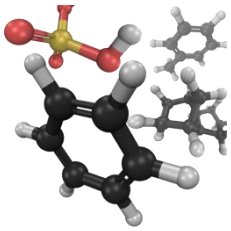


SAFETY DATA SHEET
BENZENE

SECTION 1: IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1. Product identifier

Substance name:	BENZENE
Product name:	BENZENE
Index No:	601-020-00-8
EINECS:	200-753-7
CAS number:	71-43-2
CAS name:	Benzene
IUPAC name:	Benzene
REACH registration number:	01-2119447106-44-0041
Type of substance:	Composition: mono constituent substance Origin: organic

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

1.2.1. Relevant identified uses

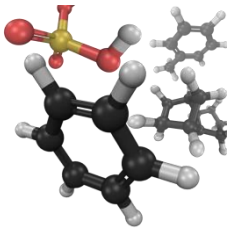
Benzene is used as a feedstock for a number of chemical syntheses including production of ethylbenzene, chlorobenzene, caprolactam, cumene, maleic anhydride, cyclohexane, aniline, adipic acid and LABS. It is also used in pharmaceutical industry and as a laboratory agent.
Benzene is destined only for industrial uses.
See section 16 for list of descriptors combination.

1.2.2. Uses advised against

Do not use for private purpose (household). All consumer uses of substance as such and in a mixture are not supported for safety reasons.
According to Annex XVII of REACH regulation benzene:

1. Shell not be used in toys or parts of toys where the concentration of benzene in the free state is greater than 5 mg/kg (0,0005%) of the weight of the toy or part of toy.
2. Shell not be placed on the market or used:
   - as a substance,
   - as a constituent of other substances, or in mixtures, in concentrations equal to, or greater than 0,1% by weight

   except of:
   - substances and mixtures for use in industrial processes not allowing for the emission of benzene in quantities in excess of those laid down in existing legislation;
   - motor fuels which are covered by Directive 98/70/EC;
   - natural gas placed on the market for use by consumers, provided that the concentration of benzene remains below 0,1 % volume/volume. .



1.3. Details of the supplier of the safety data sheet

Company identification: Petrochemia – Blachownia Sp. z o.o.
Szkolna 15
47-225 Kędzierzyn - Koźle
POLAND
Phone: +48 77 488 68 01 (Monday – Friday; 7^{00} – 15^{00})
Fax. +48 77 488 67 21
E-mail of responsible person for SDS: reach@petrochemia-bl.com.pl

1.4. Emergency telephone number

Department of Chemical Safety
Nofer Institute of Occupational Medicine, Łódź, Poland
+48 42 631 47 67
+48 42 657 99 00
working days Mo. – Fri. 8^{00} - 15^{00}

Company's Emergency phone number (round the clock): +48 697 986 566
Emergency services: general emergency number: 112
fire brigade: 998
emergency medical service: 999

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance

PHYSICAL / CHEMICAL HAZARDS

Flammability	Flam. Liquid Cat 2; H225 Highly flammable liquid and vapour

HEALTH HAZARDS

Carcinogenicity	Carc. Cat. 1A; H350 May cause cancer
Mutagenicity	Muta. Cat. 1B; H340 May cause genetic defects
Repeat toxicity	STOT Rep. Exp. cat 1; H 372 Causes damage to hematopoietic system through prolonged or repeated exposure (route of exposure: oral, inhalation, dermal)
Aspiration toxicity	Asp. Tox. Cat. 1; H304 May be fatal if swallowed and enters airways
Skin irritation	Skin Irrit. Cat. 2; H315 Causes skin irritation
Eye irritation	Eye Irrit. Cat. 2; H319 Causes serious eye irritation

ENVIRONMENTAL HAZARDS

Not sufficient for classification.

2.2 Label elements

Product identifier: BENZENE
Substance: Benzene
Index No: 601-020-00-8

Hazard pictograms:


GHS02


GHS08


GHS07

Signal word:
Danger

Hazard statements:

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H372	Causes damage to hematopoietic system through prolonged or repeated exposure (route of exposure: oral, inhalation, dermal)

Precautionary statements:

P210	Keep away from heat / sparks / open flames / ... / hot surface…No smoking.
P243	Take precautionary measures against static discharge.
P280	Wear protective gloves / protective clothing / eye protection / face protection.
P303+P361+P353	IF ON SKIN (or hair): Remove / Take off immediately all contaminated clothing. Rinse skin with water / shower.
P301+P310	IF SWALLOWED: Immediately call a PIOSON CENTER or doctor / physician.
P331	Do NOT induce vomiting.
P202	Do not handle until all safety precautions have been read and understand.

