

Catalog No.: 8002  
Reference No.: N/A

Revision Date: December 22, 2008

## SECTION 1 – Product / Preparation and Company Identification

- 1.1 **MICROVUE Osteocalcin EIA Kit** *(For research use only within the U.S. – Not for use in diagnostic procedures)*
- 1.2 The MicroVue Osteocalcin assay is a competitive immunoassay. The assay uses osteocalcin coated strips, a mouse anti-osteocalcin antibody, an anti-mouse IgG-alkaline phosphatase conjugate and a pNPP substrate to quantify osteocalcin in serum.
- 1.3 **Manufacturer:** Quidel Corporation – 10165 McKellar Court – San Diego, CA 92121  
**Telephone No.:** 1-858-552-1100    **Toll Free No.:** 1-800-874-1517    **Fax No.:** 1-858-453-4338
- 1.4 **Emergency No.:** Poison Control @ 1-800-876-4766 (United States)

## SECTION 2 – Composition / Ingredients Information

- 2.1 **Description of Components:** Substrate Tablets, Anti-Osteocalcin, Osteocalcin Standards, Low/High Controls, Enzyme Conjugate, Coated Strips, Stop Solution, 10xWash Buffer, Substrate Buffer.
- 2.2 **Hazardous Ingredients:** Dangerous solid or liquid substances present in >1% (or as required by applicable U.S., Canadian and E.U. regulations):

CAS#	EINECS	Chemical Name	Kit Component	% Weight	Classification :			
					US OSHA	WHMIS	EU	Risk Phrases
1310-73-2	215-185-5	Sodium Hydroxide	4702 (Stop)	1.5%	Corrosive	Corrosive	Xi	R36/38
111-42-2	203-868-0	Diethanolamine	4705 (Substrate)	11.5%	Irritant	Toxic	Xn	R22 – 48/22

\*\*See Section 15 and Section 16 – Regulatory Information for additional information on hazard classifications.

## SECTION 3 – Hazard Identification

**Emergency Overview:** As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical components of this kit and ensure prompt removal from skin, eyes, and clothing.

- 3.1 Some components of this kit are considered as hazardous or dangerous preparations as defined by the Occupational Safety and Health Administration (OSHA), the Canadian Workplace Materials Information System (WHMIS), and the European Union (EU) Directives 1999/45/EC and 67/548/EEC. **No significant health effects are anticipated from routine use.**
- 3.2 Contact with **Stop Solution (#4702)** or **Substrate Buffer (#4705)** to the eyes and/or skin may cause irritation upon a single exposure. Avoid prolonged contact.
- 3.3 This kit contains material of animal origin and should be considered as potentially capable of transmitting infectious diseases.

3.4 All patient samples, contaminated test strips, and fluids should be handled as potentially infectious. Follow **Universal Precautions** as necessary.

3.5 **Warning Properties:**

Chemical Name	Kit Component	Degree	Description
Sodium Hydroxide	4702 (Stop)	Poor	Sodium Hydroxide is odorless.
Diethanolamine	4705 (Substrate)	Fair	Diethanolamine has a mild ammonia-like odor.

**SECTION 4 – First Aid Measures**

**Special Instructions:**

- 4.1 **Inhalation:** Inhalation of any component in this kit is unlikely. If a component of this kit is inhaled and causes discomfort, move exposed individual to fresh air. Seek medical attention if breathing is difficult or symptoms persist.
- 4.2 **Eye Contact:** If a component of this kit enters the eyes and causes discomfort, wash eyes gently under potable running water for 15 minutes or longer, making sure that the eyelids are held open. If pain or irritation occurs, obtain medical attention.
- 4.3 **Skin Contact:** If a component of this kit contacts the skin and causes discomfort, remove any contaminated clothing. Wash affected area with plenty of soap and water. If pain or irritation occurs, obtain medical attention.
- 4.4 **Ingestion:** If a component of this kit is ingested, wash mouth out with water. If irritation or discomfort occurs, obtain medical attention.

