MATERIAL SAFETY DATA SHEET

Product Name: Phenytoin Sodium Injection, USP

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

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

Emergency Telephone
Hospira, Inc.
CHEMTREC: 800-424-9300
224 212-2055

Product Name
Phenytoin Sodium Injection, USP

Synonyms
Sodium 5, 5-diphenyl-2, 4-imidazolidinedione

2. COMPOSITION/INFORMATION ON INGREDIENTS

Active Ingredient Name
Phenytoin Sodium

Chemical Formula
C_{15}H_{11}N_{2}O_{2}Na

<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>Phenytoin Sodium</td>
<td>5</td>
<td>630-93-3</td>
<td>MU1400000</td>
</tr>
<tr>
<td>Propylene Glycol</td>
<td>40</td>
<td>57-55-6</td>
<td>TY2000000</td>
</tr>
<tr>
<td>Ethyl Alcohol</td>
<td>10</td>
<td>64-17-5</td>
<td>KQ6300000</td>
</tr>
</tbody>
</table>

Non-hazardous ingredients include water (45%, w/w). Hazardous ingredients present at less than 1% include sodium hydroxide which is used to adjust the pH.

3. HAZARD INFORMATION

Emergency Overview
Phenytoin Sodium Injection, USP, contains phenytoin sodium, a hydantoin drug used to treat epilepsy. In the workplace, this product should be considered a combustible liquid, potentially irritating to the skin and eyes, and a potential occupational reproductive hazard. Possible target organs include the central nervous system, cardiovascular system, gastrointestinal system, hematopoietic system, skin and possibly the fetus.

Occupational Exposure Potential
Information on the absorption of this product via inhalation or skin contact is not available. It has been reported that phenytoin sodium may be absorbed through the skin. Avoid liquid aerosol generation and skin contact.

Signs and Symptoms
In the workplace, phenytoin sodium can be irritating to the respiratory tract and solutions can cause severe eye and skin irritation. In clinical use, adverse central nervous system effects may include ataxia, slurred speech, dizziness, and headaches. Severe cardiotoxic reactions have included atrial and ventricular conduction depression and ventricular fibrillation. Adverse gastrointestinal effects may include nausea, vomiting, and constipation. Allergic-type reactions include dermatological manifestations sometimes accompanied by fever have included scarlatiniform or morbilliform rashes. Hematopoietic complications have included thrombocytopenia, leukopenia, granulocytopenia, agranulocytosis, and pancytopenia with or without bone marrow suppression. Local irritation, inflammation, tenderness, necrosis, and sloughing have been reported with or without extravasation of intravenous phenytoin.

Medical Conditions Aggravated by Exposure
Pre-existing hypersensitivity to phenytoin sodium or other ingredients in this product. Pre-existing central nervous system, cardiovascular system, gastrointestinal system, hematopoietic system, or skin ailments; or pregnancy.

Carcinogen Lists:
IARC: Group 2B – Possibly Carcinogenic to Humans
NTP: Reasonably Anticipated to be a Human Carcinogen.
OSHA: Not listed
### 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**
Flash Point: 63.9°C (147°F)

**Fire & Explosion Hazard**
Combustible liquid. Keep away from flames, sparks, or other sources of ignition.

**Extinguishing Media**
As with any fire, use extinguishing media appropriate for primary cause of fire. Dry chemical, foam, or carbon dioxide may be used for this product.

**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. 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 under conditions of normal product use. Protect from light by retaining in carton until contents have been used.

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

**Special Precautions**
Protect from freezing and extreme heat.
8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>OSHA-PEL</th>
<th>ACGIH-TLV</th>
<th>AIHA WEEL</th>
<th>Hospira EEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenytin sodium</td>
<td>8 hr TWA: Not</td>
<td>8 hr TWA: Not</td>
<td>8-hr TWA: Not</td>
<td>8 hr TWA: 200 mcg/m3</td>
</tr>
<tr>
<td></td>
<td>Established</td>
<td>Established</td>
<td>Established</td>
<td>STEL: Not Established</td>
</tr>
<tr>
<td>Propylene Glycol</td>
<td>8 hr TWA: Not</td>
<td>8 hr TWA: Not</td>
<td>8-hr TWA:</td>
<td>8 hr TWA: Not Established</td>
</tr>
<tr>
<td></td>
<td>Established</td>
<td>Established</td>
<td>10 mg/m3</td>
<td>STEL: Not Established</td>
</tr>
<tr>
<td>Ethyl Alcohol</td>
<td>8 hr TWA: 1900 mg/m3</td>
<td>8 hr TWA: 1900 mg/m3</td>
<td>8-hr TWA: Not Established</td>
<td>8 hr TWA: Not Established STEL: Not Established</td>
</tr>
</tbody>
</table>