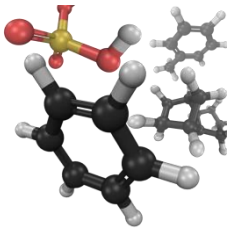
In the case of analytical samples taken for the purpose of quality control of the raw material / process / product, it is allowed to label the packaging in a different way, accepted in particular plant.

2.3 Other hazards

Substance do not meet the specific criteria for persistent and bioaccumulative and toxic (PBT) or the criteria for very persistent and very bioaccumulative (vPvB) detailed in Annex XIII of regulation 1907/2006/EC as indicate that the substance would not have these properties and the substance is not considered a PBT/vPvB.

The substance is not included in the list established in accordance with Article 59(1) of regulation 1907/2006 for having endocrine disrupting properties.

The substance is not a substance identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.



SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Benzene

CAS number:	71-43-2
EC number(EINECS):	200-753-7
Index number:	601-020-00-8
IUPAC name:	benzene
Degree of purity:	min. 99 %

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

4.1.1. General advice

Take care to self-protect by avoiding becoming contaminated.
In case of health troubles or doubts, seek medical advice immediately and show this Material Safety Data Sheet. Ensure activity of vitally important functions until the arrival of the doctor (artificial respiration, inhalation of oxygen, heart massage). If patient is unconscious, or in case of danger of blackout (apsychia), transport patient in a stabilised position. In case of first degree burns (painful redness), and second degree burns (painful blisters), cool the affected area with cold running water for a long time. In case of third degree burns (redness, cracking).

4.1.2. Inhalation

Move to fresh air. Do not leave the victim unattended. Keep patient warm and at rest. Seek immediate medical attention. If breathing is difficult, give oxygen if possible or assisted ventilation, (do not use mouth to mouth). If unconscious place in recovery position. In the event of cardiac arrest, (no pulse), apply cardiopulmonary resuscitation.

4.1.3. Skin contact

Take off all contaminated clothing and shoes. Immediately flush affected area with plenty of soap and water – continue for at least 15 minutes. If there are signs of irritation or other symptoms seek medical attention.

4.1.4. Eye contact

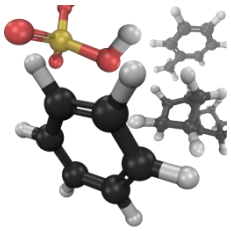
Remove any contact lenses. Flush eyes with water thoroughly and continuously for at least 15 minutes. Keep eye wide open while rinsing. Protect unharmed eye. If there are signs of irritation or other symptoms seek medical attention. If eye irritation, pain, swelling, lachrimation or photophobia persists, the patient should be seen in a specialist health care facility.

4.1.5. Ingestion

Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting, if vomiting does occur, have victim lean forward to reduce risk of aspiration. Get medical attention immediately. Do not give milk or alcoholic beverages.

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

Acute oral toxicity: Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis (inflammation of the lung caused by irritants) which can be fatal.



Existing data on human accidents demonstrate that ingestion of 15 mL (176 mg/kg bw) benzene can cause death after collapse, bronchitis and pneumonia.

Acute inhalation toxicity: High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and / or death. Exposure for 5-10 minutes to benzene vapours of 65-61 mg/L is fatal and exposure to 25 mg/L for 30 minutes is dangerous to life, while a one-hour exposure to 1,6 mg/L causes only some symptoms of illness.

Skin Irritation: Liquid benzene on direct contact with the skin may cause erythema and blistering. Skin contact with benzene removes fat from the tissue which may result in the development of a dry, scaly dermatitis if exposure is repeated or prolonged.

Eye irritation: Pain and watery eyes, redness of the conjunctiva. High concentrations of benzene vapours are irritating to the mucous membranes of the eyes.

Respiratory irritation: Inhalation of vapours or mists may cause irritation to respiratory system. High concentrations of benzene vapours are irritating to the mucous membranes of nose, and respiratory tract.

