

## SAFETY DATA SHEET

Version 5.10  
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**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING****1.1 Product identifiers**

Product name : Benzyl chloroformate

Product Number : 119938

Brand : Aldrich

**1.2 Other means of identification**

Z-Chloride

Carbobenzoxy chloride

**1.3 Relevant identified uses of the substance or mixture and uses advised against**

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

**1.4 Details of the supplier of the safety data sheet**

Company : Sigma-Aldrich Pte Ltd  
1 Science Park Road  
#02-14 The Capricorn  
Singapore Science Park Road II  
SINGAPORE 117528  
SINGAPORE

Telephone : +65 6779 1200

Fax : +65 6779 1822

**1.5 Emergency telephone number**

Emergency Phone # : 1-800-262-8200

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**2. HAZARDS IDENTIFICATION****2.1 GHS Classification**

Acute toxicity, Inhalation (Category 2)

Skin corrosion (Category 1)

Serious eye damage (Category 1)

Carcinogenicity (Category 1B)

**2.2 GHS Label elements, including precautionary statements**

Pictogram



Signal word : Danger

Hazard statement(s)

H314

Causes severe skin burns and eye damage.

H330

Fatal if inhaled.

H350

May cause cancer.

Precautionary statement(s)

Prevention

P201

Obtain special instructions before use.

P202

Do not handle until all safety precautions have been read and understood.

P260

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
Response	
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
P320	Specific treatment is urgent (see supplemental first aid instructions on this label).
P363	Wash contaminated clothing before reuse.
Storage	
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
Disposal	
P501	Dispose of contents/ container to an approved waste disposal plant.
Restricted to professional users.	

### 2.3 Other hazards

Contact with water liberates toxic gas.  
Contact with water liberates toxic gas.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

Synonyms : Z-Chloride  
Carbobenzoxy chloride

Formula :  $C_8H_7ClO_2$   
Molecular Weight : 170.59 g/mol

Component		Concentration
<b>Benzyl chloroformate</b>		
CAS-No.	501-53-1	-
EC-No.	207-925-0	
Index-No.	607-064-00-4	
<b>Benzyl chloride</b>		
CAS-No.	100-44-7	0.1 - 10 %
EC-No.	202-853-6	
Index-No.	602-037-00-3	

## 4. FIRST AID MEASURES

### 4.1 Description of 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**

Take off contaminated clothing and shoes immediately. 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.

**4.2 Most important symptoms and effects, both acute and delayed**

Nausea, Shock.

**4.3 Indication of any immediate medical attention and special treatment needed**

no data available

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**5. FIREFIGHTING MEASURES****5.1 Extinguishing media****Suitable extinguishing media**

Dry powder

**5.2 Special hazards arising from the substance or mixture**

Carbon oxides, Hydrogen chloride gas, Phosgene

**5.3 Advice for firefighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**5.4 Further information**

no data available

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**6. ACCIDENTAL RELEASE MEASURES****6.1 Personal precautions, protective equipment and emergency procedures**

Wear respiratory protection. Avoid breathing vapours, 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.

**6.2 Environmental precautions**

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

**6.3 Methods and materials for containment and cleaning up**

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

**6.4 Reference to other sections**

For disposal see section 13.

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**7. HANDLING AND STORAGE****7.1 Precautions for safe handling**

Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

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

**7.2 Conditions for safe storage, including any incompatibilities**

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.

Never allow product to get in contact with water during storage.

Recommended storage temperature: 2 - 8 °C

Moisture sensitive. Heat sensitive. Over time, pressure may increase causing containers to burst

### 7.3 Specific end use(s)

no data available

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

#### Occupational Exposure Limits

Component	CAS-No.	Value	Control parameters	Basis
Benzyl chloride	100-44-7	PEL (long term)	1 ppm 5.2 mg/m <sup>3</sup>	Singapore. Workplace Safety and Health Act - First Schedule Permissible Exposure Limits of Toxic Substances

### 8.2 Exposure controls

#### Appropriate engineering controls

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

#### Personal protective equipment

##### Eye/face protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

##### Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

##### Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

##### Splash contact

Material: Fluorinated rubber

Minimum layer thickness: 0.7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

##### Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

##### 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).

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid, clear Colour: light yellow
b) Odour	pungent
c) Odour Threshold	no data available
d) pH	no data available
e) Melting point/freezing point	Melting point/range: -18 °C
f) Initial boiling point and boiling range	152 °C
g) Flash point	92 °C - closed cup
h) Evaporation rate	no data available
i) Flammability (solid, gas)	no data available
j) Upper/lower flammability or explosive limits	no data available
k) Vapour pressure	95.809 hPa at 20 °C 195.065 hPa at 55 °C
l) Vapour density	5.89 - (Air = 1.0)
m) Relative density	1.217 g/cm <sup>3</sup> at 20 °C
n) Water solubility	no data available
o) Partition coefficient: n-octanol/water	no data available
p) Auto-ignition temperature	no data available
q) Decomposition temperature	no data available
r) Viscosity	no data available

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## 10. STABILITY AND REACTIVITY

### 10.1 Reactivity

Can violently decompose at elevated temperatures  
Contact with water liberates toxic gas.

### 10.2 Chemical stability

To avoid thermal decomposition, do not overheat. Decomposes when moist.

### 10.3 Possibility of hazardous reactions

May decompose on exposure to moist air or water. Reacts violently with water.

### 10.4 Conditions to avoid

Heat, flames and sparks. Exposure to moisture. Do not heat over: 75° C

### 10.5 Incompatible materials

no data available

### 10.6 Hazardous decomposition products

Other decomposition products - no data available

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## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

#### Acute toxicity

LD50 Oral - rat - 3,000 mg/kg

LC50 Inhalation - rat - 4 h - 590 mg/m<sup>3</sup>

#### Skin corrosion/irritation

no data available

#### Serious eye damage/eye irritation

no data available

#### Respiratory or skin sensitisation

no data available

#### Germ cell mutagenicity

no data available

#### Carcinogenicity

Carcinogen

IARC: 2A - Group 2A: Probably carcinogenic to humans (Benzyl chloride)

#### Reproductive toxicity

no data available

#### Specific target organ toxicity - single exposure

no data available

#### Specific target organ toxicity - repeated exposure

no data available

#### Aspiration hazard

no data available

#### Potential health effects

##### Inhalation

May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

##### Ingestion

Harmful if swallowed. Causes burns.

##### Skin

Harmful if absorbed through skin. Causes skin burns.

##### Eyes

Causes eye burns.

#### Signs and Symptoms of Exposure

Nausea, Shock.

#### Additional Information

RTECS: Not available

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## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

no data available

### 12.2 Persistence and degradability

no data available

### 12.3 Bioaccumulative potential

no data available

### 12.4 Mobility in soil

no data available

### 12.5 Results of PBT and vPvB assessment

no data available

- 12.6 Other adverse effects**  
no data available

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**13. DISPOSAL CONSIDERATIONS**

**13.1 Waste treatment methods**

**Product**

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

**Contaminated packaging**

Dispose of as unused product.

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**14. TRANSPORT INFORMATION**

**14.1 UN number**

ADR/RID: 1739

IMDG: 1739

IATA-DGR: 1739

**14.2 UN proper shipping name**

ADR/RID: BENZYL CHLOROFORMATE

IMDG: BENZYL CHLOROFORMATE

IATA-DGR: Benzyl chloroformate

Passenger Aircraft: Not permitted for transport

**14.3 Transport hazard class(es)**

ADR/RID: 8

IMDG: 8

IATA-DGR: 8

**14.4 Packaging group**

ADR/RID: I

IMDG: I

IATA-DGR: I

**14.5 Environmental hazards**

ADR/RID: yes

IMDG Marine pollutant: yes

IATA-DGR: no

**14.6 Special precautions for user**

no data available

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**15. REGULATORY INFORMATION**

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**Notification status**

**AICS:** On the inventory, or in compliance with the inventory

**DSL:** All components of this product are on the Canadian DSL.

**ENCS:** On the inventory, or in compliance with the inventory

**IECSC:** On the inventory, or in compliance with the inventory

**ISHL:** Not in compliance with the inventory - Benzyl chloride

**KECI:** On the inventory, or in compliance with the inventory

**NZIoC:** On the inventory, or in compliance with the inventory

**PICCS:** On the inventory, or in compliance with the inventory

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**16. OTHER INFORMATION**

**Further information**

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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 Corporation and its Affiliates shall not be held

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