

# Benzyl chloroformate

## Safety Data Sheet 27165X4

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 09/29/2017

Revision date: 12/18/2019

Version: 1.1

### SECTION 1: Identification

#### 1.1. Identification

Product form	: Substance
Substance name	: Benzyl chloroformate
CAS No	: 501-53-1
Product code	: 2716-5-X4
Formula	: C <sub>8</sub> H <sub>7</sub> ClO <sub>2</sub>
Synonyms	: Benzyl carbonochloridoate; Carbobenzoxy chloride; Z-Chloride
Other means of identification	: MFCD00000640

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	: Laboratory chemicals Manufacture of substances Scientific research and development
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#### 1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.  
P.O. Box 309  
Alachua, FL 32615 - United States of America  
T (386) 462-0788 - F (386) 462-7097  
[info@synquestlabs.com](mailto:info@synquestlabs.com) - [www.synquestlabs.com](http://www.synquestlabs.com)

#### 1.4. Emergency telephone number

Emergency number : (844) 523-4086 (3E Company - Account 10069)

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### Classification (GHS-US)

Flam. Liq. 4	H227 - Combustible liquid
Skin Corr. 1B	H314 - Causes severe skin burns and eye damage
Eye Dam. 1	H318 - Causes serious eye damage
Skin Sens. 1	H317 - May cause an allergic skin reaction
Carc. 1B	H350 - May cause cancer
STOT SE 3	H335 - May cause respiratory irritation
STOT RE 2	H373 - May cause damage to organs through prolonged or repeated exposure
Aquatic Acute 1	H400 - Very toxic to aquatic life
Aquatic Chronic 1	H410 - Very toxic to aquatic life with long lasting effects

Full text of H-phrases: see section 16

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H227 - Combustible liquid  
H314 - Causes severe skin burns and eye damage  
H317 - May cause an allergic skin reaction  
H335 - May cause respiratory irritation  
H350 - May cause cancer  
H373 - May cause damage to organs through prolonged or repeated exposure  
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) :

P201 - Obtain special instructions before use  
P202 - Do not handle until all safety precautions have been read and understood  
P210 - Keep away from heat/sparks/open flames/hot surfaces. No smoking  
P260 - Do not breathe fumes, mist, spray, vapors  
P264 - Wash skin thoroughly after handling  
P271 - Use only outdoors or in a well-ventilated area

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P272 - Contaminated work clothing must not be allowed out of the workplace  
P273 - Avoid release to the environment  
P280 - Wear protective gloves/protective clothing/eye protection/face protection  
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting  
P302+P352 - If on skin: Wash with plenty of soap and water  
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower  
P304+P340 - If inhaled: Remove person to fresh air and keep 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  
P308+P313 - If exposed or concerned: Get medical advice/attention  
P310 - Immediately call a POISON CENTER or doctor/ physician  
P314 - Get medical advice/attention if you feel unwell  
P321 - Specific treatment (see supplemental first aid instructions on this label)  
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention  
P363 - Wash contaminated clothing before reuse  
P370+P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish  
P391 - Collect spillage  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed  
P403+P235 - Store in a well-ventilated place. Keep cool  
P405 - Store locked up  
P501 - Dispose of contents/container to an approved waste disposal plant

### 2.3. Other hazards

Other hazards not contributing to the classification : Lachrymator.

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Substance type : Mono-constituent

Name	Product identifier	%	Classification (GHS-US)
Benzyl chloroformate (Main constituent)	(CAS No) 501-53-1	<= 100	Flam. Liq. 4, H227 Skin Corr. 1B, H314 Eye Dam. 1, H318 Skin Sens. 1, H317 Carc. 1B, H350 STOT SE 3, H335 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of H-phrases: see section 16

### 3.2. Mixture

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.

First-aid measures after skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.

### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

Symptoms/injuries after inhalation : Material is destructive to tissue of the mucous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

### 4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

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### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire.

#### 5.2. Special hazards arising from the substance or mixture

Fire hazard : Thermal decomposition generates: Carbon oxides. Hydrogen chloride.  
Explosion hazard : Risk of explosion if heated under confinement. Use water spray or fog for cooling exposed containers. May form flammable/explosive vapor-air mixture.  
Reactivity : Reacts with water, generates gases or heat. Reacts on exposure to water with some metals to release highly explosive/flammable hydrogen gas.

