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**1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Benzyl chloroformate

Product Number : 119938  
Brand : Aldrich

Supplier : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

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**2. HAZARDS IDENTIFICATION****Emergency Overview****OSHA Hazards**

Combustible Liquid, Target Organ Effect, Highly toxic by inhalation, Harmful by ingestion., Corrosive, Carcinogen

**Target Organs**

Kidney, Liver, Blood

**GHS Classification**

Flammable liquids (Category 4)  
Acute toxicity, Oral (Category 5)  
Acute toxicity, Inhalation (Category 2)  
Skin corrosion (Category 1B)  
Serious eye damage (Category 1)  
Carcinogenicity (Category 1B)  
Specific target organ toxicity - repeated exposure (Category 2)

**GHS Label elements, including precautionary statements**

Pictogram



Signal word

Danger

Hazard statement(s)

H227 Combustible liquid  
H303 May be harmful if swallowed.  
H314 Causes severe skin burns and eye damage.  
H330 Fatal if inhaled.  
H350 May cause cancer.  
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary statement(s)

P201 Obtain special instructions before use.  
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P284                                      Wear respiratory protection.  
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.

**Other hazards**

Contact with water liberates toxic gas.

Contact with water liberates toxic gas.

**HMIS Classification**

**Health hazard:**                    3  
**Chronic Health Hazard:**        \*  
**Flammability:**                    2  
**Physical hazards:**                0

**NFPA Rating**

**Health hazard:**                    4  
**Fire:**                                2  
**Reactivity Hazard:**              0

**Potential Health Effects**

**Inhalation**                        May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.  
**Skin**                                 Harmful if absorbed through skin. Causes skin burns.  
**Eyes**                                 Causes eye burns.  
**Ingestion**                         Harmful if swallowed.

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Synonyms                            : Z-Chloride  
  : Carbobenzoxy chloride  
  
Formula                               : C<sub>8</sub>H<sub>7</sub>ClO<sub>2</sub>  
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	1 - 5 %
EC-No.                             202-853-6	
Index-No.                         602-037-00-3	

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**4. FIRST AID MEASURES**

**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**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. Continue rinsing eyes during transport to hospital.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**5. FIREFIGHTING MEASURES****Conditions of flammability**

Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

**Suitable extinguishing media**

Dry powder

**Special protective equipment for firefighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas, Phosgene

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Wear respiratory protection. 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 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.

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

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.

**Conditions for safe storage**

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

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
Benzyl chloride	100-44-7	TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye, skin, & Upper Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans			
		TWA	1 ppm 5 mg/m <sup>3</sup>	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 ppm 5 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
The value in mg/m <sup>3</sup> is approximate.				

		C	1 ppm 5 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
	15 minute ceiling value			

### 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

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.

#### Eye 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 and 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.

#### 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, clear

Colour light yellow

### Safety data

pH no data available

Melting point/freezing point Melting point/range: -18 °C (0 °F)

Boiling point 152 °C (306 °F)

Flash point 92 °C (198 °F) - closed cup

Ignition temperature no data available

Autoignition temperature no data available

Lower explosion limit no data available

Upper explosion limit no data available

Vapour pressure 95.809 hPa (71.863 mmHg) at 20 °C (68 °F)  
195.065 hPa (146.311 mmHg) at 55 °C (131 °F)

Density 1.217 g/cm<sup>3</sup> at 20 °C (68 °F)

Water solubility no data available

Partition coefficient: n-octanol/water no data available

Relative vapour density 5.89  
- (Air = 1.0)

Odour pungent

Odour Threshold no data available

Evaporation rate no data available

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## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

May decompose on exposure to moist air or water.

Reacts violently with water.

### Conditions to avoid

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

### Materials to avoid

no data available

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas, Phosgene  
Other decomposition products - no data available

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## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

#### Oral LD50

LD50 Oral - rat - 3,000 mg/kg

#### Inhalation LC50

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

#### Dermal LD50

no data available

#### Other information on acute toxicity

no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/eye irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

Carcinogen

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

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

### Reproductive toxicity

no data available

## Teratogenicity

no data available

### Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

### Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

### Aspiration hazard

no data available

### Potential health effects

<b>Inhalation</b>	May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
<b>Ingestion</b>	Harmful if swallowed.
<b>Skin</b>	Harmful if absorbed through skin. Causes skin burns.
<b>Eyes</b>	Causes eye burns.

### Signs and Symptoms of Exposure

Nausea, Shock.

### Synergistic effects

no data available

### Additional Information

RTECS: Not available

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## 12. ECOLOGICAL INFORMATION

### Toxicity

no data available

### Persistence and degradability

no data available

### Bioaccumulative potential

no data available

### Mobility in soil

no data available

### PBT and vPvB assessment

no data available

### Other adverse effects

no data available

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## 13. DISPOSAL CONSIDERATIONS

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

### Contaminated packaging

Dispose of as unused product.

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## 14. TRANSPORT INFORMATION

### DOT (US)

UN number: 1739    Class: 8    Packing group: I  
Proper shipping name: Benzyl chloroformate  
Reportable Quantity (RQ): 6667 lbs  
Marine pollutant: No

Poison Inhalation Hazard: No

**IMDG**

UN number: 1739 Class: 8 Packing group: I EMS-No: F-A, S-B  
Proper shipping name: BENZYL CHLOROFORMATE  
Marine pollutant: Marine pollutant

**IATA**

UN number: 1739 Class: 8 Packing group: I  
Proper shipping name: Benzyl chloroformate  
IATA Passenger: Not permitted for transport

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**15. REGULATORY INFORMATION**

**OSHA Hazards**

Combustible Liquid, Target Organ Effect, Highly toxic by inhalation, Harmful by ingestion., Corrosive, Carcinogen

**SARA 302 Components**

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Benzyl chloride	100-44-7	2007-07-01

**SARA 313 Components**

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benzyl chloride	100-44-7	2007-07-01

**SARA 311/312 Hazards**

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

	CAS-No.	Revision Date
Benzyl chloride	100-44-7	2007-07-01

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
Benzyl chloroformate	501-53-1	2007-03-01
Benzyl chloride	100-44-7	2007-07-01

**New Jersey Right To Know Components**

	CAS-No.	Revision Date
Benzyl chloroformate	501-53-1	2007-03-01
Benzyl chloride	100-44-7	2007-07-01

**California Prop. 65 Components**

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	100-44-7	2007-09-28
Benzyl chloride		

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**16. OTHER INFORMATION**

**Further information**

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