MATERIAL SAFETY DATA SHEET

Product Name: Vecuronium Bromide for Injection

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Manufacturer Name And Address
Hospira Inc.
275 North Field Drive
Lake Forest, Illinois USA
60045

Emergency Telephone
CHEMTREC: North America: 800-424-9300;
International 1-703-527-3887; Australia (02) 8014 4880

Hospira, Inc., Non-Emergency
224-212-2000

Product Name
Vecuronium Bromide for Injection

Synonyms
Piperidinium, 1-[(2β, 3α, 5α, 16β, 17β)-3, 17-bis (acetyloxy)-2-(1-piperidinyl) androstan-16-yl]-1-methyl-, bromide

2. COMPOSITION/INFORMATION ON INGREDIENTS

Active Ingredient Name
Vecuronium Bromide

Chemical Formula
C₃₄H₅₇BrN₂O₄

Preparation
Non-hazardous ingredients include Water for Injection. Sodium hydroxide and/or hydrochloric acid may be use to adjust the pH.

<table>
<thead>
<tr>
<th>Component</th>
<th>Approximate Percent by Weight</th>
<th>CAS Number</th>
<th>RTECS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vecuronium Bromide</td>
<td>7</td>
<td>50700-72-6</td>
<td>TN4875000</td>
</tr>
<tr>
<td>Mannitol</td>
<td>67</td>
<td>69-65-8</td>
<td>OP2060000</td>
</tr>
<tr>
<td>Sodium Phosphate, Dibasic</td>
<td>11</td>
<td>7558-79-4</td>
<td>WC4500000</td>
</tr>
<tr>
<td>Citric Acid Anhydrous</td>
<td>14</td>
<td>77-92-9</td>
<td>GE7350000</td>
</tr>
</tbody>
</table>

3. HAZARD INFORMATION

Carcinogen List

<table>
<thead>
<tr>
<th>Substance</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citric Acid Anhydrous</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Mannitol</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Sodium Phosphate, Dibasic</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Vecuronium Bromide</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

Emergency Overview
Vecuronium Bromide for Injection is a lyophilized powder containing vecuronium bromide, a non-depolarizing neuromuscular blocking agent with pharmacologic effects similar to other neuromuscular blocking materials. In the workplace, this material should be considered potentially irritating to the eyes and respiratory tract and a potent drug. Based on clinical use, possible target organs include the skeletal muscle, the parasympathetic nervous system and the respiratory system.

Occupational Exposure Potential
Information on the absorption of this product via inhalation or skin contact is not available. Avoid liquid aerosol generation and skin contact.
Product Name: Vecuronium Bromide for Injection

Signs and Symptoms
No signs or symptoms from occupational exposure are known. In clinical use, excessive doses of vecuronium may result in enhanced pharmacological effects. These effects may include skeletal muscle weakness, decreased respiratory reserve, low tidal volume, or apnea. Respiratory depression may be due either wholly or in part to other drugs used during the conduct of general anesthesia such as narcotics, thiobarbiturates and other central nervous system depressants. The administration of vecuronium has been associated with rare instances of hypersensitivity reactions (bronchospasm, hypotension and/or tachycardia, sometimes associated with acute urticaria or erythema).

Medical Conditions Aggravated by Exposure
Hypersensitivity to the material and/or similar materials. Pre-existing muscle, respiratory system, parasympathetic nervous system ailments.

4. FIRST AID MEASURES

Eye contact
Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

Skin contact
Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

Inhalation
Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

Ingestion
Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

5. FIRE FIGHTING MEASURES

Flammability
None anticipated. However, many organic powders will combust at high temperatures.

Fire & Explosion Hazard
None anticipated. As with all powders, avoid the generation of dusty environments.

Extinguishing media
As with any fire, use extinguishing media appropriate for primary cause of fire.

Special Fire Fighting Procedures
No special provisions required beyond normal fire fighting equipment such as flame and chemical resistant clothing and self contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Spill Cleanup and Disposal
Isolate area around spill. Put on suitable protective clothing and equipment as specified by site spill procedures. Clean powder using methods that minimize the creation of dusts. If the spill occurs after reconstitution, absorb the liquid with suitable material and clean affected area with soap and water. Dispose of spill materials according to the applicable federal, state, or local regulations.
7. HANDLING AND STORAGE

Handling
No special handling required for hazard control under conditions of normal product use.

Storage
No special storage required for hazard control. For product protection, follow storage recommendations noted on the product case label, the primary container label, or the product insert.