**SECTION 5 – Fire Fighting Measures**

- 5.1 **Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, or alcohol-resistant foam.
- 5.2 **Special Fire Fighting Procedures:** This material will not significantly contribute to the intensity of a fire. Use extinguishing material suitable to the surrounding fire. Utilize proper personal protective equipment when responding to any fire. Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.
- 5.3 **Unusual Fire and Explosion Hazards:** When involved in a fire, this material can decompose and produce irritating fumes and toxic gases (e.g., Carbon monoxide, Carbon dioxide).

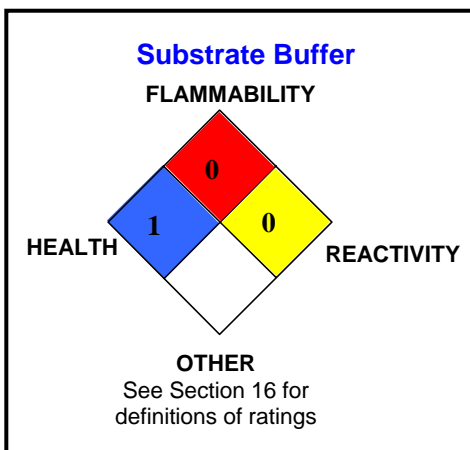
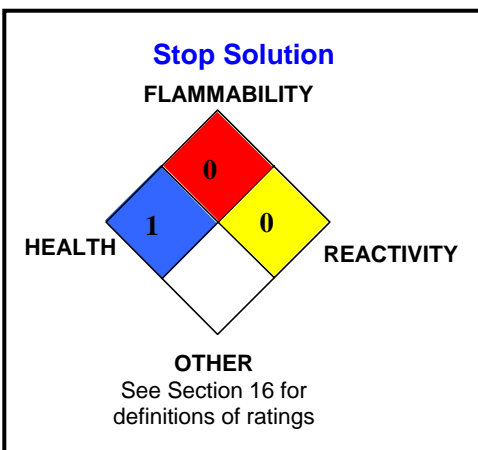
Explosion Sensitivity to Mechanical Impact: Not sensitive under normal conditions.

Explosion Sensitivity to Static Discharge: Not sensitive under normal conditions.

5.4 **Additional Considerations (Stop Solution and Substrate Buffer):**

- 5.4.1 Flash Point Non Combustible
- 5.4.2 Auto-ignition Temperature Not Applicable
- 5.4.3 Upper / Lower Explosion Limit Not Applicable

**5.5 NFPA Ratings:**



*\*\*Only trained and competent personnel shall attempt to extinguish a fire. Contact emergency response personnel as required. Be cautious of surrounding materials that may react with the extinguishing media.*

**SECTION 6 – Accidental Release Measures**

- 6.1 Personal Precautions:** This kit contains materials of biological origin. Avoid personal contact. Use Universal Precautions during clean-up procedures.
- 6.2 Environmental Precautions:** No environmental hazard is anticipated provided that the material is handled and disposed of with due care. Contain spill to prevent migration.
- 6.3 Spill and Leak Procedures:** Large spills of this product are unlikely. Utilize safety glasses, nitrile gloves, and lab coat/apron when responding to spills involving the components of this kit. Dispose of in accordance with applicable U.S. Federal, State, or local procedures or appropriate standards of Canada (see Section 13, Disposal Considerations).

**SECTION 7 – Handling and Storage**

- 7.1 Handling:** As with all chemicals, avoid getting the components within this kit ON YOU or IN YOU. Wash exposed areas thoroughly after using this product. Do not eat or drink while using this kit. This kit should be handled only by qualified clinical or laboratory employees trained on the use of this kit and who are familiar with the potential hazards.  
  
This kit should be handled as though capable of transmitting infectious diseases. Universal Precautions should be followed when using this kit.  
  
**Professional use only – Not for use by general public**
- 7.2 Storage:** Keep away from incompatible materials (Section 10). To maintain efficacy, store according to the package insert instructions.
- 7.3 Specific Use:** For research use only within the U.S. – Not for use in diagnostic procedures.

**SECTION 8 – Exposure Controls and Personal Protection**

**8.1 Exposure Limits:**

CAS#	Chemical Name	OSHA (PEL)	ACGIH (TLV)	MAK
1310-73-2	Sodium Hydroxide	2 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>
111-42-2	Diethanolamine	NE	1.98 mg/m <sup>3</sup> (Skin)	NE

**8.2 Occupational Exposure Controls:**

**8.2.1 Engineering Controls:**

No special engineering controls are required when working with this kit. Use with adequate ventilation to ensure exposure levels are maintained below the limits provided above.

