

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

**1.1 Product Identifier**

**Chemical Name** (-)-(1R)-Menthyl Chloroformate

**Catalogue #** M219450

**1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against**

**Product Uses** To be used only for scientific research and development. Not for use in humans or animals.

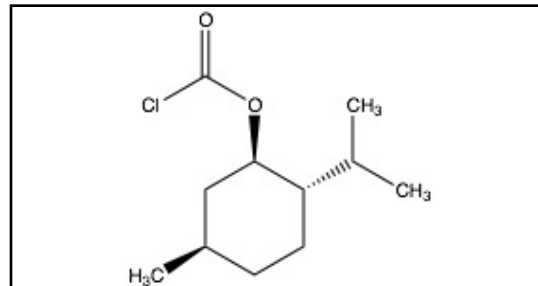
**1.3 Details of the Supplier of the Safety Data Sheet**

**Company** Toronto Research Chemicals  
2 Brisbane Road  
Toronto, ON M3J 2J8  
CANADA

**Telephone** +14166659696

**FAX** +14166654439

**Email** orders@trc-canada.com



**1.4 Emergency Telephone Number**

**Emergency#** +1(416) 665-9696 between 0800-1700 (GMT-5)

**2. HAZARDS IDENTIFICATION**

**WHMIS Classification (Canada)**

B3 Combustible Liquid

D1A Very Toxic Material Causing Immediate and Serious Toxic Effects  
Toxic by Inhalation

**WHMIS Symbols (Canada)**



**2.1/2.2 Classification of the Substance or Mixture and Label Elements**

**GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)**

Flammable Liquids (Category 4)

Acute Toxicity, Inhalation (Category 3)

Skin Corrosion (Category 1B)

Serious Eye Damage (Category 1)

Hazardous to the Aquatic Environment, Acute Hazard (Category 2)

**GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)**

**Signal Word** Danger



**GHS Hazard Statements**

H227 Combustible liquid and vapour.

H331 Toxic if inhaled.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H401 Toxic to aquatic life.

### GHS Precautionary Statements

P261 Avoid breathing dust/fume/gas/mist/vapours/spray  
P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P304/P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
P310 Immediately call a POISON CENTER or doctor/physician  
P305/P351/P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

## 2.3 Unclassified Hazards/Hazards Not Otherwise Classified

Lachrymator.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

Molecular Formula:  $C_{11}H_{19}ClO_2$

Molecular Weight: 218.72

CAS Registry #: 14602-86-9

EC#:

#### Synonyms

Carbonochloridic Acid (1R,2S,5R)-5-Methyl-2-(1-methylethyl)cyclohexyl Ester; (-)-(1R,2S,5R)-Menthyl Chloroformate; (-)-(R)-Menthyl Chloroformate; (-)-Menthyl Chloroformate; (1R,2S,5R)-2-Isopropyl-5-methylcyclohexyl Chloroformate; (1R,2S,5R)-Menthyl Chloroformate; Chlorocarbonic Acid (-)-Menthyl Ester; L-(-)-Menthyl Chloroformate; L-Menthoxy Chloroformate; L-Menthyl Chloroformate; Menthyl Chloroformate;

### 3.2 Mixtures

Not a mixture.

## 4. FIRST AID MEASURES

### 4.1 Description of First Aid Measures

#### General Advice

If medical attention is required, show this safety data sheet to the doctor.

#### If Inhaled

If inhaled, move casualty to fresh air. If not breathing, give artificial respiration and consult a physician.

#### In Case of Skin Contact

Remove contaminated clothing and shoes. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

#### In Case of Eye Contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

#### If Swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

### 4.2 Most Important Symptoms and Effects, Both Acute and Delayed

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

### 4.3 Indication of any Immediate Medical Attention and Special Treatment Needed

No data available.