Special Precautions
No special precautions required for hazard control.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>Type</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mg/m3</td>
<td>ppm</td>
</tr>
<tr>
<td>Sodium Phosphate, Dibasic</td>
<td>Not Applicable</td>
<td>N/A</td>
</tr>
<tr>
<td>Citric Acid Anhydrous</td>
<td>Not Applicable</td>
<td>N/A</td>
</tr>
<tr>
<td>Mannitol</td>
<td>Not Applicable</td>
<td>N/A</td>
</tr>
<tr>
<td>Vecuronium Bromide</td>
<td>Not Applicable</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Respiratory protection
Respiratory protection is normally not needed during intended product use. However, if the generation of dusts or aerosols is likely, and engineering controls are not considered adequate to control potential airborne exposures, the use of an approved air-purifying respirator with a HEPA cartridge (N95 or equivalent) is recommended under conditions where airborne dust or aerosol concentrations are not expected to be excessive. For uncontrolled release events, or if exposure levels are not known, provide respirators that offer a high protection factor such as a powered air purifying respirator or supplied air. A respiratory protection program that meets OSHA’s 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions require respirator use. Personnel who wear respirators should be fit tested and approved for respirator use as required.

Skin protection
If skin contact with the product formulation is likely, the use of latex or nitrile gloves is recommended.

Eye protection
Eye protection is normally not required during intended product use. However, if eye contact is likely to occur, the use of chemical safety goggles (as a minimum) is recommended.

Engineering Controls
Engineering controls are normally not needed during the normal use of this product.

9. PHYSICAL/CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Appearance/Physical State</th>
<th>Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Fine crystalline powder</td>
</tr>
<tr>
<td>Odor</td>
<td>NA</td>
</tr>
<tr>
<td>Odor Threshold:</td>
<td>NA</td>
</tr>
<tr>
<td>pH:</td>
<td>4 (3.5 to 4.5)</td>
</tr>
<tr>
<td>Melting point/Freezing point:</td>
<td>227-229°C</td>
</tr>
<tr>
<td>Initial Boiling Point/Boiling Point Range:</td>
<td>NA</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>NA</td>
</tr>
<tr>
<td>Flammability (solid, gas):</td>
<td>NA</td>
</tr>
</tbody>
</table>
Product Name: Vecuronium Bromide for Injection

Upper/Lower Flammability or Explosive Limits: NA
Vapor Pressure: NA
Vapor Density: NA
Specific Gravity: NA
Solubility: NA
Partition coefficient: n-octanol/water: NA
Auto-ignition temperature: NA
Decomposition temperature: NA

10. STABILITY AND REACTIVITY

Reactivity Not determined.
Chemical Stability Stable under standard use and storage conditions.
Hazardous Reactions Not determined.
Conditions to avoid Not determined.
Incompatibilities Not determined.
Hazardous decomposition Not determined. During thermal decomposition, it may be possible to generate irritating vapors and/or toxic fumes of carbon oxides (COx), nitrogen oxides (NOx), and hydrogen bromide (HBr).
products
Hazardous Polymerization Not anticipated to occur with this product.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity
Not determined for the product formulation. Information for the ingredients is as follows:

<table>
<thead>
<tr>
<th>Ingredient(s)</th>
<th>Percent</th>
<th>Test Type</th>
<th>Route of Administration</th>
<th>Value</th>
<th>Units</th>
<th>Species</th>
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</thead>
<tbody>
<tr>
<td>Vecuronium Bromide</td>
<td>100</td>
<td>LD50</td>
<td>Oral</td>
<td>455</td>
<td>mg/kg</td>
<td>Rat Mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>41</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
<tr>
<td>Vecuronium Bromide</td>
<td>100</td>
<td>LD50</td>
<td>Intravenous</td>
<td>0.20</td>
<td>mg/kg</td>
<td>Rat</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.05</td>
<td>mg/kg</td>
<td>Mouse</td>
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<tr>
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<td>100</td>
<td>LD50</td>
<td>Oral</td>
<td>11,700</td>
<td>mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3000</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5040</td>
<td>mg/kg</td>
<td>Rabbit</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>7280</td>
<td>mg/kg</td>
<td></td>
</tr>
<tr>
<td>D-Mannitol</td>
<td>100</td>
<td>LD50</td>
<td>Intravenous</td>
<td>43</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>330</td>
<td>mg/kg</td>
<td>Rabbit</td>
</tr>
<tr>
<td>D-Mannitol</td>
<td>100</td>
<td>LD50</td>
<td>Oral</td>
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<td>mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22,000</td>
<td>mg/kg</td>
<td>Mouse</td>
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<td>Dibasic Sodium Phosphate</td>
<td>100</td>
<td>LD50</td>
<td>Intravenous</td>
<td>9690</td>
<td>mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7470</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
</tbody>
</table>

