Material Safety Data Sheet

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Version 1.4
According to 91/155/EEC

1 - Product and Company Information

Product Name	BENZYL CHLORIDE
Product Number	13270
Company	Sigma-Aldrich Pte Ltd #08-01 Citilink Warehouse Singapore 118529 Singapore
Technical Phone #	65 271 1089
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2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
BENZYL CHLORIDE	100-44-7	202-853-6	602-037-00-3

Formula	C7H7Cl
Molecular Weight	126.59 AMU
Synonyms	Benzene, (chloromethyl)- * Benzile (cloruro di) (Italian) * Benzyl chloride (ACGIH:OSHA) * Benzyle (chlorure de) (French) * Benzylchlorid (German) * Chloromethylbenzene * Chlorophenylmethane * alpha-Chlorotoluene * omega-Chlorotoluene * alpha-Chlortoluol (German) * Chlorure de benzyle (French) * NCI-C06360 * RCRA waste number P028 * Tolyl chloride

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT

May cause cancer. Harmful if swallowed. Toxic by inhalation. Irritating to respiratory system and skin. Risk of serious damage to eyes. Harmful: danger of serious damage to health by prolonged exposure if swallowed.
Carc. Cat.3 Carc. Cat.2

4 - First Aid Measures

AFTER INHALATION

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

AFTER SKIN CONTACT

In case of contact, immediately wash skin with soap and copious amounts of water.

AFTER EYE CONTACT

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.

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

5 - Fire Fighting Measures

CONDITIONS OF FLAMMABILITY
Water hydrolyzes material liberating acidic gas which in contact with metal surfaces can generate flammable and/or explosive hydrogen gas.

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.
Unsuitable: Do not use water.

SPECIAL RISKS
Specific Hazard(s): Combustible liquid. Emits toxic fumes under fire conditions.
Explosion Hazards: Stabilized and unstabilized benzyl chloride will undergo a rapid, exothermic polymerization reaction above 212°F (100°C). This reaction occurs at much lower temperatures when species of iron are present. The gases generated during rapid polymerization will result in rapid build-up of dangerous pressure in closed vessels

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES 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. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep tightly closed. Keep away from heat and open flame. Store in a cool dry place.

SPECIAL REQUIREMENTS: Moisture sensitive.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	3 MG/M3
Poland		NDSCh	-
Poland		NDSP	5 MG/M3

EXPOSURE LIMITS - DENMARK

	Source	Type	Value
	OEL	TWA	5 mg/m3
			1 ppm

Remarks: LK

EXPOSURE LIMITS - GERMANY

	Source	Type	Value
	TRGS 900	OEL	0.2 mg/m3

Remarks: 4
Remarks: TRK,32,TRGS 901-75

EXPOSURE LIMITS - NORWAY

	Source	Type	Value
		OEL	5 mg/m3
			1 ppm

Remarks: TK

EXPOSURE LIMITS - SWEDEN

	Source	Type	Value
		LLV (Level	5 mg/m3
			1 ppm

Remarks: K

EXPOSURE LIMITS - SWITZERLAND

	Source	Type	Value
	OEL	OEL	1 ppm
			0.2mg/m3*

Remarks: K

EXPOSURE LIMITS - UNITED KINGDOM

	Source	Type	Value
	OEL	OEL	2.6 mg/m3
			0.5 ppm
	OEL	STEL	7.9 mg/m3
			1.5 ppm

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator in nonventilated areas and/or for exposure above the TLV or PEL.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance	Physical State: Liquid Color: Colorless

Property	Value	At Temperature or Pressure

pH	N/A	
BP/BP Range	65 - 67 °C	11 mmHg
MP/MP Range	-43 - -39 °C	
Flash Point	60 °C	Method: closed cup
Flammability	N/A	
Autoignition Temp	585 °C	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	Lower: 1.1 %	
	Upper: 14 %	
Vapor Pressure	10.3 mmHg	60 °C
SG/Density	1.098 g/cm3	
Partition Coefficient	N/A	
Viscosity	N/A	
Vapor Density	4.36 g/l	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	N/A	
Surface Tension	N/A	
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

10 - Stability and Reactivity

STABILITY

Stable: Decomposes easily
Conditions to Avoid: Loss of inhibitor Moisture.
Materials to Avoid: Contact with common metals (except nickel and lead) or moisture produces a Friedel-Crafts, condensation-type reaction with the liberation of heat and formation of toxic and corrosive hydrogen chloride. Hydrolyzes very slowly to form hydrogen chloride and benzyl alcohol. This product is not sensitive to physical impact. When stabilized with propylene oxide, the possibility of a Friedel-Crafts type reaction is minimized. Depletion of the stabilizer increases the possibility of condensation reactions, Oxidizing agents Iron and iron salts., Brass, Aluminum

HAZARDOUS DECOMPOSITION PRODUCTS

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

STABILIZERS PRESENT

Inhibited with 0.25% propylene oxide

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: May occur

11 - Toxicological Information

RTECS NUMBER: XS8925000

ACUTE TOXICITY

LC50
Inhalation
Rat
4,085 mg/kg
4H

LD50
Oral
Rat
1231 mg/kg

LC50
Inhalation
Rat
150 ppm
2H
Remarks: Lungs, Thorax, or Respiration:Respiratory depression.

