

SAFETY DATA SHEET

1. Identification

Product identifier	Benzyl Chloroformate
Other means of identification	Not available.
Recommended use	Industrial chemical.
Recommended restrictions	None known.
Manufacturer / Importer / Supplier / Distributor information	
Manufacturer	VanDeMark Chemical Inc.
Address	1 North Transit Road, Lockport, NY 14094 USA
Telephone	716-433-6764
e-mail	sales@vdmchemical.com
Emergency telephone	CHEMTREC 1-800-424-9300 (North America)

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, inhalation	Category 3
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Carcinogenicity	Category 1B
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA hazard(s)	Not classified.	

Label elements

Hazard symbol



Signal word

Danger

Hazard statement

Toxic if inhaled. Causes severe skin burns and eye damage. May cause cancer. May cause respiratory irritation.

Precautionary statement

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling.

Response

If inhaled: Remove person to fresh air and keep comfortable for breathing. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. If exposed or concerned: Get medical advice/attention.

Storage

Store locked up. Store in a well-ventilated place. Keep container tightly closed.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)

Not classified.

Environmental hazards

Hazardous to the aquatic environment, acute hazard	Category 1
Hazardous to the aquatic environment, long-term hazard	Category 1

3. Composition/information on ingredients

Substance

Hazardous components			
Chemical name	Common name and synonyms	CAS number	%
Benzyl chloroformate		501-53-1	>= 98

Constituents			
Chemical name		CAS number	%
Benzyl chloride		100-44-7	=< 1.5

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation	Move injured person into fresh air and keep person calm under observation. Get medical attention immediately.
Skin contact	Immediately flush with plenty of water for at least 15 minutes. Get immediate medical attention. Chemical burns must be treated by a physician.
Eye contact	Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention immediately. Continue to rinse.
Ingestion	Immediately rinse mouth and drink plenty of water. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Get medical attention immediately.
Most important symptoms/effects, acute and delayed	Causes skin and eye burns.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	First aid personnel must be aware of own risk during rescue.

5. Fire-fighting measures

Suitable extinguishing media	Foam. Carbon Dioxide. Dry powder.
Unsuitable extinguishing media	Water. Contact with water liberates toxic gas.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire-fighting equipment/instructions	Use standard firefighting procedures and consider the hazards of other involved materials. Move container from fire area if it can be done without risk. Keep upwind.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Provide adequate ventilation. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Wear necessary protective equipment. See Section 8 of the MSDS for Personal Protective Equipment.
Methods and materials for containment and cleaning up	Absorb spillage with suitable absorbent material. Collect in containers and seal securely. Large Spillages: Dike far ahead of liquid spill for later disposal.
Environmental precautions	Do not allow to enter drains, sewers or watercourses.

7. Handling and storage

Precautions for safe handling	Mechanical ventilation or local exhaust ventilation is required. Avoid inhalation of vapors and spray mist and contact with skin and eyes. Wear appropriate personal protective equipment. Wash thoroughly after handling. Contaminated clothing and shoes must be discarded. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store at temperature at or below -15°C (5°F) in a dry, well-ventilated location. All equipment and storage vessels must be constructed of Teflon or glass-lined steel. Keep container tightly closed. Protect from sunlight and avoid any contact with iron. Product is stable when stored properly at recommended storage temperature. Storage in recommended temperatures and conditions will ensure product quality for minimum 12 months before retesting may be needed to determine assay. Storage in conditions between -15°C (5°F) and -5°C (23°F) may require retesting after 6 months to determine assay. Storage above 0°C (32°F) not recommended.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Constituents	Type	Value
Benzyl chloride (CAS 100-44-7)	PEL	5 mg/m ³ 1 ppm

US. ACGIH Threshold Limit Values

Constituents	Type	Value
Benzyl chloride (CAS 100-44-7)	TWA	1 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Constituents	Type	Value
Benzyl chloride (CAS 100-44-7)	Ceiling	5 mg/m ³ 1 ppm

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Provide adequate ventilation. Observe occupational exposure limits and minimize the risk of inhalation of vapors and mist. Provide easy access to water supply and eye wash facilities.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Use safety goggles and face shield in case of splash risk.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Glove material: Fluoro carbon rubber (0.4 mm). Be aware that the liquid may penetrate the gloves. Frequent change is advisable. The most suitable glove must be chosen in consultation with the gloves supplier, who can inform about the breakthrough time of the glove material.
Other	Wear appropriate chemical resistant clothing.
Respiratory protection	Wear suitable respiratory protection. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.
Thermal hazards	When material is heated, wear gloves to protect against thermal burns.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance	Clear liquid.
Physical state	Liquid.
Form	Liquid.
Color	Clear.
Odor	Pungent.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	305.6 °F (152 °C)
Flash point	258.8 °F (126 °C)
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.

