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

1.1 Product Identifier
Chemical Name: Ethyl (3R,4S,5S)-4,5-Epoxy-3-(1-ethylpropoxy)cyclohex-1-ene-1-carboxylate

Catalogue #: E917820

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): None
WHMIS Symbols (Canada): Not WHMIS controlled.

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)
Acute Toxicity, Oral (Category 4)

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

Signal Word: Warning

GHS Hazard Statements
H302: Harmful if swallowed.

GHS Precautionary Statements
P264: Wash hands thoroughly after handling.
P301/P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

2.3 Unclassified Hazards/Hazards Not Otherwise Classified
No data available.
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 person to fresh air. If not breathing, give artificial respiration and consult a physician.

In Case of Skin Contact
Wash affected area with soap and water. Consult a physician if any exposure symptoms are observed.

In Case of Eye Contact
Immediately rinse eyes with plenty of water for at least 15 minutes. Consult a physician.

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

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

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Method and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.
Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.
Keep in a dry place.

Storage conditions: -20°C Freezer

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.
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) lab coat or coveralls.

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

<table>
<thead>
<tr>
<th>A) Appearance</th>
<th>B) Odour</th>
</tr>
</thead>
<tbody>
<tr>
<td>White to Off-White Solid</td>
<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C) Odour Threshold</th>
<th>D) pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E) Melting Point/Freezing Point</th>
<th>F) Initial Boiling Point/Boiling Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>56-57°C</td>
<td>No data available</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>G) Flash point</th>
<th>H) Evaporation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
</tr>
</tbody>
</table>
I) Flammability (Solid/Gas)  No data available  
J) Upper/Lower Flammability/Explosive Limits  No data available  
K) Vapour Pressure  No data available  
L) Vapour Density  No data available  
M) Relative Density  No data available  
N) Solubility  Chloroform (Slightly), Methanol (Slightly)  
O) Partition Coefficient: n-octanol/water  No data available  
P) Auto-Ignition Temperature  No data available  
Q) Decomposition Temperature  No data available  
R) Viscosity  No data available  
S) Explosive Properties  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  No data available.  
10.5 Incompatible Materials  Strong oxidizing agents.  
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.  
Dermal LD50: No data available.  
Inhalation LC50: No data available.  
B) Skin Corrosion/Irritation  No data available  
C) Serious Eye Damage/Irritation  No data available  
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
May be harmful if inhaled. May cause respiratory tract irritation.

**Ingestion**
Harmful if swallowed.

**Skin**
May be harmful if absorbed through skin. May cause skin irritation.

**Eyes**
May cause eye irritation.

**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 listed

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### 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**
No data available.

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### 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.

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### 14. TRANSPORT INFORMATION

**14.1 UN Number**
DOT (US): N/A  IATA: N/A  IMDG: N/A  ADR/RID: N/A

**14.2 UN Proper Shipping Name**
DOT (US)/IATA: Not dangerous goods
IMDG/ARD/RID: Not dangerous goods

**14.3 Transport Hazard Class(es)**
DOT (US): N/A  IATA: N/A  IMDG: N/A  ADR/RID: N/A

**14.4 Packing Group**
DOT (US): N/A  IATA: N/A  IMDG: N/A  ADR/RID: N/A

**14.5 Environmental Hazards**
DOT (US): None  IATA: None  IMDG: None  ADR/RID: None

**14.6 Special Precautions for User**
None

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### 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: 2/27/2013

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
TDL0                  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.