Sensitisation: Not expected to be a skin sensitizer.

Repeated dose toxicity: Blood-forming organs: repeated exposure affects the bone marrow. Blood: may cause haemolysis of red blood cells and / or anaemia.
Immune system: animal studies on this material have demonstrated immunotoxicity.

Mutagenicity: May cause heritable genetic damage.

Carcinogenicity: Known human carcinogen. May cause leukaemia (AML – acute myelogenous leukaemia).

Reproductive and developmental toxicity: Cause fetotoxicity in animals at doses which are maternally toxic. Does not impair fertility.

Additional information: Myelodysplastic syndrome (MDS) was observed in individuals exposed to very high levels (50 ppm to 300 ppm range) of benzene over a long period of time in the workplace. The relevance of these results to lower levels of exposure is not known.

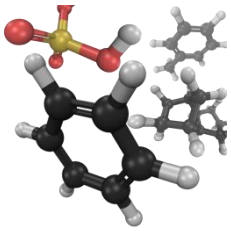
4.3. Indication of any immediate medical attention and special treatment needed

Causes eye irritation. This irritation can result in redness and swelling of the eyes. Causes irritation to the skin. This irritation can result in redness and swelling of the skin. Repeated contact with the skin may cause it to become dry and cracked. If inhalation occurs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and may cause transient central nervous system (CNS) depression. In case of ingestion, Ipecac-induced emesis is not recommended. Consider use of charcoal as a slurry (240mL water/30 g charcoal). Usual dose: 25 to 100 g in adults If determined necessary (and under qualified medical supervision), the stomach should be emptied by gastric lavage under qualified medical supervision with the airway protected by endotracheal intubation.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing media

LARGE FIRE: Use water spray, water fog or foam. DO NOT use direct water jet.
SMALL FIRE: Dry powder or carbon dioxide (CO2) extinguisher, dry sand or fire fighting foam. Use water spray to cool fire-exposed containers and to reduce rate of burning, taking care not to spread the fire



5.2. Special hazards arising from the substance

Carbon oxides (CO, CO_2), benzene vapours can be released in case of fire.
Vapour is denser than air – flashback may be possible over considerable distances. Containers may explode under fire conditions - use water spray to cool unopened containers. Do not allow run-off from firefighting to enter drains or water courses – may cause explosion hazard in drains and may reignite on surface water.

5.3. Advice for fire-fighters

Special protective equipment: Wear self-contained breathing apparatus in addition to standard firefighting gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Caution: an area threatened with explosion. Isolate hazard area. Evacuate all unauthorised personnel not participating in rescue operations from the area. Avoid entry into danger area. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition. Stop traffic and switch off the motors of the engines. Do not smoke and do not handle with naked flame. Use explosion-proof lamps and non-sparking tools. Avoid contact with the substance and its vapours. Apply recommended full protective personal equipment to paralyse the accident. When escaping from the contaminated area, wear mask with cartridge A against organic vapours. In case of general average, evacuate personnel from danger area. In places under the ground level and in enclosed spaces (including drains) risk of explosion. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog spray. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Ventilate contaminated area thoroughly.

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protective equipment. Avoid breathing vapours or mist. Ensure adequate ventilation and absence of sources of ignition. Beware of accumulation of vapours in low areas or contained areas, where explosive concentrations may occur.

6.1.1. For non-emergency personnel

Use appropriate personal protection measures as described in section 8 of the safety data sheet. Follow the instructions of the people giving help / evacuation.

6.1.2. For emergency responders

Use appropriate personal protection measures as described in section 8 of the safety data sheet. Remove the injured from the danger zone; inform appropriate services, provide first aid in accordance with the guidelines contained in section 4 of the safety data sheet.

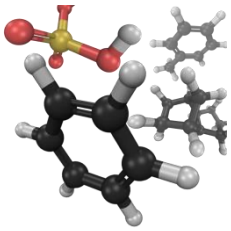
6.2. Environmental precautions

Land spillage

Prevent further leakage or spillage if safe to do so. Prevent spillage from entering drains.

Spillages in water or at sea

Prevent further leakage or spillage if safe to do so. If the spillage contaminates rivers, lakes or drains inform respective authorities. In case of drinking water contamination alert users.



