MATERIAL SAFETY DATA SHEET

Product Name: Hydromorphone Hydrochloride Injection, USP (HIGH POTENCY Formulation) 10 mg/mL

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

<table>
<thead>
<tr>
<th>Manufacturer Name And Address</th>
<th>Hospira Inc. 275 North Field Drive Lake Forest, Illinois USA 60045</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Telephone</td>
<td>CHEMTREC: North America: 800-424-9300; International 1-703-527-3887; Australia - 61-290372994; UK - 44-870-8200418</td>
</tr>
<tr>
<td>Hospira, Inc., Non-Emergency</td>
<td>224-212-2000</td>
</tr>
<tr>
<td>Product Name</td>
<td>Hydromorphone Hydrochloride Injection, USP (HIGH POTENCY Formulation) 10 mg/mL</td>
</tr>
<tr>
<td>Synonyms</td>
<td>4,5α-Epoxy-3-hydroxy-17-methylmorphinan-6-one hydrochloride; Morphinan-6-one, 4,5-alpha-epoxy-3-hydroxy-17-methyl-hydrochloride, (5'-alpha)-.</td>
</tr>
</tbody>
</table>

2. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Active Ingredient Name</th>
<th>Hydromorphone Hydrochloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Formula</td>
<td>C_{17}H_{19}NO_{3}• HCl</td>
</tr>
<tr>
<td>Preparation</td>
<td>Non-hazardous ingredients include Water for Injection. Hazardous ingredients present at less than 1% include sodium citrate and citric acid.</td>
</tr>
</tbody>
</table>

<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>Hydromorphone Hydrochloride</td>
<td>1</td>
<td>71-68-1</td>
<td>QD2625000</td>
</tr>
</tbody>
</table>

3. HAZARD INFORMATION

<table>
<thead>
<tr>
<th>Carcinogen List</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydromorphone Hydrochloride</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

Emergency Overview

Hydromorphone Hydrochloride Injection, USP (HIGH POTENCY Formulation), is a solution containing hydromorphone hydrochloride, a narcotic analgesic that is about 8-times more potent than morphine. Clinically, it is used to manage pain. In the United States, hydromorphone hydrochloride is a Schedule II controlled substance. In the workplace, hydromorphone hydrochloride should be considered a potent drug, a potential reproductive hazard, and potentially irritating to the eyes and respiratory tract. Based on clinical use, possible target organs include the central nervous system, cardiovascular system, respiratory system, gastrointestinal system, and the fetus.

Occupational Exposure Potential

Information on the absorption of this product via inhalation or skin contact is not available. Published reports have suggested that hydromorphone hydrochloride has some potential to be absorbed through intact skin. Avoid liquid aerosol generation and skin contact.
Product Name: Hydromorphone Hydrochloride Injection, USP (HIGH POTENCY Formulation)
10 mg/mL

Signs and Symptoms During occupational use, this material should be considered potentially irritating to the eyes and respiratory tract. In clinical use, frequent adverse effects include lightheadedness, dizziness, pinpoint pupils, sedation, nausea, vomiting, and sweating. Serious adverse effects may include respiratory depression and apnea, and to a lesser degree, circulatory depression, respiratory arrest, shock and cardiac arrest. Other effects include constipation, increased cranial pressure, cough suppression, urinary retention, coma, cardiovascular collapse and death. Chronic administration may produce physical and psychological dependence.

Medical Conditions Aggravated by Exposure Pre-existing hypersensitivity to hydromorphone hydrochloride or other components in this product. Pre-existing central nervous system, cardiovascular system, respiratory system, or gastrointestinal system ailments, pre-existing physical dependence on narcotics; pregnancy.

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. The narcotic antagonist, naloxone, is a specific antidote against respiratory depression which may result from overdosage, or unusual sensitivity to hydromorphone hydrochloride injection. A dose of naloxone (usually 0.4 to 2 mg) should be administered intravenously, if possible, simultaneously with respiratory resuscitation. The dose can be repeated in 3 minutes. Naloxone should not be administered in the absence of clinically significant respiratory or circulatory depression. Naloxone should be administered cautiously to persons who are known, or suspected to be physically dependent on hydromorphone hydrochloride injection (High Potency). In such cases, an abrupt or complete reversal of narcotic effects may precipitate an acute abstinence syndrome.

5. FIRE FIGHTING MEASURES

Flammability None anticipated for this aqueous product.

Fire & Explosion Hazard None anticipated for this aqueous product.

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 firefighting 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. Absorb the liquid with suitable material and clean affected area with soap and water. Because hydromorphone
Product Name: Hydromorphine Hydrochloride Injection, USP (HIGH POTENCY Formulation)
10 mg/mL

Hydromorphine Hydrochloride is a Schedule II controlled substance, all clean up operations should be witnessed by more than one individual. The amount of material collected should be assessed and documented. Notify appropriate company regulatory personnel. 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. In the United States, hydromorphone hydrochloride is a Schedule II controlled substance. Appropriate training and procedures may be required during the routine handling of this product.