## 5. FIREFIGHTING MEASURES

### 5.1 Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

### 5.2 Special Hazards Arising from the Substance or Mixture

Carbon oxides, Hydrogen chloride

### **5.3 Advice for Firefighters**

Wear self contained breathing apparatus for fire fighting if necessary.

### **5.4 Further Information**

No data available.

## **6. ACCIDENTAL RELEASE MEASURES**

### **6.1 Personal Precautions, Protective Equipment and Emergency Procedures**

Use recommended personal protective equipment (see Section 8). Adequate ventilation must be provided to ensure vapours or mists are not inhaled. Vapours are heavier than air and may accumulate in low areas. All sources of ignition, including sources of static discharge, must be removed from area.

### **6.2 Environmental Precautions**

Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

### **6.3 Methods and Materials for Containment and Cleaning Up**

Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

### **6.4 Reference to Other Sections**

For protective equipment, refer to Section 8. For disposal, see Section 13.

## **7. HANDLING AND STORAGE**

### **7.1 Precautions for Safe Handling**

Avoid contact with skin and eyes. Ventilation and proper handling are to be used to prevent the formation of vapours and mists. Remove all sources of ignition and take precautionary measures to prevent the buildup of electrostatic discharge (ground and bond containers as appropriate). No smoking, eating or drinking around this material. Wash hands after use.

### **7.2 Conditions for Safe Storage, Including any Incompatibilities**

Ensure container is kept securely closed before and after use. Keep in a well ventilated area and do not store with strong oxidizers or other incompatible materials (see Section 10).

Storage conditions: Refrigerator, under inert atmosphere

### **7.3 Specific End Uses**

For scientific research and development only. Not for use in humans or animals.

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

### **8.1 Control Parameters**

Contains no components with established occupational exposure limits.

### **8.2 Exposure Controls**

#### **Appropriate Engineering Controls**

A laboratory fumehood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

#### **Personal Protective Equipment**

All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

#### **Eye/Face Protection**

Safety goggles or face shield. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

#### **Skin Protection**

Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as "chemical resistant" by EU standard EN 374 with the resistance codes corresponding to the anticipated use of the material. Unrated gloves are not

recommended.

Suggested gloves: AnsellPro Sol-Vex nitrile gloves style 37-175, 15 mil thickness.  
Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated "chemical resistant" as per EN 734 with the resistance codes corresponding to the anticipated use of the material.

Suggested gloves: AnsellPro Viton/Butyl gloves style 38-612, 4/8 mil thickness.  
Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

### Body Protection

Fire resistant (Nomex) coveralls or chemical-resistant bodysuit (laminated Tychem SL or equivalent).

### Respiratory Protection

Recommended respirators are NIOSH-approved N100 or CEN-approved FFP3 particulate respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on Basic Physical and Chemical Properties

**A) Appearance**

Clear Colourless Oil

**C) Odour Threshold**

No data available

**E) Melting Point/Freezing Point**

No Data Available

**G) Flash point**

No data available

**I) Flammability (Solid/Gas)**

No data available

**K) Vapour Pressure**

No data available

**M) Relative Density**

No data available

**O) Partition Coefficient: n-octanol/water**

No data available

**Q) Decomposition Temperature**

No data available

**S) Explosive Properties**

No data available

**B) Odour**

No data available

**D) pH**

No data available

**F) Initial Boiling Point/Boiling Range**

No data available

**H) Evaporation Rate**

No data available

**J) Upper/Lower Flammability/Explosive Limits**

No data available

**L) Vapour Density**

No data available

**N) Solubility**

Chloroform (Sparingly), Methanol (Sparingly)

**P) Auto-Ignition Temperature**

No data available

**R) Viscosity**

No data available

**T) Oxidizing Properties**

No data available

**9.2 Other Information**

no data available

## 10. STABILITY AND REACTIVITY

### 10.1 Reactivity

No data available.

### 10.2 Chemical Stability

Stable under recommended storage conditions.

### 10.3 Possibility of Hazardous Reactions

No data available.