**8.2.2 Personal Protective Equipment (PPE):**

Respiratory

Protection: None needed under normal conditions of use.

Eye Contact:

Safety glasses are recommended to prevent eye contact.

Hand Contact:

Impervious gloves (nitrile or equivalent) should be worn to prevent hand contact.

Skin Contact:

Lab Coat or similar garment should be worn.

**8.2.3 Environmental Controls:** No special environmental controls are required.

**SECTION 9 – Physical and Chemical Properties**

Characteristic	<b>Stop Solution: 1.5% Sodium Hydroxide</b>	<b>Substrate Buffer: 11.5% Diethanolamine</b>
Boiling Point (°C)	100	268 (diethanolamine)
Melting Point (°C)	0	28 (diethanolamine)
Specific Gravity (H <sub>2</sub> O = 1)	1.3	1.09 (diethanolamine)
Vapor Pressure (mm Hg)	14	Not available
Vapor Density (AIR = 1)	N/A	Not available
Evaporation Rate (Ether = 1)	<1	<1
pH:	13	9.9
Solubility in Water:	Complete	Soluble
Appearance and Odor:	Clear colorless liquid with no odor	Mild ammonia-like odor

**SECTION 10 – Stability and Reactivity**

<b>Characteristic</b>	<b>Stop Solution: 1.5% Sodium Hydroxide</b>	<b>Substrate Buffer: 11.5% Diethanolamine</b>
Stability	Stable	Stable
Conditions to Avoid	Incompatible materials	Incompatible materials
Materials to avoid (Incompatibilities)	Strong oxidizing agents; Strong acids	Strong oxidizing agents; Strong acids
Hazardous Decomposition or Byproducts	Thermal decomposition may release toxic fumes of sodium oxide	Thermal decomposition may release irritating fumes or toxic gases (e.g., Carbon monoxide, Carbon dioxide).
Hazardous Polymerization	Will not occur	Will not occur

**SECTION 11 – Toxicological Information**

**11.1 Toxicity Data for Hazardous Ingredients:** There are currently no toxicity data available for the components of this kit; the following toxicology information is available for raw materials present in greater than 1% concentration.

**The following data are available for Sodium Hydroxide (RTECS #: WB4900000):**

Eye effects-Monkey 1%/24H Severe irritation effects  
 Skin-Rabbit, adult 500 mg/24H Severe irritation effects  
 Eye effects-Rabbit, adult 4 g Mild irritation effects  
 Eye effects-Rabbit, adult 1% Severe irritation effects  
 Eye effects-Rabbit, adult 50 mg/24H Severe irritation effects  
 Eye effects-Rabbit, adult 1 mg/24H Severe irritation effects  
 Eye effects-Rabbit, adult 100 mg rns Severe irritation effects  
 Cytogenetic Analysis-grasshopper-Parenteral 20 mg  
 Intraperitoneal-Mouse LD<sub>50</sub>:40 mg/kg  
 Oral-Rabbit, adult LDLo:500 mg/kg

**The following data are available for Diethanolamine (RTECS #: KL2975000):**

Skin-Rabbit, adult 50 mg open Mild irritation effects  
 Skin-Rabbit, adult 500 mg/24H Mild irritation effects  
 Eye effects-Rabbit, adult 5500 mg Severe irritation effects  
 Eye effects-Rabbit, adult 750 mg/24H Severe irritation effects  
 Oral-Rat TDLo:18,382 mg/kg (male 14D pre):Reproductive effects  
 Oral-Rat LD<sub>50</sub>:710 mg/kg  
 Intraperitoneal-Rat LD<sub>50</sub>:120 mg/kg  
 Subcutaneous-Rat LD<sub>50</sub>:2200 mg/kg  
 Intravenous-Rat LD<sub>50</sub>:778 mg/kg  
 Intramuscular-Rat LD<sub>50</sub>:1500 mg/kg  
 Oral-Mouse LD<sub>50</sub>:3300 mg/kg  
 Intraperitoneal-Mouse LD<sub>50</sub>:2300 mg/kg  
 Subcutaneous-Mouse LD<sub>50</sub>:3553 mg/kg  
 Skin-Rabbit, adult LD<sub>50</sub>:12,200 mg/kg  
 Oral-Guinea Pig, adult LD<sub>50</sub>:2 g/kg

**11.2 Primary Routes of Exposure:**

*Overexposures to components within this kit are not expected.* Common routes of exposure may include ingestion and eye/skin contact. Specific paths of concern for potentially infectious materials are skin puncture, contact with broken skin, contact with mucous membranes and inhalation of aerosolized material.

