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

Product Name: Guanidine Hydrochloride

Product Code(s): M110

Recommended Use: For Further Manufacturing Use Only
Not for Human or Animal Drug Use

Recommended Use: Purification of nucleic acids or polypeptides from cell sources and inhibition of both RNase and protease activity.

Synonyms: AMINOFORMAMIDINE HYDROCHLORIDE * AMINOMETHANAMIDINE HYDROCHLORIDE

Company: AMRESCO, LLC
6681 Cochran Road
Solon, Ohio 44139

Emergency Telephone Number: Chemtrec 1-800-424-9300

Company Phone Number: 1-800-448-4442
E-mail Address: info@amresco-inc.com

2. HAZARDS IDENTIFICATION

GHS - Classification

Classification: Acute Toxicity Oral 4 Skin Irritant 2 Eye Irritant 2

Signal Word: Warning

Hazard Statements: H302 - Harmful if swallowed H319 - Causes serious eye irritation H315 - Causes skin irritation

Precautionary Statements: P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>EC No.</th>
<th>REACH Reg. No.</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guanidine hydrochloride</td>
<td>EEC No. 200-002-3</td>
<td>Not available</td>
<td>50-01-1</td>
<td>95-100</td>
<td>Xn; R22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xi; R36/38</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

**Eye Contact**
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician

**Skin Contact**
Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes

**Inhalation**
Move to fresh air. If breathing is difficult, give oxygen.

**Ingestion**
Never give anything by mouth to an unconscious person. Rinse mouth. Consult a physician.

**Notes to Physician**
Treat symptomatically

5. FIRE-FIGHTING MEASURES

**Flammable Properties**
Not flammable

**Flash Point**
Not determined

**Suitable Extinguishing Media**
Dry chemical, CO₂, water spray or alcohol-resistant foam.

**Hazardous Combustion Products**
Carbon oxides, Nitrogen oxides (NOx), Emits toxic fumes.

**Explosion Data**
- Sensitivity to Mechanical Impact: Not sensitive
- Sensitivity to Static Discharge: Not sensitive

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions**
Avoid contact with the skin and the eyes. Use personal protective equipment. Ensure adequate ventilation.

**Methods for Containment**
Prevent further leakage or spillage if safe to do so

**Methods for Cleaning Up**
Pick up and transfer to properly labeled containers

7. HANDLING AND STORAGE
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guanidine hydrochloride</td>
<td>50-01-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Engineering Measures
- Showers
- Eyewash stations
- Ventilation systems

Personal Protective Equipment
- **Eye/Face Protection**
  - Safety glasses with side-shields.
  - Avoid contact with eyes.
- **Skin and Body Protection**
  - Wear protective gloves/clothing.
- **Respiratory Protection**
  - If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures
- Handle in accordance with good industrial hygiene and safety practice

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>White</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Odor Threshold</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Decomposition Temperature °C</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Freezing Point</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Initial Boiling Point</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Physical State</strong></td>
<td>Crystalline Powder</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>(as 1% solution) 6</td>
</tr>
<tr>
<td><strong>Flash Point</strong></td>
<td>Not determined</td>
</tr>
<tr>
<td><strong>Autoignition Temperature</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Boiling Point/Range</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Melting Point/Range</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability Limits in Air</strong></td>
<td>Upper: No data available  Lower: No data available</td>
</tr>
<tr>
<td><strong>Explosive Properties</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Oxidizing Properties</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Evaporation Rate</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>MMHG @ 37.8 C</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor Density</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Specific Gravity</strong></td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Solubility</strong></td>
<td>No information available</td>
</tr>
<tr>
<td><strong>Water Solubility</strong></td>
<td>Very soluble in water</td>
</tr>
<tr>
<td><strong>Partition Coefficient</strong> (n-octanol/water)</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>No information available</td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

Stability
Stable under recommended storage conditions

Incompatible Products
Strong oxidizing agents.

Conditions to Avoid
Hygroscopic. Protect from moisture.

Hazardous Decomposition Products

Hazardous Polymerization
Hazardous polymerization does not occur

11. TOXICOLOGICAL INFORMATION

Acute Toxicity
Product Information
Harmful if swallowed, inhaled, or absorbed through skin. Causes skin, eye and respiratory tract irritation.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guanidine hydrochloride</td>
<td></td>
<td>2000 mg/kg (Rabbit)</td>
<td></td>
</tr>
</tbody>
</table>

Chronic Toxicity

Chronic Toxicity
No known effect based on information supplied

Target Organ Effects
Bone marrow, Nerves.

12. ECOLOGICAL INFORMATION

Ecotoxicity
Harmful to aquatic organisms.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guanidine hydrochloride</td>
<td>&lt;= -1.7 20 °C</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method
Dispose of material in accordance with all federal, state, and local regulations.

Contaminated Packaging
Dispose of in accordance with all federal, state and local regulations.
14. TRANSPORT INFORMATION

IATA
Not regulated

DOT
Not regulated

15. REGULATORY INFORMATION

REACH Title VII Restrictions
No information available.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Dangerous Substances</th>
<th>Organic Solvents</th>
<th>Harmful Substances Who Are to be Indicated on the Label</th>
<th>Pollution Release and Transfer Registry (Class II):</th>
<th>Pollution Release and Transfer Registry (Class I):</th>
<th>Poison and Deleterious Substances Control Law:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guanidine hydrochloride</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>ISHA - Harmful Substances Prohibited for Manufacturing, Importing, Transferring, or Supplying</th>
<th>ISHA - Harmful Substances Requiring Permission</th>
<th>Toxic Chemical Classification Listing (TCCL) - Toxic Chemicals</th>
<th>Toxic Release Inventory (TRI) - Group I</th>
<th>Toxic Release Inventory (TRI) - Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guanidine hydrochloride 50-01-1 (95-100)</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

International Inventories

- TSCA: Complies
- EINECS/ELINCS: Complies
- ENCS: Complies
- IECSC: Complies
- KECL: Does not Comply
- PICCS: Complies
- AICS: Complies

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories
- Acute Health Hazard: Yes
- Chronic Health Hazard: No
Guanidine Hydrochloride

Product Code(s)  MSDS M110

Revision Date  08-Aug-2011

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)
This product does not contain any substances regulated as pollutants pursuant to the Clean Air Act (40 CFR 122.21 and 40 CFR 122.42)

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)
This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990

CERCLA

U.S. State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

International Regulations

Mexico - Grade  No information available.

Canada

WHMIS Hazard Class
D2B  Toxic materials

16. OTHER INFORMATION

Issuing Date  03-Jun-2009

Revision Date  08-Aug-2011

Revision Note
No information available.

Recommended Restrictions  No information available
Disclaimer
The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of MSDS