Aspiration Hazard None anticipated from normal handling of this product.
Dermal Irritation/Corrosion None anticipated from normal handling of this product. Citric acid and dibasic sodium phosphate have been reported to be mild skin irritants. Inadvertent contact of this product with skin may produce mild irritation.
Product Name: Vecuronium Bromide for Injection

Ocular Irritation/Corrosion
None anticipated from normal handling of this product. Dibasic sodium phosphate is reported to be a mild eye irritant while citric acid is reported to be a severe eye irritant. Inadvertent contact of this product with eyes may produce irritation with redness and tearing.

Dermal or Respiratory Sensitization
None anticipated from normal handling of this product. However, clinical use of this product has been associated with rare instances of hypersensitivity reactions.

Reproductive Effects
The effects of this product on fertility or fetal development have not been evaluated.

Mutagenicity
The mutagenic potential of this product has not been evaluated.

Carcinogenicity
The carcinogenic potential of this product has not been evaluated.

Target Organ Effects
Possible target organs include the skeletal muscle, the parasympathetic nervous system and the respiratory system.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity
Not determined for product.

Persistence/Biodegradability
Not determined for product.

Bioaccumulation
Not determined for product.

Mobility in Soil
Not determined for product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
All waste materials must be properly characterized. Further, disposal should be performed in accordance with the federal, state or local regulatory requirements.

Container Handling and Disposal
Dispose of container and unused contents in accordance with federal, state and local regulations.

14. TRANSPORTATION INFORMATION

ADR/ADG/ DOT STATUS:
Not regulated

IMDG STATUS:
Not regulated

ICAO/IATA STATUS:
Not regulated

Transport Comments:
None
### USA Regulations

<table>
<thead>
<tr>
<th>Substance</th>
<th>TSCA Status</th>
<th>CERCLA Status</th>
<th>SARA 302 Status</th>
<th>SARA 313 Status</th>
<th>PROP 65 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citric Acid Anhydrous</td>
<td>Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Mannitol</td>
<td>Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Sodium Phosphate, Dibasic</td>
<td>Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Vecuronium Bromide</td>
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<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

**RCRA Status** Not Listed  
**U.S. OSHA Classification** Target Organ Toxin

**GHS Classification**  
*In the EU, classification under GHS/CLP does not apply to certain substances and mixtures, such as medicinal products as defined in Directive 2001/83/EC, which are in the finished state, intended for the final user:*

**Hazard Class** Not Applicable  
**Hazard Category** Not Applicable

**Signal Word** Not Applicable  
**Symbol** Not Applicable

**Prevention** P260 - Do not breathe dust/fume/gas/mist/vapors/spray.  
**Hazard Statement** Not Applicable

**Response:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical attention. Wash hands after handling.

Get medical attention if you feel unwell.

**EU Classification**  
*Medical products are exempt from the requirements of the EU Dangerous Preparations Directive. Information provided below is for the pure drug substance Vecuronium Bromide.

**Classification(s):** Not Applicable  
**Symbol:** Not Applicable  
**Indication of Danger:** Not Applicable  
**Risk Phrases:** Not Applicable  
**Safety Phrases:** S23 - Do not breathe vapor.  
S24/25 - Avoid contact with skin and eyes.  
S37/39 - Wear suitable gloves and eye/face protection.
16. OTHER INFORMATION:

Notes:
ACGIH TLV  American Conference of Governmental Industrial Hygienists – Threshold Limit Value
CAS  Chemical Abstracts Service Number
CERCLA  US EPA law, Comprehensive Environmental Response, Compensation, and Liability Act
DOT  US Department of Transportation Regulations
EEL  Employee Exposure Limit
IATA  International Air Transport Association
LD50  Dosage producing 50% mortality
NA  Not applicable/Not available
NE  Not established
NIOSH  National Institute for Occupational Safety and Health
OSHA PEL  US Occupational Safety and Health Administration – Permissible Exposure Limit
Prop 65  California Proposition 65
RCRA  US EPA, Resource Conservation and Recovery Act
RTECS  Registry of Toxic Effects of Chemical Substances
SARA  Superfund Amendments and Reauthorization Act
STEL  15-minute Short Term Exposure Limit
TSCA  Toxic Substance Control Act
TWA  8-hour Time Weighted Average

MSDS Coordinator: Hospira GEHS
Date Prepared: 11/08/2011
Obsolete Date: 10/21/2008

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