SAFETY DATA SHEET

1. Identification
Product identifier Pentyl Chloroformate
Other means of identification
Synonyms Amyl Chloroformate; Carbonochloridic Acid; Pentyl Ester
Recommended use Intermediate.
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)
+1-703-527-3887 (International)

2. Hazard(s) identification
Physical hazards Flammable liquids Category 3
Health hazards Acute toxicity, inhalation Category 2
Skin corrosion/irritation Category 1B
OSHA defined hazards Not classified.
Label elements

Signal word Danger
Hazard statement Flammable liquid and vapor. Causes severe skin burns and eye damage. Fatal if inhaled.
Precautionary statement
Prevention Keep away from flames and hot surfaces. No smoking. Keep container tightly closed.
Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge.
Do not breathe mist/vapors/spray. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area.
Response 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. If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center/doctor.
Storage Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients
Substances

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentyl chloroformate</td>
<td>Amyl Chloroformate; Carbonochloridic Acid; Pentyl Ester</td>
<td>638-41-5</td>
<td>&gt;99</td>
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</tbody>
</table>

Pentyl Chloroformate
921689  Version #: 02  Revision date: 17-July-2015  Issue date: 18-July-2014
SDS US  1 / 7
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
Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

Skin contact
Immediately remove contaminated clothing. Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately. Chemical burns must be treated by a physician.

Eye contact
Immediately flush with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart. Get medical attention immediately. Continue to rinse.

Ingestion
Immediately rinse mouth and drink plenty of water. Keep victim under observation. Do not induce vomiting. Get medical attention immediately.

Most important symptoms/effects, acute and delayed
Eye contact: Extreme irritation of eyes and mucous membranes, including burning and tearing.
Skin contact: Burning pain and severe corrosive skin damage. Inhalation: Aspiration may cause pulmonary edema and pneumonitis. Cough, shortness of breath, headache, nausea, vomiting.
Ingestion: Can burn mouth, throat, and stomach.

Indication of immediate medical attention and special treatment needed
Be aware that symptoms of chemical pneumonia (shortness of breath) may occur several hours after exposure.

General information
Thermal 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.

5. Fire-fighting measures

Suitable extinguishing media
Extinguish with alcohol-resistant foam, carbon dioxide or dry powder.

Unsuitable extinguishing media
Water.

Specific hazards arising from the chemical
By heating and fire, toxic and corrosive vapors/gases may be formed. Vapors may form explosive mixtures with air.

Special protective equipment and precautions for firefighters
Self-contained breathing apparatus and full protective clothing should be worn when fighting chemical fires. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire fighting equipment/instructions
Move containers from fire area if you can do so without risk. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards
The product is flammable, and heating may generate vapors which may form explosive vapor/air mixtures.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Evacuate area. Eliminate all sources of ignition. Keep upwind. Avoid inhalation of vapors and spray mists. Avoid contact with skin and eyes. Wear suitable protective clothing.

Methods and materials for containment and cleaning up
Remove sources of ignition. Absorb spillage with non-combustible, absorbent material. Collect in approved containers and seal securely. Containers must be labeled. Following product recovery, flush area with water. Prevent product from entering drains. For waste disposal, see Section 13 of the SDS.

Environmental precautions
Do not discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling
All handling to take place in well-ventilated area. Avoid inhalation of vapors and spray mist and contact with skin and eyes. Avoid contact with clothing. Wear appropriate personal protective equipment. The product is flammable, and heating may generate vapors which may form explosive vapor/air mixtures. Use explosion-proof ventilation equipment. Wash hands after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

8. Exposure controls/personal protection

Occupational exposure limits
No exposure limits noted for ingredient(s).

Biological limit values
No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls

Should be handled in closed systems, if possible. Provide adequate ventilation. Local ventilation should be provided. Provide easy access to water supply or an emergency shower.

Individual protection measures, such as personal protective equipment

Ey/face protection

Wear tight-fitting goggles or face shield.

Skin protection

Hand protection

Wear protective gloves. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. In full contact: Glove material: Viton. Layer thickness: 0.7 mm. Breakthrough time: >480 min. Suitable gloves can be recommended by the glove supplier.

Other

Wear appropriate clothing to prevent repeated or prolonged skin contact. Apron and long sleeves are recommended.

Respiratory protection

Use a NIOSH/MSHA approved air purifying respirator as needed to control exposure. Consult with respirator manufacturer to determine respirator selection, use, and limitations. Use positive pressure, air-supplied respirator for uncontrolled releases or when air purifying respirator limitations may be exceeded. Follow respirator protection program requirements (OSHA 1910.134 and ANSI Z88.2) for all respirator use. Wear suitable respiratory protection. Chemical respirator with organic vapor cartridge.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

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.

9. Physical and chemical properties

Appearance

Colorless to pale yellow liquid.

