



MATERIAL SAFETY DATA SHEET

Product Name: Epirubicin Hydrochloride Injection

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Manufacturer Name And Address	Hospira, Inc. 275 North Field Drive Lake Forest, Illinois 60045 USA	Hospira Australia Pty Ltd 1 Lexia Place Mulgrave VIC 3170 AUSTRALIA
Emergency Telephone #'s	CHEMTREC: North America: 800-424-9300; International 1-703-527-3887; Australia (02) 8014 4880	
Hospira, Inc., Non-Emergency	224 212-2055	
Product Name	Epirubicin Hydrochloride Injection, 10 mg/5 mL, 50 mg/25 mL, 150 mg/75 mL, and 200 mg/100 mL	
Synonyms	(8S-cis)-10-[(3-amino-2,3,6-trideoxy-a-L-arabino-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxy-5,12-naphthacenedione hydrochloride; Ellence®	

2. HAZARD INFORMATION / CLASSIFICATION

Emergency Overview	Epirubicin Hydrochloride Injection contains epirubicin hydrochloride, an antineoplastic anthracycline antibiotic similar to daunorubicin and doxorubicin. It is a cytotoxic agent, and in the workplace should be considered a potential occupational reproductive hazard, harmful to the fetus, and a potential human carcinogen. Following an accidental over-exposure, possible target organs may include the bone marrow, cardiovascular system, gastrointestinal tract, skin, and the fetus.		
Occupational Exposure Potential	There are scientific studies that suggest that personnel (e.g. nurses, pharmacists, etc.) who prepare and administer parenteral antineoplastics (e.g. in hospitals) may be at some risk due to potential mutagenicity, teratogenicity, and/or carcinogenicity of these materials if workplace exposures are not properly controlled. The actual risk in the workplace is not known.		
Signs and Symptoms	During occupational use, this product should be considered irritating to the skin, eyes, and respiratory tract. In clinical use, epirubicin hydrochloride is very irritating, sometimes producing thrombophlebitis and streaking of the skin over the vein used for injection. Other adverse effects reported during clinical use have included severe nausea and vomiting, stomatitis, and esophagitis (which may progress to ulceration), and bone marrow depression. More rarely, facial flushing, conjunctivitis, and lachrymation have been reported. Hair loss and changes in skin pigmentation may also occur. Prolonged or high-dose exposures have produced cardiotoxicity. Occasionally, hypersensitivity reactions have also been reported.		
Medical Conditions Aggravated by Exposure	Pre-existing hypersensitivity to epirubicin hydrochloride. Pre-existing bone marrow, blood, gastrointestinal, cardiovascular, or skin ailments; or pregnancy.		
Carcinogen Lists:	IARC: Not listed	NTP: Not listed	OSHA: Not listed

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name	Epirubicin Hydrochloride
Chemical Formula	C ₂₇ H ₂₉ NO ₁₁ HCl

Component	Approximate Percent by Weight	CAS Number	RTECS Number
Epirubicin Hydrochloride	0.2	56390-09-1	QI9295750

Non-hazardous ingredients include: water. Hazardous ingredients present at less than 1% include: sodium chloride at 0.9%; hydrochloride acid is added to adjust the pH.

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	Not applicable.
Fire & Explosion Hazard	None anticipated for this material.
Extinguishing Media	As with any fire, use extinguishing media appropriate for primary cause of fire.
Special Fire Fighting Procedures	Firefighters should wear self-contained breathing apparatus. Protective equipment and clothing should be worn to minimize contact with the respiratory tract, skin and eyes.

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 liquid spill with suitable material and clean affected area with soap and water. Household bleach can be used to further clean the affected spill area. Dispose of spill materials according to the applicable federal, state, or local regulations.
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7. HANDLING AND STORAGE

Handling	<p>Epirubicin hydrochloride is a cytotoxic agent. Appropriate procedures should be implemented during the handling and disposal of cytotoxic antineoplastics agents to minimize potential exposures. Several guidelines on handling cytotoxic antineoplastic agents have been published. There is no general agreement that all of the procedures recommended in the guidelines are necessary or appropriate. Consult your hygienist or safety professional for your site requirements.</p> <p>Avoid ingestion, inhalation, skin contact, and eye contact. When handling the powder, precautions may include the use of a containment cabinet during the weighing, reconstitution and/or solubilization of this antineoplastic agent. The use of disposable gloves and respiratory protection is recommended. Proper disposal of contaminated vials, syringes, or other materials is required when working with this material.</p>
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Product Name: Epirubicin Hydrochloride Injection



