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

1.1 Product Code: 14487
Product Name: (+)-Pilocarpine (hydrochloride)
Synonyms: (3S,4R)-3-ethyldihydro-4-[(1-methyl-1H-imidazol-5-yl)methyl]-2(3H)-furanone, monohydrochloride; NSC 5746; Isopto Carpine; Salagen; Sanpilo;

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
Emergency Contact: CHEMTREC Within USA and Canada: +1 (800)424-9300
Alternate Emergency Contact: CHEMTREC Outside USA and Canada: +1 (703)527-3887
Information: Cayman Chemical Company +1 (734)971-3335
Web site address: www.caymanchem.com

Section 2. Hazards Identification

GHS Classification | Placard | Key word | GHS hazard phrase
--- | --- | --- | ---
Acute Toxicity: Inhalation, Category 2 | Skull and crossbones | Danger | Fatal if inhaled
Acute Toxicity: Oral, Category 2 | Skull and crossbones | Danger | Fatal if swallowed
Aquatic Toxicity (Acute), Category 1 | Pollution | Warning | Very toxic to aquatic life
Aquatic Toxicity (Chronic), Category 1 | Pollution | Warning | Very toxic to aquatic life with long lasting effects


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. Material may be irritating to the mucous membranes and upper respiratory tract. May be harmful by skin absorption. May cause eye, skin, or respiratory system irritation. Very toxic to aquatic life with long lasting effects. To the best of our knowledge, the toxicological properties have not been thoroughly investigated.
SAFETY DATA SHEET
(+)Pilocarpine (hydrochloride)

Target Organs: No data available.
LD 50 / LC 50: Please refer to Section 11.
Medical Conditions Generally Aggravated By Exposure: No data available.

Section 3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>Concentration</th>
<th>EC#</th>
<th>Risk Phrases</th>
<th>RTECS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)-Pilocarpine hydrochloride</td>
<td>54-71-7</td>
<td>100.0 %</td>
<td>200-212-5</td>
<td>R26/28-50/53</td>
<td>TK1450000</td>
</tr>
</tbody>
</table>

Section 4. First Aid Measures

4.1 Description of First Aid Measures:
4.1.1 In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
4.1.2 In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 20 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.
4.1.3 In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 20 minutes. Have eyes examined and tested by medical personnel.
4.1.4 In Case of Ingestion: No data available.
4.2 Important Symptoms and Effects, Both Acute and Delayed: No data available.
4.3 Indication of any immediate medical attention and special treatment needed: No data available.

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.
5.2 Flammable Properties and Hazards: No data available.
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

6.1 Protective Precautions, Protective Equipment and Emergency Procedures: Avoid raising and breathing dust, and provide adequate ventilation. 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).
6.2 Environmental Precautions: Take steps to avoid release into the environment, if safe to do so.
6.3 Methods and Material For Containment and Cleaning Up: Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

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.

Hazard Label Information: Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling.

Section 8. Exposure Controls/Personal Protection

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>Other Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)-Pilocarpine hydrochloride</td>
<td>54-71-7</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
</tbody>
</table>

Hazardous Components (Chemical Name) | CAS #   | Europe   | France   | Britain    |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)-Pilocarpine hydrochloride</td>
<td>54-71-7</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
</tbody>
</table>

Protective Equipment Summary - Hazard Label Information:
- Compatible chemical-resistant gloves
- Eye wash station in work area
- Lab coat
- Safety glasses
- Safety shower in work area
- Vent Hood

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 Protective Gloves: Compatible chemical-resistant gloves

8.2.3 Environmental Exposure Controls:
Do not take internally.
Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower.
Wash thoroughly after handling.

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.
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); ~2 mg/ml in EtOH & DMF; ~3.3 mg/ml in DMSO;
Autoignition Pt: No data.
Explosive Properties: No data available.
Oxidizing Properties: No data available.

9.2 Other Information
Percent Volatile: No data.
Formula: C11H16N2O2 • HCl
Molecular Weight: 244.70
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 To Avoid: strong oxidizing agents

10.6 Hazardous Decomposition Or Byproducts:
- carbon dioxide
- carbon monoxide
- hydrogen chloride gas
- nitrogen oxides

Section 11. Toxicological Information

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

(+)-Pilocarpine hydrochloride - Toxicity Data: Ocular TDLO (man): 200 µg/kg/7H (intermittent); Intraperitoneal LD50 (rat): 203 mg/kg; Oral LD50 (mouse): 200 mg/kg;

Chronic Toxicological Effects: (+)-Pilocarpine hydrochloride - Investigated as a reproductive effector.

Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information.

(+)-Pilocarpine hydrochloride RTECS Number: TK145000

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>NTP</th>
<th>IARC</th>
<th>ACGIH</th>
<th>OSHA</th>
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</thead>
<tbody>
<tr>
<td>1. (+)-Pilocarpine hydrochloride</td>
<td>54-71-7</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.

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: ALKALOID SALTS, SOLID, N.O.S. (Pilocarpine hydrochloride)
- DOT Hazard Class: 6.1
- DOT Hazard Label: POISON
- UN/NA Number: 1544
- Packing Group: III

14.1 LAND TRANSPORT (European ADR/RID)
- ADR/RID Shipping Name: ALKALOID SALTS, SOLID, N.O.S. (Pilocarpine hydrochloride)
- UN Number: 1544
- Hazard Class: 6.1 - POISON
- Packing Group: III

14.3 AIR TRANSPORT (ICAO/IATA)
- ICAO/IATA Shipping Name: ALKALOID SALTS, SOLID, N.O.S. (Pilocarpine hydrochloride)
- UN Number: 1544
Hazard Class: 6.1 - POISON
Packing Group: III
IATA Classification: 6.1
Additional Transport Information: Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

European Community Hazard Symbol codes
- T+: Very Toxic; N: Dangerous for the environment

European Community Risk and Safety Phrases
- R26/28 - Very toxic by inhalation and if swallowed.
- R50/53 - Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- S22 - Do not breathe dust.
- S24/25 - Avoid contact with skin and eyes.
- S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.
- S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible.)
- S53 - Avoid exposure - obtain special instructions before use.

US EPA SARA Title III

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>Sec.302 (EHS)</th>
<th>Sec.304 RQ</th>
<th>Sec.313 (TRI)</th>
<th>Sec.110</th>
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<tbody>
<tr>
<td>1. (+)-Pilocarpine hydrochloride</td>
<td>54-71-7</td>
<td>No</td>
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</tr>
</tbody>
</table>

Other US EPA or State Lists

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>CAA HAP,ODC</th>
<th>CWA NPDES</th>
<th>TSCA</th>
<th>CA PROP.65</th>
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<tbody>
<tr>
<td>1. (+)-Pilocarpine hydrochloride</td>
<td>54-71-7</td>
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<td>No</td>
<td>Inventory</td>
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</tbody>
</table>

Regulatory Information Statement: This SDS was prepared in accordance with Regulation (EC) No.1272/2008 and European Directive 67/548/EEC as amended.

Section 16. Other Information

Revision Date: 07/03/2013

Company Policy or Disclaimer

DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

N.A.=Not available, N.P.=Not applicable, N.D.=Not determined, N.E.=Not established, N.R.=Not required