

MATERIAL SAFETY DATA SHEET

Date Printed: 03/07/2008

Date Updated: 02/04/2006

Version 1.10

Section 1 - Product and Company Information

Product Name CHLOROBENZENE, >=99.5%, A.C.S. REAGENT
Product Number 319996
Brand SIAL

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
CHLOROBENZENE	108-90-7	Yes

Formula C₆H₅Cl
Synonyms Benzene chloride * Chloorbenzeen (Dutch) *
Chlorbenzene * Chlorbenzol * Chlorobenzen
(Polish) * Chlorobenzene (ACGIH:OSHA) *
Chlorobenzenu (Czech) * Clorobenzene (Italian) *
MCB * Monochloorbenzeen (Dutch) *
Monochlorbenzene * Monochlorbenzol (German) *
Monochlorobenzene (OSHA) * Monochlorobenzene
(Italian) * NCI-C54886 * Phenyl chloride *
Tetrosin SP

RTECS Number: CZ0175000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable. Toxic (USA) Harmful (EU). Dangerous for the environment.
Harmful by inhalation and if swallowed. Toxic to aquatic
organisms, may cause long-term adverse effects in the aquatic
environment. Risk of serious damage to eyes.
Target organ(s): Liver. Kidneys.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 0

*additional chronic hazards present.

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

Section 4 - First Aid Measures

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.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS

Flammable Hazards: Yes

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion can occur under fire conditions. In advanced or massive fires the area should be evacuated and the fire should be fought from a remote explosion-resistant location.

FLASH POINT

81 °F 27 °C Method: closed cup

EXPLOSION LIMITS

Lower: 1.3 % Upper: 7.1 %

AUTOIGNITION TEMP

637 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: 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.

FIREFIGHTING

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

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

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

METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

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

STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. 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 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.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	10 PPM
USA	MSHA Standard-air	TWA	75 PPM (350 MG/M3)
USA	OSHA.	PEL	8H TWA 75 PPM (350 MG/M3)
New Zealand OEL			
Remarks: check ACGIH TLV			

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	47
Poland		NDSch	94
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear liquid Color: Colorless		
Property	Value	At Temperature or Pressure	

Molecular Weight	112.56 AMU	
pH	N/A	
BP/BP Range	132 °C	760 mmHg
MP/MP Range	- 46.0 - -45. °C	
Freezing Point	N/A	
Vapor Pressure	11.8 mmHg	25 °C
Vapor Density	3.86 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	1.107 g/cm3	
Bulk Density	N/A	
Odor Threshold	0.21 ppm	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	33 mN/m	25 °C
Partition Coefficient	Log Kow: 2.89	
Decomposition Temp.	N/A	
Flash Point	81 °F 27 °C	Method: closed cup
Explosion Limits	Lower: 1.3 % Upper: 7.1 %	
Flammability	N/A	
Autoignition Temp	637 °C	
Refractive Index	1.524	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Other Solvents: CHLOROFORM ETHANOL, ETHYL ETHER, BENZENE	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

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

Eye Contact: Causes eye irritation.

Inhalation: Material is irritating to mucous membranes and upper respiratory tract. Harmful if inhaled.

Ingestion: Harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Spleen. Thymus. Central nervous system. Kidneys. Liver. Testes.

Lungs. Bone marrow.

SIGNS AND SYMPTOMS OF EXPOSURE

Exposure can cause: Incoordination. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral

Rat

1110 mg/kg

LD50

Remarks: Behavioral:Somnolence (general depressed activity).

Behavioral:Tremor. Behavioral:Ataxia.

Inhalation

Rat

2,965 ppm

LC50

Intraperitoneal

Rat

1655 MG/KG

LD50

Oral

Mouse

2300 mg/kg

LD50

Intraperitoneal

Mouse

515 MG/KG

LD50

Oral

Rabbit

2250 mg/kg

LD50

Oral

Guinea pig

2250 mg/kg

LD50

Oral

Mammal

2300 mg/kg

LD50

Inhalation

Mammal

10,000 mg/m3

LC50

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Species: Rat

Route of Application: Oral

Dose: 61800 MG/KG

Exposure Time: 2Y

Frequency: I
Result: Blood:Tumors. Liver:Tumors. Tumorigenic:Neoplastic by
RTECS criteria.

NTP CARCINOGEN LIST

Rating: Some evidence.
Species: Rat
Route: Gavage

ACGIH CARCINOGEN LIST

Rating: A3

IRIS/EPA CARCINOGEN LIST

Rating: Group D

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 75 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal
system.

Species: Rat
Dose: 210 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Hepatobiliary
system.

Species: Rabbit
Dose: 10 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal
system.

CHRONIC EXPOSURE - MUTAGEN

Species: Mouse
Route: Intraperitoneal
Dose: 225 MG/KG
Exposure Time: 24H
Mutation test: Micronucleus test

Species: Mouse
Dose: 70 MG/L (+S9)
Cell Type: lymphocyte
Mutation test: Mutation in microorganisms

Species: Mouse
Route: Intraperitoneal
Dose: 1 GM/KG
Mutation test: Cytogenetic analysis

Species: Mouse
Dose: 100 MG/L
Cell Type: lymphocyte
Mutation test: Mutation in mammalian somatic cells.

Species: Hamster
Dose: 300 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rabbit
Dose: 590 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g.,
dead and/or resorbed implants per total number of implants).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: EC50 Algae
Time: 48 h
Value: 235 mg/l

Test Type: EC50 Algae
Species: *Selenastrum capricornutum* resp.
Time: 96 h
Value: 12.5 mg/l

Test Type: EC50 Daphnia
Species: *Daphnia magna*
Time: 24 h
Value: 4.3 - 16.0 mg/l

Test Type: EC50 Daphnia
Time: 24 h
Value: 7.6 mg/l

Test Type: LC100 Fish
Species: *Leuciscus idus*
Time: 48 h
Value: 0.030 - 28.0 mg/l

Test Type: LC50 Fish
Species: *Cyprinodon variegatus* (Sheepshead minnow)
Time: 96 h
Value: 10 mg/l

Test Type: LC50 Fish
Species: *Lepomis macrochirus* (Bluegill)
Time: 76 h
Value: 4.5 - 7.4 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. 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.

Section 14 - Transport Information

DOT

Proper Shipping Name: Chlorobenzene
UN#: 1134
Class: 3
Packing Group: Packing Group III
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Chlorobenzene
IATA UN Number: 1134
Hazard Class: 3
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: Xn-N
Indication of Danger: Harmful. Dangerous for the environment.
R: 10-20-51/53
Risk Statements: Flammable. Harmful by inhalation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 24/25-61
Safety Statements: Avoid contact with skin and eyes. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable. Toxic (USA) Harmful (EU).
Dangerous for the environment.
Risk Statements: Harmful by inhalation and if swallowed. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Risk of serious damage to eyes.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Target organ(s): Liver. Kidneys.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

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

Section 16 - Other Information

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 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.