7. HANDLING AND STORAGE: continued

Storage	No special storage is required for hazard control. However, employees should be trained on the proper storage procedures for antineoplastic agents. For product protection, follow USP controlled room temperature storage recommendations noted on the product case label, the primary container label, or the product insert. Protect from light.
Special Precautions	Persons with known hypersensitivities to epirubicin hydrochloride, women who are pregnant, or women who want to become pregnant, should consult a health and/or safety professional prior to handling this material.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Component	Exposure limits			
	OSHA-PEL	ACGIH-TLV	Hospira EEL	Other Limits
Epirubicin Hydrochloride	8-hr TWA: Not established	8-hr TWA: Not established	8-hr TWA: Not Established	NA

Notes: OSHA PEL: US Occupational Safety and Health Administration – Permissible Exposure Limit
ACGIH TLV: American Conference of Governmental Industrial Hygienists – Threshold Limit Value.
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 considered adequate to control potential airborne exposures, the use of an approved air-purifying respirator with a HEPA cartridge (P100 or equivalent) with an organic vapor cartridge 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	When handling this material, disposable gloves should be worn at all times. Further, the use of double gloves is recommended. Disposable gloves made from nitrile, neoprene, polyurethane or natural latex generally have low permeability to this material. Persons known to be allergic to latex rubber should select a non-latex glove. Gloves should be changed regularly, and removed immediately after known contamination. Care should be taken to minimize inadvertent contamination when removing and/or disposing of gloves.
Eye Protection	As a minimum, the use of chemical safety goggles is recommended when handling this material.
Engineering Controls	If creation of aerosols is likely, local exhaust ventilation is recommended to minimize employee exposure. The use of an enclosure, such as an approved ventilated cabinet designed to minimize airborne exposures, is recommended when working with open containers of this material.

9. PHYSICAL/CHEMICAL PROPERTIES

Appearance/Physical State	Clear red aqueous solution.
Odor	Odorless
Odor Threshold:	NA
pH:	3.0
Melting point/Freezing point:	NA
Initial Boiling Point/Boiling Point Range	NA
Evaporation Rate:	NA
Flash Point:	NA
Flammability (solid, gas):	NA
Upper/Lower Flammability or Explosive Limits:	NA
Vapor Pressure	NA
Vapor Density (Air =1)	NA
Evaporation Rate	NA
Specific Gravity	NA
Solubility	Soluble in water and in methyl alcohol; slightly soluble in dehydrated 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	Not determined
Hazardous Decomposition Products	Not determined. During thermal decomposition, it may be possible to generate irritating vapors and/or toxic fumes of carbon oxides (CO _x), nitrogen oxides (NO _x), and hydrogen chloride vapors.
Hazardous Polymerization	Not anticipated to occur with this product.

Product Name: Epirubicin Hydrochloride Injection**11. TOXICOLOGICAL INFORMATION**

Acute Toxicity - Information for the active ingredient, epirubicin hydrochloride, is as follows:

Ingredient(s)	Percent	Test Type	Route of Administration	Value	Units	Species
Epirubicin Hydrochloride	100	LD50	Oral	1350	mg/kg	Rat
Epirubicin Hydrochloride	100	LD50	Oral	> 2000	mg/kg	Mouse
Epirubicin Hydrochloride	100	LD50	Intravenous	17	mg/kg	Rat
Epirubicin Hydrochloride	100	LD50	Intravenous	31.5	mg/kg	Mouse
Epirubicin Hydrochloride	100	LD50	Intravenous	2.25	mg/kg	Dog
Epirubicin Hydrochloride	100	LD50	Intraperitoneal	10.8	mg/kg	Rat

LD50 is the dosage producing 50% mortality.

Aspiration Hazard	None anticipated from normal handling of this material.
Dermal Irritation/Corrosion	None anticipated from normal handling of this material. However, inadvertent skin contact may produce irritation with redness.
Ocular Irritation/Corrosion	None anticipated from normal handling of this material. However, inadvertent eye contact may produce irritation with redness, tearing, and discomfort.
Dermal or Respiratory Sensitization	None anticipated from normal handling of this material. Occasionally, hypersensitivity reactions have been reported during clinical use of this product.
Reproductive Effects	*In fertility studies, male rats were given epirubicin daily for 9 weeks and mated with females rats given epirubicin daily for 2 weeks prior to mating and treated through Day 7 of gestation. No effects on mating behavior or fertility were noted at a dosage of 0.1 mg/kg/day, but male rats had atrophy of the testes and epididymis, and reduced spermatogenesis. An increased incidence of fetal growth retardation was noted at a dosage of 0.03 mg/kg/day. A dosage of 0.1 mg/kg/day caused embryoletality. At a dosage of 0.3 mg/kg/day to both males and females, no pregnancies occurred. Multiple daily doses of epirubicin to rabbits and dogs also resulted in the atrophy of male reproductive organs. Single intravenous dosages of 20.5 and 12 mg/kg of epirubicin caused testicular atrophy in mice and rats, respectively. A single dosage of 16.7 mg/kg epirubicin produced uterine atrophy in rats.
Mutagenicity	*In vitro, epirubicin was positive for mutagenicity in the Ames test (in the presence or absence of metabolic activation), and in the HGPRT assay in V79 Chinese hamster lung fibroblasts in the absence, but not in the presence of metabolic activation. Similarly, in vitro, epirubicin was clastogenic, producing chromosome aberrations in human lymphocytes, both in the presence and absence of metabolic activation. Epirubicin was also clastogenic in vivo, producing chromosome aberrations in a mouse bone marrow assay.
Carcinogenicity	*The carcinogenic potential of epirubicin has not been fully evaluated in long-term animal studies. However, a single intravenous administration of epirubicin to female rats at a dosage of 3.6 mg/kg approximately doubled the incidence of mammary tumors reported at 1 year. Similarly, intravenous administration of epirubicin to rats at a dosage of 0.5 mg/kg (once every 3 weeks for ten doses) increased the incidence of subcutaneous fibromas in males over an 18-month observation period. In addition, subcutaneous administration of 8 doses of epirubicin to newborn rats at dosages of 0.75 or 1.0 mg/kg/day increased the incidence of animals with tumors noted over a 2 year time period. Finally, the occurrence of secondary acute myelogenous leukemia, with or without a preleukemic phase, has been reported in patients treated with anthracyclines.
Target Organ Effects	This material should be considered irritating to the skin, eyes, and respiratory tract. Following an accidental over-exposure, possible target organs may include the bone marrow, cardiovascular system, gastrointestinal tract, skin, and the fetus.