**11.3 Potential Effects of Acute Overexposure, by Route of Exposure:**

This kit contains material of animal origin and should be considered as potentially capable of transmitting infectious diseases.

INHALATION: Vapors, mists, sprays, or dusts of this product can cause irritation to the respiratory tract.

CONTACT WITH SKIN or EYES: Contact can cause eye or skin irritation.

SKIN ABSORPTION: No component of this product is reported to be absorbed through intact skin.

INGESTION: If the product is swallowed, irritation of the mouth, throat, and other tissues of the gastro-intestinal system can occur.

INJECTION: Accidental injection of this product can cause burning, reddening, and swelling in addition to the wound. Symptoms of such exposure can include those described under "Inhalation," "Contact with Skin or Eyes," and "Ingestion."

**11.4 Potential Effects of Chronic Exposure:**

Long-term skin or eye contact can result in dermatitis or eye irritation.

**11.5 Symptoms of Overexposure:**

Symptoms of overexposure may include: eye, skin, nose, and throat irritation, headache, nausea and vomiting, and burns to contacted areas. Symptoms may be delayed for several hours after exposure.

**11.6 Medical Exposure Aggravated by Exposure:**

Persons with pre-existing skin disorders; eye problems or impaired respiratory system function can be more susceptible to health effects associated with overexposures to this product.

**11.7 Carcinogenicity:**

The ingredients in this kit are not listed as carcinogens by any of the following: ACGIH, IARC, NTP, or OSHA.

**SECTION 12 – Ecological Information**

**12.1 Ecotoxicity:**

No adverse effects on the environment are expected from the components of this kit. There is no aquatic toxicity data for any component of this product at this time.

**12.2 Mobility:**

Mobility data are not available for the components of this product.

**12.3 Persistence and Degradability:**

There is no persistence or degradation data for any component of this product at this time.

**12.4 Bioaccumulative Potential:**

Log K<sub>ow</sub> (diethanolamine) = -1.43

There is limited potential for the components within this kit to accumulate in plant or animal systems.

**SECTION 13 – Disposal Considerations**

Dispose of waste materials, unused components and contaminated packaging in compliance with country (ie., Canada, EU, etc.) federal, state and local regulations. If unsure of the applicable requirements, contact the authorities for information.

**SECTION 14 – Transport Information**

**14.1 U.S. Transportation:**

This product is regulated per 49 CFR 172.101, the U.S. department of transportation:

PROPER SHIPPING NAME:	<b>Sodium Hydroxide Solution</b>
HAZARD CLASS NUMBER and DESCRIPTION:	<b>Class 8, Corrosive</b>
UN IDENTIFICATION NUMBER:	<b>UN 1824</b>
DOT LABEL(S) REQUIRED:	<b>Class 8</b>
PACKAGING GROUP:	<b>II</b>
NORTH AMERICAN RESPONSE GUIDEBOOK NUMBER (2000):	<b>154</b>
MARINE POLLUTANT:	<b>No component is designated as a DOT Marine Pollutant.</b>

Small quantities of Class 8 materials are not subject to additional shipping requirements, provided that the requirements of 49 CFR 173.4, “Small quantity exceptions” are met. The maximum quantity of material per inner receptacle is limited to 30 ml, the packaging must meet the specifications in 49 CFR 173.4, the gross mass of the completed must not exceed 29 kg and the shipper must certify conformance with that section by marking the outside of the package with the statement “This package conforms to 49 CFR 173.4”.

**14.2 Canadian Transportation:**

The above-listed DOT basic description applies to this product under the regulations of Transport Canada.