6.3. Methods and material for containment and cleaning up

Contain spillage. Small spillages can be taken up by collection with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and placed in container for disposal according to local / national regulations. For larger spillages on water contain with booms or barriers, use surface acting agents to thicken spilled materials. Remove trapped material with suction hoses.
Spillages of liquid product will create a fire hazard and form an explosive atmosphere. Ensure all equipment is non sparking or electrically bonded. Avoid direct contact with released material. Stay upwind. Keep non-involved personnel away from the area of spillage. Ensure adequate ventilation, especially in confined areas.

6.4. Reference to other sections

Fire-fighting measures - see section 5; waste management - see section 13 of the charter; personal protection equipment - see section 8 of the SDS; emergency telephone numbers - see section 1.4.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

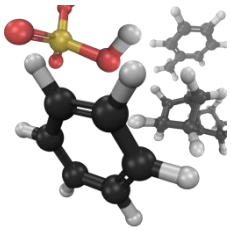
Smoking, eating and drinking should be prohibited. Use only in well ventilated areas. Avoid all sources of ignition. Take precautionary measures against static discharges. Avoid contact with heat and ignition sources and oxidizing agents. Containers should be opened only under exhaust ventilation hood. Do not allow splash filling of bulk volumes. Do not use compressed air for filling, discharging or handling. Cleaning, inspection and maintenance of the internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations. Handle empty containers with care; vapour residue may be flammable. Do not pressurise, cut, weld, braze, solder, drill, or grind on containers. Dispose of rinse water in accordance with local and national regulations. The vapour is heavier than air, beware of accumulation in pits and confined spaces. The product will float on water and can be reignited on surface water. Ensure that all relevant regulations regarding explosive atmospheres, and handling and storage facilities of flammable products are followed. Electrostatic charges may be generated during pumping. Electrostatic charges may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. In order to avoid generation of electrostatic discharge restrict line velocity during pumping into storage tanks and / or tankers (≤1 m/sec until fill pipe submerged to twice its diameter, then ≤ 7 m/sec). Avoid splash filling. Do NOT use compressed air filling, discharging or handling operations.

7.2. Conditions for safe storage, including any incompatibilities

Benzene should be stored in either mild steel or stainless steel containers or vessels. No smoking. Store in a designated cool and well-ventilated place. Store in the original, tightly closed, container. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep container tightly closed and properly labelled. Vapour space above stored liquid may be flammable/explosive unless blanketed with inert gas. Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.

7.3. Specific end use(s)

For industrial purposes only.



SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Significant routes of exposure:
Human exposure: vapours by inhalation; liquid by skin
Environmental exposure: air
Pattern of exposure: accidental/infrequent

8.1. Control parameters

Exposure limits (according to Polish regulations)

	Benzene
TWA; mg/m^3	*3,25*
STEL; mg/m^3	*-*
Notation	*skin*

A skin notation assigned to the occupational exposure limit value indicates the possibility of significant uptake through the skin.
According to Directive No 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work.

Exposure controls in accordance with local and national regulations.

DNEL: Derived No Effect Level (long-term based on local effect)

Workers

Long-term - systemic effects (dermal)	234 mg/kg bw /day
Long-term - systemic effects (inhalation)	3,25 mg/m³ (repeated dose toxicity)

General population

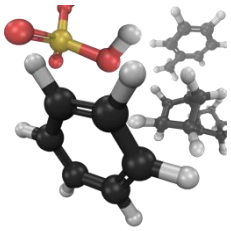
Long-term - systemic effects (dermal)	234 µg/kg bw /day
Long-term - systemic effects (inhalation)	3,25 µg/m³
Long-term - systemic effects (oral)	0,1404 µg/kg bw /day

PNEC: Predicted No Effect Concentration

Aqua – freshwater	1,9 mg/l
Aqua - marine water	1,9 mg/l
Aqua - intermittent releases	1,9 mg/l
Sediment	33 mg/kg d.w.
Soil	4,8 mg/kg.w.
Sewage Treatment Plant	39 mg/l

8.2. Exposure controls

The substance is handled under Strictly Controlled Conditions as defined under REACH Article 18(4) throughout its life cycle. Specifically the substance is rigorously contained by technical means during its whole lifecycle; procedural and control technologies are used to minimise emissions and any resulting exposures; only properly trained and authorised personnel handle the substance; special procedures such as purging and washing are applied during cleaning and maintenance works, in cases of accident and where waste is generated, procedural and/or control technologies are used to minimise emissions and the resulting exposures; and substance-handling procedures are well documented and strictly supervised by the site operator.



