

Safety data sheet

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BASF Safety data sheet according to the United Nations' Globally Harmonized System (UN GHS)

Date / Revised: 15.08.2023

Version: 6.0

Product: **Benzene (REACH region)**

(ID no. 30608792/SDS_GEN_00/EN)

Date of print 25.04.2024

1. Identification

Product identifier

Benzene (REACH region)

Chemical name: Benzene

CAS Number: 71-43-2

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

Relevant identified uses: Only to be used as intermediate according to the REACH Regulation (EC) No 1907/2006, art. 18

Details of the supplier of the safety data sheet

Company:

BASF SE

67056 Ludwigshafen

GERMANY

Operating Division Petrochemicals

Telephone: +49 621 60-42151

E-mail address: sds-petrochemicals@basf.com

Emergency telephone number

International emergency number:

Telephone: +49 180 2273-112

2. Hazards Identification

Classification of the substance or mixture

According to UN GHS criteria

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Asp. Tox. 1
Flam. Liq. 2
Skin Corr./Irrit. 2
Eye Dam./Irrit. 2A
Muta. 1B
Carc. 1A
STOT RE (Blood) 1
Aquatic Acute 2
Aquatic Chronic 3

For the classifications not written out in full in this section the full text can be found in section 16.

Label elements

Globally Harmonized System (GHS)

Pictogram:



Signal Word:

Danger

Hazard Statement:

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H315	Causes skin irritation.
H304	May be fatal if swallowed and enters airways.
H350	May cause cancer.
H340	May cause genetic defects.
H372	Causes damage to organs (Blood) through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.
H401	Toxic to aquatic life.

Precautionary Statements (Prevention):

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P280	Wear protective gloves, protective clothing and eye protection or face protection.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P201	Obtain special instructions before use.
P280	Wear eye protection.
P243	Take action to prevent static discharges.
P260	Do not breathe mist or vapour.
P273	Avoid release to the environment.
P202	Do not handle until all safety precautions have been read and understood.
P241	Use explosion-proof electrical, ventilating and lighting equipment.
P264	Wash contaminated body parts thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P233	Keep container tightly closed.
P242	Use non-sparking tools.
P240	Ground and bond container and receiving equipment.

Precautionary Statements (Response):

P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P308 + P313	IF exposed or concerned: Get medical attention.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or physician.
P332 + P313	If skin irritation occurs: Get medical attention.
P370 + P378	In case of fire: Use water spray, dry powder, foam or carbon dioxide for extinction.
P331	Do NOT induce vomiting.
P337 + P313	If eye irritation persists: Get medical attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.

Precautionary Statements (Storage):

P405	Store locked up.
P403 + P235	Store in a well-ventilated place. Keep cool.

Precautionary Statements (Disposal):

P501	Dispose of contents and container to hazardous or special waste collection point.
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Other hazards

According to UN GHS criteria

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

See section 12 - Results of PBT and vPvB assessment.

3. Composition/Information on Ingredients

Substances

Chemical nature

Benzene (Content (W/W): $\geq 99,5 \%$)
CAS Number: 71-43-2
EC-Number: 200-753-7
INDEX-Number: 601-020-00-8

Hazardous ingredients (GHS)

According to UN GHS criteria

Benzene

Content (W/W): $\geq 99,5 \%$ - $\leq 100 \%$	Asp. Tox. 1
CAS Number: 71-43-2	Flam. Liq. 2
EC-Number: 200-753-7	Skin Corr./Irrit. 2
INDEX-Number: 601-020-00-8	Eye Dam./Irrit. 2A
	Muta. 1B
	Carc. 1A
	STOT RE (Blood) 1
	Aquatic Acute 2
	Aquatic Chronic 3
	H225, H319, H315, H304, H350, H340, H372, H412, H401

Toluene

Content (W/W): $\geq 0 \%$ - $< 0,3 \%$	Asp. Tox. 1
CAS Number: 108-88-3	Flam. Liq. 2
EC-Number: 203-625-9	Skin Corr./Irrit. 2
INDEX-Number: 601-021-00-3	Repr. 2 (unborn child)
	STOT SE 3 (drowsiness and dizziness)
	STOT RE (Central nervous system) 2
	Aquatic Acute 2
	Aquatic Chronic 3
	H225, H315, H304, H336, H361, H373, H412, H401

For the classifications not written out in full in this section the full text can be found in section 16.

Mixtures

Not applicable

4. First-Aid Measures

Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:

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Keep patient calm, remove to fresh air, seek medical attention.

On skin contact:

Immediately wash thoroughly with soap and water, seek medical attention.

On contact with eyes:

Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:

Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

Hazards: When inhaled (e.g. during vomiting) risk of pulmonary oedema and/or pneumonia.

Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.
(Further) symptoms and / or effects are not known so far

Indication of any immediate medical attention and special treatment needed

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote. The presence of benzene in the body can be detected by determining the amount of this substance in the blood and/or urine.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:

water spray, dry powder, foam, carbon dioxide

Unsuitable extinguishing media for safety reasons:

No data available.

Special hazards arising from the substance or mixture

Highly flammable. Cool endangered containers with water-spray. See SDS section 7 - Handling and storage.

Advice for fire-fighters

Special protective equipment:

Wear a self-contained breathing apparatus. Special protective equipment for firefighters

Further information:

Evacuate area of all unnecessary personnel. Fight fire from maximum distance.

Extend fire extinguishing measures to the surroundings. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

6. Accidental Release Measures

High risk of slipping due to leakage/spillage of product.

Release of substance/product can cause fire or explosion. Shut off or stop source of leak. Shut off or stop released substance/product under safe conditions.

Pack in tightly closed containers for disposal.

Personal precautions, protective equipment and emergency procedures

Handle in accordance with good industrial hygiene and safety practice.

Avoid all sources of ignition: heat, sparks, open flame. Use antistatic tools. Avoid contact with the skin, eyes and clothing.

Take off immediately all contaminated clothing.

Environmental precautions

Discharge into the environment must be avoided.

Methods and material for containment and cleaning up

Pick up with suitable appliance and dispose of. Spills should be contained, solidified, and placed in suitable containers for disposal. Dispose of absorbed material in accordance with regulations.

7. Handling and Storage

Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice. Avoid all direct contact with the substance/product. Ensure thorough ventilation of stores and work areas. Change clothes immediately after contamination. Refill and handle product only in closed system.

Protection against fire and explosion:

Avoid all sources of ignition: heat, sparks, open flame. Ground all transfer equipment properly to prevent electrostatic discharge.

Conditions for safe storage, including any incompatibilities

No applicable information available.

Further information on storage conditions: Keep container tightly closed in a cool, well-ventilated place. Protect from direct sunlight. Protect against heat.

Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

8. Exposure Controls/Personal Protection

Control parameters

Components with occupational exposure limits

71-43-2: Benzene
108-88-3: Toluene

Exposure controls

Personal protective equipment

Respiratory protection:

Wear respiratory protection if ventilation is inadequate. Suitable respiratory protection for lower concentrations or short-term effect: Gas filter for gases/vapours of organic compounds (boiling point >65 °C, e. g. EN 14387 Type A) Suitable respiratory protection for higher concentrations or long-term effect: Self-contained breathing apparatus.

Hand protection:

Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN ISO 374-1):

fluoroelastomer (FKM) - 0.7 mm coating thickness

Polyethylene-Laminate (PE laminate) - ca. 0.1 mm coating thickness

Suitable materials against splashes (recommended: At least protective index 1, corresponding > 10 minutes of permeation time according to EN ISO 374-1)

butyl rubber (butyl) - 0.7 mm coating thickness

nitrile rubber (NBR) - 0.4 mm coating thickness

polyvinylchloride (PVC) - 0.7 mm coating thickness

Manufacturer's directions for use should be observed because of great diversity of types.

Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

Eye protection:

Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures

Ensure adequate ventilation. Avoid contact with the skin, eyes and clothing. Avoid inhalation of vapour. Avoid exposure - obtain special instructions before use. Wearing of closed work clothing is required additionally to the stated personal protection equipment. Handle in accordance with good industrial hygiene and safety practice. At the end of the shift the skin should be cleaned and skin-care agents applied.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	liquid
Colour:	colourless, clear
Odour:	aromatic
Odour threshold:	not determined

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pH value:		
Melting point:	not applicable 5,49 °C	
Boiling point:	Literature data. 80,1 °C (1.013 hPa)	
Flash point:	-11 °C	
Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.	
Flammability:	Highly flammable.	(derived from flash - and boiling point)
Lower explosion limit:	For liquids not relevant for classification and labelling.	
Upper explosion limit:	For liquids not relevant for classification and labelling.	
Ignition temperature:	498 °C	
Vapour pressure:	100 hPa (20 °C) 1.000 hPa (79,7 °C)	
Density:	0,88 g/cm ³ (20 °C)	
Relative density:	0,88 (20 °C)	
Relative vapour density (air):	> 1 (20 °C) Heavier than air.	(estimated)
Solubility in water:	Literature data. 1,88 g/l (23,5 °C)	
Solubility (qualitative) solvent(s):	organic solvents miscible	
Partitioning coefficient n-octanol/water (log Kow):	2,13 (25 °C; pH value: 7) Literature data.	
Self ignition:	Based on its structural properties the product is not classified as self-igniting.	Test type: Spontaneous self-ignition at room-temperature.
Thermal decomposition:	Vapours may form explosive mixture with air.	
Viscosity, dynamic:	0,604 mPa.s (25 °C) Literature data.	
Viscosity, kinematic:	No data available.	
Explosion hazard:	Based on the chemical structure there is no indication of explosive properties.	
Fire promoting properties:	Based on its structural properties the product is not classified as oxidizing.	

