MATERIAL SAFETY DATA SHEET

Product Name: Heparin Lock Flush Solution, USP (Carpuject Syringe)

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
Heparin Lock Flush Solution, USP (Carpuject Syringe)

Synonyms
Carpuject Syringes

2. COMPOSITION/INFORMATION ON INGREDIENTS

Active Ingredient Name
Heparin Sodium

Chemical Formula
Heparin is an acidic, polymeric mucopolysaccharide composed of units of glucuronic acid and sulfated glucosamine

Preparation
Non-hazardous ingredients include Water for Injection. Hazardous ingredients present at less than 1% include sodium chloride; hydrochloric acid and/or sodium hydroxide are used 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>Benzyl Alcohol</td>
<td>1</td>
<td>100-51-6</td>
<td>DN3150000</td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>0.1</td>
<td>9041-08-1</td>
<td>MI0850000</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>Benzyl Alcohol</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

Emergency Overview
Heparin Lock Flush Solution, USP (Carpuject Syringe) is a solution containing heparin sodium, a heterogenous group of straight-chain anionic mucopolysaccharides, called glycosaminoglycans. Clinically, this product is used as an anti-coagulant. In the workplace, this material should be considered potentially irritating to the eyes and respiratory tract. Based on clinical use, possible target organs include the blood and liver.

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.

Signs and Symptoms
No signs or symptoms from occupational exposure are known. Based on clinical use, adverse effects may include hemorrhage, prolongation of coagulation test times, increased susceptibility to bruising, bleeding, decreases in thrombocytes, and elevation in liver function parameters.
Product Name: Heparin Lock Flush Solution, USP (Carpuject Syringe)

Significant elevations of liver enzyme levels have occurred in a high percentage of patients (and healthy subjects) who have received heparin. Less frequently, allergic hypersensitivity reactions to heparin have occurred. Local irritation, erythema, mild pain, hematoma, or ulceration can occur after deep subcutaneous injection or intramuscular injection.

Medical Conditions Aggravated by Exposure

Hypersensitivity to the heparin sodium and/or similar materials. Pre-existing hematopoietic system or liver 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 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 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 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.
Product Name: Heparin Lock Flush Solution, USP (Carpuject Syringe)

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>Type</th>
<th>mg/m^3</th>
<th>ppm</th>
<th>µg/m^3</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzyl Alcohol</td>
<td>AIHA WEEL</td>
<td>N/A</td>
<td>10</td>
<td>N/A</td>
<td>8-hr TWA</td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>Hospira EEL</td>
<td>N/A</td>
<td>N/A</td>
<td>500</td>
<td>8-hr TWA</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>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance/Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Clear, Colorless to practically colorless.</td>
</tr>
<tr>
<td>Odor</td>
<td>NA</td>
</tr>
<tr>
<td>Odor Threshold:</td>
<td>NA</td>
</tr>
<tr>
<td>pH:</td>
<td>5.0 to 7.5</td>
</tr>
<tr>
<td>Melting point/Freezing point:</td>
<td>NA</td>
</tr>
<tr>
<td>Initial Boiling Point/Boiling Point</td>
<td>NA</td>
</tr>
<tr>
<td>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>
<tr>
<td>Upper/Lower Flammability or Explosive Limits:</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Pressure:</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Density:</td>
<td>NA</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>NA</td>
</tr>
<tr>
<td>Solubility:</td>
<td>NA</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

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 (COx), nitrogen oxides (NOx), and oxides of sulfur.

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>Heparin Sodium</td>
<td>100</td>
<td>LD50</td>
<td>Oral</td>
<td>&gt;5770</td>
<td>mg/kg</td>
<td>Rat, Mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;5000</td>
<td>mg/kg</td>
<td></td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>100</td>
<td>LD50</td>
<td>Intravenous</td>
<td>2902</td>
<td>mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2800</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1000</td>
<td>mg/kg</td>
<td>Dog</td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>100</td>
<td>LD50</td>
<td>Intraperitoneal</td>
<td>&gt;2500</td>
<td>mg/kg</td>
<td>Mouse</td>
</tr>
<tr>
<td>Benzyl Alcohol</td>
<td>100</td>
<td>LD50</td>
<td>Oral</td>
<td>1040 - 2500</td>
<td>mg/kg</td>
<td>Rat, Mouse, Rabbit, Guinea Pig</td>
</tr>
<tr>
<td>Benzyl Alcohol</td>
<td>100</td>
<td>LD50</td>
<td>Dermal</td>
<td>2000</td>
<td>mg/kg</td>
<td>Rabbit</td>
</tr>
<tr>
<td>Benzyl Alcohol</td>
<td>100</td>
<td>LC50(8 hr)</td>
<td>Inhalation</td>
<td>1000</td>
<td>ppm</td>
<td>Rat</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.

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

Dermal or Respiratory Sensitization None anticipated from normal handling of this product. In clinical use, allergic hypersensitivity reactions to heparin have occurred.

Reproductive Effects In studies in animals, heparin use during gestation has not produced teratogenic effects. In animals, heparin does not cross the placenta and is not distributed into breast milk. In clinical use, heparin has not been associated with fetal malformations. However, an increase in premature deliveries (about 1 in 5 cases) and neonatal mortality (still-birth in about 1 in 8 cases) has been reported when heparin was administered during pregnancy. However, further study has suggested that these effects may have been associated with co-morbid conditions that independently affected pregnancy outcomes.
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Mutagenicity
Studies to evaluate the genotoxic potential of heparin have not been conducted.

Carcinogenicity
Studies to evaluate the effects of heparin on fertility or fetal development have not been conducted in animals.

Target Organ Effects
Based on clinical use, possible target organs include the blood and liver.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity
Not determined for product.

LC50(96 hr) = 460 mg/L in Pimephales promelas for benzyl alcohol
LC50 = 640 mg/L in Leuciscus idus for benzyl alcohol
EC50(24 hr) = 400 mg/L in Daphnia magna for benzyl alcohol
EC50 = 95 mg/L in Chlorella pyrenoidosa for benzyl alcohol

Persistence/Biodegradability
Not determined for the product.

Benzyl alcohol was degraded over 90% in a 28-day biodegradaton assay in sewage sludge.

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

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>Benzyl Alcohol</td>
<td>Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Heparin Sodium</td>
<td>Listed</td>
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<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>
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RCRA Status: Not Listed
U.S. OSHA Classification: Target Organ Toxin
GHS Classification: Possible Irritant

*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.

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

Classification(s): Not Applicable
Symbol: Not Applicable
Indication of Danger: Not Applicable
Risk Phrases: R00 - Not Applicable
Safety Phrases: S23 - Do not breathe vapor.
S24 - Avoid contact with 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: Hospira GEHS
Date Prepared: 09/28/2011
Obsolete Date: 01/27/2009

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