8.2.1. Appropriate engineering controls

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on risk assessment of local circumstances.

Appropriate measures include: Use sealed systems as far as possible. Adequate explosion-proof ventilation to local airborne concentrations below the exposure guidelines / limits. Firewater monitors and deluge systems is recommended.

8.2.2. Personal protective equipment

Consider the potential hazards of this material applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment.

If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended

Respiratory protection: gas-mask with A type absorber against organic vapours. The absorber should be selected depending on benzene volumetric concentration: up. to 0,1% vol. – A1, 0,1 – 0,5 % vol. – A2; 0,5 – 1% vol. – A3.

When mixture of vapours of different substances of different origin (organic, inorganic, acidic, ammonia) may occure use universal ABEK absorber.

When concentration of compound is higher than 1% of volume or there is oxygen lack in air (below 17%) use self-contained breathing apparatus.

In case of emergency or when substance concentration isn't known use personal protective equipment in highest class of protection.

Hand protection: protective gloves (covered with viton, nitril, neoprene), or other gloves approved by the manufacturer for contact with benzene.

Eye protection: protective glasses; when liquid spatter is possible use a protective mask.

Skin and body protection: antistatic protective clothing and shoes.

In areas with explosion possibility use anti-electrostatic clothing, gloves and shoes.

Depending on the task being performed, wear protective clothing and personal protective equipment appropriate to the potential risks indicated by a competent person.

8.2.3. General safety and hygiene measures

Do not breath vapours/spray. Keep away from drink, food and animal feeding stuffs. No eating, drinking, smoking or tobacco use at the place of work. Take off immediately all contaminated clothing. Hands and face should be washed before breaks and at the end of shift. At the end of the shift the skin should be cleaned and skin-care agents applied.

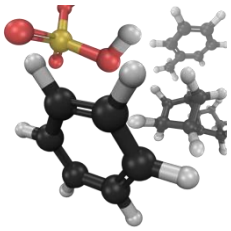
8.2.4. Environmental exposure controls

Benzene does not dilute in water, is lighter than water and accumulates on its surface. It is dangerous for surface water and outer soil layers

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.



GENERAL INFORMATION

Physical State:	Liquid
Colour:	Colourless
Odour:	Characteristic for aromatic compounds
Odour Threshold:	16,25 mg/m^3

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15.6 °C):	0,8765 g/cm^3
Flash Point:	(-)11°C
Explosion limits	lower 1,2% upper 8,0 %
Autoignition Temperature:	498°C
Boiling Point / Range:	80,09°C
Vapour Density (Air = 1):	Not available
Vapour Pressure:	10kPa at 20˚C and 100kPa at 79,7˚C
Evaporation Rate (N-Butyl Acetate = 1):	not available
pH:	not applicable
Log Pow (n-Octanol/Water Partition Coefficient):	2,13
Solubility in Water:	ca. 1,88g/l at 23,5˚C
Viscosity:	0,604 mPas at 25°C
Oxidising properties:	not applicable

9.2. Other information

Solidification / Freezing Point:	5,49°C
Molecular Weight:	78 g/mol
Hygroscopic:	not available
Coefficient of Thermal Expansion:	not available

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

Danger of violent reaction and explosion in fire environment.

10.2. Chemical stability

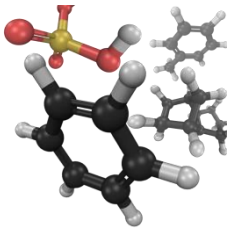
In normal conditions -stable

10.3. Possibility of hazardous reactions

Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide (CAS 630-08-0), carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

10.4. Conditions to avoid

Avoid high temperatures, heat, sparks, open flames and other ignition sources. Static discharges. Prevent vapour accumulation. Tanks exposed to long effect of high temperatures may explode and cause fire