Notes: OSHA PEL: US Occupational Safety and Health Administration – Permissible Exposure Limit
ACGIH TLV: American Conference of Governmental Industrial Hygienists – Threshold Limit Value.
AIHA WEEL: Workplace Environmental Exposure Level
EEL: Employee Exposure Limit.
TWA: 8 hour Time Weighted Average.
STEL: 15-minute Short Term Exposure Limit.

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 adequate to control potential airborne exposures, the use of an approved air-purifying respirator with a HEPA cartridge (P100 or equivalent) and an organic vapor cartridge may be needed if excess volatiles are generated. 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 anticipated use of this product.

9. PHYSICAL/CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Appearance/Physical State</th>
<th>Clear, colorless to slightly yellow solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor</td>
<td>NA</td>
</tr>
<tr>
<td>Odor Threshold:</td>
<td>NA</td>
</tr>
<tr>
<td>pH:</td>
<td>12</td>
</tr>
<tr>
<td>Melting point/Freezing point:</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Initial Boiling Point/Boiling Point Range</td>
<td>99°C</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>NA</td>
</tr>
<tr>
<td>Flammability :</td>
<td>Combustible liquid</td>
</tr>
<tr>
<td>Upper/Lower Flammability or Explosive Limits:</td>
<td>LEL: 3.3% based on ethanol</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>43 mm Hg at 23°C for ethyl alcohol; 0.07 mm Hg at 20°C for propylene glycol</td>
</tr>
<tr>
<td>Vapor Density (Air =1)</td>
<td>1.59 for ethyl alcohol; 2.6 for propylene glycol</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not determined</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.0306</td>
</tr>
</tbody>
</table>
9. PHYSICAL/CHEMICAL PROPERTIES: continued

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solubility</td>
<td>Ethyl alcohol</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water:</td>
<td>NA</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>NA</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>NA</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactivity</td>
<td>Not determined</td>
</tr>
<tr>
<td>Chemical Stability</td>
<td>Stable under standard use and storage</td>
</tr>
<tr>
<td>Hazardous Reactions</td>
<td>Not determined</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Not determined</td>
</tr>
<tr>
<td>Incompatibilities</td>
<td>Strong oxidizers, acids</td>
</tr>
<tr>
<td>Hazardous Decomposition Products</td>
<td>Not determined. During thermal decomposition, it may be possible to generate irritating vapors and/or toxic fumes of carbon oxides (COx) and nitrogen oxides (NOx).</td>
</tr>
<tr>
<td>Hazardous Polymerization</td>
<td>Not anticipated to occur with this product.</td>
</tr>
</tbody>
</table>

11. TOXICOLOGICAL INFORMATION

**Acute Toxicity – Oral**

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>Value</th>
<th>Units</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenytoin Sodium</td>
<td>100</td>
<td>LD50</td>
<td>1530</td>
<td>mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td>Phenytoin Sodium</td>
<td>100</td>
<td>LD50</td>
<td>165-490</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
<tr>
<td>Propylene Glycol</td>
<td>100</td>
<td>LD50</td>
<td>10,400 - 29,536</td>
<td>mg/kg</td>
<td>Rat, Mouse, Rabbit, Dog, Guinea Pig</td>
</tr>
<tr>
<td>Ethyl Alcohol</td>
<td>100</td>
<td>LD50</td>
<td>3450 - 11,500</td>
<td>mg/kg</td>
<td>Guinea Pig, Rat, Mouse, Dog</td>
</tr>
</tbody>
</table>

LD 50: Dosage that produces 50% mortality.

