chemical Mixtures, as amended

the product is not subject to the obligation of notification to the information system PCN (Poison centres notification)

Act No. 258/2000 Coll. on the Protection of Public Health, as amended
Act No. 254/2001 Coll., on Water, as amended
Act No. 201/2012 Coll., on Air Protection, as amended
Act No. 541/2929 Coll., the Waste Act, as amended
Regulation No. 8/2021 Coll., on the Waste Catalogue and on Assessing Waste Characteristics, as amended
Governmental decree no. 361/2007 Coll., laying down occupational health and safety conditions

product has exposure limit; the product is subject to the obligation to establish a controlled zone

Act no. 224/2015 Coll., on prevention of serious accidents caused by selected dangerous chemical substances or mixtures

15.2. Chemical safety assessment

Isolated intermediate products in accordance with Article 2 (8) of Regulation (EC) No 1907/2006 REACH are not subject to the obligation to test chemical safety and to process a report on chemical safety in the sense of Article 14 of this Regulation. Exposure scenarios for isolated intermediate product used under strictly controlled conditions are not required.
Information on the safe handling of the substance is incorporated into the body of the safety data sheet (section 1-16).

SECTION 16: OTHER INFORMATION

Changes adopted as a part of the revision process

03/01/2021: Revision (10) – Overall modification of the document in relation to the update of Appendix II of Directive (EC) No. 1907/2006 REACH, by Directive of the Council (EC) No. 2020/878;
Data modification in Sections 13 and 15 - update of the legal regulations;
Data modification in Section 1 – change of the company name;

22/07/2024 / 10(1): Section 8.1. – workplace exposure limit values (updated according to legal regulations), Section 10 – Stability and reactivity (addition according to the registration documentation);

20. 03. 2025 / 10(2): Data modification in Sections 4, 9, 11, 12 based on updated data in the registration dossier prepared as part of the joint submission;

Acronyms and abbreviations used in the text

ADR	Agreement concerning the International Carriage of Dangerous Goods by Road
CAS	Registration number assigned to the substance by the Chemical Abstracts Service of the American Chemical Society
CLP	EU Directive No. 1272/2008 on Classification, Labeling and Packaging of chemical substances and mixtures, which is implemented into the European legislature by the means of GHS (United Nations´ Globally harmonized System) for classifying and labeling chemical substances
CMR	Carcinogenic, mutagenic or toxic for reproduction
ČSN EN (ISO)	European standard incorporated into the Czech technical standards
CSR	Chemical Safety Report
DMEL	Derived minimal effect level - an exposure level that corresponds to a low and possibly theoretical risk, which should be considered as an acceptable risk (for threshholdless effects, i.e. there is no exposure level without effect))
DNEL	Derived no-effect level - level of exposure derived from toxicological data that does not produce any adverse effects on human health
DW	Data waiving
EC_{50}	Effective concentration EC_{50} is the concentration of substance that causes immobilization of 50% of individuals
ErC_{50}	Effective concentration EC_{50} is the concentration of substance that causes 50 % decrease of Algea growth
ECHA	European Chemicals Agency
ES	Official number of the chemical substance in the European Union: EINECS from the European Inventory of Existing Commercial Substances, or ELINCS from the European List of Notified Chemical Substances, or NLP from the No Longer Polymer list
HSDB	Hazardous Substances Data Bank
IATA	International Air Transport Association
IBC	Intermediate Bulk Container
IC_{50}	Inhibition concentration IC_{50} that causes inhibition of 50% of individuals
ICAO	International Civil Aviation Organization
ICE	"Intervention in Chemical Transport Emergencies" system providing both professional and practical assistance in dealing with emergency situations related to the transport and storage of hazardous chemicals
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organisation

ISO	International Organization for Standardization
LC_{50}/LD_{50}	Lethal concentration/level is the concentration/level of substance that causes mortality of 50 % individuals
LOEC/LOEL	Lowest Observed Effect Concentration/Level
log Kow	Logarithm of distribution coefficient n-octanol/water
nf	Not feasible
NOAEC/NOAEL	No Observed Adverse Effect Concentration/No Observed Adverse Effect Level
NOEC/NOEL	No Observed Effect Concentration/No Observed Effect Level
NPK-P	The highest permitted concentration of the chemical substance in the air (the concentration of the substance that a worker may be exposed to for a maximum of 15 minutes but which must never be exceeded)
OECD	Organization for Economic Co-operation and Development
OOP	Recommended personal protective aids
OSN	United Nations
(Q)SAR	Quantitative Structure-Activity Relationship
PBT, vPvB	Persistent, bioaccumulative and toxic; high persistent and high bioaccumulative
PEL	Permitted exposure limit of the chemical substance in the air (the exposure value that an employee may be exposed to during the entire working shift (8 hours), without endangering his health during lifetime occupational exposure)
PNEC	Predicted No Effect Concentration
REACH	EU Directive No. 1907/2006 on Registration, Evaluation and Authorization of Chemicals
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STOT	Specific Target Organ Toxicity
STP	Sewage treatment plant
su	Scientifically Unjustified
TRINS	Transport Information and Accident System of the Czech Republic, providing professional and practical assistance in dealing with emergency situations related to transport and storage of hazardous chemical substances, included in ICE
UACRON	Chemical database (The University of Akron).
UFI code	The unique formula identifier for products with hazardous mixtures.
UN number	The four-digit identification number of the substance or object identifying hazardous material in international transport
UVCB	Substances of Unknown or Variable composition, Complex reaction products or Biological materials

