SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 3.1 Revision Date 11.12.2008
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GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product name : Benzene

Product Number : 401765
Brand : Sigma-Aldrich

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2. HAZARDS IDENTIFICATION

Risk advice to man and the environment
May cause cancer. May cause heritable genetic damage. Highly flammable. Irritating to eyes and skin. Also toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. Also harmful: may cause lung damage if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C6H6
Molecular Weight : 78,11 g/mol

CAS-No.	EC-No.	Index-No.	Classification	Concentration
Benzene				
71-43-2	200-753-7	601-020-00-8	F, T, Carc.Cat.1, Mut.Cat.2, R45 - R46 - R11 - R36/38 - R48/23/24/25 - R65	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

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

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
Store in cool place. 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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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
The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. 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
Boiling point	80,0 - 80,2 °C
Flash point	-11,0 °C - closed cup
Ignition temperature	562 °C
Lower explosion limit	1,3 %(V)
Upper explosion limit	8 %(V)
Vapour pressure	221,3 hPa at 37,7 °C 99,5 hPa at 20,0 °C
Density	0,88 g/cm3
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

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)

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

Nausea, Dizziness, Headache, narcosis, Inhalation of high concentrations of benzene may have an initial stimulatory effect on the central nervous system characterized by exhilaration, nervous excitation and/or giddiness, depression, drowsiness, or fatigue. The victim may experience tightness in the chest, breathlessness, and loss of consciousness. Tremors, convulsions, and death due to respiratory paralysis or circulatory collapse can occur in a few minutes to several hours following severe exposures. Aspiration of small amounts of liquid immediately causes pulmonary edema and hemorrhage of pulmonary tissue. Direct skin contact may cause erythema. Repeated or prolonged skin contact may result in drying, scaling dermatitis, or development of secondary skin infections. The chief target organ is the hematopoietic system. Bleeding from the nose, gums, or mucous membranes and the development of purpuric spots, pancytopenia, leukopenia, thrombocytopenia, aplastic anemia, and leukemia may occur as the condition progresses. The bone marrow may appear normal, aplastic or hyperplastic, and may not correlate with peripheral blood-forming tissues. The onset of effects of prolonged benzene exposure may be delayed for many months or years after the actual exposure has ceased., Blood disorders

Potential Health Effects

Inhalation	Toxic if inhaled. May cause respiratory tract irritation.
Skin	Toxic if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Toxic if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.
Target Organs	Blood, Eyes, Female reproductive system., Bone marrow,

Additional Information
RTECS: CY1400000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Biodegradability Result: - Readily biodegradable.

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d Bioconcentration factor (BCF): 10

Ecotoxicity effects

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 5,90 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 15,00 - 32,00 mg/l - 96 h
	LC50 - Lepomis macrochirus (Bluegill) - 230,00 mg/l - 96 h
	NOEC - Pimephales promelas (fathead minnow) - 10,2 mg/l - 7 d
	LOEC - Pimephales promelas (fathead minnow) - 17,2 mg/l - 7 d
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 22,00 mg/l - 48 h
	EC50 - Daphnia magna (Water flea) - 9,20 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 29,00 mg/l - 72 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

ADR/RID
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

Labelling according to EC Directives

EC Label

Hazard symbols

F	Highly flammable
T	Toxic

R-phrase(s)

R45	May cause cancer.
R46	May cause heritable genetic damage.

R11	Highly flammable.
R36/38	Irritating to eyes and skin.
R48/23/24/25	Also toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R65	Also harmful: may cause lung damage if swallowed.

S-phrase(s)

S53	Avoid exposure - obtain special instructions before use.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Restricted to professional users.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.