LD50
Subcutaneous
Rat
1 GM/KG

LD50
Oral
Mouse
1500 mg/kg

LC50
Inhalation
Mouse
80 ppm
2H
Remarks: Lungs, Thorax, or Respiration:Respiratory depression.

LD50
Oral
Mammal
1500 mg/kg

LC50
Inhalation
Mammal
390 mg/m3

SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may result in spasm, inflammation and edema of the larynxand bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

ROUTE OF EXPOSURE

Skin Contact: Causes burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns. Lachrymator.
Inhalation: Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: Harmful if swallowed. Ingestion can cause immediate burning pain in the mouth, throat, abdomen; severe swelling of the larynx and skeletal paralysis affecting the ability to breathe, circulatory shock and convulsions.

TARGET ORGAN INFORMATION
Kidneys. Liver. Blood.

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.

Rat
Route of Application: Subcutaneous
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

Mouse
Route of Application: Oral
Exposure Time: 2Y
Result: Tumorigenic:Carcinogenic by RTECS criteria. Vascular:Tumors. Gastrointestinal:Tumors.

Mouse
Route of Application: Skin
Exposure Time: 50W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Skin and Appendages: Other: Tumors.

Rat
Route of Application: Subcutaneous
Exposure Time: 53W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

IARC CARCINOGEN LIST
Rating: Group 2A Group 2A
Species: Mouse/rat Mouse/rat
Route: Skin Subcutaneous Gavage Skin Subcutaneous Gavage

CHRONIC EXPOSURE - MUTAGEN

Human
1 MMOL/L
Cell Type: fibroblast
DNA damage

Human
1 MMOL/L
Cell Type: Other cell types
DNA damage

Human
50 UMOL/L
Cell Type: HeLa cell
Unscheduled DNA synthesis

Rat
120 UMOL/L
Cell Type: Other cell types
Cytogenetic analysis

Mouse
393 UMOL/L

Cell Type: lymphocyte
DNA damage

Mouse
8 MG/L
Cell Type: lymphocyte
Mutation in mammalian somatic cells.

Hamster
1 UMOL/L
Cell Type: Embryo
Micronucleus test

Hamster
1600 UG/L
Cell Type: Embryo
Morphological transformation.

Hamster
100 UMOL/L
Cell Type: ovary
Sister chromatid exchange

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 1 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat
Dose: 11 UG/KG
Route of Application: Oral
Exposure Time: (1-19D PREG)
Result: Effects on Embryo or Fetus: Fetal death.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Mouse
Dose: 250 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (5D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Species: Mouse
Dose: 2500 MG/KG
Route of Application: Subcutaneous
Exposure Time: (5D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

CMR CAT.: Carc. Cat.3

12 - Ecological Information

No data available.

13 - Disposal Considerations

SUBSTANCE DISPOSAL

Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR
- UN#: 1738
- Class: 6.1
- PG: II
- Proper Shipping Name: Benzyl chloride

IMDG
- UN#: 1738
- Class: 6.1
- PG: II
- Subrisk: 8
- Proper Shipping Name: Benzyl chloride
- Marine Pollutant: No
- Severe Marine Pollutant: No

IATA
- UN#: 1738
- Class: 6.1
- PG: II
- Subrisk: 8
- Proper Shipping Name: Benzyl chloride
- Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES
- ANNEX I INDEX NUMBER: 602-037-00-3
- NOTA: E
- INDICATION OF DANGER: T
  Toxic.
- R-PHRASES: 45 22 23 37/38 41 48/22
  May cause cancer. Harmful if swallowed. Toxic by inhalation. Irritating to respiratory system and skin. Risk of serious damage to eyes. Harmful: danger of serious damage to health by prolonged exposure if swallowed.
- S-PHRASES: 53 45
  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).

COUNTRY SPECIFIC INFORMATION

Germany
- WGK: 3

SWITZERLAND
- SWISS POISON CLASS: 3

16 - Other Information

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.

DISCLAIMER

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