**14.3 International Air Transportation:**

This product is regulated per International Air Transportation Association (IATA) Dangerous Goods Regulations:

PROPER SHIPPING NAME:	<b>Sodium Hydroxide Solution</b>
HAZARD CLASS NUMBER and DESCRIPTION:	<b>Class 8, Corrosive</b>
UN IDENTIFICATION NUMBER:	<b>UN 1824</b>
DOT LABEL(S) REQUIRED:	<b>Class 8</b>
PACKAGING GROUP:	<b>II</b>
Packing Instruction (Limited Quantity)	<b>809 (Y809)</b>

Small quantities of Class 8 materials are not subject to additional shipping requirements, provided that the requirements of Section 2.7, “Dangerous Goods in Excepted Quantities” are met. The maximum quantity of material per inner package must be less than 30 ml, the total net quantity of Dangerous Goods in each outer package is limited to 500 g or 500 ml and each package containing Dangerous Goods in Excepted Quantities must be labeled with the “Excepted Quantities Label (2.7.6)” as shown in Figure 2.7.B of the 2004 IATA Dangerous Goods Regulations.

**SECTION 15 – Regulatory Information**

**15.1 U.S. Federal and State Regulations:**

	<b>Sodium Hydroxide</b>	<b>Diethanolamine</b>
40 CFR 355.30/355.40 - SECTION 302	Not Listed	Not Listed
40 CFR 302.4 - SECTION 304	RQ = 1000 lbs.	RQ = 100 lbs.
40 CFR 372.65 - SECTION 313	Not Listed	Listed

U.S. SARA SECTION 311/312 FOR PRODUCT: Acute health effects; chronic health effects.

U.S. TSCA INVENTORY STATUS: The components of this kit are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):

This material is not found on either the Proposition 65 Carcinogen List or the Adverse Reproductive Effects List.

CALIFORNIA – 8 CCR SECTION 339 – DIRECTOR’S LIST OF HAZARDOUS SUBSTANCES:

Sodium Hydroxide	1310-73-2	Present
Diethanolamine	111-42-2	Present

**15.2 Label Information:**

<b>ANSI Z129.1</b>	<b>Stop Solution</b>	<b>Substrate Buffer</b>	<b>Kit Package</b>
<b>Labeling:</b>	CAUTION: Corrosive. Harmful if swallowed. Eye and skin irritant.	CAUTION: Eye and skin irritant.	CAUTION: Kit components may be corrosive or harmful if swallowed or eye and skin irritants.
<b>Label Precautions:</b>	Do not swallow or take internally. Do not get in eyes, on skin, or on clothing.	Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.	Do not swallow or take internally. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. This kit contains material of animal origin and should be considered as potentially capable of transmitting infectious diseases. Follow package insert instructions for use.

ENVIRONMENTAL HAZARDS:

Do not discharge effluent containing this product into streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

**15.3 Canadian Regulations:**

CANADIAN DSL/NDL INVENTORY STATUS:

The components of this product are listed on the DSL Inventory.

CANADIAN WHMIS SYMBOLS:

Stop Solution #4702 – Sodium Hydroxide 1.5%

Substrate Buffer #4705–Diethanolamine 11.5%



Class E

Corrosive Materials



Class D2B

Eye/Skin Irritation - Toxic

**15.4 HMIS Ratings** (See Page 16 for Definition of Ratings):



**Stop Solution**

Health	2 *
Flammability	0
Physical Hazard	0
Protective Equipment	C

**Substrate Buffer**

Health	1 *
Flammability	0
Physical Hazard	0
Protective Equipment	C

**15.5 EU Labeling Classification:**

<p><b>Classification:</b> Stop Solution</p> <p>Xi  Irritant</p>	<p><b>Risk Phrases (for 1.5% Sodium Hydroxide):</b> R36/38: Irritating to eyes and skin.</p> <p><b>Safety Phrases:</b> S2: Keep out of the reach of children. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37/39: Wear suitable gloves and eye/face protection. S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).</p>
<p><b>Classification:</b> Substrate Buffer</p> <p>Xn  Harmful</p>	<p><b>Risk Phrases (for 11.5% Diethanolamine):</b> R22: Harmful if swallowed. R38: Irritating to skin. R41: Risk of serious damage to eyes. R48/22: Harmful: danger of serious damage to health by prolonged exposure if swallowed.</p> <p><b>Safety Phrases:</b> S2: Keep out of the reach of children. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39: Wear suitable protective clothing, gloves and eye/face protection. S46: If swallowed, seek medical advice immediately and show this container or label.</p>

