SAFETY DATA SHEET
L-(-)-Norepinephrine (bitartrate hydrate)

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 1272/2008

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Code: 16673
Product Name: L-(-)-Norepinephrine (bitartrate hydrate)
Synonyms: 4-[(1R)-2-amino-1-hydroxyethyl]-1,2-benzenediol (2R,3R)-2,3-dihydroxybutanedioate, monohydrate; L-Noradrenaline; Arterenol; Levarterenol; NE;

1.2 Relevant identified uses of the substance or mixture and uses advised against:
Relevant identified uses: For research use only, not for human or veterinary use.

1.3 Details of the Supplier of the Safety Data Sheet:

Company Name: Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI  48108
Web site address: www.caymanchem.com
Information: Cayman Chemical Company +1  (734)971-3335

1.4 Emergency telephone number:
Emergency Contact: CHEMTREC Within USA and Canada: +1  (800)424-9300
CHEMTREC Outside USA and Canada: +1  (703)527-3887

Section 2. Hazards Identification

2.1 Classification of the Substance or Mixture:
Acute Toxicity: Inhalation, Category 1
Acute Toxicity: Oral, Category 2
Acute Toxicity: Skin, Category 2

2.2 Label Elements:

GHS Signal Word: Danger

GHS Hazard Phrases:
H300: Fatal if swallowed.
H310: Fatal in contact with skin.
H330: Fatal if inhaled.

GHS Precaution Phrases:
P260: Do not breathe {dust/fume/gas/mist/vapors/spray}.
P262: Do not get in eyes, on skin, or on clothing.
P264: Wash {hands} thoroughly after handling.
P280: Wear {protective gloves/protective clothing/eye protection/face protection}.
P284: Wear respiratory protection {}.

GHS Response Phrases:
P301+310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302+350: IF ON SKIN: Gently wash with plenty of soap and water.
P304+340: 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.
P320: Specific treatment is urgent {see ... on this label}.
P330: Rinse mouth.
P361: Remove/Take off immediately all contaminated clothing.
SAFETY DATA SHEET
L-(-)-Norepinephrine (bitartrate hydrate)

P363: Wash contaminated clothing before reuse.

GHS Storage and Disposal Phrases:
Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.3 Adverse Human Health Effects and Symptoms:
Fatal if inhaled.
Fatal if swallowed.
Fatal in contact with skin.
Material may be irritating to the mucous membranes and upper respiratory tract.
May cause eye, skin, or respiratory system irritation.
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>CAS # / RTECS #</th>
<th>Hazardous Components (Chemical Name)/REACH Registration No.</th>
<th>Concentration</th>
<th>EC No./EC Index No.</th>
<th>GHS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>108341-18-0 NA</td>
<td>L-(-)-Norepinephrine (bitartrate hydrate)</td>
<td>100.0 %</td>
<td>NA</td>
<td>Acute Tox.(O) 2: H300</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NA</td>
<td>Acute Tox.(D) 2: H310</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Acute Tox.(I) 1: H330</td>
</tr>
</tbody>
</table>

Section 4. First Aid Measures

4.1 Description of First Aid Measures:
In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.
In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.
In Case of Ingestion: Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

Section 5. Fire Fighting Measures

5.1 Suitable Extinguishing Media:
Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.
Use water spray to cool fire-exposed containers.

Unsuitable Extinguishing Media:
A solid water stream may be inefficient.

5.2 Flammable Properties and Hazards:
No data available.

Flash Pt: No data.
Explosive Limits: LEL: No data. UEL: No data.
Autoignition Pt: No data.

5.3 Fire Fighting Instructions:
As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.
### Section 6. Accidental Release Measures

<table>
<thead>
<tr>
<th>6.1</th>
<th>Protective Precautions, Methods and Material For Containment and Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avoid raising and breathing dust, and provide adequate ventilation.</td>
</tr>
<tr>
<td></td>
<td>As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).</td>
</tr>
<tr>
<td>6.2</td>
<td>Environmental Precautions: Take steps to avoid release into the environment, if safe to do so.</td>
</tr>
<tr>
<td>6.3</td>
<td>Methods and Material For Containment and Cleaning: Transfer to a chemical waste container for disposal in accordance with local regulations.</td>
</tr>
<tr>
<td>Up:</td>
<td>Avoid raising and breathing dust, and provide adequate ventilation.</td>
</tr>
<tr>
<td></td>
<td>As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).</td>
</tr>
<tr>
<td></td>
<td>Take steps to avoid release into the environment, if safe to do so.</td>
</tr>
<tr>
<td></td>
<td>Transfer to a chemical waste container for disposal in accordance with local regulations.</td>
</tr>
</tbody>
</table>

