

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Benzene
Product Number : 401765
Brand : Aldrich
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
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Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₆H₆
Molecular Weight : 78.11 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Benzene			
71-43-2	200-753-7	601-020-00-8	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Flammable Liquid

Target Organ Effect

Irritant

Carcinogen

Mutagen

Target Organs

Blood, Eyes, Female reproductive system., Bone marrow

HMIS Classification

Health Hazard: 2

Chronic Health Hazard: *

Flammability: 3

Physical hazards: 0

NFPA Rating

Health Hazard: 2

Fire : 3

Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point -11.0 °C (12.2 °F) - closed cup

Ignition temperature 562 °C (1,044 °F)

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Specific hazards

Flash back possible over considerable distance. Container explosion may occur under fire conditions.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling

Avoid exposure - obtain special instructions before use. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Update	Basis
Benzene	71-43-2	TWA	0.5 ppm 1.6 mg/m ³	1997-05-21	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
		STEL	2.5 ppm 8 mg/m ³	1997-05-21	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
		TWA	1 ppm	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
Remarks	<p>Sec. 1910.1028 Benzene. The final benzene standard in 1910.1028 applies to all occupational exposures to benzene except some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply. See Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028.</p>				
		STEL	5 ppm	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
	<p>See Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028. The final benzene standard in 1910.1028 applies to all occupational exposures to benzene except some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sale of fuels, sealed containers and pipelines, coke</p>				

production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply.
 Sec. 1910.1028 Benzene.

		TWA	1 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.
		STEL	5 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.
		TWA	10 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration; (OSHA) Standards, Toxic and Hazardous Substances, Subpart Z 29 CFR Part 1910.1000, Table Z-2
(Z37.40-1969) This standard applies to the industry segments exempt from the 1 ppm 8-hour TWA and 5 ppm STEL of the benzene standard at 1910.1028.					
		CEIL	25 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration; (OSHA) Standards, Toxic and Hazardous Substances, Subpart Z 29 CFR Part 1910.1000, Table Z-2
(Z37.40-1969) This standard applies to the industry segments exempt from the 1 ppm 8-hour TWA and 5 ppm STEL of the benzene standard at 1910.1028.					
		AMP	50 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration; (OSHA) Standards, Toxic and Hazardous Substances, Subpart Z 29 CFR Part 1910.1000, Table Z-2
(Z37.40-1969) This standard applies to the industry segments exempt from the 1 ppm 8-hour TWA and 5 ppm STEL of the benzene standard at 1910.1028.					

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Safety glasses

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	no data available
Melting point	5.5 °C (41.9 °F)
Boiling point	80.0 - 80.2 °C (176.0 - 176.4 °F)
Flash point	-11.0 °C (12.2 °F) - closed cup
Ignition temperature	562 °C (1,044 °F)
Lower explosion limit	1.3 %(V)
Upper explosion limit	8 %(V)
Vapour pressure	221.3 hPa (166.0 mmHg) at 37.7 °C (99.9 °F) 99.5 hPa (74.6 mmHg) at 20.0 °C (68.0 °F)
Density	0.88 g/cm ³
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability

Stable under recommended storage conditions.

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

acids, Bases, Halogens, Strong oxidizing agents, Metallic salts

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Hazardous reactions

Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 2,990 mg/kg

LC50 Inhalation - rat - female - 4 h - 44,700 mg/m³

LD50 Dermal - rabbit - 8,263 mg/kg

Irritation and corrosion

Skin - rabbit - Skin irritation

Eyes - rabbit - Eye irritation

Sensitisation

no data available

Chronic exposure

Carcinogenicity - Human - male - Inhalation

Tumorigenic: Carcinogenic by RTECS criteria. Leukaemia Blood: Thrombocytopenia.

Carcinogenicity - rat - Oral

Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. Leukaemia

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

IARC: Group 1 - The agent (mixture) is carcinogenic to humans. (Benzene)

NTP: Known to be human carcinogens. (Benzene)

OSHA: 19.101.028 (Benzene)

Genotoxicity in vitro - Human - lymphocyte

Sister chromatid exchange

Genotoxicity in vitro - mouse - lymphocyte

Mutation in mammalian somatic cells.

Genotoxicity in vivo - mouse - Inhalation

Sister chromatid exchange

Laboratory experiments have shown mutagenic effects.

Developmental Toxicity - rat - Inhalation

Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Developmental Toxicity - mouse - Inhalation

Effects on Embryo or Fetus: Cytological changes (including somatic cell genetic material). Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).

Reproductive toxicity - mouse - Intraperitoneal

Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetal death.

Signs and Symptoms of Exposure

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 1114 Class: 3 Packing group: II
Proper shipping name: Benzene

IMDG

UN-Number: 1114 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: BENZENE
Marine pollutant: No

IATA

UN-Number: 1114 Class: 3 Packing group: II
Proper shipping name: Benzene

15. REGULATORY INFORMATION

OSHA Hazards

Flammable Liquid, Target Organ Effect, Irritant, Carcinogen, Mutagen

TSCA Status

On TSCA Inventory

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Benzene	71-43-2	1987-01-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzene	71-43-2	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzene	71-43-2	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzene	71-43-2	1987-01-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer. Benzene	71-43-2	2004-05-12

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm. Benzene	71-43-2	2004-05-12

16. OTHER INFORMATION

Further information

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