10.5. Incompatible materials

Oxidizing agents. Dangerous reaction with: diborane, bromine pentafluoride, permanganic acid, chlorine, chromium trioxide, ozone, perchlorates, potassium peroxide, sodium peroxide, nitric acid, sulphuric acid, iodine pentafluoride, oxygen. Benzene may diluting some plastics

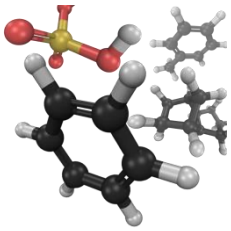
10.6. Hazardous decomposition products

No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION11: TOXICOLOGICAL INFORMATION

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

	Conclusion / Remarks
Acute toxicity	
By oral route By inhalation By dermal route	Oral : Low acute toxicity (LD50 > 2000 mg/kg) Inhalation: Low acute toxicity (4 hour LC50 > 20 mg/L) Dermal: Low acute toxicity (LD50 > 5000 mg/kg)
Skin corrosion / irritation	
Assessment of available human and animal data	Irritating
Assessment of the acid or alkaline reserve In vitro studies	Not justified
In vivo skin irritation	Irritating
Serious eye damage / irritation	
Assessment of available human and animal data	Irritating
Ass of the acid or alkaline reserve In vitro study	Not justified
In vivo eye irritation	Irritating
Respiratory or skin sensitisation	
Assessment of available human , animal and alternative data	Not sensitizing
In vivo study	Not sensitizing
Germ cell mutagenicity	
In vitro studies	Genotoxic
Carcinogenicity	Long term experimental carcinogenicity bioassays have shown that benzene is a carcinogen producing a variety of tumours in animals (including lymphomas and leukaemia). Human epidemiological studies indicate a causal relationship between benzene exposure and acute non-lymphatic leukaemia.
Reproductive toxicity	
Fertility (route; inhalation) Developmental toxicity (route: inhalation)	NOAEC: 960 mg/m³ air NOAEC: 32 mg/m³ air
STOT- repeated exposure	
Short term Sub-chronic toxicity results	Inhalation: may cause bone marrow toxicity and depression of red and white blood cells
Aspiration toxicity	
By oral route	May be fatal if swallowed and enters airways
By inhalation	



11.2. Information on other hazards

	Conclusion / Remarks
Endocrine disrupting properties	The substance is not included in the list established in accordance with Article 59(1) of regulation 1907/2006 for having endocrine disrupting properties. The substance is not a substance identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.
Toxicokinetics	At low exposure levels, benzene is rapidly metabolized and excreted predominantly as conjugated urinary metabolites. At higher exposure levels, metabolic pathways appear to become saturated and a large portion of an absorbed dose of benzene is excreted as parent compound in exhaled air.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

	Conclusion / Remarks
Aquatic toxicity	
Short term toxicity testing on invertebrates (Daphnia)	48 hour EC50 10mg/l
Long term toxicity testing on invertebrates (Daphnia)	7 day NOEC 3mg/l
Growth inhibition study aquatic plants (algae)	72 hour EC50 100mg/l 72 hour NOEC 34mg/l
Short term toxicity testing on fish	96 hour LC50 5,3mg/l
Long term toxicity testing on fish	32 day NOEC 0,8mg/l
Activated sludge respiration inhibition testing	24 hour IC50 (nitrification) 13mg/l
Effects on terrestrial organisms	Measured data are not available for terrestrial toxicity endpoints.
Long-term toxicity to invertebrates	
Effects on soil micro-organisms	
Long-term toxicity to plants	
Long term toxicity to sediment organisms	Measured data are not available for sediment toxicity.
Long-term or reproductive toxicity to birds	Measured data are not available for toxicity to birds.

12.2. Persistence and degradability

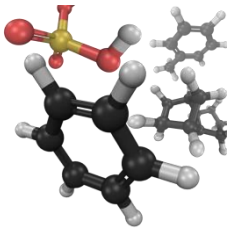
Biodegradation*:* Benzene is readily biodegradable
Hydrolysis *(as a function of pH) :* Benzene will not undergo hydrolysis
Photolysis: Benzene will not undergo photolysis
Atmospheric Oxidation: Benzene is expected to degrade by indirect photolysis in air.