#### 5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.  
Protection during firefighting : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate unnecessary personnel. Ensure adequate air ventilation. Do not breathe gas, fumes, vapor or spray.

##### 6.1.1. For non-emergency personnel

Emergency procedures : Only qualified personnel equipped with suitable protective equipment may intervene.

##### 6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".  
Emergency procedures : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level. Consider the risk of potentially explosive atmospheres. Eliminate every possible source of ignition.

#### 6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

#### 6.3. Methods and material for containment and cleaning up

For containment : Stop leak if safe to do so. Dike for recovery or absorb with appropriate material.  
Methods for cleaning up : Take up large spills with pump or vacuum and finish with dry chemical absorbent. Use explosion-proof equipment. Take up small spills with dry chemical absorbent. Sweep or shovel spills into appropriate container for disposal. Ventilate area.  
Other information : For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

#### 6.4. Reference to other sections

No additional information available

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapors are flammable.  
Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes. Keep away from ignition sources (including static discharges). Proper grounding procedures to avoid static electricity should be followed. Use only non-sparking tools.  
Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

#### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.  
Storage conditions : Keep container closed when not in use. Keep away from ignition sources. Moisture sensitive. Keep contents under inert gas.  
Incompatible materials : Refer to Section 10 on Incompatible Materials.  
Storage temperature : 2 - 8 °C Use explosion proof refrigerator  
Heat-ignition : Heat sensitive.  
Prohibitions on mixed storage : Do not store with: Water.

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Storage area : Store in dry, well-ventilated area.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

No additional information available

#### 8.2. Exposure controls

Appropriate engineering controls : Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Hand protection : Protective gloves. 29 CFR 1910.138: Hand Protection.

Eye protection : Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.

Skin and body protection : Wear suitable protective clothing.

Respiratory protection : In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection.

Other information : Safety shoes. 29 CFR 1910.136: Foot Protection.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : Colorless liquid.

Color : Colorless

Odor : sharp Irritating

Odor threshold : No data available

pH : No data available

Melting point : No data available

Freezing point : No data available

Boiling point : 152 °C

Flash point : 126 °C

Relative evaporation rate (butyl acetate=1) : No data available

Flammability (solid, gas) : No data available

Explosion limits : No data available

Explosive properties : No data available

Oxidizing properties : No data available

Vapor pressure : 1.39 psig (@ 20 °C)

Relative density : No data available

Relative vapor density at 20 °C : No data available

Specific gravity / density : 1.195 g/ml (@ 25 °C)

Molecular mass : 170.59 g/mol

Solubility : No data available

Log Pow : No data available

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Viscosity : No data available

Viscosity, kinematic : No data available

Viscosity, dynamic : No data available

#### 9.2. Other information

Refractive index : 1.519 (@ 20 °C)

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Reacts with water, generates gases or heat. Reacts on exposure to water with some metals to release highly explosive/flammable hydrogen gas.

#### 10.2. Chemical stability

Stabilized product: 1000 ppm sodium carbonate.

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### 10.3. Possibility of hazardous reactions

No additional information available

### 10.4. Conditions to avoid

Keep away from heat, sparks and flame. Moisture.

### 10.5. Incompatible materials

Acids. Alcohols. Amines. Bases. Strong oxidizing agents. Water.

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Not classified

Benzyl chloroformate (501-53-1)	
LD50 oral rat	3 g/kg
LC50 inhalation rat (mg/l)	590 mg/m <sup>3</sup> (Exposure time: 4 h)
ATE US (oral)	3000.000 mg/kg body weight

Skin corrosion/irritation : Causes severe skin burns and eye damage.

Serious eye damage/irritation : Causes serious eye damage.

Respiratory or skin sensitization : May cause an allergic skin reaction.

Germ cell mutagenicity : Not classified

Carcinogenicity : May cause cancer.

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : May cause respiratory irritation.

Specific target organ toxicity (repeated exposure) : May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard : Not classified

Symptoms/injuries after inhalation : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

## SECTION 12: Ecological information

### 12.1. Toxicity

No additional information available

### 12.2. Persistence and degradability

No additional information available

### 12.3. Bioaccumulative potential

No additional information available

### 12.4. Mobility in soil

No additional information available

### 12.5. Other adverse effects

No additional information available

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Waste treatment methods : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.