Storage
No special storage required for hazard control. Location of storage area should comply with all regulations for a controlled substance. 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>mg/m³</th>
<th>ppm</th>
<th>µg/m³</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydromorphine Hydrochloride</td>
<td>Not Applicable</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>None Established</td>
</tr>
</tbody>
</table>

Respiratory protection
Respiratory protection is normally not needed during intended product use. However, if the generation of 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 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>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Clear, colorless to near colorless solution</td>
</tr>
<tr>
<td>Odor</td>
<td>Not determined</td>
</tr>
<tr>
<td>Odor Threshold:</td>
<td>Not determined</td>
</tr>
</tbody>
</table>
Product Name: Hydromorphone Hydrochloride Injection, USP (HIGH POTENCY Formulation)
10 mg/mL

**pH:** 3.5 to 5.5

**Melting point/Freezing point:** Approximately that of water (0°C, 32°F)

**Initial Boiling Point/Boiling Point Range:** Approximately that of water (100°C, 212°F)

**Evaporation Rate:** NA

**Flammability (solid, gas):** NA

**Upper/Lower Flammability or Explosive Limits:** NA

**Vapor Pressure:** Approximately that of water (17.5 mm Hg at 20°C)

**Vapor Density:** NA

**Specific Gravity:** Approximately that of water (1.0)

**Solubility:** Soluble in water

**Partition coefficient: n-octanol/water:** Not determined

**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**
Strong oxidizers.

**Hazardous decomposition products**
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 chloride.

**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>
</tr>
</thead>
<tbody>
<tr>
<td>Hydromorphone hydrochloride</td>
<td>100</td>
<td>LD50</td>
<td>Oral</td>
<td>199</td>
<td>mg/kg</td>
<td>Rat, male</td>
</tr>
<tr>
<td>Hydromorphone hydrochloride</td>
<td>100</td>
<td>LD50</td>
<td>Oral</td>
<td>215-261</td>
<td>mg/kg</td>
<td>Mouse, male</td>
</tr>
<tr>
<td>Hydromorphone hydrochloride</td>
<td>100</td>
<td>LD50</td>
<td>Oral</td>
<td>~ 261</td>
<td>mg/kg</td>
<td>Mouse, female</td>
</tr>
<tr>
<td>Hydromorphone hydrochloride</td>
<td>100</td>
<td>LD50</td>
<td>Intravenous</td>
<td>55</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>100</td>
<td>LD50</td>
<td>Intravenous</td>
<td>104</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.
Product Name: Hydromorphone Hydrochloride Injection, USP (HIGH POTENCY Formulation)
10 mg/mL

Ocular Irritation/Corrosion  None anticipated from normal handling of this product. However, inadvertent contact of this product with eyes or mucus membranes may produce irritation with redness and discomfort.

Dermal or Respiratory Sensitization  None anticipated from normal handling of this product. In clinical use, pruritus, urticaria, other skin rashes, wheal and flare over the vein with intravenous injection, and diaphoresis have been reported with narcotic analgesics.

Reproductive Effects  No effects on fertility, reproductive performance, or reproductive organ morphology were observed in male or female rats given oral dosages up to 7 mg/kg/day. No effects on teratogenicity or embryotoxicity were observed in female rats given oral dosages up to 7 mg/kg/day. Hydromorphone hydrochloride was not teratogenic in rats treated orally with as high as 10 mg/kg/day or in rabbits treated with as high as 50 mg/kg/day.

In a separate study, hydromorphone hydrochloride administered orally at dosages of 2 and 5 mg/kg/day to pregnant rats over the last third of the gestation period to the weaning of pups produced an increased incidence of peri/postnatal pup deaths and reduced pup body weights. These effects were not observed at a dosage of 0.5 mg/kg/day. Hydromorphone produced skull malformations (exencephaly and cranioschisis) in Syrian hamsters given oral dosages up to 20 mg/kg during the peak of organogenesis (gestation days 8-9).

Babies born to mothers who have been taking opioids regularly prior to delivery may be physically dependent. The withdrawal signs include irritability and excessive crying, tremors, hyperactive reflexes, increased respiratory rate, increased stools, sneezing, yawning, vomiting, and fever. The intensity of the syndrome does not always correlate with the duration of maternal opioid use or dose.

Mutagenicity  Hydromorphone was not mutagenic in an in vitro Ames reverse mutation assay, or a human lymphocyte chromosome aberration assay. Hydromorphone was not clastogenic in the in vivo mouse micronucleus assay.

Carcinogenicity  Long-term studies to evaluate the carcinogenic potential of hydromorphone hydrochloride have not been conducted in animals.

Target Organ Effects  Possible target organs include the central nervous system, cardiovascular system, respiratory system, gastrointestinal system, and the fetus.

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: In the United States, hydromorphone hydrochloride is a Schedule II controlled substance. 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

15. REGULATORY INFORMATION

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>Hydromorphone Hydrochloride</td>
<td>Not Listed</td>
<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
Possible Reproductive Toxin
Possible Irritant

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

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.
Product Name: Hydromorphone Hydrochloride Injection, USP (HIGH POTENCY Formulation)
10 mg/mL

**EU Classification***
*Medicinal products are exempt from the requirements of the EU Dangerous Preparations Directive. Information provided below is for the pure drug substance Hydromorphone Hydrochloride.

- 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
- TCA — Toxic Substance Control Act
- TWA — 8-hour Time Weighted Average

**MSDS Coordinator:** Hospira GEHS
**Date Prepared:** 10/18/2012
**Obsolete Date:** 09/27/2011

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