Material Safety Data Sheet

NFPA | HMIS | PPE | Transport Symbol
--- | --- | --- | ---
2 | 3* | [Icon of protective equipment] | [Icon of toxic symbol]
3 | 2 | 1

*Indicates a chronic health hazard.

**Issuing Date:** 05-Feb-2009

**Revision Date:**

**Revision Number:** 0

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1. **PRODUCT AND COMPANY IDENTIFICATION**

**Product Name:** Cyclopentyl Chloroformate

**UN-No:** UN2742

**Recommended Use:** Intermediate.

**Supplier Address**
VanDeMark Chemical, Inc.
1 North Transit Road
Lockport, NY 14094
Telephone: 716-433-6764

**Company Emergency Phone Number:** 716-433-6764

**Emergency Telephone Number:** Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US
2. HAZARDS IDENTIFICATION

**WARNING!**

**Emergency Overview**
Harmful by inhalation
May cause pulmonary edema
Pulmonary edema can be fatal
Harmful if swallowed
May be harmful if absorbed through skin
Irritant
May produce an allergic reaction
May cause sensitization by skin contact
Vapors may be irritating to eyes, nose, throat, and lungs

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Colorless</th>
<th>Physical State</th>
<th>Liquid.</th>
<th>Odor</th>
<th>Acrid</th>
</tr>
</thead>
</table>

**OSHA Regulatory Status**
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Potential Health Effects**
**Principle Routes of Exposure**
Inhalation, Skin contact, Eye contact.

**Acute Toxicity**
**Eyes**
Severely irritating to eyes. May cause burns.

**Skin**
May be harmful in contact with skin. May cause skin irritation and/or dermatitis. May cause sensitization by skin contact.

**Inhalation**
Harmful by inhalation. Irritating to respiratory system. Contact with moist mucous membranes of the respiratory system can cause caustic condition resulting in burns. Inhalation of vapors in high concentration may cause shortness of breath (lung edema). Pulmonary edema can be fatal.

**Ingestion**
Harmful if swallowed. Ingestion causes burns of the upper digestive and respiratory tract. Aspiration may cause pulmonary edema and pneumonitis. May cause additional affects as listed under "Inhalation".

**Chronic Effects**
Avoid repeated exposure. Prolonged exposure may cause chronic effects. May produce an allergic reaction. Repeated inhalation of vapors may cause irritation of respiratory tract or bronchitis.

**Aggravated Medical Conditions**
Allergies, Skin disorders, Respiratory disorders.

**Environmental Hazard**
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

**Formula**
C6H9ClO2

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclopentyl chloroformate</td>
<td>50715-28-1</td>
<td>&gt;=95</td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

General Advice
Immediate medical attention is required. Show this safety data sheet to the doctor in attendance. If symptoms persist, call a physician.

Eye Contact
Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Call a physician immediately.

Skin Contact
Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Inhalation
Call a physician or Poison Control Center immediately. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation.

Ingestion
Call a physician or Poison Control Center immediately. Remove from exposure, lie down. Clean mouth with water and afterwards drink plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.

Notes to Physician
May cause sensitization of susceptible persons. Use of epinephrine may be indicated. Treat symptomatically.

Protection of First-aiders
Use personal protective equipment. Avoid contact with skin, eyes and clothing. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Remove all sources of ignition.

5. FIRE-FIGHTING MEASURES

Flammable Properties
Flammable; may be ignited by heat, sparks or flames.

Flash Point
42.5°C

Suitable Extinguishing Media
Carbon dioxide (CO₂). Dry powder. Dry chemical. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
Water.

Hazardous Combustion Products
Cyclopentyl alcohol, Hydrogen chloride, Chlorine gas, Carbon oxides.

Explosion Data

<table>
<thead>
<tr>
<th>Sensitivity to Mechanical Impact</th>
<th>Sensitivity to Static Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

Specific Hazards Arising from the Chemical
Emits toxic gases/vapors under fire conditions and in contact with water. Thermal decomposition can lead to release of toxic and corrosive gases/vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus and full protective gear.

NFPA
Health Hazard 3
Flammability 2
Stability 1
Physical and Chemical Hazards W

HMIS
Health Hazard 3*
Flammability 2
Physical Hazard 1
Personal Protection -

*Indicates a chronic health hazard.
6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Evacuate personnel to safe areas. Remove all sources of ignition. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.

Environmental Precautions
Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

Methods for Containment
Dike for later disposal; do not apply water unless directed to do so. Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up
Use personal protective equipment. Dam up. Neutralize with soda ash (sodium carbonate) or lime over area of spill. Cover liquid spill with sand, earth or other noncombustible absorbent material. Sweep up and shovel into suitable containers for disposal. After cleaning, flush away traces with water. Do not direct water at spill or source of leak. Use non-sparking tools and equipment.