Data sources used for preparing the material safety sheet

Annexes I, IV, VI and VII to Regulation (EC) No. 1272/2008 CLP, as amended;
Principles for providing first aid upon being exposed to chemical substances ;
Substance registration documentation pursuant to Regulation (EC) No. 1907/2006 REACH;
Decision of the European Chemicals Agency (ECHA) No. SUB-D-2114118349-48-01/F on registration pursuant to Directive (EC) No. 1907/2006 REACH;
Research data sources (European chemical Substances Information System ESIS, Hazardous Substances Data Bank HSDB, Sicherheitstechnische Kenndaten chemischer Stoffe SORBE, MedisAlarm, University of Akron Chemical UAKRON, Occupational safety and health guideline, National Institute for Occupational Safety and Health NIOSH, Cheminfo of Canadian Centre for Occupational Health and Safety CCOHS, Directive for air quality in Europe (ecologic center in Most), Gestis sanitary limits);

Full text of H-/ EUH-sentences and abbreviations of hazard classes stated in Section 2 and/or 3

H 225	Highly flammable liquid and vapor.
H 304	May be fatal if swallowed and enters airways.
H 315	Causes skin irritation.
H 319	Causes serious eye irritation.
H 340	May cause genetic defects.
H 350	May cause cancer.
H 412	Harmful to aquatic life with long lasting effects.
Aquatic Chronic	Hazardous to the aquatic environment, category Chronic toxicity

Asp. Tox.	Aspiration hazard
Carc	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquid
Muta	Germ cell mutagenicity
Skin Irrit.	Skin irritation
STOT RE	Specific target organ toxicity — repeat exposure

Training instructions

Persons handling the product must be advised of the risks involved in handling the product and the health and environmental protection requirements (see applicable provisions of the Labor Code).

Access to information

Pursuant to Article 35 of Directive (EC) No. 1907/2006 REACH, every employer is obliged to allow access to the information stated on the given material safety sheet to all workers who use this product or are exposed to its impacts while working, and also to representatives of these workers.

Strictly controlled conditions

These are technological processes and working conditions which ensure that, during the whole service life of the intermediate product (i.e. from its production until its transformation to another substance), emissions into the environment and exposure of employees are minimized.
For isolated intermediate product on-site, these conditions are defined in article 17(3) of EC Regulation No 1907/2006 REACH.
For transported isolated intermediate product, these conditions are defined in article 18(4) of EC Regulation No 1907/2006 REACH.

Occupational exposure limit values for EU countries (see point 8.1.1)

data for benzene (number CAS 71-43-2)

	8-hour limit [mg.m^{-3}]	Short-term limit [mg.m^{-3}]
European Union (Regulation No. 2000/39/EC as amended)	1.65 (1)	not specified
Italy	3.25 (1)	not specified
Germany (AGS)	1.9	15.2
Austria	3.2	12.8
Poland	1.6 (1)	not specified
Slovakia	not specified	not specified
France	3,25 (1)	not specified
Hungary	3,25 (1)	not specified

(1) *skin*

8-hour limit: *Measured or calculated in relation to the 8-hour reference period as a timely weighted average*
Short-term limit: *Exposure limit value, which shall not be exceeded and which corresponds to a 15-minute period*

Emergency telephone number for EU countries (see subsection 1.4)