Waste disposal recommendations : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Additional information : Recycle the material as far as possible.

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### SECTION 14: Transport information

#### Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1739 Benzyl chloroformate, 8, I

UN-No.(DOT) : UN1739

Proper Shipping Name (DOT) : Benzyl chloroformate

Transport hazard class(es) (DOT) : 8 - Class 8 - Corrosive material 49 CFR 173.136

Hazard labels (DOT) : 8 - Corrosive



Packing group (DOT) : I - Great Danger

Dangerous for the environment : Yes

Marine pollutant : Yes



DOT Packaging Non Bulk (49 CFR 173.xxx) : 201

DOT Packaging Bulk (49 CFR 173.xxx) : 243

DOT Special Provisions (49 CFR 172.102) : A3 - For combination packaging, if glass inner packaging (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packaging.  
A6 - For combination packaging, if plastic inner packaging are used, they must be packed in tightly closed metal receptacles before packing in outer packaging.  
B4 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized.  
N41 - Metal construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.  
T10 - 4 6 mm Prohibited 178.275(g)(3).  
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where:  $t_r$  is the maximum mean bulk temperature during transport,  $t_f$  is the temperature in degrees celsius of the liquid during filling, and  $a$  is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling ( $t_f$ ) and the maximum mean bulk temperature during transportation ( $t_r$ ) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where:  $d_{15}$  and  $d_{50}$  are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.  
TP12 - This material is considered highly corrosive to steel.  
TP13 - Self-contained breathing apparatus must be provided when this hazardous material is transported by sea.

DOT Packaging Exceptions (49 CFR 173.xxx) : None

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 2.5 L

DOT Vessel Stowage Location : D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Emergency Response Guide (ERG) Number : 137

Other information : No supplementary information available.

#### TDG

No additional information available

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### Transport by sea

UN-No. (IMDG) : 1739  
Proper Shipping Name (IMDG) : BENZYL CHLOROFORMATE  
Class (IMDG) : 8 - Corrosive substances  
Packing group (IMDG) : I - substances presenting high danger

### Air transport

UN-No. (IATA) : 1739  
Proper Shipping Name (IATA) : Benzyl chloroformate  
Class (IATA) : 8 - Corrosives  
Packing group (IATA) : I - Great Danger

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### Benzyl chloroformate (501-53-1)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

### 15.2. International regulations

#### CANADA

#### Benzyl chloroformate (501-53-1)

Listed on the Canadian DSL (Domestic Substances List)

### EU-Regulations

No additional information available

### National regulations

#### Benzyl chloroformate (501-53-1)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on the Canadian IDL (Ingredient Disclosure List)  
Listed on INSQ (Mexican national Inventory of Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### 15.3. US State regulations

#### Benzyl chloroformate (501-53-1)

State or local regulations	U.S. - New Jersey - Right to Know Hazardous Substance List
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California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

## SECTION 16: Other information

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### Full text of H-phrases:

Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Carc. 1B	Carcinogenicity Category 1B
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Flam. Liq. 4	Flammable liquids Category 4
Skin Corr. 1B	Skin corrosion/irritation Category 1B
Skin Sens. 1	Skin sensitization Category 1
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H227	Combustible liquid
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H318	Causes serious eye damage
H335	May cause respiratory irritation
H350	May cause cancer
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
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### NFPA health hazard

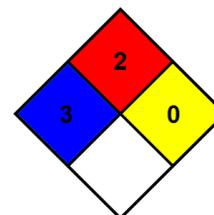
: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

### NFPA fire hazard

: 2 - Must be moderately heated or exposed to relatively high temperatures before ignition can occur.

### NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



### HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

\* - Chronic (long-term) health effects may result from repeated overexposure

### Flammability

: 2 Moderate Hazard - Materials which must be moderately heated or exposed to high ambient temperatures before ignition will occur. Includes liquids having a flash point at or above 100 F but below 200 F. (Classes II & IIIA)

### Physical

: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

### SDS US (GHS HazCom 2012)

*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 offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable for any damage resulting from handling or from contact with the above product.*