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Other information

Self heating ability:	not applicable, the product is a liquid	
Radioactivity:		not radioactive for transport purposes
pKA:	The substance does not dissociate., Study scientifically not justified.	
Adsorption/water - soil:	KOC: 165; log KOC: 2,22 Adsorption to solid soil phase is not expected.	(calculated)
Surface tension:	Based on chemical structure, surface activity is not to be expected.	
Grain size distribution:	The substance / product is marketed or used in a non solid or granular form.	
Molar mass:	78,11 g/mol	

10. Stability and Reactivity**Reactivity**

No hazardous reactions if stored and handled as prescribed/indicated., When heated can give off ignitable vapours., Vapours may form explosive mixture with air.

Corrosion to metals:	No corrosive effect on metal.	
Formation of flammable gases:	Remarks:	Forms no flammable gases in the presence of water.

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Peroxides: The product does not contain peroxides.

Possibility of hazardous reactions

No hazardous reactions if stored and handled as prescribed/indicated.

Conditions to avoid

Avoid all sources of ignition: heat, sparks, open flame. Avoid direct sunlight. Avoid electro-static charge.

Incompatible materials

Substances to avoid:
Bromine, Chlorine, Iodine, Sulfur, oxidizing agents, acids

Hazardous decomposition products

:

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

11. Toxicological Information

Information on toxicological effects

Acute toxicity

Assessment of acute toxicity:

Virtually nontoxic after a single skin contact. Virtually nontoxic by inhalation. Virtually nontoxic after a single ingestion.

Experimental/calculated data:

LD50 rat (oral): > 2.000 mg/kg (OECD Guideline 401)

Literature data.

LD50 rat (oral): 5.970 mg/kg (other)

Literature data.

LC50 rat (by inhalation): 43,76 mg/l 4 h (OECD Guideline 403)

Literature data. The vapour was tested.

LD50 rat (dermal): 17.574 mg/kg (other)

Literature data.

LD50 rabbit (dermal): > 8.260 mg/kg (other)

Literature data.

Irritation

Assessment of irritating effects:

Eye contact causes irritation. Skin contact causes irritation.

Experimental/calculated data:

Skin corrosion/irritation rabbit: Irritant. (OECD Guideline 404)

Literature data.

Serious eye damage/irritation rabbit: Irritant. (other)

Literature data.

Respiratory/Skin sensitization

Assessment of sensitization:

Skin sensitizing effects were not observed in animal studies.

Experimental/calculated data:

Guinea pig maximization test guinea pig: Non-sensitizing. (OECD Guideline 406)

Literature data.

Guinea pig maximization test guinea pig: Non-sensitizing. (OECD Guideline 406)

Literature data.

Germ cell mutagenicity

Assessment of mutagenicity:
Capable of causing genetic defects.

Carcinogenicity

Assessment of carcinogenicity:
The substance caused cancer in animal studies.

Reproductive toxicity

Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect.

Developmental toxicity

Assessment of teratogenicity:
In animal studies the substance did not cause malformations.

Experiences in humans

Experimental/calculated data:

Has a carcinogenic effect in human beings.
High concentrations have a narcotizing effect.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Based on available data, the classification criteria are not met.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
Repeated exposure to small quantities may affect certain organs. Damages blood cells.

Aspiration hazard

May also damage the lung at swallowing (aspiration hazard).

12. Ecological Information

Toxicity

Assessment of aquatic toxicity:
Acutely toxic for aquatic organisms. Harmful to aquatic organisms based on long-term (chronic) toxicity study data. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Toxicity to fish:
LC50 (96 h) 5,3 mg/l, *Oncorhynchus mykiss* (other, Flow through.)
Literature data.

Aquatic invertebrates:

EC50 (48 h) 10 mg/l, Daphnia magna (other, static)
Literature data.

Aquatic plants:

EC50 (72 h) 100 mg/l (growth rate), Selenastrum capricornutum (OECD Guideline 201, static)
Literature data.

Microorganisms/Effect on activated sludge:

EC50 (24 h) 13 mg/l, Nitrosomonas sp. (other, aquatic)

EC50 (15 h) 520 mg/l, activated sludge (other, aquatic)
Nominal concentration. Literature data.

