

SAFETY DATA SHEET


1. Identification

Product identifier	Benzyl Chloroformate
Other means of identification	None.
Recommended use	Industrial chemical. Chemical intermediate.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company name	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) +1-703-527-3887 (International)

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 4
Health hazards	Acute toxicity, oral	Category 3
	Acute toxicity, inhalation	Category 2
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Carcinogenicity	Category 1B
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, repeated exposure (oral)	Category 2 (heart, stomach)
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	
Label elements		

Signal word	Danger
Hazard statement	Combustible liquid. Toxic if swallowed. Causes severe skin burns and eye damage. Fatal if inhaled. May cause respiratory irritation. May cause cancer. May cause damage to organs (heart, stomach) through prolonged or repeated exposure by ingestion. Very toxic to aquatic life with long lasting effects.
Precautionary statement	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from open flames/hot surfaces. - No smoking. Do not breathe mist/vapors. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection.
Response	If swallowed: Immediately call a poison center/doctor. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. 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. Wash contaminated clothing before reuse. In case of fire: Use appropriate media to extinguish. Collect spillage.

Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Keep cool.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	Contact with acids liberates toxic gas.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
Benzyl chloroformate		501-53-1	> 98.5

Impurities

Chemical name	Common name and synonyms	CAS number	%
Benzyl chloride		100-44-7	< 1.5

Composition comments All concentrations are in percent by weight unless otherwise indicated. Occupational Exposure Limits for impurities are listed in Section 8.

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.
Skin contact	Remove contaminated clothing immediately and wash skin with soap and water. Call a physician or poison control center immediately. Chemical burns must be treated by a physician.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Foam. Dry powder. Carbon dioxide (CO ₂).
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. Combustion products may include: carbon oxides, hydrogen chloride, phosgene.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Keep upwind. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers. Do not get water inside container or in contact with the material. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Avoid discharge into drains, water courses or onto the ground.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	May develop highly toxic or corrosive fumes if heated.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Collect runoff for disposal as potential hazardous waste.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Mechanical ventilation or local exhaust ventilation is required. Do not breathe mist/vapors. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. 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.

Store locked up. Store in tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS). Protect from moisture.

8. Exposure controls/personal protection

Occupational exposure limits

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

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

US. ACGIH Threshold Limit Values

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

US. NIOSH: Pocket Guide to Chemical Hazards

Impurities	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

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

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. Full contact: Glove material: Fluoro carbon rubber; Layer thickness: 0.7 mm; Breakthrough time: 480 min. Incidental contact: Use gloves with breakthrough time of 480 minutes. Minimum glove thickness 0.7 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.
Skin protection	
Other	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
Respiratory protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Wear NIOSH approved respirator appropriate for airborne exposure at the point of use. Appropriate respirator selection should be made by a qualified professional.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Observe any medical surveillance requirements. Keep away from food and drink. 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

Physical state	Liquid.
Form	Clear liquid.
Color	Light yellow.
Odor	Acrid. Pungent.
Odor threshold	Not determined.
pH	5.5 10% Concentration
Melting point/freezing point	-22 °F (-30 °C)
Initial boiling point and boiling range	305.6 °F (152 °C)
Flash point	197.6 °F (92 °C) Closed Cup
Evaporation rate	Not determined.
Flammability (solid, gas)	Not applicable.

Upper/lower flammability or explosive limits

Explosive limit - lower (%)	Not determined.
Explosive limit - upper (%)	Not determined.