**15.6 Japan – Existing and New Chemical Substances (ENCS):** Listed



SECTION 16 – Other Information

This MSDS has been prepared in accordance with ANSI Z400.1 format. Every effort has been made to adhere to the hazard criteria and content requirements of the US OSHA Hazard Communication Standard, European Communities Safety Data Sheets Directive, Canadian Controlled Products Regulations, UK Chemical Hazard information and Packaging Regulations, and UN Globally Harmonized System of Classification and Labeling of Chemicals.

The hazard ratings on this MSDS are for appropriately trained workers using the Hazardous Materials Identification System (HMIS®) or a National Fire Protection Association (NFPA) 704 Program. The ratings are estimates and should be treated as such. The hazard rating scales range from (0) minimal hazards to (4) significant hazards or risks (Refer to Definitions of Terms at the end of this MSDS). Chronic (long-term) health effects are indicated in the HMIS by an asterisk (\*). HMIS is a registered trade and service mark of the NPCA. For details on HMIS ratings visit [www.paint.org/hmis](http://www.paint.org/hmis). For details on NFPA 704 visit [www.nfpa.org](http://www.nfpa.org).

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# MICROVUE™ Osteocalcin EIA Kit

## 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 compound. **ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

**TLV** - Threshold Limit Value - an airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers can be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration.

**PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order.

**IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

**The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called Recommended Exposure Levels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference. **Protective Equipment - A:** Safety Glasses. **B:** Safety glasses and gloves. **C:** Safety glasses, gloves and body protection. **D:** Splash goggles with face shield, gloves and body protection. **E:** Eye protection, gloves and dust mask respiratory protection. **F:** Eye protection, gloves, body protection and dust mask respiratory protection. **G:** Eye protection, gloves and air purifying respiratory protection.

### HAZARD RATINGS:

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:** Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can cause permanent injury and can be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

**NATIONAL FIRE PROTECTION ASSOCIATION:** Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

### FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

### TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m<sup>3</sup>** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDL<sub>o</sub>**, the lowest dose to cause a symptom and **TCL<sub>o</sub>** the lowest concentration to cause a symptom; **TDo**, **LDLo**, **LDo**, **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: **EC** is the effect concentration in water.

Data from several sources are used to evaluate the cancer-causing potential of the material. The sources and ratings are: **IARC** - the International Agency for Research on Cancer; 1 = Carcinogenic to humans, 2A, 2B = Probably carcinogenic to humans, 3 = Unclassifiable as to carcinogenicity in humans, and 4 = Probably not carcinogenic to humans. **NTP** - the National Toxicology Program; K = Known to be a human carcinogen, and R = Reasonably anticipated to be a human carcinogen. **RTECS** - the Registry of Toxic Effects of Chemical Substances. **OSHA** - Occupational Safety and Health Administration and **CAL/OSHA** - California's subunit of the Occupational Safety and Health Administration; Ca = Carcinogen defined with no further categorization. **ACGIH** - American Conference of Governmental Industrial Hygienists; A1 = Confirmed human carcinogen, A2 = Suspected human carcinogen, A3 = Confirmed animal carcinogen with unknown relevance to humans, A4 = Not classifiable as a human carcinogen, and A5 = Not suspected as a human carcinogen. **NIOSH** - U.S. National Institute for Occupational Safety and Health; Ca = Potential occupational carcinogen, with no further categorization. **EPA** - U.S. Environmental Protection Agency; A = Human carcinogen, B = Probable human carcinogen, C = Possible human carcinogen, D = Not classifiable as to human carcinogenicity, E = Evidence of Non-carcinogenicity for humans, K = Known human carcinogen, L = Likely to produce cancer in humans, CBD = Cannot be determined, NL = Not likely to be carcinogenic in humans, and I = Data are inadequate for an assessment of human carcinogenic potential.

### REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDSL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings that appear on a material's industrial package label.