12.3. Bioaccumulative potential

Based on a log Kow <3 benzene has low potential for bioaccumulation

12.4. Mobility in soil

Based on a log Kow <3 benzene is not expected to adsorb to soil or sediment.



12.5. Endocrine disrupting properties

The substance is not included in the list established in accordance with Article 59(1) of regulation 1907/2006 for having endocrine disrupting properties.
The substance is not a substance identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

12.6. Results of PBT and vPvB assessment

Does not meet criteria

12.7. Other adverse effects

It is not expected that benzene as an effect on global warming, ozone depletion in the stratosphere or ozone formation in the troposphere.

SECTION 13: DISPOSAL CONSIDERATIONS

Wastes classification : according to Waste Catalogue.

13.1. Waste treatment methods

Do not let the product get into the sewage systems and soil waters. Do not store on municipal landfills. Consider possibility of use. Carry on the recovery or disposal of wastes in accordance to law regulations.
Recommended way of disposal: incineration.
Disposable packaging provide to an authorized recipient. Carry on the recovery or disposal of wastes in accordance to law regulations.
Reusable packaging after careful cleaning can be reused if necessary.

SECTION 14: TRANSPORT INFORMATION

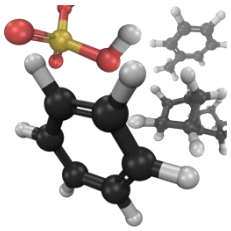
Subsection	Road transport (ADR)	Railway transport (RID)
14.1. ***UN numer or ID nimber***	UN 1114	UN 1114
14.2. Proper shipping name	BENZENE	BENZENE
14.3. Transport hazard class(es)	3	3
14.4. Packing group	II	II
14.5. Environmental hazards	no	no
14.6. Special precautions for users	Excepted quantities: LQ4 Packing instructions: P001, IBC02, R001	Excepted quantities: LQ4 Packing instructions: P001, DPPL02, R001
14.7. Marine transport in bulk according to IMO instruments	-	-

SECTION 15: REGULATORY INFORMATION

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

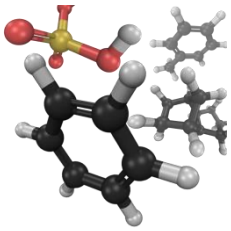
15.1.1. Information regarding relevant Community safety, health and environmental provisions

The group of flammable liquids is found in Annex I of Directive 2012/18/EC (Seveso III). Qualifying quantity (tonnes) for dangerous substance for the application of:
Lower-tier: 5.000 tonnes
Upper-tier: 50.000 tonnes



15.1.2. EU regulations

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/105/EC and 2000/21/EC
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.
- Directive No 2012/18/EC of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC.
- Regulation (EC) No 273/2004 of the European Parliament and of the Council of 11 February 2004 on drug precursors.
- Directive No 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (sixth individual directive within the meaning of Article 16(1) of Directive 89/391/EEC).
- Directive (EU) 2022/431 of the European Parliament and of the Council of 9 March 2022 amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work.
- Council Directive No 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteen individual directive within the meaning of Article 16(1) of Directive 89/391/EEC).
- Commission Directive No 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC.
- Commission Directive No 2006/15/EC of 7 February 2006 establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending of Directive 2000/39/EC.
- Commission Directive No 2009/161/EU of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending of Directive 2000/39/EC
- Commission Directive (EU) 2017/164 of 31 January 2017 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU
- Commission Directive (EU) 2019/1831 of 24 October 2019 establishing a fifth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC and amending Commission Directive 2000/39/EC
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
- Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste
- Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods.



- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).
- Regulations concerning the International Carriage of Dangerous Goods by Rail (RID).
- Regulation (EC) No 273/2004 of the European Parliament and of the Council of 11 February 2004 on drug precursors.
- Commission Delegated Regulation (EU) 2017/2100 of 4 September 2017 setting out scientific criteria for the determination of endocrine-disrupting properties pursuant to Regulation (EU) No 528/2012 of the European Parliament and Council.
- Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products

15.2. Chemical Safety Assessment

A chemical safety assessment was conducted.
Benzene is a separate transported intermediate and can only be used under strictly controlled conditions in accordance with Article 18 (4) of the REACH Regulation. In the area of handling the product, documentation on how to use it safely should be available along with a description of selected technical, organizational and personal protection measures.

