Section 1 - Product and Company Information

Product Name L-ORNITHINE HYDROCHLORIDE
Product Number O2375
Brand SIGMA
Company Sigma-Aldrich Canada, Ltd
Street Address 2149 Winston Park Drive
City, State, Zip, Country Oakville ON L6H 6J8 CA
Technical Phone: 9058299500
Emergency Phone: 800-424-9300
Fax: 9058299292

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
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<tbody>
<tr>
<td>L(+)-ORNITHINE MONOHYDROCHLORIDE</td>
<td>3184-13-2</td>
<td>No</td>
</tr>
<tr>
<td>Formula</td>
<td>C5H12N2O2.ClH</td>
<td></td>
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<tr>
<td>Synonyms</td>
<td>L-Ornithine hydrochloride * L-Ornithine monohydrochloride</td>
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<tr>
<td>RTECS Number:</td>
<td>RM2985000</td>
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</tr>
</tbody>
</table>

Section 3 - Hazards Identification

HMIS RATING

HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A
AUTOIGNITION TEMP
N/A
FLAMMABILITY
N/A
EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of dust.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Wear dust mask.
Hand: Protective gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance
Physical State: Solid
Color: White
Form: Powder
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
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</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
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<tr>
<td>pH</td>
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<tr>
<td>BP/BP Range</td>
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<tr>
<td>MP/MP Range</td>
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<td>Freezing Point</td>
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<tr>
<td>Vapor Pressure</td>
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<tr>
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<tr>
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<td>Bulk Density</td>
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<td>Odor Threshold</td>
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<tr>
<td>Volatile%</td>
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<tr>
<td>Water Content</td>
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</tr>
<tr>
<td>Solvent Content</td>
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<td>Evaporation Rate</td>
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<tr>
<td>Viscosity</td>
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<td>Partition Coefficient</td>
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<tr>
<td>Flash Point</td>
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<tr>
<td>Explosion Limits</td>
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<tr>
<td>Flammability</td>
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<tr>
<td>Autoignition Temp</td>
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<tr>
<td>Refractive Index</td>
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<tr>
<td>Optical Rotation</td>
<td>Degree of Rotation: 50 g/l Solvent: 5 M HCl +27.3 - +23.0 (+/-0.5)</td>
<td></td>
</tr>
</tbody>
</table>

Miscellaneous Data: N/A

Solubility: Solubility in Water: 1 M in H2O, 20°C complete, colorless

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
   Stable: Stable.
   Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION
   Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
   Skin Contact: May cause skin irritation.
   Skin Absorption: May be harmful if absorbed through the skin.
   Eye Contact: May cause eye irritation.
   Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
   Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
   To the best of our knowledge, the chemical, physical, and
toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Rat
10000 mg/kg
LD50

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or