PART I

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

PRODUCT IDENTIFIER

TRADE NAME (AS LABELED): MiSeq Sequencing System

CHEMICAL NAME/CLASS: Mixture

SYNONYMS: None

DOCUMENT NUMBER: 15029301

PRODUCT USE: DNA Sequencing

SUPPLIER OF THE SAFETY DATA SHEET

U.S. MANUFACTURER/DISTRIBUTOR: ILLUMINA, Inc.

Address: 9885 Towne Centre Drive
San Diego, CA 92121-1975

Business Phone: +1-800-809-ILMN (toll-free)
+1-800-809-4566 (toll-free)
+1-858-202-4566 (outside North America)

AUSTRALIAN SUPPLIER/DISTRIBUTOR'S NAME:

Address:

Business Phone:

EUROPEAN SUPPLIER/ DISTRIBUTOR'S NAME:

Address:

Business Phone:

EMERGENCY PHONE: 1-858-202-4566 (North America)
+1-858-202-4566 (outside North America, call collect)

EMAIL ADDRESS/COMPETENT PERSON FOR MSDS: techsupport@illumina.com

DATE OF PREPARATION: September 1, 2011

DATE OF REVISION: New

NOTE: ALL United States Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, Canadian WHMIS [Controlled Products Regulations], EU Directives [67/548/EEC and subsequent amendments to the directive], European Union Regulations [EC] 1272/2008 and subsequent amendments to the regulation], Global Harmonization Standard, Australian [NOHSC-2011 (2003)], and Japanese Industrial Standard (JIS Z 7250: 2005) required information is included in appropriate sections based on the U.S. ANSI Z400.1-2010 format. This product has been classified in accordance with the hazard criteria of the countries listed above.

2. HAZARD IDENTIFICATION

This Material Safety Data Sheet describes the Illumina Sequencing Reagents. This product consists of fifteen solutions. This Material Safety Data Sheet provides complete information on all the components described in the following tables. Unless otherwise specified, the information in each section of this document is pertinent to each solution. The solutions of this product are mixtures (preparations) of chemical compounds.

GLOBAL HARMONIZATION AND EU CLP REGULATION (EC) 1272/2008 LABELING AND CLASSIFICATION: This product has been classified per CLP Regulation (EC) 1272/2008 and Japanese Industrial Standard Z 7251:2006.

MS#-LDR1 Solution:

Classification: Reproductive Toxicant Category 1B. Signal Word: Danger Hazard Statement Codes: H360 Precautionary Statement Codes: P201, P202, P281, P308 + P313, P405, P501 Hazard Symbol/Pictogram: GHS08

All Other Solutions:

Classification: Not applicable. Signal Word: Not applicable. Hazard Statement Codes: Not applicable. Precautionary Statement Codes: Not applicable. Hazard Symbol/Pictogram: Not applicable.


MS#-LDR1 Solution:

Classification: Toxic to Reproduction, Category 2. Risk Phrases: R61 Symbol: ☢

All Other Solutions:

Classification: Not applicable. Risk Phrases: Not applicable. Symbol: Not applicable.

EMERGENCY OVERVIEW: Product Description: MS#-LDR1 Solution: This solution is a clear, colorless liquid with a mildly sulfurous odor. All Other Solutions: These solutions are clear, colorless, odorless liquids. Health Hazards: MS#-LDR1 Solution: The Aliphatic Amide constituent of this component is considered toxic to reproduction. All Other Solutions: The chief hazard in event of overexposure is the potential for irritation of contaminated skin or eyes. Flammability Hazards: All Other Solutions: These solutions present no significant fire hazards.
2. HAZARD IDENTIFICATION (Continued)

**EMERGENCY OVERVIEW (continued):** Reactivity Hazards: These solutions are not reactive. Environmental Hazards: Negligible. Emergency Recommendations: Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>European EINECS#</th>
<th>Japanese ENCS#</th>
<th>Australian AICS</th>
<th>% v/v</th>
<th>EU Classification (67/548/EEC)</th>
<th>GHS &amp; EU Classification (1272/2008 EC)</th>
</tr>
</thead>
</table>

**COMPONENTS 1–3: Codes MS#-HP10, MS#-HP11, and MS#-HP12**

- **Sodium Salt**
  - Proprietary
  - Listed
  - Listed
  - Listed
  - 1–5
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 4: Code MS#-LPM**

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 5: Code MS#-LDR1**

- **Aliphatic Amide**
  - Proprietary
  - Listed
  - Listed
  - Listed
  - 90–100
  - EU 67/548 Classification: Toxic to Reproduction Cat. 2
    - Risk Phrases: R61
    - Symbol: T
  - GHS & EU 1272/2008 Classification: Reproduction Toxicity Cat. 1B
    - Hazard Statement Codes: H360D
    - Pictogram(s): GHS08

- **Other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 6: Code MS#-SRE**

- **Aliphatic Triol Hydrochloride**
  - Proprietary
  - Listed
  - Listed
  - Listed
  - 10–20
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Sodium Salt**
  - Proprietary
  - Listed
  - Listed
  - Listed
  - 1–5
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Water and other constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 7: Code MS#-PR2**

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 8: Code MS#-HT1**

- **Sodium Salt**
  - Proprietary
  - Listed
  - Listed
  - Listed
  - 1–5
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 9: Code MS#-RMF**

- **Disaccharide**
  - Proprietary
  - Listed
  - Listed
  - NE
  - 7–13
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENTS 10–11: Codes MS#-LMX1 and MS#-LMX2**

- **Disaccharide**
  - Proprietary
  - Listed
  - Listed
  - NE
  - 7–13
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 12: Code MS#-AMX1**

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 13: Code MS#-AMX2**

- **Carboxymethyl Hydroxide Monohydrate**
  - Proprietary
  - Listed
  - Listed
  - NE
  - 20–30
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Aliphatic Sulfoxide**
  - Proprietary
  - Listed
  - Listed
  - Listed
  - 1–5
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

**COMPONENT 14: Code MS#-CMF**

- **Aliphatic Triol**
  - Proprietary
  - Listed
  - Listed
  - Listed
  - 1–5
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

- **Water and other trace constituents.**
  - Balance
  - EU 67/548 HAZARD CLASSIFICATION: Not Applicable
  - GHS & EU 1272/2008 CLASSIFICATION: Not Applicable

See Section 16 for full text of Ingredient Risk Phrases and Hazard Statements. All trace constituents present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).
3. COMPOSITION AND INFORMATION ON INGREDIENTS (Continued)

### COMPONENT 15: Code MS#-IMF

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>European EINECS#</th>
<th>Japanese ENCS#</th>
<th>Australian AICS</th>
<th>% v/v EU Classification (67/548/EEC)</th>
<th>GHS &amp; EU Classification (1272/2008 EC)</th>
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</thead>
</table>

See Section 16 for full text of Ingredient Risk Phrases and Hazard Statements. All trace constituents present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).

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### PART II  What should I do if a hazardous situation occurs?

4. FIRST-AID MEASURES

**PROTECTION OF FIRST AID RESPONDERS:** Rescuers should be taken for medical attention if necessary.

**DESCRIPTION OF FIRST AID MEASURES:** Contaminated individuals must seek medical attention if any adverse effect occurs. Take a copy of label and MSDS to physician or health professional with the contaminated individual.

**Skin Exposure:** If this product contaminates the skin, begin decontamination with copious amounts of running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Contaminated clothing must be removed and laundered before re-use. The contaminated individual must seek medical attention if any adverse effect develops after the area is flushed.

**Eye Exposure:** If this product contaminates the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have the contaminated individual "roll" eyes. Minimum flushing is for 20 minutes. The contaminated individual must seek medical attention if adverse effects occur after flushing.

**Inhalation:** If vapors, mists or sprays from this product are inhaled, remove contaminated individual to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if adverse effect continues after removal to fresh air.

**Ingestion:** If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING unless directed by medical personnel. Have contaminated individual rinse mouth with water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position if possible) to maintain an open airway and prevent aspiration. If contaminated individual is convulsing, maintain an open airway and obtain immediate medical attention.

**IMPORTANT SYMPTOMS AND EFFECTS:** See Sections 3 (Hazard Identification) and 11 (Toxicological Information).

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing dermatitis, other skin conditions, respiratory conditions, and liver disorders may be aggravated by overexposure to components of this product.

**IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED:** Treat symptoms and eliminate overexposure.

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5. FIRE-FIGHTING MEASURES

**FLASH POINT:**
- **Aliphatic Amide Solution:** 154°C (310°F)
- **All Other Solutions:** Not flammable.

**AUTOIGNITION TEMPERATURE:**
- **Aliphatic Amide Solution:** Not established.
- **All Other Solutions:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**
- **Aliphatic Amide Solution:** (LEL): Not established. (UEL): Not established.
- **All Other Solutions:** (LEL): Not applicable. (UEL): Not applicable.

**FIRE EXTINGUISHING MEDIA:** In the event of a fire, use suppression methods for surrounding materials (e.g., water spray, dry chemical, carbon dioxide, foam, any "ABC" class extinguisher).

**UNSUITABLE EXTINGUISHING MEDIA:** Halon extinguishers should not be used for fires involving this product.
5. FIRE-FIGHTING MEASURES (Continued)

SPECIAL FIRE AND EXPLOSION HAZARDS:

- **Aliphatic Amide Solution**: This component is combustible and considered toxic to reproduction. When involved in a fire, this component will decompose and produce irritating vapors and toxic gases (including carbon oxides, dimethyl amine, hydrogen sulfide, phosphine, cyanides, hydrogen chloride, and phosphorous, sodium and nitrogen oxides).

- **Explosion Sensitivity to Mechanical Impact**: Not sensitive.
- **Explosion Sensitivity to Static Discharge**: Not sensitive.

ADVICE FOR FIREFIGHTERS: Do not use halogenated extinguishing media. Move containers from fire area if it can be done without risk to personnel. Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: In the event of a spill, clear the area and protect people. Trained personnel using pre-planned procedures should respond to uncontrolled releases. Avoid generating airborne dusts, mists, or sprays. Eliminate all sources of ignition before cleanup begins. Use non-sparking tools. The atmosphere must have levels of components lower than those listed in Section 8, (Exposure Controls and Personal Protective Equipment) if applicable, and have at least 19.5 percent oxygen before personnel can be allowed into the area without Self-Contained Breathing Apparatus (SCBA). Monitor area and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, before non-response personnel are allowed into the spill area.

PROTECTIVE EQUIPMENT:

- **Small Spills**: For incidental spills (e.g., 1 bottle), wear lightweight gloves, a lab coat, and eye protection.
- **Large Spills**: For large spills (e.g., a case of bottles), protective apparel should be Level C: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hardhat, and Air-Purifying respirator with organic vapor cartridge. Self-Contained Breathing Apparatus must be selected if release occurs in confined or poorly ventilated areas or in situations in which the level of oxygen is below 19.5%.

METHODS FOR CLEANUP AND CONTAINMENT:

- **Small Spills**: Absorb spilled liquid with polypads or other suitable absorbent material.
- **Large Spills**: Absorb spilled liquid with polypads or other suitable absorbent materials. Dike or otherwise contain spill and remove with vacuum truck or pump to storage/salvage vessels.
- **All Spills**: Decontaminate the area of the spill thoroughly using detergent and water. Place all spill residue in an appropriate container and seal. Do not mix with wastes from other materials. If necessary, discard contaminated response equipment or rinse with soapy water before returning such equipment to service. Dispose of in accordance with applicable international, national, state, and local procedures (see Section 13, Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewer or confined spaces, waterways, soil or public waters. Do not flush to sewer. For spills on water, contain, minimize dispersion and collect.

PART III  How can I prevent hazardous situations from occurring?

7. HANDLING and STORAGE

PRECAUTIONS FOR SAFE HANDLING: All employees who handle this material should be trained to handle it safely. As with all chemicals, avoid getting this product’s components ON YOU or IN YOU. Open containers slowly on a stable surface. Avoid splashing or spraying this product’s components. Avoid breathing vapors, mists, or sprays generated by this product’s components. Do not eat or drink while handling this product’s components. Wash thoroughly after handling this product’s components.

CONDITIONS FOR SAFE STORAGE: Ensure containers of this product’s components are properly labeled. Store vials as directed in the product insert. Store away from incompatible materials. Material should be stored in secondary containers, as appropriate. Containers should be separated from oxidizing materials by a minimum distance of 20 ft. or by a barrier of non-combustible material at least 5 ft. high having a fire-resistance rating of at least 0.5 hours. Storage areas should be made of fire resistant materials. Post warning and “NO SMOKING” signs in storage and use areas, as appropriate. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers). Keep vials tightly closed when not in use. Inspect vials containing this product’s components for leaks or damage. Read instructions provided with the product prior to use. Refer to NFPA 30, Flammable and Combustible Liquids Code, for additional information on storage.

SPECIFIC END USE(S): This product is for use in laboratory biological research. Follow industry standards for use.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tag-out safely, as applicable. Collect all rinsates and dispose of according to applicable Federal, State, and local procedures standards.
### 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

#### EXPOSURE LIMITS/CONTROL PARAMETERS:

**Workplace/Occupational Exposure Limits:**

NOTE: Solutions not specifically listed are primarily water and trace constituents; no exposure limits are applicable.

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>EXPOSURE LIMITS IN AIR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ACGIH-TLVs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA mg/m³</td>
</tr>
</tbody>
</table>

**COMPONENTS 1–3: Codes MS#-HP10, MS#-HP11, and MS#-HP12**

- Sodium Salt: Proprietary
  - NE NE NE NE NE NE NE NE

**COMPONENT 5: Code MS#-LDR1**

- Aliphatic Amide: Proprietary
  - 10 (skin) NE 10 (skin) NE NE NE NE NE DFG MAK: Skin

**COMPONENT 6: Code MS#-SRE**

- Aliphatic Triol Hydrochloride: Proprietary
  - NE NE NE NE NE NE NE NE
- Sodium Salt: Proprietary
  - NE NE NE NE NE NE NE NE

**COMPONENT 7: Code MS#-HT1**

- Sodium Salt: Proprietary
  - NE NE NE NE NE NE NE NE

**COMPONENT 8: Code MS#-RMF**

- Disaccharide: Proprietary
  - NE NE NE NE NE NE NE NE

**COMPONENTS 10–11: Codes MS#-LMX1 and MS#-LMX2**

- Disaccharide: Proprietary
  - NE NE NE NE NE NE NE NE

**COMPONENT 13: Code MS#-AMX2**

- Carboxymethyl Hydroxide Monohydrate: Proprietary
  - NE NE NE NE NE NE NE NE
- Aliphatic Sulfoxide: Proprietary
  - NE NE NE NE NE NE NE NE

**COMPONENT 14: Code MS#-CMF**

- Aliphatic Triol: Proprietary
  - NE NE NE NE NE NE NE NE

**ENGINEERING CONTROLS:**

Ventilation: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below, if applicable. If necessary, refer to Australian National Code of Practice for the Control of Workplace Hazardous Substances [NOHSC: 2007 (1994)] for further information. As with all products that contain chemicals, ensure proper decontamination equipment (e.g., eyewash/safety shower stations) are available near areas where this product is used as necessary.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

PERSONAL PROTECTIVE EQUIPMENT (continued):

Respiratory Protection: Respiratory protection is not generally needed when using this product. Maintain airborne contaminant concentrations below limits listed above. In instances where inhalable mists or sprays of product may be generated and respiratory protection is necessary, use only respiratory protection authorized per regulatory authorities. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, SAR with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

Eye Protection: Depending on the use of this product, splash goggles or safety glasses may be worn. Use goggles or safety glasses for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS. If necessary, appropriate country regulations for eye protective equipment.

Hand Protection: Wear butyl rubber, neoprene, or nitrile rubber or latex gloves for routine use. If necessary, refer to appropriate country regulations for hand protection.

Body Protection: Use body protection appropriate for task, such as a lab coat. If necessary, use body protection appropriate for task (e.g., Tyvek suit, rubber apron). If necessary, refer to U.S. OSHA Technical Manual (Section VII: Personal Protective Equipment), appropriate individual country standards. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee’s feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136 and the Canadian CSA Standard Z195-02, Protective Footwear and appropriate individual country standards.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is component specific.

ODOR:
MS#-LDR1 Solution: Mildly sulfurous odor.
All Other Solutions: Odorless.

HOW TO DETECT THESE SUBSTANCES:
MS#-LDR1 Solution: The odor may act as a warning property associated with these liquids.
All Other Solutions: There are no unusual warning properties associated with these components.

The following information applies to all components, in general.

MOLECULAR WEIGHT (single entity only): Not applicable.
COLOR: Colorless.
APPEARANCE: Clear.
BOILING POINT: Not established.
RELATIVE VAPOR DENSITY (air = 1): Not established.
FLASH POINT: Aliphatic Amide Solution: 154°C (310°F)
All Other Solutions: Not flammable.
UPPER EXPLOSIVE LIMIT: Not established.
AUTOIGNITION TEMPERATURE: Not established.
EXPLOSIVE PROPERTIES: Not applicable.
EVAPORATION RATE (n-BuAc = 1): Not established.
DENSITY/SPECIFIC GRAVITY: Not established.
SOLUBILITY: Miscible in some organic solvents.
ODOR THRESHOLD: Not established.

PART IV
Is there any other useful information about this material?

10. STABILITY AND REACTIVITY

REACTIVITY/CHEMICAL STABILITY: Stable at room temperature in sealed containers. This product is not expected to be reactive.

POSSIBILITY OF HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Mixing with incompatible chemicals or as given above.

INCOMPATIBLE MATERIALS:
MS#-LDR1 Solution: Karl Fischer reagent (mixture of toluene, pyridine and sulfur trioxide), strong oxidizers, strong acids, some metals, substances that are incompatible with water.
All Other Solutions: Strong oxidizers, strong acids, some metals and substances which are incompatible with water.

HAZARDOUS DECOMPOSITION PRODUCTS:
Combustion: Carbon oxides, dimethyl amine, hydrogen sulfide, phosphate, cyanides, hydrogen chloride, and phosphorous, sodium and nitrogen oxides.
Hydrolysis: None known.
11. TOXICOLOGICAL INFORMATION (Continued)

**INHALATION:**
- **MS#-LDR1 Solution:** Inhalation of vapors, mists, or sprays of these components will irritate the nose, throat, and lungs. Symptoms may include nausea, headache, and vomiting.
- **All Other Solutions:** Inhalation of vapors, mists, or sprays of these solutions may slightly irritate the nose, throat, and lungs. Symptoms are generally alleviated upon breathing fresh air.

**SKIN CONTACT:**
- **MS#-LDR1 Solution:** Depending on the duration and concentration of overexposure, skin contact can irritate contaminated tissue. Symptoms of skin overexposure may include redness and discomfort.
- **All Other Solutions:** Skin contact may cause mild irritation, which is alleviated upon rinsing.

**EYE CONTACT:**
- **MS#-LDR1 Solution:** Depending on the duration and concentration of overexposure, eye contact can irritate contaminated tissue. Symptoms of eye overexposure may include redness, tearing, and pain.
- **All Other Solutions:** Eye contact may cause mild irritation, which is alleviated upon rinsing.

**SKIN ABSORPTION:**
- **MS#-LDR1 Solution:** The Aliphatic Amide constituent of these components can be absorbed through the skin and may cause adverse reproductive effects.
- **All Other Solutions:** No constituents in these components are known to be absorbed via intact skin.

**INGESTION:** Ingestion is not anticipated to be a significant route of exposure for the product’s components.
- **MS#-LDR1 Solution:** Ingestion may cause irritation, nausea, vomiting, and diarrhea.
- **All Other Solutions:** If these solutions are swallowed they may cause gastric distress. Large doses may cause nausea, vomiting, and diarrhea.

**INJECTION:** Accidental injection of this product’s solutions, via laceration or puncture by a contaminated object, may cause local reddening, tissue swelling, and discomfort in addition to the wound.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE:** An Explanation in Lay Terms.

**Acute:**
- **MS#-LDR1 Solution:** Inhalation of vapors, mists, or sprays of the Aliphatic Amide constituent of these components may cause nausea, headache, and vomiting. Depending on the duration and concentration of overexposure, skin and eye contact can irritate contaminated tissue. Aliphatic Amide can be absorbed through the skin and may cause adverse reproductive effects. Ingestion may cause adverse reproductive effects.
- **All Other Solutions:** Beyond mild irritation of the skin or eyes, contact with these components does not usually cause acute health effects.

**Chronic:** These components are not known to cause any significant chronic health effects.
TARGET ORGS: Acute: Eyes, skin, reproductive system. All Other Orgs: Eyes, gastrointestinal tract.

TOXICITY DATA: The following information is available for the constituents in components of this product present in greater that 1 percent concentration and listed in Section 3 (Composition and Information on Ingredients).

**ALIPHATIC SULFOXIDE**

**TDLo** (Intravenous) 150,000 mg/kg: Lungs, Thorax, or Respiration; dyspnea, cyanosis, Blood: other changes

**TDLo** (Intravenous-Man) 606 mg/kg: Gastrointestinal: nausea or vomiting; Liver, jaundice, other; Unclassified

Open Irritation Test (Skin-Rabbit) 10 mg/24 hours: Mild

Standard Draize Test (Skin-Rabbit) 0.1 mL: Mild

Standard Draize Test (Eye-Rabbit) 100 mg

Standard Draize Test (Eye-Rabbit) 500 mg/24 hours: Mild

**LC50** (Inhalation-Rat) > 1600 mg/m³/4 hours

**LC50** (Inhalation-Rat) > 2000 mg/m³/4 hours

**LD50** (Oral-Rat) 14,500 mg/kg: Sense Organs and Special Senses (Eye): hemorrhage, conjunctival irritation

**LD50** (Oral-Rat) 28,300 mg/kg: Behavioral: ataxia, Lungs, Thorax, or Respiration; respiratory depression

**LD50** (Oral-Rat) 14.5 g/kg: Sense Organs and Special Senses (Eye): effect, not otherwise specified; Vascular system: regional or general arterioles or venules, dilatation

**LD50** (Oral-Rat) 17,400 mg/kg

**LD50** (Oral-Mouse) 7520 mg/kg

**LD50** (Oral-Chicken) 21.4 g/kg: Behavioral: ataxia, Lungs, Thorax, or Respiration; respiratory depression

**LD50** (Oral-Dog) > 10 g/kg

**LD50** (Oral-Chicken) 1.5 g/kg

**LD50** (Oral-Wild Bird Species) 100 mg/kg

**LD50** (Oral-Mammal-Species Unspecified) 21,400 mg/kg

**LD50** (Oral-Pigeon) 40,000 mg/kg

**LD50** (Skin-Mouse) 50,000 mg/kg

**LD50** (Intraperitoneal-Rat) 8200 mg/kg

**LD50** (Intraperitoneal-Mouse) 2500 mg/kg

**LD50** (Subcutaneous-Rat) 12 g/kg: Behavioral: changes in motor activity (specific assay); Lungs, Thorax, or Respiration: dyspnea

**LD50** (Scalpaneous Mouse) 14 g/kg: Behavioral: changes in motor activity (specific assay); Lungs, Thorax, or Respiration: dyspnea

**LD50** (Intravenous-Rat) 3560 mg/kg: Behavioral: tremor, muscle weakness; Lungs, Thorax, or Respiration: dyspnea

**LD50** (Intravenous-Rat) 3560 mg/kg: Behavioral: tremor, convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration; dyspnea

**LD50** (Oral-Mouse) 3750 mg/kg: Behavioral: tremor, convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration; dyspnea

**LD50** (Oral-Rat) 3100 mg/kg

**LD50** (Intravenous-Mouse) 3100 mg/kg: Sense Organs and Special Senses (Eye): hemorrhage, conjunctival irritation

**LD50** (Intravenous-Dog) 2500 mg/kg: Cardiac: other changes; Kidney/Ureter/Bladder: hematuria, other changes

**LD50** (Unreported-Rat) 1300 mg/kg

**LD50** (Unreported-Mouse) 12 g/kg

**LD50** (Oral-Guinea Pig) > 11 g/kg

**LD50** (Intravenous-Cal) 200 mg/kg: Behavioral: altered sleep time (including change in righting reflex)

**LD50** (Intraperitoneal-Guinea Pig) > 5500 mg/kg

**TDLo** (Oral-Rat) 1070 g/kg/13 weeks-0ntermittent: Blood: other changes; Nutritional and Gross Metabolic: weight loss or decreased weight gain; Related to Chronic Data: death

**TDLo** (Oral-Rat) 3,564,000 mg/kg/72 weeks-intermittent: Sense Organs and Special Senses (Eye): changes in refraction; Blood: normocytic anemia; Nutritional and Gross Metabolic: weight loss or decreased weight gain; Related to Chronic Data: death

**TDLo** (Oral-Rat) 59 g/kg/81 weeks-0ntermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Skin and Appendages: tumors

**TDLo** (Oral-Rat) 50,000 mg/kg: female 6-15 days after conception; Reproductive: Maternal Effects: other effects; Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

**TDLo** (Oral-Rat) 10 mL/kg/10 days-0ntermittent: Related to Chronic Data: death

**TDLo** (Intravenous-Rat) 56 g/kg: female 6-12 days (after conception); Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)

**TDLo** (Intravenous-Rat) 6000 mg/kg: female 7-15 day (after conception); Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), litter size (e.g. # fetuses per litter; measured before birth)
11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

ALIPHATIC AMIDE (continued):

LD50 (subcutaneous, frog) = 30 mg/kg
LD50 (skin, rabbit) = 6 g/kg
LD50 (intraarterial, rat) = 200 mg/kg
LD50 (intrauterine, mouse) = 5000 mg/kg
LD50 (subcutaneous, guinea pig) = 2160 mg/kg
LD50 (intraarterial, rabbit) = 1100 mg/kg
LD50 (intrauterine, guinea pig) = 2910 mg/kg
LD50 (parenteral, guinea pig) = 300 mg/kg
LD50 (intrauterine, guinea pig) = 300 mg/kg
Mutation in Microorganisms (yeast, Saccharomyces cerevisiae) = 2 mol/L

SODIUM SALT (continued):

DNA inhibition (fibroblast, human) = 125 mM
Unscheduled DNA Synthesis (oral, rat) = 16800 mg/kg/4 weeks/continuous
Cytogenetic Analysis (intraperitoneal, rat) = 2338 mg/kg
Cytogenetic Analysis (ovary, hamster) = 160 mM/4 weeks
Cytogenetic Analysis (lung, hamster) = 7500 mg/L
DNA Damage (lymphocyte, mouse) = 5000 µmol/L
DNA Damage (ovary, hamster) = 275 mM/4 weeks
Mutation in Mammalian Somatic Cells (lymphocyte, mouse) = 57200 µmol/L
Muscular Tissue (lung, hamster) = 4 g/kg

DISCHARID:

LD50 (oral, rat) = 29,700 mg/kg; Behavioral: somnolence (general depressed activity); Lungs, Thorax, or Respiration: cyanosis; Gastrointestinal: hypermetabolism, diaphoresis

LD50 (intrauterine, mouse) = 14,000 mg/kg
LD50 (oral, mammal) = 40 g/kg; Behavioral: somnolence (general depressed activity); Lungs, Thorax, or Respiration: respiratory stimulation; Gastrointestinal: hypermetabolism, diaphoresis

LD50 (oral, rat) = 1548 g/kg/female 21 days preimplant/female 1–22 days after preimplantation; Reproductive: Specific Developmental Abnormalities: Cerebral Nervous System

LD50 (oral, rat) = 683 g/kg/female 21 days postimplantation; Reproductive: Effects on Newborn: growth statistics (e.g., %, reduced weight gain)

LD50 (oral, mammal) = 54,810 mg/kg/female 15–35 days after conception; Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

Mutation in Microorganisms (bacteria, Salmonella typhimurium) = 600 µg/dose
DNA Repair (yeast, Saccharomyces cerevisiae) = 300 mg/mL
Cytogenetic Analysis (lung, hamster) = 10 g/mL
Cytogenetic Analysis (ovary, hamster) = 275 mM

ALIPHATIC TROL:

Standard Draize Test (Skin-Rat) 100 mg
Standard Draize Test (Skin-Rabbit) 25%; Moderate
Standard Draize Test (Eye-Rabbit) 500 mg; Severe
LD50 (oral-Rat) = 3000 mg/kg
LD50 (Ora-Mouse) = 5500 mg/kg
LD50 (Intraperitoneal-Rat) = 1800 mg/kg
LD50 (Intraarterial-Rat) = 3.28 g/kg; Liver: hepatitis (hepatocellular necrosis), diffuse; Kidney/Ureter/Bladder: changes in tubules (including acute renal failure, acute tubular necrosis)
LD50 (Intraperitoneal-Mouse) = 1210 mg/kg
LD50 (Intraperitoneal-Mouse) = 6100 mg/kg; Behavioral: muscle weakness; Lungs, Thorax, or Respiration: respiratory depression
LD50 (Intraportal-Rat) = 3350 mg/kg
LD50 (Intraocular-Rat) 1 g/kg; Behavioral: somnolence (general depressed activity), muscle weakness, coma
LD50 (Intraportal-Rat) = 3000 mg/kg; Kidney/Ureter/Bladder: urine volume increased
LD50 (Oral-Rat) = 12000 mg/kg; female 14 days’ preimplanting; 4 days’ post-implanting; Reproductive: Maternal Effects: other effects; Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Sense Organs and Special Senses (Ear); effect, not otherwise specified
LD50 (Ora-Mouse) = 3000 mg/kg
LD50 (Intraportal-Rat) = 6000 mg/kg/20 days/intermittent; Gastrointestinal: ulceration or bleeding from stomach; Kidney/Ureter/Bladder: changes in both tubes and glomeruli
LD50 (Intraocular-Rabbit) = 500 mg/kg; Lungs, Thorax, or Respiration: dyspnea
LD50 (Intraocular-Rabbit) = 10,000 mg/kg/4 weeks/intermittent; Sense Organs and Special Senses (Ear); effect, not otherwise specified; Blood: changes in leukocyte (WBC) count; Blood: other hemolysis with or without anemia; Lungs, Thorax, or Respiration: respiratory stimulation; Gastrointestinal: hypermetabolism, diaphoresis
LD50 (Intraportal-Dog) = 125 mg/kg; Lungs, Thorax, or Respiration: dyspnea
11. TOXICOLOGICAL INFORMATION (Continued)

IRRITANCY OF PRODUCT:
MS#-LDR1 Solution: Depending on the duration and concentration of overexposure, skin and eye contact can irritate contaminated tissue.
All Other Solutions: Contact with the skin or eyes may cause mild irritation, which is alleviated upon rinsing.

SENSITIZATION TO THE PRODUCT: These solutions are not known to cause skin or respiratory sensitization in humans.

REPRODUCTIVE TOXICITY INFORMATION: The constituents in the solutions in this product are not reported to produce mutagenic, embryotoxic, teratogenic, and adverse reproductive effects in humans.

ALIPHATIC AMIDE: Mutagenicity: Negative results have been obtained in tests using cultured human cells for the Aliphatic Sulfoxide constituent and negative results have been obtained in tests using cultured mammalian cells and bacteria. The available information from short-term tests does not indicate that the Aliphatic Amide constituent is mutagenic; it was not found to be mutagenic in a dominant lethal test in mice or in tests using bacteria or Drosophila (fruit flies); positive results (bone marrow micronuclei induction) were reported in mice exposed by intratracheal injection, which is not a relevant route of occupational exposure. Embryotoxicity: The Aliphatic Amide constituent caused reduced fetal weight (fetotoxicity) in the offspring of rats and mice exposed to Aliphatic Amide orally, in the absence of maternal toxicity. In rabbits, rats, and mice exposed orally, embryotoxicity (fetal deaths) was observed in the presence of maternal toxicity. Aliphatic Amide has caused reduced fetal weight in rats, in the absence of maternal toxicity. Embryotoxicity was observed in rabbits, in the presence of severe maternal toxicity.

Teratogenicity: In one study involving the Aliphatic Sulfoxide constituent given orally, embryotoxicity in the presence of maternal toxicity in mice was observed.

Reproductive Toxicity: There is insufficient animal information available to conclude that the Aliphatic Amide constituent is a reproductive toxin. In a continuous breeding study using mice, female reproductive toxicity (decreased fertility, decreased litter size, increased days to litter and changes in the reproductive cycle) was observed in the presence of modest changes in body weight (both generations) and increases in food consumption.

BIological Exposure Indices: Currently, there are no Biological Exposure Indices (BEIs) determined for the constituents in this product’s solutions.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: This product has not been tested for mobility in soil. The following information is available for some constituents:

ALIPHATIC SULFOXIDE:
The Koc of this compound is estimated as 4, using a log Kow of -1.35 and a regression-derived equation. According to a classification scheme, this estimated Koc value suggests that this compound is expected to have very high mobility in soil.

ALIPHATIC AMIDE:
The Koc of Aliphatic Amide is 3.6. According to a classification scheme, this Koc value suggests that Aliphatic Amide is expected to have very high mobility in soil.

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. It is expected that the constituents of this product will slowly degrade in the environment and form a variety of organic and inorganic materials; however, no specific information is known. Data for some constituents of this product are available as follows:

ALIPHATIC SULFOXIDE:
If released to air, a vapor pressure of 6.1X10^-1 mm Hg at 25°C indicates this material will exist solely as a vapor phase in the atmosphere. Vapor-phase material will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 6.2-6.6 hours. The compound does not absorb light at wavelengths > 290 nm and therefore is not expected to be susceptible to direct photolysis by sunlight. If released to soil, this compound is expected to have very high mobility based upon an estimated Koc of 4. Volatilization from water and moist soil surfaces is not expected to be an important fate process based upon a Henry's Law constant of 1.4X10^-9 atm-cm/mole. If released into water, Aliphatic Sulfoxide is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. A low experimental BCF of < 1 suggests that bioconcentration in aquatic organisms is low. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions.

ALIPHATIC AMIDE:
If released to air, a vapor pressure of 6.1X10^-2 mm Hg at 25°C indicates Aliphatic Amide will exist solely as a vapor in the ambient atmosphere. Vapor-phase Aliphatic Amide will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 0.8 days. If released to soil, Aliphatic Amide is expected to have very high mobility based upon a Koc of 3.6. Volatilization from moist soil surfaces is not expected to be an important fate process based upon an estimated Henry's Law constant of 1.4X10^-9 atm-cm/mole. If released into water, Aliphatic Amide is not expected to adsorb to suspended solids and sediment based upon the Koc. Several biodegradation screening studies have observed significant biodegradation of Aliphatic Amide which suggests that biodegradation may be important. Volatilization from water surfaces is not expected to be an important fate process based upon this compound's estimated Henry's Law constant. Hydrolysis is expected to be slow.

SODIUM SALT:
Water solubility = 37 g/100 mL @ 0°C; 39.12 g/100 ml of water @ 100°C; Log Kow = -3.0

ALIPHATIC TRIOX: Water solubility = 55-80 g/100 mL (20°C)

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential. The following information is available for some constituents:

ALIPHATIC SULFOXIDE:
A BCF of < 1 was observed for this material, using orange-red killifish (Oryzias latipes) which were exposed over an 8-week period. According to a classification scheme, this BCF suggests that bioconcentration in aquatic organisms is low.

ALIPHATIC AMIDE:
An estimated BCF of 3 was calculated for Aliphatic Amide, using a log Kow of -1.51 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.
12. ECOLOGICAL INFORMATION (Continued)

ECOTOXICITY: This product has not been tested for aquatic or animal toxicity. All releases to terrestrial, atmospheric and aquatic environments should be avoided. The aquatic toxicity data for some constituents of this product are available on the following below.

ALIPHATIC SULFOXIDE:  
LC50 (Ictalurus melas Black bullhead) 24 hours = 11.4 g/L; static; 95% CI (10.4-12.4)
LC50 (Ictalurus punctatus Channel catfish) 24 hours = 42.5 g/L; static; 95% CI (37.9-47.6)
LC50 (Lepomis cyanellus Green sunfish) 24 hours = 65.0 g/L; static; 95% CI (61.3-88.9)

ALIPHATIC SULFOXIDE (continued):  
LC50 (Lepomis macrochirus Bluegill) 24 hours = 72.0 g/L; static; 95% CI (63.2-82.1)
LC50 (Perca flavescens Yellow perch) 24 hours = 65.0 g/L; static; 95% CI (61.3-68.9)
LC50 (Salvelinus fontinalis Brook trout) 24 hours = 54.5 g/L; static; 95% CI (50.9-58.3)
LC50 (Salvelinus fontinalis Brook trout 48 hours = 46.0 g/L; static; 95% CI (42.2-50.1)
LC50 (Pimephales promelas Fathead minnow) 96 hours = > 34 g/L; static
LC50 (Lepomis macrochirus Bluegill) 96 hours = > 40 g/L; static
LC50 (Salvelinus fontinalis Brook trout) 96 hours = 36.5 g/L; static; 95% CI (33.2-40.2)
EC50 (Daphnia magna water flea) 24 hours = 7000 mg/L; toxic effect: inhibition of mobility

RESULTS OF PBT AND vPvB ASSESSMENT: No data available. PBT and vPvB assessments are part of the chemical safety report required for some substances in European Union Regulation (EC) 1907/2006, Article 14.

OTHER ADVERSE EFFECTS: This product does not contain any constituents with known ozone depletion potential.

ENVIRONMENTAL EXPOSURE CONTROLS: Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

13. DISPOSAL CONSIDERATIONS

WASTE TREATMENT/DISPOSAL METHODS: Do NOT dispose of any solution of this product by pouring down the drain. It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate international, national, state, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials.

U.S. EPA WASTE NUMBER:  
MS#-AMX2 Solution: Wastes of this solution should be tested for D001 (Waste Characteristic Ignitability). All Other Solutions: Not applicable.

EWC WASTE CODE: Wastes from research, diagnoses, treatment, or prevention of disease involving animals: chemicals other than containing dangerous substances: 18-02-06

14. TRANSPORTATION INFORMATION

This product is not classified under any jurisdiction as Dangerous Goods and has no UN Number, Hazard Class or Packing Group Special Precautions for User.

U.S. DEPARTMENT OF TRANSPORTATION: This product is NOT classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA: This product is NOT classified as Dangerous Goods, per the Transportation of Dangerous Goods regulations.

INTERNATIONAL AIR TRANSPORT ASSOCIATION/ICAO (IATA/ICAO): This product is NOT classified as dangerous goods, per rules of IATA.

INTERNATIONAL MARITIME ORGANIZATION (IMO): This product is NOT dangerous goods, per the rules of IMO.

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE): This product is NOT classified as dangerous goods, per the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR).

AUSTRALIAN FEDERAL OFFICE OF ROAD SAFETY: This product is NOT dangerous goods, per the Code for the Transportation of Dangerous Goods by Road or Rail.

TRANSPORT IN BULK ACCORDING TO THE IBC CODE: See the information under the individual jurisdiction listings for IBC information.

ENVIRONMENTAL HAZARDS: This product is neither environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID, and ADN) nor a marine pollutant according to the IMDG Code.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:  
U.S. SARA REPORTING REQUIREMENTS: The constituents in this product’s solutions are not subject to Sections 302, 304, and 313 reporting requirements under the Superfund Amendment and Reauthorization Act.
15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the constituents in this product’s solutions. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: The constituents in the solutions of this product are on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No constituent in the solutions of this product is on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The constituents in this product’s solutions are listed on the DSL Inventory or are exempt.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): The constituents in this product’s solutions are not on the CEPA Priority Substances Lists.

CANADIAN WHMIS CLASSIFICATION AND SYMBOLS:

- MS#-AMX2 Solution: Class B3 Combustible Material
- MS#-LDR1 Solution: D2A Teratogenicity and embryotoxicity

All Other Solutions: Not applicable.

ADDITIONAL EUROPEAN UNION REGULATIONS:

SAFETY, HEALTH, AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE PRODUCT:

Currently, there is no specific legislation pertaining to this product.

CHEMICAL SAFETY ASSESSMENT: No data available. The chemical safety assessment is required for some substances according to European Union Regulation (EC) 1907/2006, Article 14.

ADDITIONAL AUSTRALIAN REGULATIONS:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: The constituents in the solutions of this product are on the AICS. Hydrates of listed compounds and biological materials are exempt from listing. Any chemical not included in AICS is regarded as a new industrial chemical unless it is outside the scope of the Industrial Chemicals (Notification and Assessment) Act 1989 or is otherwise exempt from notification. New industrial chemicals must be notified and assessed before being manufactured or imported into Australia.

HAZARDOUS SUBSTANCES INFORMATION SYSTEM (HSIS): The constituents in this product’s solutions are not listed in the HSIS.

STANDARD FOR THE UNIFORM SCHEDULING OF MEDICINES AND POISONS:

- MS#-LDR1 Solution: Schedule 6
- All Other Solutions: Not applicable.

ADDITIONAL LABELING:

- MS#-LDR1 Solution: Avoid contact with eyes. Avoid contact with skin. Avoid breathing vapour or spray mist. For advice, contact a Poisons Information Centre (Phone e.g. Australia 131 126; New Zealand 03 4747 000) or a doctor (at once). If in eyes, wash out immediately with water. If inhaled, remove from contaminated area. Apply artificial respiration if not breathing. If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water.

All Other Solutions: Not applicable.

ADDITIONAL JAPANESE REGULATIONS:

JAPANESE ENCS: The constituents in this product’s solutions are on the ENCS Inventory as indicated in composition tables in Section 3 (Composition and Information on Ingredients).

JAPANESE MINISTRY OF ECONOMY, TRADE, AND INDUSTRY (METI) STATUS: There is Biodegradation and Bioconcentration information from tests conducted according to the Chemical Substances Control Law on the following components: Aliphatic Sulfoxide, Aliphatic Amide. There is Mutagenicity information from tests conducted according to the Industrial Safety and Health Law on the following components: Aliphatic Amide.

16. OTHER INFORMATION

U.S. ANSI LABELING (Z129.1; Provided to Summarize Occupational Hazard Information):

- MS#-LDR1 Solution: CAUTION! POSSIBLE BIRTH DEFECT HAZARD. MAY CAUSE BIRTH DEFECTS BASED ON ANIMAL DATA. MAY CAUSE SKIN AND EYE IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED OR INHALED. Do not taste or swallow. Avoid skin or eye contact. Avoid prolonged or repeated skin contact. Avoid breathing mists or sprays. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves and goggles. FIRST-AID: In case of contact, immediately flush skin or eyes with plenty of water. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention if necessary. IN CASE OF FIRE: Use water fog, dry chemical, CO₂, or “alcohol” foam. IN CASE OF SPILL: Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.
16. OTHER INFORMATION (Continued)

U.S. ANSI LABELING (Z129.1; Provided to Summarize Occupational Hazard Information) (continued):

<table>
<thead>
<tr>
<th>Classification</th>
<th>Risk Phrases</th>
<th>Hazard Statements</th>
<th>Precautionary Statements</th>
</tr>
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<tbody>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
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<td>Not applicable</td>
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</tbody>
</table>

EU 67/548/EEC AND 2001/59/EC AUSTRALIAN NOHSC FULL TEXT:

MS#-LDR1 Solution:

Classification: Reproductive Toxicant Category 1B

Hazard Statements: H360D: May damage fertility or the unborn child

Precautionary Statements:

Exposure Limits are given as TWA (Time-Weighted Average) or PEAK (short-term exposure) values.

COMPONENT EU 67/548/EEC AND AUSTRALIA NOHSC FULL TEXT:

Aliphatic Amide:

Classification: Reproductive Toxicity Category 1B

Hazard Statements: H360D: May damage fertility or the unborn child

METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Bridging principles were used to classify this product.

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 1961, Hilo, HI 96721 • 800/441-3365 • 808/969-4846

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

DFG MAKs: Federal Republic of Germany Maximum Concentration Values in the workplace. Exposure limits are given as TWA (Time-Weighted Average) or PEAK (short-term exposure) values.