Vapor pressure	7 mmHg (85°C)
Vapor density	5.89 (20°C)
Relative density	1.217 (68 °F (20 °C))

Solubility(ies)

Solubility (water)	Insoluble.
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Partition coefficient (n-octanol/water)	Not determined.
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Auto-ignition temperature	Not determined.
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Decomposition temperature	Not determined.
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Viscosity	2.57 mm ² /s
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Viscosity temperature	68 °F (20 °C)
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Other information

Explosive properties	Not explosive.
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Kinematic viscosity	2.57 mm ² /s
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Kinematic viscosity temperature	68 °F (20 °C)
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Oxidizing properties	Not oxidizing.
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Surface tension 25 mN/m (68 °F (20 °C))

10. Stability and reactivity

Reactivity	Water reactive material.
Chemical stability	Decomposes on heating. Decomposes in the presence of water.
Possibility of hazardous reactions	If heated to decomposition, emits corrosive and toxic fumes. Reacts with water and moisture in air liberating hydrogen chloride.
Conditions to avoid	Heat. Moisture. Exposure to air.
Incompatible materials	Water. Iron. Acids. Bases. Alcohols. Amines. Metal salts.
Hazardous decomposition products	Slowly decomposed by moisture. Thermal decomposition can produce hydrogen chloride, phosgene.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Fatal if inhaled.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Toxic if swallowed. Causes digestive tract burns. May cause damage to organs through prolonged or repeated exposure by ingestion.

Symptoms related to the physical, chemical and toxicological characteristics Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation. Prolonged exposure may cause chronic effects.

Information on toxicological effects

Acute toxicity Fatal if inhaled. Toxic if swallowed.

Toxicological data

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

Acute

Inhalation

LC50	Rat	0.74 mg/l, 4 hours
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Oral

LD50	Rat	340 mg/kg
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Skin corrosion/irritation Causes severe skin burns.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization Based on available data, the classification criteria are not met.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

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

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

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

Specific target organ toxicity - repeated exposure May cause damage to organs (heart, stomach) through prolonged or repeated exposure by ingestion.

Aspiration hazard Not an aspiration hazard.

Chronic effects May cause damage to organs through prolonged or repeated exposure.

Further information May be absorbed through the skin in harmful amounts.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Impurities		Species	Test Results
Benzyl chloride (CAS 100-44-7)			
Aquatic			
Crustacea	EC50	Daphnia magna	1.3 mg/l, 24 hours
<i>Acute</i>			
Fish	LC50	Fathead minnow (Pimephales promelas)	>= 4.4 - <= 5.6 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 No data is available on the degradability of this substance.

Bioaccumulative potential No data available.

Mobility in soil The product is insoluble in water. Expected to have low mobility in soil.

Other adverse effects This product contains one or more substances which may be hazardous air pollutants (HAPs).

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1739
UN proper shipping name	Benzyl chloroformate
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	I
Environmental hazards	
Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
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)	
Class	8

Subsidiary risk -
Packing group I
Environmental hazards Yes
ERG Code 8L
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

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

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

General information IMDG Regulated Marine Pollutant. DOT Regulated Marine Pollutant.

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.

CERCLA Hazardous Substance List (40 CFR 302.4)

Benzyl chloride (CAS 100-44-7) Listed.

SARA 304 Emergency release notification

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

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Toxic Substances Control Act (TSCA) This substance is on the TSCA 8(b) inventory and is designated "active".

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Benzyl chloride	100-44-7	100	500		

SARA 311/312 Hazardous chemical

Classified hazard categories Flammable (gases, aerosols, liquids, or solids)
 Acute toxicity (any route of exposure)
 Serious eye damage or eye irritation
 Carcinogenicity
 Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Benzyl chloride	100-44-7	< 1.5

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) Contains component(s) regulated under the Safe Drinking Water Act.

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

US state regulations

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)
Benzyl chloroformate (CAS 501-53-1)

US. Pennsylvania Worker and Community Right-to-Know Law

Benzyl chloride (CAS 100-44-7)

US. Rhode Island RTK

Benzyl chloride (CAS 100-44-7)

California Proposition 65



WARNING: This product can expose you to Benzyl chloride, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzyl chloride (CAS 100-44-7) Listed: January 1, 1990

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Benzyl chloride (CAS 100-44-7)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	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
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

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

Issue date	12-October-2012
Revision date	20-March-2023
Version #	04
HMIS® ratings	Health: 3* Flammability: 1 Physical hazard: 1

NFPA ratings**Disclaimer**

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