7. HANDLING AND STORAGE

Handling
Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Prevent breathing of mist or vapors. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. Use only in an area containing flame proof equipment. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Use only in area provided with appropriate exhaust ventilation.

Storage
Keep at < -5 °C. Keep container tightly closed in a dry and well-ventilated place. Keep in properly labeled containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines
This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/ Face Protection
Tightly fitting safety goggles. Face-shield.

Skin and Body Protection
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Impervious butyl rubber gloves.

Respiratory Protection
Wear a positive-pressure supplied-air respirator with full facepiece.

Hygiene Measures
Wear suitable gloves and eye/face protection. Prevent contact with skin eyes and clothing. Remove and wash contaminated clothing before re-use. Contaminated work clothing should not be allowed out of the workplace. Provide regular cleaning of equipment, work area and clothing. Keep away from food, drink and animal feeding stuffs. When using, do not eat, drink or smoke.
### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash Point</td>
<td>42.5°C</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>&lt;60°C</td>
</tr>
<tr>
<td>Flammability Limits in Air</td>
<td>No information available</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>148.59</td>
</tr>
<tr>
<td>Solubility</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>204 Pa (20°C) 85100 Pa (100°C)</td>
</tr>
<tr>
<td>Density</td>
<td>1.1507 g/cm³ @ 20 degreesC</td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

**Stability**

Stable up to approximately -5°C. Reacts with water.

**Incompatible Products**


**Conditions to Avoid**

Exposure to water. Exposure to air or moisture over prolonged periods. Extremes of temperature and direct sunlight. Temperatures above -5°C.

**Hazardous Decomposition Products**

Keep refrigerated. Emits toxic gases/vapors under fire conditions and in contact with water. Thermal decomposition can lead to release of toxic/corrosive gases and vapors. Hydrogen chloride. Cyclopentyl alcohol.

**Hazardous Polymerization**

Hazardous polymerization does not occur.
**11. TOXICOLOGICAL INFORMATION**

**Acute Toxicity**

**Product Information**

**Inhalation** There is no data available for this product. Harmful by inhalation. Contact with moist mucous membranes of the respiratory system can cause caustic condition resulting in burns. Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhalation of vapors in high concentration may cause shortness of breath (lung edema). Pulmonary edema can be fatal.

**Eye Contact** Severely irritating to eyes. May cause burns.

**Skin Contact** May be harmful in contact with skin. May cause irritation. May cause sensitization by skin contact.

**Ingestion** Harmful if swallowed. Ingestion causes burns of the upper digestive and respiratory tract. Aspiration may cause pulmonary edema and pneumonitis.

**Chronic Toxicity**

**Chronic Toxicity** Avoid repeated exposure. Prolonged exposure may cause chronic effects. May produce an allergic reaction. Repeated inhalation of vapors may cause irritation of respiratory tract or bronchitis.

**Carcinogenicity** There are no known carcinogenic chemicals in this product.

**Sensitization** May cause sensitization by skin contact. Shown to be strong sensitizer in animal (Guinea-pig) studies.

**Target Organ Effects** Lungs, Eyes.

**12. ECOLOGICAL INFORMATION**

**Ecotoxicity**

The environmental impact of this product has not been fully investigated.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Toxicity to Algae</th>
<th>Toxicity to Fish</th>
<th>Toxicity to Microorganisms</th>
<th>Daphnia Magna (Water Flea)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclopentyl chloroformate</td>
<td>Brachydanio rerio:</td>
<td>CL50 (24 hrs) = 26.3 mg/l</td>
<td>CE50 (24 hrs) = 16.2 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CL50 (48 hrs) = 26.3 mg/l</td>
<td>CL50 (72 hrs) = 26.3 mg/l</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CL50 (96 hrs) = 26.3 mg/l</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Persistence and Degradability** Decomposes by hydrolyse to form hydrochloric acid, carbon dioxide and cyclopentyl alcohol. No data is available on the product itself.

**13. DISPOSAL CONSIDERATIONS**

**Waste Disposal Methods** Should not be released into the environment.

**Contaminated Packaging** Dispose of in accordance with local regulations
## 14. TRANSPORT INFORMATION

**DOT**

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>Chloroformates, toxic, corrosive, flammable, n.o.s.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Class</td>
<td>6.1</td>
</tr>
<tr>
<td>Subsidiary Class</td>
<td>8, 3</td>
</tr>
<tr>
<td>UN-No</td>
<td>UN2742</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
<tr>
<td>Description</td>
<td>UN2742, Chloroformates, toxic, corrosive, flammable, n.o.s., 6.1(8, 3), PG II</td>
</tr>
</tbody>
</table>

**TDG**

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<td>UN2742</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
<tr>
<td>Description</td>
<td>CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S., 6.1, UN2742, PG II</td>
</tr>
</tbody>
</table>