**Acute Toxicity – Dermal:**

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>Value</th>
<th>Units</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene Glycol</td>
<td>100</td>
<td>LD50</td>
<td>20,800</td>
<td>mg/kg</td>
<td>Rabbit</td>
</tr>
</tbody>
</table>

LD50 (sc) is the value for skin contact.
Product Name: Phenytoin Sodium Injection, USP

11. TOXICOLOGICAL INFORMATION: continued

Acute Toxicity – Inhalation:

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>Value</th>
<th>Units</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl Alcohol</td>
<td>100</td>
<td>LC50 (10h)</td>
<td>20,000</td>
<td>ppm</td>
<td>Rat</td>
</tr>
<tr>
<td>Ethyl Alcohol</td>
<td>100</td>
<td>LD50 (4h)</td>
<td>39,000</td>
<td>mg/m3</td>
<td>Mouse</td>
</tr>
</tbody>
</table>

LC50 is the concentration in air that produces 50% mortality.

Aspiration Hazard
None anticipated from normal handling of this product.

Dermal Irritation/Corrosion
None anticipated from normal handling of this product. Inadvertent contact of this product with skin may produce irritation.

Ocular Irritation/Corrosion
None anticipated from normal handling of this product. Inadvertent contact of this product with eyes may produce severe irritation.

Dermal or Respiratory Sensitization
None anticipated from normal handling of this product. Allergic-like reactions have been reported during the normal clinical use of this product.

Reproductive Effects
Phenytoin is a teratogen in rats, mice, and rabbits. Days 12 and 13 are the critical period for induction of teratogenicity in CD-1 mice. Phenytoin was not teratogenic in dogs or cats. It was fetotoxic, but not teratogenic, in monkeys at doses where maternal toxicity was seen.

Mutagenicity
It has been reported that phenytoin induced micronuclei in mice at an intravenous dose of 500 or 1000 mcg/kg. In other reports, phenytoin was not active for inducing chromosome aberrations in cultured Chinese hamster ovary cells. It was also inactive for inducing chromosome aberrations in bone marrow cells of mice injected with doses as high as 500 mg/kg. No increases in chromosome aberrations were seen in epileptic patients receiving long-term phenytoin or primidone therapy. No increases in sister chromatid exchanges were seen in lymphocytes of epileptic patients receiving phenytoin monotherapy in comparison with healthy controls.

Carcinogenicity
Elevated risks for Hodgkin's disease, lymphosarcomas, and reticulum-cell sarcoma have been seen in patients receiving phenytoin therapy. Phenytoin sodium induced thymic lymphomas in female mice when given in the diet at a level of 60 mg/kg body weight/day for 168 days. Thymic and mesenteric lymphomas and leukemias were induced in mice with intraperitoneal doses of 0.6 mg/animal/day for 66 days. Phenytoin was not carcinogenic in rats when given in the diet at levels of 0.025 or 0.05% for 2 years. It was also not carcinogenic in mice at dietary levels of 0.006 or 0.12% for 78 weeks. Phenytoin is an IARC and NTP listed carcinogen.

Target Organ Effects
Based on clinical use, possible target organs include the central nervous system, cardiovascular system, gastrointestinal system, hematopoietic system, skin and possibly the fetus.
Product Name: Phenytoin Sodium Injection, USP

12. ECOLOGICAL INFORMATION:

Aquatic Toxicity
Not determined for the product. Information for ingredients is provided below:

LC50 (24 hr) = 12,900 - 15,300 mg/L in rainbow trout for ethanol
LC50 (24 hr) = 11,200 mg/L in fingerling trout for ethanol
LC50 (48 hr) = 9,268 - 14,221 mg/L in Daphnia magna for ethanol
EC50 = 9310 mg/L in Chlorella pyrenoidosa (green algae) for ethanol

LC50 (96 hr) = 51,600 mg/L in rainbow trout for propylene glycol
LC50 (48 hr) = 34,400 - 43,500 mg/L in Daphnia magna for propylene glycol
EC50 (14 day) = 19,000 mg/L in algae for propylene glycol

Persistence/Biodegradability
Not determined for the product. Information for ingredients is provided below:

Ethanol, an ingredient in this product, was reported to be degraded between 45% and 74% in five days in two aqueous biodegradation assays.

