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 $C_{15}H_{11}N_2O_2 \bullet Na$

Component	Approximate Percent by Weight	CAS Number	RTECS Number
Phenytoin Sodium	5	630-93-3	MU1400000
Propylene Glycol	40	57-55-6	TY2000000
Ethyl Alcohol	10	64-17-5	KQ6300000

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. Hemopoietic 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

Component	OSHA-PEL	ACGIH-TLV	AIHA WEEL	Hospira EEL
Phenytoin sodium	8 hr TWA: Not Established	8 hr TWA: Not Established	8-hr TWA: Not Established	8 hr TWA: 200 mcg/m3 STEL: Not Established
Propylene Glycol	8 hr TWA: Not Established	8 hr TWA: Not Established	8-hr TWA: 10 mg/m3	8 hr TWA: Not Established STEL: Not Established
Ethyl Alcohol	8 hr TWA: 1900 mg/m3	8 hr TWA: 1900 mg/m3	8-hr TWA: Not Established	8 hr TWA: Not Established STEL: Not Established

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

Appearance/Physical State Clear, colorless to slightly yellow solution

Odor NA

Odor Threshold: NA

pH: 12

Melting point/Freezing point: Not determined.

Initial Boiling Point/Boiling Point Range 99°C

Evaporation Rate: NA

Flammability : Combustible liquid

Upper/Lower Flammability or Explosive Limits: LEL: 3.3% based on ethanol
UEL: 19% based on ethanol

Vapor Pressure 43 mm Hg at 23°C for ethyl alcohol; 0.07 mm Hg at 20°C for propylene glycol

Vapor Density (Air =1) 1.59 for ethyl alcohol; 2.6 for propylene glycol

Evaporation Rate Not determined

Specific Gravity 1.0306

9. PHYSICAL/CHEMICAL PROPERTIES: continued

Solubility	Ethyl alcohol
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	Strong oxidizers, acids
Hazardous Decomposition Products	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).
Hazardous Polymerization	Not anticipated to occur with this product.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity - Oral

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

Ingredient(s)	Percent	Test Type	Value	Units	Species
Phenytoin Sodium	100	LD50	1530	mg/kg	Rat
Phenytoin Sodium	100	LD50	165-490	mg/kg	Mouse
Propylene Glycol	100	LD50	10,400 - 29,536	mg/kg	Rat, Mouse, Rabbit, Dog, Guinea Pig
Ethyl Alcohol	100	LD50	3450 - 11,500	mg/kg	Guinea Pig, Rat, Mouse, Dog

LD 50: Dosage that produces 50% mortality.

Acute Toxicity – Dermal:

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

Ingredient(s)	Percent	Test Type	Value	Units	Species
Propylene Glycol	100	LD50	20,800	mg/kg	Rabbit

LD50 (sc) is the value for skin contact

11. TOXICOLOGICAL INFORMATION: continued

Acute Toxicity – Inhalation:

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

Ingredient(s)	Percent	Test Type	Value	Units	Species
Ethyl Alcohol	100	LC50 (10h)	20,000	ppm	Rat
Ethyl Alcohol	100	LD50 (4h)	39,000	mg/m3	Mouse

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.

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

15. REGULATORY INFORMATION

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

Notes: TSCA, Toxic Substance Control Act; CERCLA, US EPA law, Comprehensive Environmental Response, Compensation, and Liability Act; SARA, Superfund Amendments and Reauthorization Act; RCRA, US EPA, Resource Conservation and Recovery Act; Prop 65, California Proposition 65

U.S. OSHA Classification

Possible Irritant
Reproductive Toxin
Possible Carcinogen
Target Organ Toxin
Combustible Liquid

GHS Classification

Hazard Class	Acute Oral Toxicity	Eye Irritation	Toxic to Reproduction	Carcinogenicity	Target Organ Toxicity	Flammable Liquid
Hazard Category	Unclassified	2B	2	2	2	3
Symbol						
Signal Word		Warning	Warning	Warning	Warning	Warning
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.

Classification(s):	Harmful	Irritant	Toxic to Reproduction Category 2	Carcinogen Category 2
Symbol:				
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
LD_{50}	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
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