Chronic toxicity to fish:

No observed effect concentration (32 d) 0,8 mg/l, Pimephales promelas (OECD Guideline 210, Flow through.)

Chronic toxicity to aquatic invertebrates:

No observed effect concentration (7 d) 3 mg/l, Ceriodaphnia dubia (other, semistatic)
Literature data.

Assessment of terrestrial toxicity:

No data available.

Persistence and degradability

Assessment biodegradation and elimination (H₂O):

Readily biodegradable (according to OECD criteria). Easily eliminated from water.

Elimination information:

> 80 % BOD of the ThOD (28 d) (OECD 301F; ISO 9408; 92/69/EEC, C.4-D) (aerobic, activated sludge, domestic) Readily biodegradable.

> 90 % DOC reduction (6 d) (OECD Guideline 302 B) (aerobic, activated sludge) Easily eliminated from water.

Literature data.

Assessment of stability in water:

In contact with water the substance will hydrolyse slowly.

Information on Stability in Water (Hydrolysis):

According to structural properties, hydrolysis is not expected/probable.

Bioaccumulative potential

Assessment bioaccumulation potential:

No significant accumulation in organisms is expected as a result of the distribution coefficient of n-octanol/water (log Pow).

Bioaccumulation potential:

No significant accumulation in organisms is expected as a result of the distribution coefficient of n-octanol/water (log Pow).

Mobility in soil

Assessment transport between environmental compartments:

Volatility: The substance will rapidly evaporate into the atmosphere from the water surface.

Adsorption in soil: Adsorption to solid soil phase is not expected.

Results of PBT and vPvB assessment

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative). Self classification

Other adverse effects

The substance is not listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

Additional information

Other ecotoxicological advice:

Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations. The product should not be allowed to reach either ground or open waters.

13. Disposal Considerations

Waste treatment methods

Dispose of in accordance with national, state and local regulations.

Contaminated packaging:

Disposal must be made according to official regulations.

14. Transport Information

Land transport

ADR

UN number or ID number: UN1114
UN proper shipping name: BENZENE

Transport hazard class(es): 3
Packing group: II
Environmental hazards: no
Special precautions for user: Tunnel code: D/E

RID

UN number or ID number: UN1114
UN proper shipping name: BENZENE

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Transport hazard class(es): 3
Packing group: II
Environmental hazards: no
Special precautions for user: None known

Inland waterway transport

ADN

UN number or ID number: UN1114
UN proper shipping name: BENZENE

Transport hazard class(es): 3
Packing group: II
Environmental hazards: no
Special precautions for user: None known

Transport in inland waterway vessel

UN number or ID number: UN1114
UN proper shipping name: BENZENE

Transport hazard class(es): 3, N3, CMR
Packing group: II
Environmental hazards: yes
Type of inland waterway vessel: C
Cargo tank design: 2
Cargo tank type: 2

Sea transport

IMDG

UN number or ID number: UN 1114
UN proper shipping name: BENZENE

Transport hazard class(es): 3
Packing group: II
Environmental hazards: no
Special precautions for user: Marine pollutant: NO
EmS: F-E; S-D

Air transport

IATA/ICAO

UN number or ID number: UN 1114
UN proper shipping name: BENZENE

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Transport hazard class(es): 3
 Packing group: II
 Environmental hazards: No Mark as dangerous for the environment is needed
 Special precautions for user: None known

Maritime transport in bulk according to IMO instruments

Regulation: IBC-Code
 Product name: Benzene and Mixtures having 10% benzene or more
 Pollution category: Y
 Ship Type: 3

15. Regulatory Information

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

Not applicable

16. Other Information

Full text of classifications, hazard symbols and hazard statements, if mentioned in section 2 or 3:

Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
Skin Corr./Irrit.	Skin corrosion/irritation
Eye Dam./Irrit.	Serious eye damage/eye irritation
Muta.	Germ cell mutagenicity
Carc.	Carcinogenicity
STOT RE	Specific target organ toxicity — repeated exposure
Aquatic Acute	Hazardous to the aquatic environment - acute
Aquatic Chronic	Hazardous to the aquatic environment - chronic
Repr.	Reproductive toxicity
STOT SE	Specific target organ toxicity — single exposure
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H315	Causes skin irritation.
H304	May be fatal if swallowed and enters airways.
H350	May cause cancer.
H340	May cause genetic defects.
H372	Causes damage to organs (Blood) through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.
H401	Toxic to aquatic life.
H336	May cause drowsiness or dizziness.
H361	Suspected of damaging the unborn child.
H373	May cause damage to organs (Central nervous system) through prolonged or repeated exposure.

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The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.