Vapor density	Not available.
Relative density	1.217 (20 °C)
Solubility(ies)	Not available.
Partition coefficient (n-octanol/water)	
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	Water reactive material.
Chemical stability	Decomposes on heating. Decomposes in the presence of water.
Possibility of hazardous reactions	Thermal decomposition or combustion may liberate toxic gases or fumes. Contact with water liberates toxic gas.
Conditions to avoid	Heat. Moisture. Exposure to air.
Incompatible materials	Water. Iron. Acids. Bases. Alcohols. Metal salts.
Hazardous decomposition products	Hydrogen chloride. Benzyl alcohol.

11. Toxicological information

Information on likely routes of exposure

Ingestion	May cause burns of the gastrointestinal tract if swallowed.
Inhalation	Vapors irritate the respiratory system, and may cause coughing and difficulties in breathing.
Skin contact	Corrosive effects. Causes skin burns.
Eye contact	Corrosive. Prolonged contact causes serious eye and tissue damage.

Symptoms related to the physical, chemical and toxicological characteristics
 Contact with this material will cause burns to the skin, eyes and mucous membranes. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity Toxic if inhaled.

Product	Species	Test Results
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Benzyl chloroformate (CAS 501-53-1)

Acute

Inhalation

LC50 Rat 590 mg/m³, 4 hours

Oral

LD50 Rat 3 g/kg

Constituents	Species	Test Results
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Benzyl chloride (CAS 100-44-7)

Acute

Inhalation

LC50 Rat 0.74 mg/l, 4 hours

Oral

LD50 Rat 340 mg/kg

Skin corrosion/irritation Causes severe skin burns.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory sensitization No data available.

Skin sensitization No data available.

Germ cell mutagenicity No data available.

Carcinogenicity May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzyl chloride (CAS 100-44-7) 2A Probably carcinogenic to humans.

Reproductive toxicity No data available.

Specific target organ toxicity - single exposure May cause respiratory irritation.

Specific target organ toxicity - repeated exposure	No data available.
Aspiration hazard	No data available.
Chronic effects	Frequent inhalation of dust over a long period of time increases the risk of developing lung diseases.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Constituents		Species	Test Results
Benzyl chloride (CAS 100-44-7)			
Aquatic			
Crustacea	EC50	Daphnia magna	1.3 mg/l, 24 hours
Fish	LC50	Fathead minnow (<i>Pimephales promelas</i>)	4.4 - 5.6 mg/l, 96 hours
		Zebra danio (<i>Danio rerio</i>)	4 mg/l, 96 hours
Other			
Micro-organisms	EC50	Micro-organisms	2.97 mg/l, 30 minutes
			2.25 mg/l, 15 minutes
			1.92 mg/l, 5 minutes

Persistence and degradability Decomposes in the presence of water.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Benzyl chloride 2.3

Mobility in soil Not available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Dispose of in accordance with all applicable regulations. Do not discharge into drains, water courses or onto the ground.

Local disposal regulations Dispose of in accordance with local regulations.

Hazardous waste code D003: Waste Reactive material

Waste from residues / unused products Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

Contaminated packaging Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number	UN1739
UN proper shipping name	Benzyl chloroformate, MARINE POLLUTANT
Transport hazard class(es)	8
Subsidiary class(es)	Not available.
Packing group	I
Special precautions for user	Not available.
Labels required	8
Special provisions	A3, A6, B4, N41, T10, TP2, TP12, TP13
Packaging exceptions	None
Packaging non bulk	201
Packaging bulk	243

IATA

UN number	UN1739
UN proper shipping name	Benzyl chloroformate
Transport hazard class(es)	8
Subsidiary class(es)	-
Packaging group	I
Environmental hazards	Yes
Labels required	8
ERG Code	8L
Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.

IMDG

UN number	UN1739
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UN proper shipping name BENZYL CHLOROFORMATE, MARINE POLLUTANT
Transport hazard class(es) 8
Subsidiary class(es) -
Packaging group I
Environmental hazards
Marine pollutant Yes
Labels required 8
EmS F-A, S-B
Special precautions for user Read safety instructions, MSDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not on regulatory list.

CERCLA Hazardous Substance List (40 CFR 302.4)

Benzyl chloride (CAS 100-44-7) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - Yes

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzyl chloride (CAS 100-44-7)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Benzyl chloride (CAS 100-44-7) 8570

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Benzyl chloride (CAS 100-44-7) 20 %WV

DEA Exempt Chemical Mixtures Code Number

Benzyl chloride (CAS 100-44-7) 8568

Food and Drug Administration (FDA) Not regulated.

US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Benzyl chloride (CAS 100-44-7)

US. New Jersey Worker and Community Right-to-Know Act

Benzyl chloride (CAS 100-44-7) 500 LBS

US. Pennsylvania RTK - Hazardous Substances

Benzyl chloride (CAS 100-44-7)

US. Rhode Island RTK

Benzyl chloride (CAS 100-44-7)

US. California Proposition 65**US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance**

Benzyl chloride (CAS 100-44-7)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date	10-12-2012
Revision date	10-12-2012
Version #	03
Further information	Not available.
References	ECHA CHEM International Chemical Safety Cards (ICSC) GESTIS Substance Database

Disclaimer This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.