

## MATERIAL SAFETY DATA SHEET

Date Printed: 11/27/2007

Date Updated: 02/05/2006

Version 1.5

## Section 1 - Product and Company Information

Product Name AZOBENZENE, 96%  
Product Number 150738  
Brand ALDRICH

Company Sigma-Aldrich  
Address 3050 Spruce Street  
SAINT LOUIS MO 63103 US

Technical Phone: 800-325-5832  
Fax: 800-325-5052  
Emergency Phone: 314-776-6555

## Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313 No
AZOBENZENE	103-33-3	No

Formula C12H10N2  
Synonyms Azobenzene (Dutch) \* Azobenzide \* Azobenzol \*  
Azobisbenzene \* Azodibenzene \*  
Azodibenzeneazofume \* Azofume \* Benzeneazobenzene  
\* Benzene, azodi \* Benzofume \* Diazobenzene \*  
Diphenyldiazene \* 1,2-Diphenyldiazene \*  
Diphenyldiimide \* ENT 14,611 \* NCI-C02926 \* USAF  
EK-704  
RTECS Number: CN1400000

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Toxic.

May cause cancer. Harmful by inhalation and if swallowed. Harmful: danger of serious damage to health by prolonged exposure if swallowed. Possible risk of irreversible effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Target organ(s): Liver. Calif. Prop. 65 carcinogen. Probable Carcinogen (US).

## HMIS RATING

HEALTH: 1\*

FLAMMABILITY: 1

REACTIVITY: 0

## NFPA RATING

HEALTH: 1

FLAMMABILITY: 1

REACTIVITY: 0

\*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

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## Section 4 - First Aid Measures

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### ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

### INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

### DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

### EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

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## Section 5 - Fire Fighting Measures

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### FLASH POINT

212 °F 100 °C Method: closed cup

### AUTOIGNITION TEMP

477 °C

### FLAMMABILITY

N/A

### FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.  
Specific Hazard(s): Emits toxic fumes under fire conditions.

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## Section 6 - Accidental Release Measures

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### PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area.

### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

### METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

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## Section 7 - Handling and Storage

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### HANDLING

User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

### STORAGE

Suitable: Keep tightly closed.

### SPECIAL REQUIREMENTS

Store under inert gas.

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## Section 8 - Exposure Controls / PPE

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### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

### GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

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## Section 9 - Physical/Chemical Properties

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Appearance	Physical State: Solid	
	Color: Red	
	Form: Fine crystals	
Property	Value	At Temperature or Pressure
Molecular Weight	182.23 AMU	
pH	N/A	
BP/BP Range	293 °C	760 mmHg
MP/MP Range	66 °C	
Freezing Point	N/A	
Vapor Pressure	1 mmHg	104 °C
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	1.09 g/cm <sup>3</sup>	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	212 °F 100 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	477 °C	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

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## Section 10 - Stability and Reactivity

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### STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

#### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, and nitrogen oxides.

#### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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### Section 11 - Toxicological Information

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#### ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: May cause eye irritation.

Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

Ingestion: Harmful if swallowed.

#### TARGET ORGAN(S) OR SYSTEM(S)

Liver. Spleen.

#### SIGNS AND SYMPTOMS OF EXPOSURE

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

#### TOXICITY DATA

Oral

Rat

1000 mg/kg

LD50

Intraperitoneal

Mouse

500 MG/KG

LD50

#### CHRONIC EXPOSURE - CARCINOGEN

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

Species: Rat

Route of Application: Oral

Dose: 7350 MG/KG

Exposure Time: 2Y

Frequency: C

Result: Tumorigenic: Carcinogenic by RTECS criteria. Blood: Tumors.

Species: Rat

Route of Application: Subcutaneous

Dose: 17 GM/KG

Exposure Time: 2Y

Frequency: I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Ear: Tumors.

Species: Mouse

Route of Application: Oral

Dose: 300 MG/KG

Exposure Time: 8W  
Frequency: I  
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax,  
or Respiration:Tumors.

Species: Rat  
Route of Application: Oral  
Dose: 15 GM/KG  
Exposure Time: 2Y  
Frequency: C  
Result: Tumorigenic:Carcinogenic by RTECS criteria. Blood:Tumors.

Species: Rat  
Route of Application: Oral  
Dose: 7280 MG/KG  
Exposure Time: 2Y  
Frequency: C  
Result: Tumorigenic:Neoplastic by RTECS criteria. Blood:Tumors.

#### IARC CARCINOGEN LIST

Rating: Group 3

#### NTP CARCINOGEN LIST

Rating: Clear evidence.  
Species: Rat  
Route: Feed

#### CHRONIC EXPOSURE - MUTAGEN

Result: Laboratory experiments have shown mutagenic effects.

Species: Human  
Dose: 40 UMOL/L  
Cell Type: lymphocyte  
Mutation test: DNA inhibition

Species: Rat  
Route: Oral  
Dose: 375 MG/KG  
Mutation test: Micronucleus test

Species: Rat  
Dose: 300 UMOL/L  
Cell Type: liver  
Mutation test: DNA damage

Species: Mouse  
Route: Oral  
Dose: 500 MG/KG  
Mutation test: DNA damage

Species: Mouse  
Dose: 210 MG/KG  
Cell Type: E. coli  
Mutation test: Host-mediated assay

Species: Hamster  
Dose: 250 UG/L  
Cell Type: ovary  
Mutation test: Sister chromatid exchange

## Section 12 - Ecological Information

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### ACUTE ECOTOXICITY TESTS

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 24 h  
Value: 5 mg/l

Test Type: EC50 Algae  
Species: Scenedesmus subspicatus  
Time: 48 h  
Value: 1.7 - 2.5 mg/l

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## Section 13 - Disposal Considerations

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### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

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## Section 14 - Transport Information

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### DOT

Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.  
UN#: 3077  
Class: 9  
Packing Group: Packing Group III  
Hazard Label: Class 9  
PIH: Not PIH

### IATA

Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s  
IATA UN Number: 3077  
Hazard Class: 9  
Packing Group: III

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## Section 15 - Regulatory Information

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### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: T-N  
Indication of Danger: Toxic. Dangerous for the environment.  
R: 45-20/22-48/22-68-50/53  
Risk Statements: May cause cancer. Also harmful by inhalation and if swallowed. Also harmful: danger of serious damage to health by prolonged exposure if swallowed. Also possible risks of irreversible effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
S: 53-45-60-61

Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Toxic.

Risk Statements: May cause cancer. Harmful by inhalation and if swallowed. Harmful: danger of serious damage to health by prolonged exposure if swallowed. Possible risk of irreversible effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US Statements: Target organ(s): Liver. Calif. Prop. 65 carcinogen. Probable Carcinogen (US).

#### UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

TSCA INVENTORY ITEM: Yes

#### UNITED STATES - STATE REGULATORY INFORMATION

##### CALIFORNIA PROP - 65

California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer.

#### CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

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#### Section 16 - Other Information

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#### DISCLAIMER

For R&D use only. Not for drug, household or other uses.

#### WARRANTY

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 Inc., 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. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.