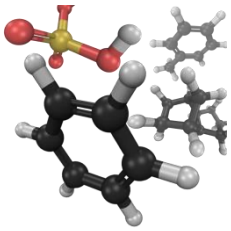
SECTION16: OTHER INFORMATION

16.1. Indication of changes

This version replaces versions 3.2 of 15.08.2020.
Adaptation of the card to the new format in accordance with Commission Regulation (EU) 2020/878 of June 18, 2020. amending Annex II to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).
Section 1.1.2. - Information on uses advised against has been clarified.
Section 1.4. - Update of emergency numbers.
Section 2.3. - Information on endocrine disrupting properties has been added.
Section 6.1. - Information on personal precautions and emergency procedures has been clarified.
Section 8.1. - The methods of exposure assessment have been specified and the legal basis has been given
Section 8.2. - The description of exposure control methods has been supplemented.
Section 11 - Updated information on toxicological hazards in terms of endocrine disrupting properties.
Section 12 - Supplemented information on ecological hazards in terms of endocrine disrupting properties

16.2. Abbreviations and acronyms

EC50	Half maximal effective concentration
IC50	Half maximal inhibitory concentration
LC50	Lethal concentration, 50 %
LD50	Median Lethal Dose
NOAEC / NOAEC	No Observed Adverse Effect Level / Concentration
NOEL / NOEC	No Observed Effect Level / Concentration
PBT	Persistent, Bioaccumulative and Toxic
vPvB	Very Persistent and Very Bioaccumulative
DNEL	Derived No Effect Level (long-term based on local effect)
PNEC	Predicted No Effect Concentration



16.3. Key literature references and sources for data

Registration dossier for benzene.

16.4. Advice on any training for workers

To ensure protection of human health and the environment all workers involve in benzene handling should be appropriately trained. Trainings should include physical and chemical properties of the substance, effects for human health and on environment as well as way of protection (including personal protective equipment) and first aid measurements. Trainings should include accident / emergency simulations and should be periodically repeat.

16.5. Further information

This SDS is prepared for the purpose of providing health, safety and environmental data. The information given corresponds with our actual knowledge and experience. While the descriptions, data and information contained in the present datasheet are provided in good faith, these are to be considered as guidance only. Thus, this SDS shall not constitute a guarantee for any specific properties or quality standards.

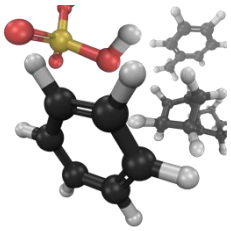
This information is meant to describe our product in view of possible safety requirements, but it remains the responsibility of the customer to determine the applicability of the information and suitability of any product for its own particular purpose, to provide a safe workplace and comply with all applicable laws and regulations.

Since handling, storage, use and disposal is of the product are beyond our control and our knowledge, we do exclude any responsibility connecting to handling, storage, use or disposal of this product.

Please note that if the product used as a component of another product, this SDS information may not be applicable.

16.5.1. Identified uses

Identified Use name	**Use descriptors**
Manufacture	***Process category (PROC):*** PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis of formulation) PROC 8a: Transfer of substance (charging / discharging) from / to vessels / large containers at non-dedicated facilities PROC8b: Transfer of substance (charging / discharging) from / to vessels / large containers at dedicated facilities PROC 15: Use a laboratory agent ***Environmental release category (ERC):*** ERC1: Manufacture of substances ***Sector of Use (SU)*** SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU0: Other: other activity relating to manufacturing of chemicals (re-loading, laboratory analyses) ***Exposure scenario reference in the CSR:*** -
Use as an intermediate	***Process category (PROC):*** PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure



	PROC3: Use in closed batch process (synthesis of formulation) PROC8a: Transfer of substance (charging / discharging) from / to vessels / large containers at non-dedicated facilities PROC8b: Transfer of substance (charging / discharging) from / to vessels / large containers at dedicated facilities PROC15: Use a laboratory agent ***Environmental release category (ERC):*** ERC1: Manufacture of substances ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC7: Industrial use of substances in closed systems ***Sector of Use (SU)*** SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU0: Other: other activity relating to manufacturing of chemicals (re-loading, laboratory analyses) ***Exposure scenario reference in the CSR:*** -