*Abstracted from Ellence® Package Insert

12. ECOLOGICAL INFORMATION

Aquatic Toxicity	Not determined
Persistence/ Biodegradability	Not determined
Bioaccumulation	Not determined
Mobility in Soil	Not determined

Notes:

1. EC50: Concentration in water that produces 50% mortality in *Daphnia* sp.
2. LC50: Concentration in water that produces 50% mortality in fish.
3. EC50: Concentration in water that produces 50% inhibition of growth in algae.
4. LD50 = Time to 50% mortality of organisms

13. DISPOSAL CONSIDERATIONS

Waste Disposal	All waste materials must be properly characterized by the waste generator. Disposal of all pharmaceuticals should be performed in accordance with the federal, state or local regulatory requirements. Incineration at an approved facility is recommended.
Container Handling and Disposal	Dispose of containers and unused contents in accordance with federal, state and local regulations. Treat contaminated containers and materials as hazardous material. Incineration at an approved facility is recommended.

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

U.S. TSCA Status	Exempt
U.S. CERCLA Status	Not listed
U.S. SARA 302 Status	Not listed
U.S. SARA 313 Status	Not listed
U.S. RCRA Status	Not listed
U.S. PROP 65 (Calif.)	Not listed

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
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GHS Classification* *Where medicinal products are not exempt, the recommended GHS workplace classification for this product is as follows:

Hazard Class	Acute Oral Toxicity	Eye Irritation	Skin Irritation	Toxic to Reproduction	Mutagenicity	Carcinogenicity	Target Organ Toxicity
Hazard Category	Unclassified	2B	2	2	2	2	2
Symbol	NA	NA					
Signal Word	NA	Warning	Warning	Warning	Warning	Warning	Warning
Hazard Statement	NA	Causes eye irritation	Causes skin irritation	Suspected of damaging fertility or the unborn child	Suspected of causing genetic defects if ingested.	Suspected of causing cancer if ingested.	May cause damage to the bone marrow, cardiovascular system, gastrointestinal tract, and skin, through prolonged or repeated exposure.

GHS Precautionary Statements:

Prevention:	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Avoid breathing dust or vapors. In case of inadequate ventilation wear respiratory protection. Wear protective gloves. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
Response:	IF SWALLOWED: Immediately call a POISON CENTER or doctor. Rinse mouth. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs, seek medical attention. Take off contaminated clothing and wash before reuse. 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. If exposed or concerned, get medical attention.

Product Name: Epirubicin Hydrochloride Injection**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 epirubicin hydrochloride.

Classification(s):	Irritant	Toxic to Reproduction Category 2	Carcinogen Category 2	Mutagen Category 2
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Symbol:**Indication of Danger:**

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Risk Phrases:

R36/37/38 - Irritating to eyes, respiratory system and skin
R45 - May cause cancer
R46 - May cause heritable genetic damage
R48/25 - Danger of serious damage to health by prolonged exposure if swallowed
R60 - May impair fertility
R61 - May cause harm to the unborn child
R64 - May cause harm to breastfed babies

Safety Phrases:

S23: Do not breathe vapor/spray
S24/25: Avoid contact with the skin and eyes
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S60: This material and its container must be disposed of as hazardous waste

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

Product Name: Epirubicin Hydrochloride Injection



16. OTHER INFORMATION: continued

MSDS Coordinator: Global Occupational Toxicology
Date Prepared: July 16, 2007
Revision Date: March 13, 2008
Revision Date: November 5, 2009

Disclaimer:

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