Physical state

Liquid.

Form

Liquid.

Color

Colorless to Pale Yellow.

Odor

Pungent.

Odor threshold

Not available.

pH

Not available.

Melting point/freezing point

Not available.

Initial boiling point and boiling range

140 - 143.6 °F (60 - 62 °C) (15 mbar)

Flash point

128.3 °F (53.5 °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.

Vapor pressure

3 mbar (25 °C)

Vapor density

Not available.

Relative density

1.032 (20 °C)

Solubility(ies)

Solubility (water)

Not available.

Partition coefficient (n-octanol/water)

No data available.

Auto-ignition temperature

509 °F (265 °C)

Decomposition temperature

Not available.

Viscosity

Not available.

Other information

Explosive limit

Not available.

Explosive properties

Not explosive.

Molecular formula

C6H11ClO2

Oxidizing properties

Not oxidizing.
10. Stability and reactivity

Reactivity
The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical stability
Decomposes in the presence of water.

Possibility of hazardous reactions
Hazardous polymerization does not occur.

Conditions to avoid

Incompatible materials

Hazardous decomposition products

11. Toxicological information

Information on likely routes of exposure

Inhalation
Can cause severe respiratory irritation. Inhalation of vapor or mist may cause lung edema. Be aware that symptoms of chemical pneumonia (shortness of breath) may occur several hours after exposure.

Skin contact
Causes skin burns.

Eye contact
Causes skin burns.

Ingestion
May cause burns in mucous membranes, throat, esophagus and stomach.

Symptoms related to the physical, chemical and toxicological characteristics
Eye contact: Extreme irritation of eyes and mucous membranes, including burning and tearing.
Skin contact: Burning pain and severe corrosive skin damage. Inhalation: Aspiration may cause pulmonary edema and pneumonitis. Cough, shortness of breath, headache, nausea, vomiting.
Ingestion: Can burn mouth, throat, and stomach.

Information on toxicological effects

Acute toxicity
Fatal if inhaled.

Skin corrosion/irritation
Causes severe skin burns.

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization
No data available.

Skin sensitization
No data available.

Germ cell mutagenicity
No data available.

Carcinogenicity
No data available.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

Reproductive toxicity
No data available.

Specific target organ toxicity - single exposure
No data available.

Specific target organ toxicity - repeated exposure
No data available.

Aspiration hazard
No data available.

Chronic effects
Prolonged exposure may cause chronic effects. Erosion of exposed teeth.

12. Ecological information

Ecotoxicity
The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Persistence and degradability
No data available.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

Mobility in general
No data available.

Other adverse effects
None known.
13. Disposal considerations

**Disposal instructions**
Dispose in accordance with applicable federal, state, and local regulations.

**Hazardous waste code**
D001: Waste Flammable material with a flash point <140 °F  
D002: Corrosive waste

**Waste from residues / unused products**
Dispose of in accordance with local regulations. Avoid discharge into water courses or onto the ground.

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

14. Transport information

**DOT**

<table>
<thead>
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<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
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<td>Packaging exceptions</td>
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<td>Packaging non bulk</td>
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**IATA**

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**IMDG**

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<td>Class</td>
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</table>

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Not relevant.

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.

Not listed.
CERCLA Hazardous Substance List (40 CFR 302.4)
Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)
Hazard categories
- Immediate Hazard - Yes
- Delayed Hazard - No
- Fire Hazard - Yes
- Pressure Hazard - No
- Reactivity Hazard - No

SARA 302 Extremely hazardous substance
Not listed.
SARA 311/312 Hazardous chemical
Yes

SARA 313 (TRI reporting)
Not regulated.

Other federal regulations
- Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
  Not regulated.
- Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
  Not regulated.
- Safe Drinking Water Act (SDWA)
  Not regulated.

US state regulations
- US. Massachusetts RTK - Substance List
  Not regulated.
- US. New Jersey Worker and Community Right-to-Know Act
  Not listed.
- US. Pennsylvania Worker and Community Right-to-Know Law
  Not listed.
- US. Rhode Island RTK
  Not regulated.
- US. California Proposition 65
  Not Listed.

International Inventories

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<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
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<tbody>
<tr>
<td>Australia</td>
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<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
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<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
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<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
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<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
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<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
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<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
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</tbody>
</table>

A “Yes” indicates this product complies 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    | 18-July-2014 |
| Revision date | 17-July-2015 |
| Version #     | 02           |
Further information
HMIS® is a registered trade and service mark of the NPMA.
HMIS personal protection: C - Safety Glasses, Gloves, Apron.
NFPA Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

HMIS® ratings
Health: 3
Flammability: 2
Physical hazard: 1
Personal protection: C

NFPA ratings

List of abbreviations
LD50: Lethal Dose, 50%.
LC50: Lethal Concentration, 50%.

References
C&L Inventory 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.