National Centers		TELEFONE	LANGUAGE	Institution / website / email
Belgium		☎+070245245	German	http://www.poisoncentre.be Centre Antipoisons, c/o Hôpital Militaire Reine Astrid Rue Bruyn 1, 1120 Bruxelles
Czech Republic		☎+420/224-919293; 915402	Czech	http://www.tis-cz.cz Toxikologické informační středisko (TIS) Na bojišti 1, 120 00 Praha 2 e-mail: tis@vfn.cz
France – Orfila (INRS)		☎+33/0145425959	French	"Centres Antipoison et de Toxicovigilance (CapTv) Hôpital Fernand Widal" 200 rue du Faubourg Saint Denis 75010 PARIS viviane.damboise@lrb.aphp.fr
France - Angers		☎+33/241482121	French	http://www.centres-antipoison.net/angers/index.html
France - Bordeaux		☎+33/556964080	French	http://www.centres-antipoison.net/bordeaux/index.html
France - Lille		☎+33/0800595959	French	http://www.centres-antipoison.net/lille/index.html

National Centers	TELEFONE	LANGUAGE	Institution / website / email
France - Lyon	☎+33/472116911	French	http://www.centres-antipoison.net/lyon/index.html
France - Marseille	☎+33/491752525	French	http://www.centres-antipoison.net/marseille/index.html
France - Nancy	☎+33/383225050	French	http://www.centres-antipoison.net/nancy/index.html
France - Paris	☎+33/140054848	French	http://www.centres-antipoison.net/paris/index.html
France - Strasbourg	☎+33/388373737	French	http://www.centres-antipoison.net/strasbourg/index.html
France - Toulouse	☎+33/561777447	French	http://www.centres-antipoison.net/toulouse/index.html
Ireland	☎+353/18092166	English	http://www.poisons.ie/Public
Italy - Bergamo	☎+39/800883300	Italian	Istituto Superiore di sanitá – Preparati Pericolosi
Italy - Firenze	☎+39/0557947819	Italian	
Italy - Milano	☎+39/02-66101029	Italian	
Italy - Pavia	☎+39/0382-24444	Italian	
Italy - Napoli	☎+39/081-5453333	Italian	
Italy - Foggia	☎+39/800183459	Italian	
Italy - Verona	☎+39/800011858	Italian	
Italy - Roma	☎+39/06-49978000, ☎+39/06-3054343	Italian	
Hungary	☎+36/680201199, 36/0614766464	Hungarian	http://www.okbi.hu/page.php?trid=1&dz=103
Germany	☎+49/112, ☎+49/116117	German	
Germany - Berlin	☎+49/3019240	German	https://giftnotruf.charite.de
Germany - Bonn	☎+49/22819240	German	http://www.gizbonn.de/index.php?id=272
Germany - Erfurt	☎+49/361730730	German	https://www.ggiz-erfurt.de/home.html
Germany - Freiburg	☎+49/076119240	German	https://www.uniklinik-freiburg.de/giftberatung.html
Germany - Göttingen	☎+49/55119240	German	https://www.giz-nord.de/cms/index.php
Germany – Homburg/Saar	☎+49/684119240	German	http://www.uniklinikum-saarland.de/de/einrichtungen/kliniken_institute/kinder_und_jugendmedizin/informations_und_behandlungszentrum_fuer_vergiftungen_des_saarlandes
Germany – Mainz	☎+49/613119240	German	http://www.giftinfo.uni-mainz.de/index.php?id=24807
Germany - München	☎+49/8919240	German	http://www.toxinfo.med.tum.de
Netherlands	☎+31/302748888	Dutch	http://www.productnotification.nl/
Poland - Kraków	☎+48/124119999	Polish	http://www.oit.cm.uj.edu.pl
Poland – Gdansk	☎+48/586820404	Polish	http://www.pctox.pl/news.php
Poland – Poznaň	☎+48/618476946	Polish	http://www.raszeja.poznan.pl/oddzialy/oddzialtoksykologiczny
Poland - Warszawa	☎+48/607218174	Polish	okzit@burdpi.pol.pl
Austria	☎+43/14064343	German	Austrian Poison Information Centre (Vergiftungsinformationszentrale-VIZ)
Slovakia	☎+421/254652307	Slovak	http://www.ntic.sk
Spain	☎+34/915620420	Spanish	Servicio de Información Toxicológica (SIT) Instituto Nacional de Toxicología y Ciencias Forenses (INTCF) C/José Echegaray nº4, 28232 Las Rozas de Madrid Madrid sit@mju.es / intcf@justicia.es

Statement: *The material safety sheet has been prepared in compliance with Directive (EC) No. 1907/2006 REACH. It includes data that are necessary for securing occupational health and safety and the protection of the environment. These data have been provided in good faith, correspond to the current state of knowledge and experience and are in accordance with our valid legal regulations The data provided does not replace the quality specification and can not be considered as a guarantee of the suitability and usability of this product for a specific application. It is the responsibility of the product user to assess the accuracy of the information in a particular application where the product's properties can influence different factors. The consumer is responsible for compliance with the appropriate, regionally valid legal regulations.*