### 10.4 Conditions to Avoid

Heat, flames and sparks.

### 10.5 Incompatible Materials

Acids, Alcohols, Strong bases, Amines.

### 10.6 Hazardous Decomposition Products

In the event of fire: See section 5. **Other decomposition products:** No data available.

## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on Toxicological Effects

#### **A) Acute Toxicity**

**Oral LD50:** No data available.

**Inhalation LC50:** No data available.

**Dermal LD50:** No data available.

#### **B) Skin Corrosion/Irritation**

No data available

#### **C) Serious Eye Damage/Irritation**

Corrosive - causes skin and eye burns. May also cause respiratory tract damage.

#### **D) Respiratory or Skin Sensitization**

No data available

#### **E) Germ Cell Mutagenicity**

No data available

#### **F) Carcinogenicity**

No data available

#### **G) Reproductive Toxicity/Teratogenicity**

No data available

#### **H) Single Target Organ Toxicity - Single Exposure**

No data available

#### **I) Single Target Organ Toxicity - Repeated Exposure**

No data available

#### **J) Aspiration Hazard**

No data available

#### **K) Potential Health Effects and Routes of Exposure**

##### **Inhalation**

Toxic if inhaled. May cause respiratory tract irritation.

##### **Ingestion**

May be harmful if swallowed.

##### **Skin**

May be harmful if absorbed through skin. Causes skin burns.

##### **Eyes**

Causes severe eye burns and possible permanent eye damage.

#### **L) Signs and Symptoms of Exposure**

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

#### **M) Additional Information**

RTECS: Not available.

## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

No data available.

### 12.2 Persistence and Degradability

No data available.

### 12.3 Bioaccumulative Potential

No data available.

### 12.4 Mobility in Soil

No data available.

### 12.5 Results of PBT and vPvB Assessment

No data available.

### 12.6 Other Adverse Effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

### 13. DISPOSAL CONSIDERATIONS

#### 13.1 Waste Treatment Methods

##### A) Product

Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

##### B) Contaminated Packaging

Dispose of as above.

##### C) Other Considerations

Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

### 14. TRANSPORT INFORMATION

#### 14.1 UN Number

DOT (US): UN3277                      IATA: UN3277                      IMDG: UN3277                      ADR/RID: UN3277

#### 14.2 UN Proper Shipping Name

DOT (US)/IATA:

Chloroformates, toxic, corrosive, n.o.s. ((1R)-(-)-Menthyl chloroformate)

IMDG/ARD/RID:

CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S. ((1R)-(-)-Menthyl chloroformate)

#### 14.3 Transport Hazard Class(es)

DOT (US): 6.1 (8)                      IATA: 6.1 (8)                      IMDG: 6.1 (8)                      ADR/RID: 6.1 (8)

#### 14.4 Packing Group

DOT (US): II                      IATA: II                      IMDG: II                      ADR/RID: II

#### 14.5 Environmental Hazards

DOT (US): None                      IATA: None                      IMDG: None                      ADR/RID: None

#### 14.6 Special Precautions for User

None

### 15. REGULATORY INFORMATION

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

#### 15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

##### A) Canada

**DSL/NDSL Status:** This product is not listed on the Canadian DSL/NDSL.

##### B) United States

**TSCA Status:** This product is not listed on the US EPA TSCA.

##### C) European Union

**ECHA Status:** This product is not registered with the EU ECHA.

#### 15.2 Chemical Safety Assessment

No data available

### 16. OTHER INFORMATION

#### 16.1 Revision History

Original Publication Date: 11/30/2017

#### 16.2 List of Abbreviations

LD50	Median lethal dose of a substance required to kill 50% of a test population.
LC50	Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo	Lowest known lethal dose
TDLo	Lowest known toxic dose
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
RTECS	Registry of Toxic Effects of Chemical Substances

#### 16.3 Further Information

Copyright 2015. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.