Propylene glycol was reported to be 100% biodegradable after 24-hours in activated sludge.

Bioaccumulation
Not determined for the product. Because of its low octanol:water partition coefficient, ethanol is not anticipated to bioaccumulate.

Mobility in Soil
Not determined.

Notes:
1. LC50: Concentration in water that produces 50% mortality in fish or Daphnia.
2. EC50: Concentration in water that produces 50% inhibition of growth in algae or immobilization in Daphnia.

13. DISPOSAL CONSIDERATIONS

Waste Disposal
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

DOT STATUS: Not Regulated
Proper Shipping Name: NA
Hazard Class: NA
UN Number: NA
Packing Group: NA
Reportable Quantity: NA

ICAO/IATA STATUS Not Regulated
Proper Shipping Name: NA
Hazard Class: NA
UN Number: NA
Packing Group: NA
Reportable Quantity: NA

IMDG STATUS Not Regulated
Proper Shipping Name: NA
Hazard Class: NA
UN Number: NA
Packing Group: NA
Reportable Quantity: NA

Notes: DOT - US Department of Transportation Regulations
Product Name: Phenytoin Sodium Injection, USP

15. REGULATORY INFORMATION

<table>
<thead>
<tr>
<th>TSCA Status</th>
<th>Exempt</th>
</tr>
</thead>
<tbody>
<tr>
<td>CERCLA Status</td>
<td>Not listed</td>
</tr>
<tr>
<td>SARA 302 Status</td>
<td>Not listed</td>
</tr>
<tr>
<td>SARA 313 Status</td>
<td>Not listed</td>
</tr>
<tr>
<td>RCRA Status</td>
<td>Not listed</td>
</tr>
<tr>
<td>PROP 65 (Calif.)</td>
<td>This product is, or contains chemical(s) known to the State of California to cause cancer and/or developmental toxicity.</td>
</tr>
</tbody>
</table>


U.S. OSHA Classification
- Possible Irritant
- Reproductive Toxin
- Possible Carcinogen
- Target Organ Toxin
- Combustible Liquid

GHS Classification

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Acute Oral Toxicity</th>
<th>Eye Irritation</th>
<th>Toxic to Reproduction</th>
<th>Carcinogenicity</th>
<th>Target Organ Toxicity</th>
<th>Flammable Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Category</td>
<td>Unclassified</td>
<td>2B</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Symbol

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Warning</th>
<th>Warning</th>
<th>Warning</th>
<th>Warning</th>
<th>Warning</th>
</tr>
</thead>
</table>

Hazard Statement
- Causes eye irritation
- Suspected of damaging the unborn child
- Suspected of causing cancer if ingested.
- May cause damage to the central nervous system, cardiovascular system, gastrointestinal system, hematopoietic system, and skin through prolonged or repeated exposure.
- Flammable liquid and vapor

Prevention:
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Use personal protective equipment as required.
- Keep container tightly closed.
- Keep away from ignitions sources such as heat/sparks/open flame – No smoking.
- Wear protective gloves and eye/face protection.
- Take precautionary measures against static discharge.

Response:
- If exposed or concerned: Get medical attention.

In case of fire, use media appropriate for the primary cause of the fire for extinction.
- IF ON SKIN: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- 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.
15. REGULATORY INFORMATION: continued

EU Classification*

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

<table>
<thead>
<tr>
<th>Classification(s):</th>
<th>Harmful</th>
<th>Irritant</th>
<th>Toxic to Reproduction</th>
<th>Carcinogen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Category 2</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Symbol: 

- ![Hazards Symbol](image)
- ![Hazards Symbol](image)
- ![Hazards Symbol](image)
- ![Hazards Symbol](image)

Indication of Danger: 

- Xn
- Xi
- T
- T

Risk Phrases: 

- R22 – Harmful if swallowed
- R36/37 - Irritating to eyes and respiratory system
- R45 - May cause cancer
- R61 – May cause harm to the unborn child

Safety Phrases: 

- S24: Avoid contact with the skin
- S25: Avoid contact with 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: Global Occupational Toxicology
Date Prepared: September 15, 2005
Revision Date: July 10, 2008

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