Material Safety Data Sheet
Benzyl chloroformate, 50 wt% solution in toluene

ACC# 99390

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzyl chloroformate, 50 wt% solution in toluene
Catalog Numbers: AC124495000, AC9585179, AC9591482, XXAC124491LT, XXAC124492.5
Synonyms: Carbobenzoxy chloride; Carbonochloride acid benzylester.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
108-88-3	Toluene	50	203-625-9
501-53-1	Benzyl chloroformate	50	207-925-0

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear slightly yellow liquid. Flash Point: 7 deg C.
Danger! Causes eye and skin burns. Causes digestive and respiratory tract burns. **Flammable liquid and vapor.** Lachrymator (substance which increases the flow of tears). Harmful or fatal if swallowed. Vapor harmful. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system depression. May cause liver and kidney damage. May cause cardiac disturbances. Moisture sensitive.
Target Organs: Kidneys, heart, central nervous system, liver.

Potential Health Effects

Eye: Causes eye burns. Lachrymator (substance which increases the flow of tears).
Skin: Causes skin burns.
Ingestion: Aspiration hazard. May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May be harmful if swallowed. Causes digestive tract irritation with possible burns.
Inhalation: May cause liver and kidney damage. May cause cardiac sensitization and possible failure. Causes chemical burns to the respiratory tract. May cause drowsiness, unconsciousness, and central nervous system depression.
Chronic: Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Remove contaminated clothing and shoes. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Containers may explode in the heat of a fire. Flammable liquid and vapor. May be ignited by heat, sparks, and flame. Substance may react with water, and may release corrosive and/or toxic gases.
Extinguishing Media: Do NOT use water directly on fire. For large fires, use water spray, fog or regular foam. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: 7 deg C (44.60 deg F)
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 4; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation. Do not get water inside containers. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture. Storage at 2-8C is recommended.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Toluene	50 ppm TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	100 ppm TWA; 375 mg/m3 TWA 500 ppm IDLH	200 ppm TWA; 300 ppm Ceiling
Benzyl chloroformate	none listed	none listed	none listed

OSHA Vacated PELs: Toluene: 100 ppm TWA; 375 mg/m3 TWA Benzyl chloroformate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear slightly yellow
Odor: toluene-like odor
pH: Not available.
Vapor Pressure: 2 mmHg @ 78 C
Vapor Density: 1
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature:> 100 deg C
Solubility: decomposes in water
Specific Gravity/Density:1.0100g/cm3
Molecular Formula: Not applicable.
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, moisture, excess heat.
Incompatibilities with Other Materials: Acids (mineral, oxidizing, e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), oxidizing agents (strong, e.g. bromine, hydrogen peroxide, nitrogen dioxide, potassium nitrate), water reactive substances (e.g. acetic anyhdride, alkyl aluminum chloride, calcium carbide, ethyl dichlorosilane), iron salts.
Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 108-88-3: XS5250000
CAS# 501-53-1: LQ5860000

LD50/LC50:
CAS# 108-88-3:
Draize test, rabbit, eye: 870 ug Mild;
Draize test, rabbit, eye: 2 mg/24H Severe;
Draize test, rabbit, skin: 435 mg Mild;
Draize test, rabbit, skin: 500 mg Moderate;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, mouse: LC50 = 400 ppm/24H;
Inhalation, mouse: LC50 = 30000 mg/m3/2H;
Inhalation, mouse: LC50 = 19900 mg/m3/7H;
Inhalation, mouse: LC50 = 10000 mg/m3;
Inhalation, rat: LC50 = 49 gm/m3/4H;
Oral, rat: LD50 = 636 mg/kg;
Skin, rabbit: LD50 = 14100
CAS# 501-53-1:
Inhalation, rat: LC50 = 590 mg/m3/4H;
Oral, rat: LD50 = 3 gm/kg;
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Carcinogenicity:
CAS# 108-88-3: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 501-53-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: In an epidemiologic study of toluene and pregnancy, occupational exposures to toluene were said to be associated with an increased incidence of renal, urinary, gastrointestinal, and cardiac anomalies.Fetotoxicity (reduced fetal weight), behavioural effects (effects on learning and memory) and hearing loss (in males) were observed in the offspring of rats exposed by inhalation to toluene, in the absence of maternal toxicity.
Reproductive Effects: Many reports of reproductive effects of toluene abuse or heavy occupational exposure are confounded by mixed solvent exposure or fetal alcohol syndrome. Women exposed to toluene in lab work had a 4.7-fold increased risk of spontaneous abortions.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. Cas# 108-88-3:LC50(96Hr.) = 24.0 mg/L Rainbow troutLC50(96Hr) = 24.0 mg/L BluegillEC50(48Hr) = 310-313 mg/L Photobacterium phosphoreum
Environmental: If toluene is released to soil, it will be lost by evaporation from near-surface soil and by leaching to the groundwater. Biodegradation occurs both in soil and groundwater, but it is apt to be slow especially at high concentrations, which may be toxic to microorganisms. The presence of acclimated microbial populations may allow rapid biodegradation. It will not significantly hydrolyze in soil or water under normal environmental conditions.
Physical: If toluene is released to the atmosphere, it will exist predominatly in the vapor phase. It degrades moderately rapidly by reaction with photochemically produced hydroxyl radicals. Its half-life ranges from 3 hrs to somewhat over a day. It is very effectively washed out by rain. It will not be subject to direct photolysis in sunlight, although a complex of toluene with molecular oxygen has been shown to absorb light at wavelengths >290nm.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 108-88-3: waste number U220.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	CORROSIVE LIQUIDS, FLAMMABLE, N.O.S.	No information available.
Hazard Class:	8	
UN Number:	UN2920	
Packing Group:	I	

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 108-88-3 is listed on the TSCA inventory.
CAS# 501-53-1 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 108-88-3: Effective 10/4/82, Sunset 10/4/92
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.

Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 108-88-3: 1000 lb final RQ; 454 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 108-88-3: immediate, fire.
CAS # 501-53-1: immediate, fire, reactive.
Section 313
This material contains Toluene (CAS# 108-88-3, 50%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 108-88-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 108-88-3 is listed as a Hazardous Substance under the CWA. CAS# 108-88-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 108-88-3 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 108-88-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 501-53-1 can be found on the following state right to know lists: New Jersey.

California Prop 65
WARNING: This product contains Toluene, a chemical known to the state of California to cause developmental reproductive toxicity.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
F C N
Risk Phrases:
R 11 Highly flammable.
R 34 Causes burns.
R 20 Harmful by inhalation.
R 63 Possible risk of harm to the unborn child.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:
S 16 Keep away from sources of ignition - No smoking.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37 Wear suitable protective clothing and gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 7 Keep container tightly closed.
S 60 This material and its container must be disposed of as hazardou s waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)
CAS# 108-88-3: 2
CAS# 501-53-1: No information available.
Canada - DSL/NDSL
CAS# 108-88-3 is listed on Canada's DSL List.
CAS# 501-53-1 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of E, B2.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 108-88-3 is listed on the Canadian Ingredient Disclosure List.
CAS# 501-53-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 5/20/1999
Revision #5 Date: 10/03/2005