**MEX**

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>Chloroformates, toxic, corrosive, flammable, n.o.s.</th>
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<tbody>
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<tr>
<td>Subsidiary Class</td>
<td>3, 8</td>
</tr>
<tr>
<td>UN-No</td>
<td>UN2742</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
<tr>
<td>Description</td>
<td>UN2742 Chloroformates, toxic, corrosive, flammable, n.o.s., 6.1, II</td>
</tr>
</tbody>
</table>

**ICAO**

- **UN-No** UN2742
- **Proper Shipping Name** Chloroformates, toxic, corrosive, flammable, n.o.s.
- **Hazard Class** 6.1
- **Subsidiary Class** 3, 8
- **Packing Group** II
- **Description** Chloroformates, toxic, corrosive, flammable, n.o.s., 6.1(3, 8), UN2742, PG II

**IATA**

- **UN-No** UN2742
- **Proper Shipping Name** Chloroformates, toxic, corrosive, flammable, n.o.s.
- **Hazard Class** 6.1
- **Subsidiary Class** 3, 8
- **Packing Group** II
- **ERG Code** 6CF
- **Description** UN2742, Chloroformates, toxic, corrosive, flammable, n.o.s., 6.1(3, 8), PG II

**IMDG/IMO**

- **Proper Shipping Name** Chloroformates, toxic, corrosive, flammable, n.o.s.
- **Hazard Class** 6.1
- **Subsidiary Class** 3, 8, +
- **UN-No** UN2742
- **Packing Group** II
- **EmS No.** F-E, S-C
- **Description** UN2742, Chloroformates, toxic, corrosive, flammable, n.o.s., 6.1(3, 8, +), PG II

**RID**

- **Proper Shipping Name** Chloroformates, toxic, corrosive, flammable, n.o.s.
# 14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th><strong>Hazard Class</strong></th>
<th>6.1</th>
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<tr>
<td><strong>UN-No</strong></td>
<td>UN2742</td>
</tr>
<tr>
<td><strong>Packing Group</strong></td>
<td>II</td>
</tr>
<tr>
<td><strong>Classification Code</strong></td>
<td>TFC</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>UN2742 Chloroformates, toxic, corrosive, flammable, n.o.s., 6.1, II, RID</td>
</tr>
<tr>
<td><strong>ADR/RID-Labels</strong></td>
<td>6.1 + 3 + 8</td>
</tr>
</tbody>
</table>

## ADR

<table>
<thead>
<tr>
<th><strong>Proper Shipping Name</strong></th>
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<td>UN2742</td>
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<td><strong>Packing Group</strong></td>
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<tr>
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<td><strong>ADR/RID-Labels</strong></td>
<td>8, 3</td>
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</tbody>
</table>

## ADN

<table>
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<tr>
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<td><strong>Hazard Class</strong></td>
<td>6.1</td>
</tr>
<tr>
<td><strong>Packing Group</strong></td>
<td>II</td>
</tr>
<tr>
<td><strong>Classification Code</strong></td>
<td>TFC</td>
</tr>
<tr>
<td><strong>Special Provisions</strong></td>
<td>274, 561, 802</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>UN2742 Chloroformates, toxic, corrosive, flammable, n.o.s., 6.1, II</td>
</tr>
<tr>
<td><strong>Hazard Labels</strong></td>
<td>6.1 + 3 + 8</td>
</tr>
<tr>
<td><strong>Limited Quantity</strong></td>
<td>LQ17</td>
</tr>
<tr>
<td><strong>Ventilation</strong></td>
<td>VE01, VE02</td>
</tr>
</tbody>
</table>
15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSCA</td>
<td>This product contains ingredients which are not listed on the TSCA Inventory. It is for research and development purposes only.</td>
</tr>
<tr>
<td>DSL</td>
<td>Does not comply</td>
</tr>
<tr>
<td>NDSL</td>
<td>Does not comply</td>
</tr>
<tr>
<td>EINECS</td>
<td>Complies</td>
</tr>
<tr>
<td>ENCS</td>
<td>Does not comply</td>
</tr>
<tr>
<td>IECSC</td>
<td>Does not comply</td>
</tr>
<tr>
<td>PICCS</td>
<td>Does not comply</td>
</tr>
<tr>
<td>AICS</td>
<td>Does not comply</td>
</tr>
</tbody>
</table>

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/EINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
PICCS - Philippines Inventory of Chemicals and Chemical Substances
ENCSC - Japan Existing and New Chemical Substances
AECSC - Australian Inventory of Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Sudden Release of Pressure Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

U.S. State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

International Regulations

Mexico - Grade
Moderate risk, Grade 2

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
B3  Combustible liquid
D2B  Toxic materials
16. OTHER INFORMATION

Prepared By          Product Stewardship  
                     23 British American Blvd.  
                     Latham, NY 12110  
                     1-800-572-6501
Issuing Date         05-Feb-2009
Revision Date        
Revision Note        No information available

Disclaimer
The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet