

## MATERIAL SAFETY DATA SHEET

### 1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): HT Pico Protein Express Reagent Kit, Labeling Dye, HT Pico Protein 5 x 20 ug Vials

CODE NUMBERS: PN 760498, 760519

U.N. NUMBER: Not applicable

U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK: Not applicable

HAZCHEM CODE (AUSTRALIA): Not applicable

POISONS SCHEDULE NUMBER (AUSTRALIA): Not applicable

PRODUCT USE: Laboratory Biological Research

U.S. SUPPLIER/MANUFACTURER'S NAME: Caliper Life Sciences

Address: 68 Elm Street  
Hopkinton, MA 01748

Business Phone: +1-800-LAB-CHIP (toll-free)  
+1-800-522-2447 (toll-free)  
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AUSTRALIAN SUPPLIER/DISTRIBUTOR'S NAME:

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Business Phone:

EUROPEAN SUPPLIER/ DISTRIBUTOR'S NAME:

Address:

Business Phone:

EMERGENCY PHONE: 1-800-255-3924 (CHEM-TEL) in U.S., Canada, Puerto Rico, U.S. Virgin Islands

EMAIL ADDRESS/COMPETENT PERSON FOR MSDS: Technical Support: Tech.Support@caliperls.com

DATE OF PREPARATION: June 24, 2009

DATE OF REVISION: New

### 2. HAZARD IDENTIFICATION

EU/AUSTRALIAN LABELING/CLASSIFICATION: Some components of this product meet the definition of various hazard classes, as defined by the European Union Council Directive 67/548/EEC and subsequent Directives and by the Australian National Occupational Health and Safety Commission [NOHSC(1008:2004)].

Express Ladder:

Hazard Classification: Irritant.

Risk Phrases: R 43

Stop Buffer:

Hazard Classification: Carcinogenic Category 2. Harmful. Irritant.

Dangerous to the Environment.

Risk Phrases: R 36/38; R 40; R 43; R 48/22; R 51

Labeling Buffer:

Hazard Classification: Harmful.

Risk Phrases: R 42

Labeling Dye:

Hazard Classification: Irritant.

Risk Phrases: R 41

All Other Components:

Hazard Classification: Not applicable.

Risk Phrases: Not applicable.

TSCA Status: Some components of this product contain ingredients not included in the TSCA Inventory. In accordance with the conditions listed in 40 CFR 720.36 and 721.47, this product must be used only for research and development, pharmaceutical manufacture, or export. It must be used by, or directly under the supervision of, a technically qualified individual. The manufacturer should be consulted prior to using this compound for other applications. Other requirements may apply.

**Health Hazards:**

Express Ladder: The Sodium Dodecyl Sulfate constituent of this component is a skin sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

Wash Buffer and Labeling Buffer: The Lithium Dodecyl Sulfate constituent of these components is known to be a respiratory sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

Gel Matrix: Inhalation of vapors, mists, or sprays of this component may irritate the nose, throat, and lungs. Symptoms may include irritation, coughing, sneezing, and runny nose.

Stop Buffer: Inhalation of vapors, mists, or sprays of this component may irritate the nose, throat, and lungs. Symptoms may include irritation, coughing, sneezing, and runny nose. Skin and eye contact irritates contaminated tissue. Symptoms of skin overexposure may include redness, discomfort and severe irritation. Repeated skin overexposure can cause dermatitis (dry, red skin). The Hydroxylamine Hydrochloride constituent is a skin sensitizer; subsequent exposure to very small amounts may cause allergic reaction. Symptoms of eye overexposure may include redness, tearing, temporary blurred vision, and pain. If this component is swallowed, it may cause irritate the mouth, throat, esophagus, and other tissues of the digestive system. Ingestion can also cause nausea, vomiting, diarrhea, and cyanosis (blue color to skin due to lack of oxygen) caused by methemoglobinemia (a condition that affects the ability of the blood to carry oxygen).

DMSO: Inhalation of vapors, mists, or sprays of this component may irritate the nose, throat, and lungs. Symptoms may include nausea, headache, and vomiting. Depending on the duration of overexposure, skin and eye contact may irritate contaminated tissue. Symptoms of skin overexposure may include redness and discomfort. Symptoms of eye overexposure may include redness, tearing, and pain. The Dimethyl Sulfoxide constituent of this component can be absorbed through the skin and may carry dissolved chemicals with it into the body. Symptoms of overexposure for a prolonged period of time and a large area of skin may include redness, burning, itching, scaling, vision disturbance, photophobia, headache, and diarrhea. If this component is swallowed, it may cause gastric distress. Large doses may cause nausea, vomiting, chills, cramps, and lethargy.

## 2. HAZARD IDENTIFICATION (Continued)

### Health Hazards (continued):

**Labeling Dye:** Inhalation of airborne dusts of this component may irritate the nose, throat, and lungs. Symptoms may include coughing, sneezing, and runny nose. This product can severely irritate the eyes and can seriously damage the eyes. Symptoms of eye overexposure can include redness, burning, stinging, blurred vision, and tearing. The dusts of this product may irritate contaminated skin (especially in the event of prolonged overexposures). Symptoms of skin overexposure may include redness.

**All Other Components:** Inhalation of vapors, mists, or sprays of these components may slightly irritate the nose, throat, and lungs. Symptoms are generally alleviated upon breathing fresh air. No constituents of these components are known to be absorbed via intact skin. If these components are swallowed they may cause gastric distress. Large doses may cause nausea, vomiting, and diarrhea.

### Flammability Hazards:

**DMSO and Labeling Dye:** These components must be substantially preheated for ignition to become a hazard.

**All Other Components:** These components present no significant fire hazards. In the event of a fire, this product will not contribute significant additional hazards.

**Reactivity Hazards:** This product is not reactive.

### Environmental Hazards:

**Stop Buffer:** This component is toxic to aquatic organisms.

**All Other Components:** These components present negligible hazards to the environment.

## 3. COMPOSITION AND INFORMATION ON INGREDIENTS

This Material Safety Data sheet describes the HT Pico Protein Express Reagent Kit. This product consists of eight solutions and one solid. This Material Safety Data Sheet provides complete information on all the components described in the following tables. Unless otherwise specified, the information in each of the following sections (Sections 3–16) of this document is pertinent to each solution. The components of this product are mixtures (preparations) of the following chemical components:

CHEMICAL NAME	CAS #	EINECS#	ENCS#	% v/v	EU CLASSIFICATION FOR COMPONENTS
<b>COMPONENT 1: HT PICO PROTEIN EXPRESS LOWER MARKER</b>					
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).				Balance	None of the other constituents in these solutions contribute significantly to the hazards associated with these solutions.
<b>COMPONENT 2: HT PICO PROTEIN EXPRESS LADDER</b>					
Sodium Dodecyl Sulfate	151-21-3	205-788-1	2-1679	1–5	SELF-CLASSIFICATION Hazard Classification: Irritant Risk Phrases: R 43
Glycerol	56-81-5	200-289-5	2-242	10–25	Hazard Classification: Not applicable. Risk Phrases: Not applicable.
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).				Balance	None of the other constituents in these solutions contribute significantly to the hazards associated with these solutions.
<b>COMPONENT 3: HT PICO PROTEIN EXPRESS WASH BUFFER</b>					
Lithium Dodecyl Sulfate	2044-56-6	218-058-2	2-3045	1–5	SELF-CLASSIFICATION Hazard Classification: Harmful Risk Phrases: R 42
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).				Balance	None of the other constituents in these solutions contribute significantly to the hazards associated with these solutions.
<b>COMPONENT 4: HT PICO PROTEIN EXPRESS GEL MATRIX</b>					
Methylurea	598-50-5	209-935-0	2-3254	1–5	Hazard Classification: Not applicable. Risk Phrases: Not applicable.
Tris	77-86-1	201-064-4	2-318	1–5	Hazard Classification: Not applicable. Risk Phrases: Not applicable.
Poly(N,N-dimethylacrylamide)				3–7	Hazard Classification: Not applicable. Risk Phrases: Not applicable.
Tricine	5704-04-1	227-193-6	Not Listed	10–20	Hazard Classification: Not applicable. Risk Phrases: Not applicable.
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).				Balance	None of the other constituents in these solutions contribute significantly to the hazards associated with these solutions.
<b>COMPONENT 5: DMSO</b>					
Dimethyl Sulfoxide	67-68-5	200-664-3	2-1553	100	Hazard Classification: Not applicable. Risk Phrases: Not applicable.
<b>COMPONENT 6: HT PICO PROTEIN EXPRESS STOP BUFFER</b>					
Hydroxylamine Hydrochloride	5470-11-1	226-798-2	Not Listed	15–25	Hazard Classification: Explosive. Carcinogenic Category 3. Harmful. Irritant. Dangerous to the Environment. Risk Phrases: R 2; R 21/22; R 36/38; R 40; R 43; R 48/22; R 50
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).				Balance	None of the other constituents in these solutions contribute significantly to the hazards associated with these solutions.
<b>COMPONENT 7: HT PICO PROTEIN EXPRESS 5X LABELING BUFFER</b>					
Sodium Bicarbonate	144-55-8	205-633-8	1-164	5–10	Hazard Classification: Not applicable. Risk Phrases: Not applicable.
Lithium Dodecyl Sulfate	2044-56-6	218-058-2	2-3045	15–25	SELF-CLASSIFICATION Hazard Classification: Harmful. Risk Phrases: R: 42.
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).				Balance	None of the other constituents in these solutions contribute significantly to the hazards associated with these solutions.

### 3. COMPOSITION AND INFORMATION ON INGREDIENTS (Continued)

CHEMICAL NAME	CAS #	EINECS#	ENCS#	% v/v	EU CLASSIFICATION FOR COMPONENTS
<b>COMPONENT 8: LABELING DYE</b>					
DY™-631-NHS Ester				100	SELF-CLASSIFICATION Hazard Classification: Irritant. Risk Phrases: R: 41.

See Section 16 for full text of Ingredient Risk Phrases

NOTE: Unless otherwise indicated, the hazard assessments in the following sections are pertinent to all component reagents.

### 4. FIRST-AID MEASURES

Contaminated individuals must seek medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. 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. Remove or cover gross contamination to avoid exposure to rescuers. Seek medical attention if adverse effect continues after removal to fresh air.

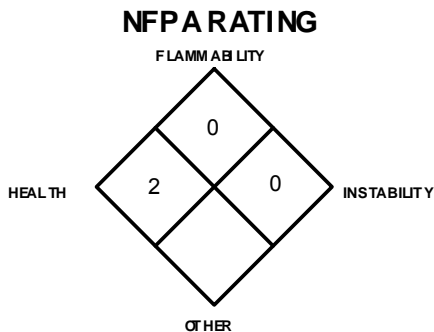
**INGESTION:** If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING unless directed by medical personnel. Have contaminated individual rinse mouth with water. Never induce vomiting or give diluents (milk or water) to someone who is 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.

**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.

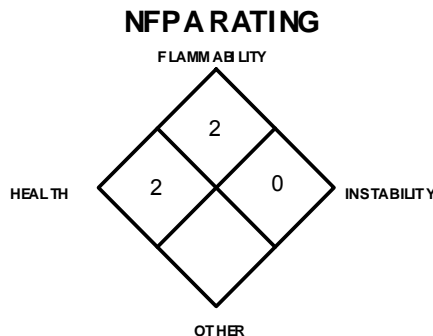
**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate overexposure.

### 5. FIRE-FIGHTING MEASURES

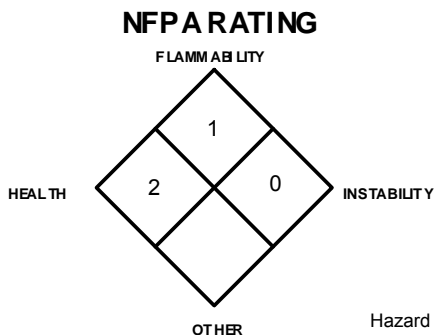
**Express Ladder, Wash Buffer,  
Labeling Buffer, and Stop Buffer**



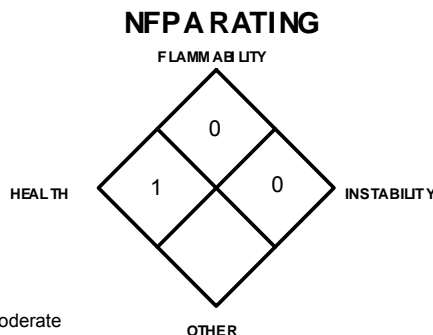
**DMSO**



**Labeling Dye**



**All Other Reagents**



Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate  
3 = Serious 4 Severe

**5. FIRE-FIGHTING MEASURES (Continued)****FLASH POINT:**

DMSO: 95°C (203°F)

All Other Components: Not flammable.

**AUTOIGNITION TEMPERATURE:**

DMSO: 215°C (419°F)

All Other Components: Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**DMSO: *LEL*: 2.2% *UEL*: 19.7%

All Other Components: Not applicable.

**FIRE EXTINGUISHING MATERIALS:** 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).

**FIRE EXTINGUISHING MATERIALS NOT BE USED:** Halon extinguishers should not be used for fires involving this product.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** When involved in a fire, this product's components will decompose and produce irritating vapors and toxic gases (including carbon oxides, dimethyl amine, hydrogen sulfide, cyanides, sodium oxides, and nitrogen oxides).

**SPECIAL FIRE-FIGHTING PROCEDURES:** 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**

**SPILL AND LEAK RESPONSE:** Trained personnel using pre-planned procedures should respond to uncontrolled releases. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. Eliminate all sources of ignition before cleanup begins. Use non-sparking tools. The atmosphere must have levels of constituents 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).

**Small Spills:** Lightweight gloves, a lab coat, and eye protection should be worn. Absorb spilled liquid with paper towels. Wash contaminated area with soap and water, absorb with paper towels, and rinse with water.

**Large Spills:** Minimum Personal Protective Equipment should be Level D: lab-gloves, chemical resistant apron, boots, and splash goggles. Respiratory protection should not be necessary. 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. Decontaminate the area thoroughly. Prevent material from entering sewer or confined spaces, waterways, soil or public waters. 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.

Place all spill residue in a double plastic bag or other containment and seal. Decontaminate the area thoroughly. Do not mix with wastes from other materials. Dispose of in accordance with applicable International, National, and local procedures (see Section 13, Disposal Considerations). For spills on water, contain, minimize dispersion and collect. Dispose of recovered material and report spill per regulatory requirements.

**7. HANDLING and STORAGE**

**WORK PRACTICES AND HYGIENE PRACTICES:** As with all chemicals, avoid getting this product's components ON YOU or IN YOU. Wash thoroughly after handling this product's components. Avoid splashing or spraying this product's components. Do not eat or drink while handling this product's components.

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. This material must be used by, or directly under the supervision of, a technically qualified individual. Avoid breathing vapors, mists, or airborne dusts generated by this product's components. Ensure containers of this product's components are properly labeled. Open containers slowly on a stable surface. Store vials as directed in the product insert. Keep vials tightly closed when not in use. Store away from incompatible materials. Inspect vials containing this product's components for leaks or damage. Read instructions provided with the product prior to use.

**SPECIFIC USE(S):** This product is for use in laboratory biological research. Follow all 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 tagged-out safely, as applicable. Collect all rinsates and dispose of according to applicable International, National, and local hazardous waste disposal regulations.

**8. EXPOSURE CONTROLS - PERSONAL PROTECTION**

**VENTILATION, ENGINEERING, AND OCCUPATIONAL EXPOSURE CONTROLS:** 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.

**EXPOSURE LIMITS/GUIDELINES:**

NOTE: For components not specifically listed, those components are primarily water and trace constituents, no exposure limits are applicable.

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR										
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELS		NIOSH		AIHA WEELs		OTHER
		TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	IDLH mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	mg/m <sup>3</sup>	

**COMPONENT 2: HT PICO PROTEIN EXPRESS LADDER**

COMPONENT 2: HT PICO PROTEIN EXPRESS LADDER											
Sodium Dodecyl Sulfate	151-21-3	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Glycerol	56-81-5	10 (mist)	NE	15 (total dust) 5 (resp. frac.) 10 (total dust) 5 (resp. frac.) [vacated 1989 PEL]	NE	NE	NE	NE	NE	NE	DFG MAKs: TWA = 50 (Inhalable fraction) PEAK = 2(MAK 15 min, average value, 1-hr interval Pregnancy Risk Group C

NE = Not Established.

See Section 16 for Definitions of Terms Used.

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

### EXPOSURE LIMITS/GUIDELINES (continued):

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR										
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH		AIHA WEELs		OTHER
		TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	IDLH mg/m <sup>3</sup>	TWA mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	mg/m <sup>3</sup>	

#### COMPONENT 3: HT PICO PROTEIN EXPRESS WASH BUFFER

Lithium Dodecyl Sulfate	2044-56-6	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
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#### COMPONENT 4: HT PICO PROTEIN EXPRESS GEL MATRIX

Methylurea	598-50-5	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Tris	77-86-1	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Poly(N,N-dimethylacrylamide)		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Tricine	5704-04-1	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

#### COMPONENT 5: DMSO

Dimethyl Sulfoxide	67-68-5	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	DFG MAK: Danger of Cutaneous absorption
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#### COMPONENT 6: HT PICO PROTEIN EXPRESS STOP BUFFER

Hydroxylamine Hydrochloride	5470-11-1	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
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#### COMPONENT 7: HT PICO PROTEIN EXPRESS 5X LABELING BUFFER

Sodium Bicarbonate	144-55-8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Lithium Dodecyl Sulfate	2044-56-6	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

#### COMPONENT 8: LABELING DYE

DY™-631-NHS-Ester		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
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NE = Not Established.

See Section 16 for Definitions of Terms Used.

**INTERNATIONAL OCCUPATIONAL EXPOSURE LIMITS:** Currently the following international exposure limits are in place for the some constituents of this product. Values given may not be the most current; individual country lists should be consulted to determine most current values available.

##### DIMETHYL SULFOXIDE:

Germany: No MAK Established, JAN 1999

Russia: STEL = 20 mg/m<sup>3</sup>, JUN 2003Sweden: TWA = 50 ppm (150 mg/m<sup>3</sup>), KTV = 150 ppm(500 mg/m<sup>3</sup>), Skin, JAN 1999Switzerland: MAK-W = 50 ppm (160 mg/m<sup>3</sup>), Skin, JAN

1999

The Netherlands: MAC-TGG = 150 mg/m<sup>3</sup>, Skin, 2003

##### DIMETHYL SULFOXIDE (continued):

The Netherlands: MAC-TGG = 150 mg/m<sup>3</sup>, Skin, 2003

##### GLYCEROL:

Australia: TWA = 10 mg/m<sup>3</sup>, JAN 1993Belgium: TWA = 10 mg/m<sup>3</sup>, JAN 1993Finland: TWA = 20 mg/m<sup>3</sup>, JAN 1999France: VME = 10 mg/m<sup>3</sup>, JAN 1999Korea: TWA = 10 mg/m<sup>3</sup> (mist), 2006

##### GLYCEROL (continued):

Mexico: TWA = 10 mg/m<sup>3</sup> (inhalable), 2004The Netherlands: MAC-TGG = 10 mg/m<sup>3</sup>, 2003New Zealand: TWA = 10 mg/m<sup>3</sup> (mist), JAN 2002United Kingdom: TWA = TWA 10 mg/m<sup>3</sup>, 2005

In Argentina, Bulgaria, Colombia, Jordan, Singapore,

Vietnam check ACGIH TLV

##### TRIS:

Russia: STEL = 5 mg/m<sup>3</sup>, JUN 2003

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132), equivalent standards of Canada (including CSA Standard Z94.4-02 and CSA Standard Z94.3-07), standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand/body protection, and CR 13464:1999 for face/eye protection), standards of Australia (including AS/NZS 1715:1994 for respiratory PPE, AS/NZS 4501.2:2006 for protective clothing, AS/NZS 2161.1:2000 for glove selection, and AS/NZS 1336:1997 for eye protection), or standards of Japan (including JIS T 8116:2005 for glove selection, JIS T 8150:2006 for respiratory PPE, JIS T 8147:2003 for eye protectors, and JIS T 8030:2005 for protective clothing). Please reference applicable regulations and standards for relevant details.

**RESPIRATORY PROTECTION:** Respiratory protection is not generally needed when using this product. Maintain airborne contaminant concentrations below limits listed in this section. If mists, sprays or vapors from this product are created during use, use appropriate respiratory protection. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-02, European Standard EN 529:2005, EU member state standards, Australian Standard 1716-Respiratory Protective Devices and Australian Standard 1715-Selection, Use, and Maintenance of Respiratory Protective Devices, or Japanese Standard JIS T 8150:2006. 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, supplied air respirator with auxiliary self-contained air supply is required under U.S. Federal 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, refer to U.S. OSHA 29 CFR 1910.133, Canadian CSA Standard Z94.3-07, European Standard CR 13464:1999, Australian Standard 1337-Eye Protection for Industrial Applications and Australian Standard 1336-Recommended Practices for Eye Protection in the Industrial Environment, or Japanese Standard JIS T 8147:2003.

**HAND PROTECTION:** Wear butyl rubber, neoprene, or nitrile rubber or latex gloves for routine use. Use triple gloves for spill response. If necessary, refer to U.S. OSHA 29 CFR 1910.138, Australian Standard 2161-Industrial Safety Gloves and Mittens, European Standard CEN/TR 15419:2006, or Japanese Standard JIS T 8116:2005.

**BODY PROTECTION:** Use body protection appropriate for task, such as a lab coat. If necessary, refer to OSHA Technical Manual (Section VII: Personal Protective Equipment), European Standard CEN/TR 15419:2006, Australian Standard 3765-Clothing for Protection Against Hazardous Chemicals, or Japanese Standard JIS T 8030:2005. 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, Canadian CSA Standard Z195.1-02, Guideline on Selection, Care, and Use of Protective Footwear, or European Standard CEN ISO/TR 18690:2006.

## 9. PHYSICAL and CHEMICAL PROPERTIES

### APPEARANCE AND COLOR:

**DMSO:** Clear, colorless liquid with a mildly garlic-like odor.

**Labeling Dye:** Odorless, blue solid.

**Stop Buffer:** Odorless, faintly yellow liquid.

**All Other Components:** Clear, odorless, colorless liquids.

## 9. PHYSICAL and CHEMICAL PROPERTIES (Continued)

### HOW TO DETECT THIS SUBSTANCE:

DMSO: The odor may act as a warning property associated with this component.

Labeling Dye: The color may act as a warning property associated with this component.

All Other Components: There are no unusual warning properties associated with these components.

### pH:

DMSO: Not established.

All Other Components: 6.0 (10.7)

### BOILING POINT:

DMSO: 189°C (372°F)

All Other Components: Not established.

### FLASH POINT:

DMSO: 95°C (203°F)

All Other Components: Not flammable.

### EXPLOSIVE PROPERTIES:

### VAPOR PRESSURE:

DMSO: 0.37 @ 20°C

All Other Components: Not established.

### SOLUBILITY:

DMSO and Labeling Dye: Miscible in organic solvents.

All Other Components: Miscible in methanol and ethanol.

### VISCOSITY:

### EVAPORATION RATE:

### COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT):

### FREEZING/MELTING POINT:

DMSO: 18.5°C (66°F)

All Other Components: Not established.

### FLAMMABILITY:

DMSO and Labeling Dye: Combustible

All Other Components: Not flammable.

### OXIDIZING PROPERTIES:

### SPECIFIC GRAVITY:

DMSO: 1.1 @ 20°C

All Other Components: Not established.

### SOLUBILITY IN WATER:

### RELATIVE VAPOR DENSITY (air = 1):

### ODOR THRESHOLD:

## 10. STABILITY AND REACTIVITY

### STABILITY:

### DECOMPOSITION PRODUCTS:

Combustion: Carbon oxides, dimethyl amine, hydrogen sulfide, cyanides, sodium oxides, and nitrogen oxides.

Hydrolysis: None known.

### MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:

DMSO: Strong oxidizers, acetyl chloride, cyanuric chloride, acid chlorides, phosphorus halides, strong acids, strong reducers, substances that are incompatible with water.

Labeling Dye: Amine containing buffers and reducing agents.

All Other Components: Strong oxidizers, strong acids, some metals, substances that are incompatible with water.

### HAZARDOUS POLYMERIZATION:

### CONDITIONS TO AVOID:

DMSO and Labeling Dye: Heat, sparks, flame, contact with or exposure to incompatible chemicals.

All Other Components: Contact with or exposure to incompatible chemicals.

## 11. TOXICOLOGICAL INFORMATION

### HEALTH EFFECTS OR RISKS FROM EXPOSURE:

#### Acute:

DMSO: Large oral doses may cause nausea, vomiting, chills, cramps, and lethargy.

Stop Buffer: Ingestion can cause nausea, vomiting, diarrhea, and cyanosis (blue color to skin due to lack of oxygen) caused by methemoglobinemia (a condition that affects the ability of the blood to carry oxygen).

All Other Components: Beyond mild irritation of the skin or eyes, contact with these components does not usually cause acute health effects.

#### Chronic:

Express Ladder: The Sodium Dodecyl Sulfate constituent of this component is a skin sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

Wash Buffer and Labeling Buffer: The Lithium Dodecyl Sulfate constituent of these components is known to be a respiratory sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

DMSO: The Dimethyl Sulfoxide component of this product can cause anaphylactic reaction by unspecified exposure routes; symptoms may include rash, abdominal cramps, nausea, chills, and chest pain. Chronic ingestion of the Dimethyl Sulfoxide constituent of these components may affect the liver and kidneys.

Stop Buffer: The Hydroxylamine Hydrochloride constituent is a skin sensitizer; subsequent exposure to very small amounts may cause allergic reaction. Symptoms of eye overexposure may include redness, tearing, temporary blurred vision, and pain.

All Other Components: These components are not known to cause any significant chronic health effects.

### TARGET ORGANS:

#### Acute:

Express Ladder, Wash Buffer, Labeling Buffer, and Labeling Dye:

Eyes.

DMSO: Eyes, gastrointestinal tract.

Stop Buffer: Eyes, skin, blood.

All Other Solutions: Eyes, gastrointestinal tract.

#### Chronic:

Express Ladder and Stop Buffer: Skin.

Wash Buffer and Labeling Buffer: Respiratory system.

DMSO: Liver, kidneys, skin.

All Other Solutions: None known.

### TOXICITY DATA:

The following information is available for the constituents in constituents in this product present in greater than 1 percent concentration and listed in Section 3 (Composition and Information on Ingredients).

DIMETHYL SULFOXIDE:	DIMETHYL SULFOXIDE (continued):	DIMETHYL SULFOXIDE (continued):
TDLo (intravenous, man) = 606 mg/kg;	LD <sub>50</sub> (oral, chicken) = 12 g/kg	LD <sub>50</sub> (subcutaneous, mouse) = 14 g/kg; Behavioral:
Gastrointestinal: nausea or vomiting; Liver: jaundice, other or unclassified	LD <sub>50</sub> (intraperitoneal, rat) = 8200 mg/kg	changes in motor activity (specific assay); Lungs,
LD <sub>50</sub> (oral, rat) = 14500 mg/kg; Eye: hemorrhage, conjunctive irritation	LD <sub>50</sub> (intraperitoneal, mouse) = 2500 mg/kg	Thorax, or Respiration: other changes; Kidney,
LD <sub>50</sub> (oral, mouse) = 7920 mg/kg	LD <sub>50</sub> (subcutaneous, rat) = 12 g/kg; Behavioral:	Ureter, Bladder: hematuria
LD <sub>50</sub> (oral, dog) > 10 g/kg	changes in motor activity (specific assay); Lungs,	LD <sub>50</sub> (intravenous, rat) = 5360 mg/kg; Behavioral:
	Thorax, or Respiration: dyspnea	tremor; muscle weakness; Lungs, Thorax, or
		Respiration: dyspnea

## 11. TOXICOLOGICAL INFORMATION (Continued)

### TOXICITY DATA (continued):

#### DIMETHYL SULFOXIDE (continued):

LD<sub>50</sub> (intravenous, mouse) = 3100 mg/kg; Eye: hemorrhage; conjunctive irritation  
 LD<sub>50</sub> (skin, mouse) = 50 g/kg  
 LD<sub>50</sub> (skin, rat) = 40 g/kg  
 TDLo (oral, rat) = 1070 g/kg/13 weeks/intermittent; Blood changes; weight loss or decreased weight gain  
 TDLo (oral, rat) = 59 g/kg/81 weeks/intermittent; Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Skin and Appendages: tumors  
 TDLo (oral, mouse) = 65340 mg/kg/66 weeks/intermittent; Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Blood: leukemia; Skin and Appendages: tumors  
 TDLo (oral, mouse) = 16 mg/kg/female 5–9 days after conception; Reproductive: Fertility: pre-implantation mortality; Effects on Embryo or Fetus: fetotoxicity; Specific Developmental Abnormalities: musculoskeletal system  
 TDLo (oral, hamster) = 11 g/kg/female 7 days after conception; Reproductive: Specific Developmental Abnormalities: Central Nervous System, musculoskeletal system  
 TDLo (oral, monkey) = 4864 g/kg/78 weeks/intermittent  
 TDLo (intraperitoneal, rat) = 56 g/kg/female 6–12 days after conception; Reproductive: Fertility: abortion  
 TDLo (intraperitoneal, rat) = 192 g/kg/4 weeks/intermittent; Blood: normocytic anemia; weight loss or decreased weight gain  
 TDLo (intraperitoneal, mouse) = 210 g/kg/female 6-12 days after conception; Reproductive: Specific Developmental Abnormalities: Central Nervous System, musculoskeletal system  
 TDLo (intraperitoneal, hamster) = 5500 mg/kg/female 8 days after conception; Reproductive: Specific Developmental Abnormalities: musculoskeletal system, Central Nervous System, craniofacial  
 TDLo (subcutaneous, rat) = 220 g/kg/82 weeks/intermittent; Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Skin and Appendages: tumors  
 TDLo (ocular, rabbit) = 250 (g/kg/30 days/intermittent; Eye: effect, not otherwise specified  
 TDLo (skin, pig) = 4698 mL/kg/58 weeks/intermittent; Eye: changes in refraction; Behavioral: fluid intake  
 Mutation in Microorganisms (*Salmonella typhimurium*) = 25 ppb  
 Mutation in Microorganisms (*Escherichia coli*) = 551 g/L  
 Mutation Test Systems (*Salmonella typhimurium*) = 70 g/L  
 Open Irritation Test (skin, rabbit) = 10 mg/24 hours  
 Standard Draize Test (skin, rabbit) = 500 mg/24 hours; mild  
 Standard Draize Test (eye, rabbit) = 100 mg  
 Standard Draize Test (eye, rabbit) = 500 mg/24 hours; mild

#### GLYCEROL:

DNA Inhibition (human, lymphocyte) = 200 mmol/L  
 LD<sub>50</sub> (oral, rat) = 12600 mg/kg; general anesthetic, muscle weakness, Liver: other changes  
 LC<sub>50</sub> (inhalation, rat) > 570 mg/m<sup>3</sup>/1 hour  
 LD<sub>50</sub> (intraperitoneal, rat) = 4420 mg/kg; toxic psychosis; Cardiac: other changes; Kidney, Urethra, Bladder: other changes  
 LD<sub>50</sub> (subcutaneous, rat) = 100 mg/kg  
 LD<sub>50</sub> (intravenous, rat) = 5566 mg/kg  
 LD<sub>50</sub> (oral, mouse) = 4090 mg/kg  
 LD<sub>50</sub> (intraperitoneal, mouse) = 8700 mg/kg  
 LD<sub>50</sub> (subcutaneous, mouse) = 91 mg/kg  
 LD<sub>50</sub> (intravenous, mouse) = 4250 mg/kg  
 LD<sub>50</sub> (oral, rabbit) = 27 g/kg  
 LD<sub>50</sub> (skin, rabbit) > 10 g/kg  
 LD<sub>50</sub> (intravenous, rabbit) = 53 g/kg  
 LD<sub>50</sub> (oral, guinea pig) = 7750 mg/kg  
 TDLo (oral, rat) = 16800 mg/kg/28 days/continuous; Endocrine: changes in adrenal weight  
 TDLo (oral, rat) = 96 g/kg/30 days/intermittent; Blood: changes in leukocyte (WBC) count, changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase  
 TDLo (oral, rat) = 100 mg/kg/male 1 day pre-mating; Reproductive: Fertility: post-implantation mortality  
 TDLo (intratesticular, rat) = 280 mg/kg/male 2 days pre-mating; Reproductive: Paternal Effects: spermatogenesis, testes, epididymis, sperm duct  
 TDLo (intratesticular, rat) = 1600 mg/kg/male 1 day pre-mating; Reproductive: Fertility: male fertility index

#### GLYCEROL (continued):

TDLo (intratesticular, rat) = 862 mg/kg/male 1 day pre-mating; Reproductive: Paternal Effects: spermatogenesis  
 TDLo (intratesticular, monkey) = 119 mg/kg/male 1 day pre-mating; Reproductive: Paternal Effects: spermatogenesis, testes, epididymis, sperm duct  
 TDLo (oral, mouse) = 560 g/kg/8 weeks/continuous; Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi  
 Cytogenetic Analysis (oral, rat) = 1 g/kg  
 Skin Irritancy (rabbit) = 500 mg/24 hours; mild  
 Eye Irritancy (rabbit) = 126 mg; mild  
 Eye Irritancy (rabbit) = 500 mg/24 hours; mild  
**HYDROXYLAMINE HYDROCHLORIDE:**  
 LD<sub>50</sub> (Oral-Rat) 141 mg/kg; Behavioral: convulsions or effect on seizure threshold  
 LD<sub>50</sub> (Oral-Mouse) 408 mg/kg  
 LD<sub>50</sub> (Intraperitoneal-Mouse) 10 mg/kg  
 LD<sub>50</sub> (Subcutaneous-Mouse) 125 mg/kg  
 LDLo (Subcutaneous-Dog) 70 mg/kg  
 TDLo (Oral-Rat) 49,500 mg/kg/25 weeks-intermittent; Endocrine: changes in spleen weight, changes in thyroid weight  
 TDLo (Oral-Rat) 2478 mg/kg/6 days-continuous; Behavioral: food intake (animal); Blood: changes in leukocyte (WBC) count; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
 Cytogenetic Analysis (Human-Leukocyte) 25 mg/L  
 Mutation Test Systems-Not Otherwise Specified (Human Cells-Not Otherwise Specified) 10 mg/L  
 LD<sub>50</sub> (Oral-Rat) 141 mg/kg; Behavioral: convulsions or effect on seizure threshold  
 LD<sub>50</sub> (Oral-Mouse) 408 mg/kg  
 LD<sub>50</sub> (Intraperitoneal-Mouse) 10 mg/kg  
 LD<sub>50</sub> (Subcutaneous-Mouse) 125 mg/kg  
 LDLo (Subcutaneous-Dog) 70 mg/kg  
 TDLo (Oral-Rat) 49,500 mg/kg/25 weeks-intermittent; Endocrine: changes in spleen weight, changes in thyroid weight  
 TDLo (Oral-Rat) 2478 mg/kg/6 days-continuous; Behavioral: food intake (animal); Blood: changes in leukocyte (WBC) count; Nutritional and Gross Metabolic: weight loss or decreased weight gain  
 Cytogenetic Analysis (Human-Leukocyte) 25 mg/L  
 Mutation Test Systems-Not Otherwise Specified (Human Cells-Not Otherwise Specified) 10 mg/L  
 DNA Repair (Bacteria-*Escherichia coli*) 500 µg/plate  
 DNA Damage (Bacteria-*Bacillus subtilis*) 100 mmol/L  
 Mutation in Microorganisms (Bacteria-*Bacillus subtilis*) 1 mol/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 200 mmol/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 1 mol/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 20 mmol/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 450 mmol/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 1 mol/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 2 mol/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 10 mmol/L  
 Mutation in Microorganisms (Yeast-*Schizosaccharomyces pombe*) 1 mol/L  
 Mutation in Microorganisms (Mouse-Lymphocyte) 220 mg/L  
 Specific Locus Test (Oral-Insect-*Drosophila melanogaster*) 30 mmol/L  
 Gene Conversion and Mitotic Recombination (Yeast-*Schizosaccharomyces pombe*) 200 ppm  
 Cytogenetic Analysis (Parenteral-Grasshopper) 2500 µg  
 Cytogenetic Analysis (Mouse-Embryo) 72 µmol/L  
 Cytogenetic Analysis (Hamster Cells-Not Otherwise Specified) 72 µmol/L  
 Cytogenetic Analysis (Monkey-Kidney) 25 mg/L  
 Cytogenetic Analysis (Mammal-Species Unspecified Lymphocyte) 500 mg/L  
 Morphological Transformation (Rat-Embryo) 19,500 ng/plate  
 Mutation in Mammalian Somatic Cells (Mouse-Lymphocyte) 31,300 µg/L  
 Sister Chromatid Exchange (Hamster-Lung) 5 mmol/L  
 Sister Chromatid Exchange (Mammal-Species Unspecified Lymphocyte) 25 mg/L  
 Micronucleus Test (Monkey-Kidney) 50 mg/L  
 Mutation Test Systems-Not Otherwise Specified (Monkey-Kidney) 25 mg/L

#### LITHIUM DODECYL SULFATE:

Currently, there are no toxicological data available for this component.

#### METHYLUREA:

LD<sub>50</sub> (Intraperitoneal-Rat) > 2 gm/kg  
 LDLo (Oral-Rat) 500 mg/kg  
 LDLo (Parenteral-Mouse) 10,189 mg/kg; Behavioral: general anesthetic, somnolence (general depressed activity), convulsions or effect on seizure threshold  
 Mutation in Microorganisms (Bacteria-*Bacillus subtilis*) 5 g/L  
 Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 500 ppm/1 hour  
 Mutation in Microorganisms (Protozoa-*Chlamydomonas reinhardtii*) 400 mmol/L

#### SODIUM BICARBONATE:

Standard Draize Test (Skin-Human) 30 mg/3 days-intermittent; Mild  
 Standard Draize Test (Eye-Rabbit) 100 mg/30 seconds; Mild  
 TDLo (Oral-Infant) 1260 mg/kg; Lungs, Thorax, or Respiration: other changes; Kidney, Ureter, Bladder: urine volume increased; Nutritional and Gross Metabolic: changes in sodium  
 TDLo (Oral-Man) 20 mg/kg/5 days-intermittent; Gastrointestinal: nausea or vomiting; Nutritional and Gross Metabolic: changes in potassium; Nutritional and Gross Metabolic: metabolic acidosis  
 LD<sub>50</sub> (Oral-Rat) 4220 mg/kg  
 LD<sub>50</sub> (Oral-Mouse) 3360 mg/kg  
 LC (Inhalation-Rat) > 900 mg/m<sup>3</sup>  
 TCLo (Inhalation-Rat) 77,200 (g/kg/17 weeks; Cardiac: other changes; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Nutritional and Gross Metabolic: changes in sodium  
 TDLo (Intraperitoneal-Mouse) female 7 day(s) after conception; Reproductive: Specific Developmental Abnormalities: other developmental abnormalities  
 Unscheduled DNA Synthesis (Oral-Rat) 50,400 mg/kg/4 weeks-continuous

#### SODIUM DODECYL SULFATE:

Skin Irritancy (human) = 250 mg/24 hours; mild  
 Skin Irritancy (human) = 25 mg/24 hours; mild  
 DNA Inhibition (lymphocyte, human) = 100 mg/L  
 LD<sub>50</sub> (oral, rat) = 1288 mg/kg  
 LC<sub>50</sub> (inhalation, rat) > 3900 mg/m<sup>3</sup>/1 hour  
 LD<sub>50</sub> (intraperitoneal, rat) = 210 mg/kg  
 LD<sub>50</sub> (intravenous, rat) = 118 mg/kg  
 LD<sub>50</sub> (intraperitoneal, mouse) = 250 mg/kg; Behavioral: somnolence (general depressed activity), changes in motor activity (specific assay); Vascular: regional or general arteriolar or venous dilation  
 LD<sub>50</sub> (intravenous, mouse) = 118 mg/kg  
 LDLo (skin, rabbit) = 10 g/kg; Behavioral: ataxia; Gastrointestinal: changes in structure or function of salivary glands; Gastrointestinal: hypermotility, diarrhea  
 TDLo (oral, rat) = 75 mg/kg/3 days/ intermittent; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels; hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)  
 TDLo (oral, rat) = 22750 mg/kg/13 weeks/continuous; Liver: changes in liver weight  
 TDLo (oral, rat) = 840 mg/kg/28 days/continuous; Endocrine: changes in adrenal weight  
 TDLo (skin, mouse) = 480 mg/kg/6–13 days pregnant; Reproductive: Effects on Fetus, fetotoxicity (except death, e.g., stunted fetus)  
 Skin Irritancy (mouse) = 25 mg/24 hours; moderate  
 Skin Irritancy (rabbit) = 50 mg/24 hours; severe  
 Skin Irritancy (rabbit) = 25 mg/24 hours; moderate  
 Skin Irritancy (rabbit) = 250 mg/24 hours; moderate  
 Skin Irritancy (rabbit) = 50 mg/24 hours; mild  
 Skin Irritancy (dog) = 25 mg/24 hours; mild  
 Skin Irritancy (pig) = 25 mg/24 hours; mild  
 Skin Irritancy (guinea pig) = 25 mg/24 hours; mild  
 Eye Irritancy (rabbit) = 100 mg/24 hours; moderate  
 Eye Irritancy (rabbit) = 250 µg; mild  
 Eye Irritancy (rabbit) = 2 mg  
 Eye Irritancy (rabbit) = 10 mg; moderate  
 Mutation in Microorganisms (*Saccharomyces cerevisiae*) = 3500 µmol/L  
 Mutation in Microorganisms (other microorganisms) = 200 mg/L  
 Sex Chromosome Loss and Non-disjunction (*Aspergillus nidulans*) = 900 ppm  
 DNA Repair (*Escherichia coli*) = 12500 nL/well  
 DNA Damage (liver, rat) = 243 µmol/L  
 DNA Inhibition (kidney, guinea pig) = 60 µmol/L

## 11. TOXICOLOGICAL INFORMATION (Continued)

### TOXICITY DATA (continued):

**TRICINE:**

Currently, there are no toxicological data available for this component.

**TRIS:**

LD<sub>50</sub> (oral, rat) = 5900 mg/kg  
LD<sub>50</sub> (intravenous, rat) = 1800 mg/kg

**TRIS (continued):**

LD<sub>50</sub> (intravenous, mouse) = 1210 mg/kg  
LDLo (oral, rabbit) = 1 g/kg; Behavioral: somnolence (general depressed activity), muscle weakness, coma

**CARCINOGENIC POTENTIAL:** The Hydroxylamine Hydrochloride constituent in the Stop Buffer is classified as a Carcinogen Category 3 in ESIS (European chemical Substances Information System) and HSIS (Australian Hazardous Substances Information System).

The remaining constituents in the components of this product are not found on the following lists: U.S. EPA, U.S. NTP, U.S. OSHA, U.S. NIOSH, GERMAN MAK, IARC, or ACGIH and therefore are neither considered to be nor suspected to be cancer causing agents by these agencies.

### IRRITANCY OF PRODUCT:

**DMSO:** Depending on the duration of overexposure, skin and eye contact can irritate contaminated tissue.

**Stop Buffer:** Skin and eye contact irritates contaminated tissue.

**Labeling Dye:** This product can severely irritate the eyes and can seriously damage the eyes.

**All Other Components:** Contact with the skin or eyes may cause mild irritation, which is alleviated upon rinsing.

### SENSITIZATION TO THE PRODUCT:

**Express Ladder:** The Sodium Dodecyl Sulfate constituent of this component is a skin sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

**Wash Buffer and Labeling Buffer:** The Lithium Dodecyl Sulfate constituent of these components is known to be a respiratory sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

**DMSO:** The Dimethyl Sulfoxide component of this product can cause anaphylactic reaction by unspecified exposure routes; symptoms may include rash, abdominal cramps, nausea, chills, and chest pain. The Sodium Dodecyl Sulfate constituent of this component is a skin sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

**Stop Buffer:** The Hydroxylamine Hydrochloride constituent is a skin sensitizer; subsequent exposure to very small amounts may cause allergic reaction.

**All Other Components:** All other components of this product are not known to cause skin or respiratory sensitization.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of this product and its components on the human reproductive system.

**Mutagenicity:** The constituents in the components in this product are not reported to produce mutagenic effects in humans. Human mutation data are available for the Dimethyl Sulfoxide, Glycerol, and Hydroxylamine Hydrochloride constituents in this product's components; these data were obtained during clinical studies on specific human tissues exposed to high doses of these compounds.

**Embryotoxicity:** The constituents in the components in this product are not reported to cause human embryotoxic effects.

**Teratogenicity:** The constituents in the components in this product are reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of the Dimethyl Sulfoxide constituent in this product's components, indicate teratogenic effects.

**Reproductive Toxicity:** The constituents in the components in this product are not reported to cause adverse reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of the Dimethyl Sulfoxide and Glycerol constituents in this product's components indicate adverse reproductive effects.

*A **mutagen** is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryotoxin** is a chemical that causes damage to a developing embryo (i.e., within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance that interferes in any way with the reproductive process.*

**BIOLOGICAL EXPOSURE INDICES:** Currently, there are no Biological Exposure Indices (BEIs) determined for the constituents in this product's components.

## 12. ECOLOGICAL INFORMATION

**MOBILITY:** This product has not been tested for 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. Additional environmental data for components are available as follows:

**DIMETHYL SULFOXIDE:**

**Biological Half-Life:** Dermal application resulted in 50-60 mg % in blood in 4-8 hr; half-life 11-14 hr. 220-340 mg % reported following oral admin of 1,000 mg/kg; half-life 20 hours.

**Biodegradation:** No degradation of Dimethyl Sulfoxide (%) was noted in a screening test using an activated sludge inoculum. Dimethyl Sulfoxide is considered to be very difficult to degrade in water, based on available data. The data used to make this classification were not indicated. A variety of microorganisms, including some that are found in anaerobic lake mud, have the ability to transform Dimethyl Sulfoxide to dimethyl sulfide.

**GLYCEROL:**

Water Solubility = Miscible. Log Kow = -1.76.

5-Day Biological Oxygen Demand = 0.54 p/p; 10 day BOD = 0.98 p/p; 20 Day BOD = 1.0 p/p:

**Terrestrial Fate:** If released to soil, Glycerol is expected to undergo rapid biodegradation under aerobic conditions. Biodegradation is also expected under anaerobic condition. Based on its Log Kow of -1.76 and its water solubility, the soil absorption coefficients for Glycerol can be estimated at 3 and 2, respectively, using regression-derived equations. These values indicated that Glycerol will be highly mobile in soil. Glycerol is not expected to significantly volatilize from moist or dry soil to the atmosphere.

**Aquatic Fate:** If released to an aquatic environment, Glycerol is expected to rapidly degrade under aerobic conditions. Degradation is also likely in seawater and under anaerobic conditions. Based on water solubility and its Log Kow, the bioconcentration factors for Glycerol can be estimated at 3 and 0.2, respectively. These values indicate that bioconcentration is not significant in aquatic organisms.

**Atmospheric Fate:** If released to the atmosphere, Glycerol may undergo a gas-phase oxidation with photochemically produced hydroxyl radicals. An estimated reaction rate indicates that the atmospheric half-life of Glycerol in the atmosphere to be 33 hours. The water solubility of Glycerol indicates that it may also undergo atmospheric removal by wet deposition processes.

**SODIUM DODECYL SULFATE:**

**Terrestrial Fate:** Based on a classification scheme, an estimated Koc value of 1.0X10<sup>4</sup>, determined from a structure estimation method, indicates that Sodium Lauryl Sulfate is expected to be immobile in soil. Volatilization of Sodium Lauryl Sulfate from moist soil surfaces is not expected to be an important fate process as it is a salt and has a water solubility of 1.0X10<sup>5</sup> mg/L. Sodium Lauryl Sulfate is not expected to volatilize from dry soil surfaces based upon an estimated vapor pressure of 4.7X10<sup>-13</sup> mm Hg.

## 12. ECOLOGICAL INFORMATION (Continued)

### PERSISTENCE AND BIODEGRADABILITY (continued):

#### SODIUM DODECYL SULFATE (continued):

**Aquatic Fate:** Based on a classification scheme, an estimated Koc value of  $1.0 \times 10^4$ , determined from an estimation method, indicates that Sodium Lauryl Sulfate is expected to adsorb to suspended solids and sediment in water. Volatilization from water surfaces is not expected based upon a water solubility,  $1.0 \times 10^5$  mg/L and that it is a salt. According to a classification scheme, an estimated BCF of 71, from its log Kow of 1.6 and a regression-derived equation, suggests the potential for bioconcentration in aquatic organisms is moderate.

**Atmospheric Fate:** According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, Sodium Lauryl Sulfate, which has an estimated vapor pressure of  $4.7 \times 10^{-13}$  mm Hg at 25°C, is expected to exist solely in the particulate phase in the ambient atmosphere. Particulate-phase Sodium Lauryl Sulfate may be removed from the air by wet and dry deposition.

**TRIS(HYDROXYMETHYL)AMINOMETHANE (TRIS):** Water solubility = 55–80 g/ 100 mL (20°C)

**BIO-ACCUMULATION POTENTIAL:** This product has not been tested for bio-accumulation potential. Additional data for components are available as follows:

#### SODIUM DODECYL SULFATE:

**Bioconcentration:** An estimated BCF of 71 was calculated for Sodium Lauryl Sulfate, using a log Kow of 1.6 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is moderate.

**ECOTOXICITY:** This product has not been tested for aquatic or animal toxicity. All releases to terrestrial, atmospheric and aquatic environments should be avoided. Additional aquatic toxicity data are available as follows:

#### DIMETHYL SULFOXIDE:

TLm (bluegill) 48 hours = 33,500 ppm; fresh water

#### GLYCEROL:

EC<sub>0</sub> (*Pseudomonas putida* bacteria) 16 hours = >10,000 mg/L

EC<sub>0</sub> (*Microcystis aeruginosa* algae) 8 days = 2,900 mg/L

EC<sub>0</sub> (*Scenedesmus quadricauda* green algae) 7 days = > 10,000 mg/L

EC<sub>0</sub> (*Entosiphon sulcatum* protozoa) 72 hours = 3,200 mg/L

EC<sub>0</sub> (*Uronema parduczi* Chatton-Lwoff protozoa) = > 10,000 mg/L

LC<sub>50</sub> (goldfish) 24 hours = > 5,000 mg/L

#### SODIUM BICARBONATE:

LC<sub>50</sub> (mosquito fish) 24 hours = 7700 mg/L

LC<sub>50</sub> (mosquito fish) 48 hours = 7550 mg/L

LC<sub>50</sub> (bluegill sunfish) 96 hours = 8250-9000 mg/L

Immobilization Threshold (*Daphnia* water flea) = 2350 mg/L

LC<sub>50</sub> (mosquito fish) 24 hours = 7700 mg/L

#### SODIUM DODECYL SULFATE:

EC<10 (*Pseudomonas putida*) 30 min = >9,050 mg/L

EC<sub>0</sub> (*Pseudomonas putida*) 16 hours = 290 mg/L

EC<sub>0</sub> (*Entosiphon sulcatum*) 72 hours = 40 mg/L

EC<sub>0</sub> (*Uronema parduczi* - Chatton-Lwoff) = 0.75 mg/L

EC<sub>0</sub> (*Scenedesmus quadricauda*) 7 days = 0.02 mg/L

EC<sub>0</sub>,S (*Daphnia magna*) 24 hours = 17; 23; 27; 5; 41 mg/L

EC<sub>1</sub>,S (*Microcystis aeruginosa*) 8 days = 7 mg/L

EC<sub>10</sub> (*Pseudomonas putida*) 16 hours = 9,050 mg/L

EC<sub>50</sub> (*Daphnia magna*) 48 hours = 6.3; 6.2–9; 7.1–49.4 mg/L

EC<sub>50</sub> (*Pseudomonas fluorescens*) = 18 hours = 1,650; 1,700 mg/L

EC<sub>50</sub> (*Neomysis americana*) 96 hours = 5.7–8.8 mg/L

EC<sub>50</sub> (*Cephaloscyllium ventriosum*) avoidance = 160 mg/L

EC<sub>50</sub> (*Heterodontus franciscanus*) avoidance = 174 mg/L

EC<sub>50</sub> (*Crassostrea virginica*) 48 hours = 0.37 mg/L

EC<sub>50</sub> (*Mercenaria mercenaria*) 48 hours = 0.47 mg/L

EC<sub>50</sub> (*Acartia tonsa*) 96 hours = 55 mg/L

EC<sub>50</sub> (*Eurytemora affinis*) 96 hours = 2.0–3.1 mg/L

EC<sub>50</sub> (*Triakis semifasciata*) avoidance = 113 mg/L

EC<sub>50</sub>,S (*Aeromonas hydrophila*) 18 hours = 3,700 mg/L

EC<sub>50</sub>,S (*Skeletonema costatum*) 2 hours = 2.3 mg/L

EC<sub>50</sub>,S (*Pseudoisochrysis paradoxa*) 2 hours = 1.3 mg/L

EC<sub>50</sub>,S (*Prorocentrum minimum*) 2 hours = 1.3 mg/L

EC<sub>50</sub>,S (*Selenastrum capricornutum*) 8 days = 3.7 mg/L

EC<sub>50</sub>,S (*Daphnia magna*) 24 hours = 5–20.2; 33; 38–44; 79 mg/L

EC<sub>50</sub>,S (*Acanthomysis sculpta*) 72 hours = 0.94–0.96 mg/L

EC<sub>50</sub>,S (*Gammarus pulex*) 4 days = 3.6–4.6; 9.4–13 mg/L

EC<sub>50</sub>,S (*Daphnia magna*) 24 hours = 9.8; 10–33; 80 mg/L

EC<sub>50</sub>,S (*Palaemonetes pugio*) 96 hours = 13.8; 108 mg/L

EC<sub>50</sub>,S (*Mysidopsis bahia*) 72 hours = 4.5–3.8 mg/L

EC<sub>50</sub>,S (*Spirillum volutans*) 2 hours = 4.2; 43 mg/L

EC<sub>100</sub>,S (*Daphnia magna*) 24 hours = 58; 63; 118 mg/L

NOEC (*Pimephales promelas* larvae) 8 days = 2.2–4.6 mg/L

NOEC,S (*Daphnia magna*) 10 days = 2 mg/L

LC<sub>0</sub> (*Leuciscus idus*) 48 hours = 10; 12.5 mg/L

LC<sub>10</sub> (*Pimephales promelas* larvae) 8 days = 4–4.5 mg/L

LC<sub>50</sub> (*Pimephales promelas* larvae) 8 days = 4.8–5.9 mg/L

LC<sub>50</sub> (*Artemia salina*) 48 hours = 2.2–3.2 mg/L

LC<sub>50</sub> (*Artemia salina*) 24 hours = 3.6; 6.9; 13.3–19.9; 14.8–18.5; 18.8–24.8; 19.1; 20–22.5 mg/L

LC<sub>50</sub> (*Ceriodaphnia dubia*) 48 hours = 48 mg/L

LC<sub>50</sub> (*Daphnia pulex*) 24 hours = 5–20; 14–18 mg/L

LC<sub>50</sub> (*Daphnia pulex*) 48 hours = 1.4–15; 10–13 mg/L

LC<sub>50</sub> (*Artemia salina*) 24 hours = 3.6; 6.9–25 mg/L

LC<sub>50</sub> (*Artemia salina*) 24 hours = 0.94–21.1 mg/L

LC<sub>50</sub> (*Ceriodaphnia dubia*) = 36–59 mg/L

LC<sub>50</sub> (*Daphnia magna*) 24 hours = 10–33; 13–21; 6.3 mg/L

LC<sub>50</sub> (*Daphnia magna*) 48 hours = 105.4–15; 11–13; 2.8; 1.8 mg/L

LC<sub>50</sub> (*Oryzias latipes*) 48 hours = 10 mg/L

LC<sub>50</sub> (*Tresus capax* larvae) 48 hours = 0.35 mg/L

LC<sub>50</sub> (*Limnaea peregra*) 96 hours = 0.54 mg/L

#### SODIUM DODECYL SULFATE (continued):

LC<sub>50</sub> (*Crassostrea gigas*) 48 hours = 0.58–1.16; 1 mg/L

LC<sub>50</sub> (brown trout) 0.07 hour = 560 mg/L

LC<sub>50</sub> (brown trout) 0.08 hour = 320 mg/L

LC<sub>50</sub> (brown trout) 0.15 hour = 180 mg/L

LC<sub>50</sub> (brown trout) 0.26 hour = 150 mg/L

LC<sub>50</sub> (*Floridichthys carpio*) 5 hours = 3 mg/L

LC<sub>50</sub> (brown trout) 2.15 hours = 100 mg/L

LC<sub>50</sub> (brown trout) 6.5 hours = 56 mg/L

LC<sub>50</sub> (brown trout) 32 hours = 32 mg/L

LC<sub>50</sub> (brown trout) 45 hours = 18 mg/L

LC<sub>50</sub> (*Fundulus heteroclitus*) 1 hour = 4.5–80 mg/L

LC<sub>50</sub> (*Leuciscus idus*) 48 hours = 15.6; 22; 27 mg/L

LC<sub>50</sub> (*Carassius auratus*) 96 hours = 23.7–34.9 mg/L

LC<sub>50</sub> (*Fundulus similis*) 96 hours = 4.5 mg/L

LC<sub>50</sub> (*Brachydanio rerio*) 96 hours = 9.9–20 mg/L

LC<sub>50</sub> (*Cichlasoma nigrofasciatum*) 96 hours = 16–30 mg/L

LC<sub>50</sub> (*Cyprinus carpio*) 96 hours = 1.31 mg/L

LC<sub>50</sub> (*Lebistes reticulatus*) 96 hours = 13.5–18 mg/L

LC<sub>50</sub> (*Lepomis macrochirus*) 96 hours = 4.5 mg/L

LC<sub>50</sub> (*Macrones vittatus*) 96 hours = 1.39 mg/L

LC<sub>50</sub> (*Oncorhynchus mykiss*) 96 hours = 4.62; 4.3 mg/L

LC<sub>50</sub> (*Oncorhynchus mykiss*) 48 hours = 5.95 mg/L

LC<sub>50</sub> (*Oryzias latipes*) 6 hours = 67 mg/L

LC<sub>50</sub> (*Oryzias latipes*) 24 hours = 46; 70 mg/L

LC<sub>50</sub> (*Menidia beryllina*) 96 hours = 1.48 mg/L

LC<sub>50</sub> (*Pleuronectes platessa*) 24 hours = 5.8 mg/L

LC<sub>50</sub> (*Palaemonetes pugio*) 48 hours = 70–162 mg/L

LC<sub>50</sub> (*Oryzias latipes*) 48 hours = 46 mg/L

LC<sub>50</sub> (*Pimephales promelas*) 96 hours = 6.6; 10–22 mg/L

LC<sub>50</sub> (*Atherinops affinis*) 96 hours = 1.88 mg/L

LC<sub>50</sub>,F (*Corbicula fluminea*) 5 days = 7.8–23.6 mg/L

LC<sub>50</sub>,F (trout) 48 hours = 5.9 mg/L

LC<sub>50</sub>,F (trout) 96 hours = 4.6 mg/L

LC<sub>50</sub>,F (trout) 10 days = 2.8 mg/L

LC<sub>50</sub>,F (*Brachydanio rerio*) 48 hours = 8.8 mg/L

LC<sub>50</sub>,F (*Brachydanio rerio*) 96 hours = 8.0 mg/L

LC<sub>50</sub>,F (*Brachydanio rerio*) 10 days = 8.0 mg/L

LC<sub>50</sub>,F (*Salmo gairdneri*) 96 hours = 5.3 mg/L

LC<sub>50</sub>,F (*Jordanella floridae*) 48 hours = 10.0 mg/L

LC<sub>50</sub>,F (*Jordanella floridae*) 96 hours = 8.1 mg/L

LC<sub>50</sub>,F (*Jordanella floridae*) 10 days = 6.9 mg/L

LC<sub>50</sub>,S (*Mysidopsis bahia*) 96 hours = 6.1–7.1; 7–18.3 mg/L

LC<sub>50</sub>,S (*Mysidopsis bahia*) 7 days = 5.9–14.5 mg/L

LC<sub>50</sub>,S (*Nereis virens*) 96 hours = 13.5 mg/L

LC<sub>50</sub>,S (*Crassostrea gigas* larvae) 48 hours = 0.91 mg/L

LC<sub>50</sub>,S (*Corbicula fluminea*) 96 hours = 27.2–36.2 mg/L

LC<sub>100</sub> (*Leuciscus idus*) 48 hours = 20; 30 mg/L

LC<sub>50</sub>,S (*Salmo gairdneri*) 96 hours = 4.6; 6.2 mg/L

LC<sub>50</sub>,S (*Pimephales promelas* fry) 96 hours = 10.2 mg/L

LC<sub>50</sub>,S (*Pimephales promelas* juvenile) 96 hours = 17 mg/L

LC<sub>50</sub>,S (*Pimephales promelas* adult) 96 hours = 22.5 mg/L

LC<sub>50</sub>,S (*Pimephales promelas*) 48 hours = 5.1–5.9 mg/L

LC<sub>50</sub>,S (*Cichlasoma nigrofasciatum*) 96 hours = 16.1–30 mg/L

LC<sub>50</sub>,S (*Poecilia reticulata*) 96 hours = 13.5–18.3 mg/L

LC<sub>50</sub>,S (*Carassius auratus*) 6 hours = 60 mg/L

LC<sub>50</sub>,S (*Phoxinus phoxinus*) 24 hours = 30.5 mg/L

LC<sub>50</sub>,S (*Macrones vittatus*) 96 hours = 1.4–1.5 mg/L

LC<sub>50</sub>,S (*Cyprinodon variegatus*) 96 hours = 3.8–4.5; 9 mg/L

LC<sub>50</sub>,S (*Cyprinodon variegatus*) 7 days = 1.8–3.4 mg/L

LC<sub>50</sub>,S (*Menidia beryllina*) 7 days = 1.5–2.2 mg/L

LC<sub>50</sub>,S (*Menidia beryllina*) 96 hours = 1.5; 2.5–3.0; 2.8 mg/L

LC<sub>50</sub>,S (*Gasterosteus aculeatus*) 96 hours = 0.5–4.2 mg/L

LC<sub>50</sub>,S (*Fundulus heteroclitus*) 96 hours = 4.5–5.6 mg/L at 20 ppt salt

LC<sub>50</sub>,S (*Fundulus similis*) 96 hours = 0.5–1.8 mg/L at 20 ppt salt

**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

**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 Federal, 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:** Not applicable.

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

### 14. TRANSPORTATION INFORMATION

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

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** This product is NOT classified as Dangerous Goods, per regulations of Transport Canada.

**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 classified as dangerous goods, per the rules of IMO.

**EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):**

This product is NOT classified by the United Nations Economic Commission for Europe to be dangerous goods.

**AUSTRALIAN FEDERAL OFFICE OF ROAD SAFETY CODE FOR THE TRANSPORTATION OF DANGEROUS GOODS BY ROAD OR RAIL:** This product is NOT dangerous goods, per regulations of the Office of Road Safety.

### 15. REGULATORY INFORMATION

#### ADDITIONAL U.S. REGULATIONS:

**U.S. SARA REPORTING REQUIREMENTS:** The constituents in components of this product are not subject to Sections 302, 304, and 313 reporting requirements under the Superfund Amendment and Reauthorization Act.

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

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

**U.S. TSCA INVENTORY STATUS:** Some solutions of this product contain ingredients not included in the TSCA Inventory. In accordance with the conditions listed in 40 CFR 720.36 and 721.47, this product must be used only for research and development, pharmaceutical manufacture, or export. It must be used by, or directly under the supervision of, a technically qualified individual. The manufacturer should be consulted prior to using this product for other applications. Other requirements may apply.

**OTHER U.S. FEDERAL REGULATIONS:** Not applicable.

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

**ANSI LABELING (Z129.1: Provided to Summarize Occupational Hazard Information):**

**Express Ladder:** **WARNING!** MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE SKIN, EYE, AND RESPIRATORY TRACT IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED. Avoid prolonged or repeated skin contact. Avoid skin contact. Avoid breathing mists or sprays. Do not taste or swallow. 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, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.

**Wash Buffer and Labeling Buffer:** **DANGER!** MAY CAUSE ALLERGIC RESPIRATORY REACTION. MAY CAUSE SKIN, EYE, AND RESPIRATORY TRACT IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED. Do not breathe mists or sprays. Avoid skin or eye contact. Do not taste or swallow. 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, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.

**DMSO:** **CAUTION!** MAY CAUSE SENSITIZATION BY UNSPECIFIED ROUTE OF EXPOSURE. MAY CAUSE SKIN, EYE, AND RESPIRATORY TRACT IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED. Do not taste or swallow. Avoid skin or eye 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, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.

**Labeling Dye:** **DANGER!** CAUSES EYE BURNS. MAY CAUSE SKIN AND RESPIRATORY TRACT IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED. Do not get in eyes. Avoid skin contact. Avoid breathing mists or sprays. Do not taste or swallow. 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, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.

## 15. REGULATORY INFORMATION (Continued)

### ADDITIONAL U.S. REGULATIONS (continued):

#### ANSI LABELING (Z129.1: Provided to Summarize Occupational Hazard Information) [contained]:

Stop Buffer: **WARNING!** CONTAINS POSSIBLE CANCER HAZARD; MAY CAUSE CANCER BASED ON ANIMAL DATA. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE SKIN, EYE, AND RESPIRATORY TRACT IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED. Avoid prolonged or repeated skin contact. Avoid skin contact. Avoid breathing mists or sprays. Do not taste or swallow. 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, CO<sub>2</sub>, or "alcohol" foam. IN CASE OF SPILL: Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.

All Other Solutions: **CAUTION!** MAY CAUSE SKIN, EYE, AND RESPIRATORY TRACT IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED. 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, CO<sub>2</sub>, or "alcohol" foam. IN CASE OF SPILL: Absorb spill with polypads and place in suitable container. Consult Material Safety Data Sheet for additional information.

### ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: Some components of this product contain ingredients not included in the DSL/NDSL Inventory. This product must be used only for research and development purposes. The manufacturer should be consulted prior to using this product for other applications. Other requirements may apply.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS: The constituents in components of this product are not on the CEPA Priority Substances Lists.

### CANADIAN WHMIS CLASSIFICATION AND SYMBOLS:

Express Ladder and Stop Buffer: **D2B** Materials Causing Other Toxic Effects (Contains skin sensitizer in greater than 1%)



Wash Buffer and Labeling Buffer: **D2A** Materials Causing Other Toxic Effects (Contains respiratory sensitizer in greater than 1%)



Labeling Dye: **D2B** Materials Causing Other Toxic Effects (Can damage eyes)



DMSO: **B3** Combustible Material



All Other Components: Not applicable.

### EUROPEAN UNION AND AUSTRALIAN CLASSIFICATION:

LABELING/CLASSIFICATION: Some components of this product meet the definition of various hazard classes, as defined by the European Union Council Directive 67/548/EEC and subsequent Directives.

Express Ladder:

Hazard Classification: Irritant.

Risk Phrases: R 43: May cause sensitization by skin contact

Safety Phrases: S: 1/2: Keep locked up and out of reach of children. S 24: Avoid contact with skin. S 37: Wear suitable gloves. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Annex II Hazard Symbol: Xi



Stop Buffer:

Hazard Classification: Carcinogenic Category 3. Harmful. Irritant. Dangerous to the Environment.

Risk Phrases: R 36/38: Irritating to eyes and skin. R 40: Limited evidence of carcinogenic effects. R 43: May cause sensitization by skin contact. R 48/22: Harmful: danger of serious damage to health by prolonged exposure if swallowed. R 51: Toxic to aquatic organisms.

Safety Phrases: S 2: Keep out of the reach of children. S 36/37: Wear suitable protective clothing and gloves. S 61: Avoid release to the environment. Refer to special instructions/Safety data sheets.

Annex II Hazard Symbol: Xn, Xi, N



Wash Buffer and Labeling Buffer:

Hazard Classification: Harmful.

Risk Phrases: R 42: May cause sensitization by inhalation.

Safety Phrases: S 2: Keep out of the reach of children. S 23: Do not breathe mists or sprays. S 63: In case of accident by inhalation, remove casualty to fresh air and keep at rest.

Annex II Hazard Symbol: Xn



**15. REGULATORY INFORMATION (Continued)****EUROPEAN UNION AND AUSTRALIAN CLASSIFICATION (continued):****LABELING/CLASSIFICATION:****Labeling Dye:****Hazard Classification:** Irritant.**Risk Phrases:** R 41: Risk of serious damage to eyes.**Safety Phrases:** S 22: Do not breathe dust. S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 39: Wear eye/face protection.**Annex II Hazard Symbol:** Xi**All Other Components:****Hazard Classification:** Not applicable.**Risk Phrases:** Not applicable.**Safety Phrases:** Not applicable.**Annex II Hazard Symbol:** Not applicable.**FOR CONSTITUENTS:****Dimethyl Sulfoxide:**

An official classification for this substance has not been published in Commission Directives 93/72EEC, 94/69/EC, 96/56/EC, or 98/98/EC.

**DY™-631-NHS-Ester:****Hazard Classification:** Irritant.**Risk Phrases:** R 41: Risk of serious damage to eyes.**Safety Phrases:** S 22: Do not breathe dust. S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 39: Wear eye/face protection.**Glycerol:**

An official classification for this substance has not been published in Commission Directives 93/72EEC, 94/69/EC, 96/56/EC, or 98/98/EC.

**Hydroxylamine Hydrochloride:****Hazard Classification:** Explosive. Carcinogenic Category 3. Harmful. Irritant. Dangerous to the Environment.**Risk Phrases:** R 2: Risk of explosion by shock, friction, fire, or other sources of ignition. R 21/22: Harmful in contact with skin and if swallowed.

R 36/38: Irritating to eyes and skin. R 40: Limited evidence of carcinogenic effects. R 43: May cause sensitization by skin contact. R 48/22:

Harmful: danger of serious damage to health by prolonged exposure if swallowed. R 50: Very toxic to aquatic organisms.

**Safety Phrases:** S 2: Keep out of the reach of children. S 36/37: Wear suitable protective clothing and gloves. S 61: Avoid release to the environment. Refer to special instructions/Safety data sheets.**Methylurea:**

An official classification for this substance has not been published in Commission Directives 93/72EEC, 94/69/EC, 96/56/EC, or 98/98/EC.

**Lithium Dodecyl Sulfate (Self-classification):****Hazard Classification:** Irritant.**Risk Phrases:** R 42: May cause sensitization by inhalation.**Safety Phrases:** S 1/2: Keep locked up and out of reach of children. S 23: Do not breathe mists or sprays. S 45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S 63: In case of accident by inhalation, remove casualty to fresh air and keep at rest.**Poly(N,N-dimethylacrylamide):**

An official classification for this substance has not been published in Commission Directives 93/72EEC, 94/69/EC, 96/56/EC, or 98/98/EC.

**Sodium Bicarbonate:**

An official classification for this substance has not been published in Commission Directives 93/72EEC, 94/69/EC, 96/56/EC, or 98/98/EC.

**Sodium Dodecyl Sulfate (Self-classification):****Hazard Classification:** Irritant.**Risk Phrases:** R 43: May cause sensitization by skin contact.**Safety Phrases:** S 1/2: Keep locked up and out of reach of children. S 24: Avoid contact with skin. S 37: Wear suitable gloves. S 45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).**Tricine:**

An official classification for this substance has not been published in Commission Directives 93/72EEC, 94/69/EC, 96/56/EC, or 98/98/EC.

**Tris:**

An official classification for this substance has not been published in Commission Directives 93/72EEC, 94/69/EC, 96/56/EC, or 98/98/EC.

**AUSTRALIAN INFORMATION FOR PRODUCT:****AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS:** The constituents in components of this product are on the AICS as indicated in composition tables in Section 3 (Composition and Information on Ingredients).**LIST OF DESIGNATED SUBSTANCES:** Not applicable.**STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS:** Not applicable.**JAPANESE INFORMATION FOR PRODUCT:****JAPANESE ENCS:** The constituents in components of this product are on the ENCS Inventory as indicated in composition tables in Section 3 (Composition and Information on Ingredients).**POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW:** No constituent in the components of this product is a listed Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.**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: Glycerol.**16. OTHER INFORMATION****PREPARED BY:**CHEMICAL SAFETY ASSOCIATES, Inc.  
PO Box 1961, Hilo, HI 96921  
800/441-3365/808/969-4846