DFG MAK Germ Cell Mutagen Categories: 1: Germ cell mutagens that have been shown to increase the mutant frequency in the progeny of exposed mammals. 2A: Substances that have been shown to induce genetic damage in germ cells of human or animals, which can produce mutagenic effects in somatic cells of mammals in vivo and have been shown to reach the germ cells in an active form. 3B: Substances that are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell in vivo; in exceptional cases, substances for which there are no in vivo data, but that are clearly mutagenic in vitro and structurally related to known in vivo mutagens. 4: Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem necessary.) 5: Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DFG MAK Pregnancy Risk Group Classification: Group A: A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. Group B: Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable.
**DEFINITIONS OF TERMS (Continued)**

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (Continued):** 1 PHYSICAL HAZARD: (continued) 1 Unstable Reactives: Substances that may decompose, or self-react, or both, under only conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosion. Substances that are unstable reactives are not expected to explode in the absence of inhibitors. 2 Water Reactivity: Materials that may react violently with water. Organic Peroxides: Materials that, in themselves, are normally unstable and will readily polymerize, decompose, or self-react, with the evolution of heat and other energy violently. Explosives: Division 1.4 explosives. Explosive substances where the explosive effects are largely confined to the package and no joule heat of fragmentation of appreciable size and range are expected. An external fire must cause virtually complete destruction of the load instantaneously. 3 Extreme Hazard: Materials that are capable of detonation or explosive reaction, but require a strong initiating source or may be heated under confinement before initiation; or materials that react explosively with water, or whose reaction with water is rapid and/or pressure and have little or no potential to cause significant heat generation or explosion. Substances that may polymerize, decompose, or self-react at ambient temperature and/or pressure, and have a high potential (or high risk) to cause significant heat generation or explosion. 4 National Fire Protection Association Hazard Ratings: HEALTH HAZARD: 4 Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials. Gases and vapors with an LC₅₀ for acute inhalation toxicity greater than 200 mg/L. Materials with an LC₅₀ for acute dermal toxicity greater than 2000 mg/kg. Materials with an LC₅₀ for acute oral toxicity greater than 500 mg/kg but less than or equal to 2 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 5,000 ppm but less than or equal to 5,000 mg/L. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than ten-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 2 mg/L but less than or equal to 10 mg/L. Materials with an LC₅₀ for acute dermal toxicity greater than 2000 mg/kg but less than or equal to 10 mg/L. Materials with an LC₅₀ for acute oral toxicity greater than 5 mg/kg but less than or equal to 2 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 50 ppm but less than or equal to 300 ppm. Materials with an LC₅₀ for acute dermal toxicity greater than 100 mg/kg but less than or equal to 10 mg/kg. Materials with an LC₅₀ for acute oral toxicity greater than 2 mg/kg but less than or equal to 0.5 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 5 ppm but less than or equal to 0.5 ppm. Any substance that may polymerize, decompose, or self-react at ambient temperature and/or pressure, and have a high potential (or high risk) to cause significant heat generation or explosion. 5 National Fire Protection Association Hazard Ratings: NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS: HEALTH HAZARD: 4 Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials. Gases and vapors with an LC₅₀ for acute inhalation toxicity greater than 200 mg/L. Materials with an LC₅₀ for acute dermal toxicity greater than 2000 mg/kg. Materials with an LC₅₀ for acute oral toxicity greater than 500 mg/kg but less than or equal to 2 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 5,000 ppm but less than or equal to 5,000 mg/L. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than ten-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 2 mg/L but less than or equal to 10 mg/L. Materials with an LC₅₀ for acute dermal toxicity greater than 2000 mg/kg but less than or equal to 10 mg/L. Materials with an LC₅₀ for acute oral toxicity greater than 5 mg/kg but less than or equal to 2 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 5 ppm but less than or equal to 300 ppm. Materials with an LC₅₀ for acute dermal toxicity greater than 100 mg/kg but less than or equal to 10 mg/kg. Materials with an LC₅₀ for acute oral toxicity greater than 2 mg/kg but less than or equal to 0.5 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 0.5 ppm but less than or equal to 0.5 ppm. Any substance that may polymerize, decompose, or self-react at ambient temperature and/or pressure, and have a high potential (or high risk) to cause significant heat generation or explosion. 5 National Fire Protection Association Hazard Ratings: NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS: HEALTH HAZARD: 4 Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials. Gases and vapors with an LC₅₀ for acute inhalation toxicity greater than 200 mg/L. Materials with an LC₅₀ for acute dermal toxicity greater than 2000 mg/kg. Materials with an LC₅₀ for acute oral toxicity greater than 500 mg/kg but less than or equal to 2 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 5,000 ppm but less than or equal to 5,000 mg/L. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than ten-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 2 mg/L but less than or equal to 10 mg/L. Materials with an LC₅₀ for acute dermal toxicity greater than 2000 mg/kg but less than or equal to 10 mg/L. Materials with an LC₅₀ for acute oral toxicity greater than 5 mg/kg but less than or equal to 2 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 5 ppm but less than or equal to 300 ppm. Materials with an LC₅₀ for acute dermal toxicity greater than 100 mg/kg but less than or equal to 10 mg/kg. Materials with an LC₅₀ for acute oral toxicity greater than 2 mg/kg but less than or equal to 0.5 mg/kg. Materials with an LC₅₀ for acute inhalation toxicity greater than 0.5 ppm but less than or equal to 0.5 ppm. Any substance that may polymerize, decompose, or self-react at ambient temperature and/or pressure, and have a high potential (or high risk) to cause significant heat generation or explosion.
DEFINITIONS OF TERMS (Continued):

FLAMMABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions. Materials that have an instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100 W/mL.

INSTABILITY HAZARD: 3 Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation. Materials that have an estimated instantaneous power density at or above 10 W/mL and below 100 W/mL.

STORAGE HAZARD: 0 Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures. Materials that have an instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100 W/mL.

REGULATORY INFORMATION:

U.S. and CANADA: This section explains the impact of various laws and regulations on the material. EPA: U.S. Environmental Protection Agency, ACGIH: American Conference of Governmental Industrial Hygienists, a professional association that establishes exposure limits. OSHA: U.S. Occupational Safety and Health Administration, NIOSH: National Institute of Occupational Safety and Health, and which is the research arm of OSHA. WHMIS: Canadian Workplace Hazardous Materials Information System. DOT: U.S. Department of Transportation, TC: Transport Canada. SARA: Superfund Amendments and Reauthorization Act. DSL/NDSL: Canadian Domestic/Non-Domestic Substances List. TSCA: U.S. Toxic Substance Control Act. CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act. Marine Pollutant status according to the DOT. CERCLA or Superfund, and various state regulations. This section also includes information on the precautionary warnings that appear on the material’s package label.

EU: European Union (formerly known as the EEC, European Economic Community).

ENEC: European Inventory of Non-Existing Chemical Substances. ARD: European Agreement Concerning the International Carriage of Dangerous Goods by Road. RID: International Regulations Concerning the Carriage of Dangerous Goods by Rail.


JAPAN: METI: Ministry of Economy, Trade and Industry.