### Section 7. Handling and Storage

| 7.1 | Precautions To Be Taken in Handling: Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure. |
| 7.2 | Precautions To Be Taken in Storing: Keep container tightly closed. Store in accordance with information listed on the product insert. |

### Section 8. Exposure Controls/Personal Protection

#### 8.1 Exposure Parameters:

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Partial Chemical Name</th>
<th>Britain EH40</th>
<th>France VL</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>108341-18-0</td>
<td>L-(-)-Norepinephrine (bitartrate hydrate)</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Partial Chemical Name</th>
<th>OSHA TWA</th>
<th>ACGIH TWA</th>
<th>Other Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>108341-18-0</td>
<td>L-(-)-Norepinephrine (bitartrate hydrate)</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
</tbody>
</table>

#### 8.2 Exposure Controls:

| 8.2.1 Engineering Controls (Ventilation etc.): Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. |
| 8.2.2 Personal protection equipment: |
| **Eye Protection:** Safety glasses |
| **Protective Gloves:** Compatible chemical-resistant gloves |
| **Other Protective Clothing:** Lab coat |
| **Respiratory Equipment:** NIOSH approved respirator, as conditions warrant. (Specify Type): |
| **Work/Hygienic/Maintenance Practices:** Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower. Wash thoroughly after handling. No data available. |
Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States: [ ] Gas [ ] Liquid [X] Solid
Appearance and Odor: A crystalline solid
Melting Point: No data.
Boiling Point: No data.
Flash Pt: No data.
Evaporation Rate: No data.
Flammability (solid, gas): No data available.
Explosive Limits: LEL: No data. UEL: No data.
Vapor Pressure (vs. Air or mm Hg): No data.
Vapor Density (vs. Air = 1): No data.
Specific Gravity (Water = 1): No data.
Solubility in Water: No data.
Solubility Notes: ~10 mg/ml in PBS (pH 7.2); ~25 mg/ml in DMSO; ~10 mg/ml in DMF;
Autoignition Pt: No data.

9.2 Other Information

Percent Volatile: No data.
Molecular Formula & Weight: C8H11NO3 • C4H6O6 • H2O 337.3

Section 10. Stability and Reactivity

10.1 Reactivity: No data available.
10.2 Stability: Unstable [ ] Stable [X]
10.3 Stability Note(s): Stable if stored in accordance with information listed on the product insert.
10.4 Conditions To Avoid: No data available.
10.5 Incompatibility - Materials acids
   To Avoid: bases oxidizing agents
10.6 Hazardous
   Decomposition or Byproducts: No data available.
Section 11. Toxicological Information

11.1 Information on Toxicological Effects:
The toxicological effects of this product have not been thoroughly studied.

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Hazardous Components (Chemical Name)</th>
<th>NTP</th>
<th>IARC</th>
<th>ACGIH</th>
<th>OSHA</th>
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<tbody>
<tr>
<td>108341-18-0</td>
<td>L-(−)-Norepinephrine (bitartrate hydrate)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Section 12. Ecological Information

12.1 Toxicity:
Avoid release into the environment.
Runoff from fire control or dilution water may cause pollution.

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.

Section 13. Disposal Considerations

13.1 Waste Disposal Method:
Dispose in accordance with local, state, and federal regulations.

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):
DOT Proper Shipping Name: Not dangerous goods.
DOT Hazard Class:
UN/NA Number:

14.1 LAND TRANSPORT (European ADR/RID):
ADR/RID Shipping Name: Not dangerous goods.
UN Number:
Hazard Class:

14.3 AIR TRANSPORT (ICAO/IATA):
ICAO/IATA Shipping Name: Not dangerous goods.
Additional Transport Information:
Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Hazardous Components (Chemical Name)</th>
<th>S. 302 (EHS)</th>
<th>S. 304 RQ</th>
<th>S. 313 (TRI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>108341-18-0</td>
<td>L-(−)-Norepinephrine (bitartrate hydrate)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Hazardous Components (Chemical Name)</th>
<th>Other US EPA or State Lists</th>
</tr>
</thead>
<tbody>
<tr>
<td>108341-18-0</td>
<td>L-(−)-Norepinephrine (bitartrate hydrate)</td>
<td>CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No</td>
</tr>
</tbody>
</table>

Multi-region format
Section 16. Other Information

Revision Date: 09/27/2015

Additional Information About This Product: No data available.

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