

Catalog No.: A021 (RUO) A025 (CE)
 Reference No.: N/A

Revision Date: June 29, 2009

SECTION 1 – Kit / Preparation and Company Identification

- 1.1 **MicroVue C5a ENZYME IMMUNOASSAY KIT** *(For In Vitro Diagnostic Use)*
- 1.2 The MicroVue C5a EIA Kit is a 96 well, enzyme immunoassay for the detection of the complement anaphylatoxin C5a in human plasma or 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 (USA only)

SECTION 2 – Composition / Ingredients Information

- 2.1 **Description of Components:** Standards A → E, Normal and High Controls, Microassay Plate, Stop Solution, 20X Wash Solution Concentrate, Complement Specimen Diluent, TMB Substrate and Conjugate.
- 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
7647-01-0	231-595-7	Hydrochloric Acid	Stop Solution (A9947)	4	Irritant	E	--	N/A
--	--	Proprietary	TMB Substrate (5059)	<20	Irritant	D2B	Xi	R36/R66/R67

**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 within 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/or the European Union (EU) Directives 1999/45/EC and 67/548/EEC. **No significant health effects are anticipated from routine use of this kit when following the precautions listed below.**
- 3.2 Contact with **Stop Solution #A9947** or **TMB Substrate (5059)** to the eyes and/or skin may cause irritation upon prolonged exposure.
- 3.3 This kit contains material of human and/or animal origin and should be considered as potentially capable of transmitting infectious diseases.
- 3.4 All patient samples, contaminated plates, and fluids should be handled as potentially infectious. Follow **Universal Precautions** as necessary.

3.5 Warning Properties:

Chemical Name	Kit Component	Degree	Description
Hydrochloric Acid	A9947	Fair	Slightly irritating, pungent odor
Proprietary	5059	Poor	Mildly pungent

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** Components #A9947 and 5059 may cause mild irritation upon contact. If these components enter the eyes, immediately wash eyes under potable running water for 15 minutes or longer, making sure that the eyelids are held open. If other components of this kit enter the eyes and cause discomfort, gently wash eyes under potable running water for 15 minutes or longer, making sure that the eyelids are held open. For both situations, if pain or irritation occurs, obtain medical attention.
- 4.3 **Skin Contact** Components #A9947 and 5059 may cause mild irritation upon contact. If these components contact the skin, remove any contaminated clothing and wash affected area with plenty of soap and water. If other components of this kit contact the skin and cause discomfort, remove any contaminated clothing. Wash affected area with plenty of soap and water. For both situations, if pain or irritation occurs, obtain medical attention.
- 4.4 **Ingestion** If a component of this kit is ingested, wash mouth out with water, provided person is conscious. If irritation or discomfort occurs, obtain medical attention.

SECTION 5 – Fire Fighting Measures

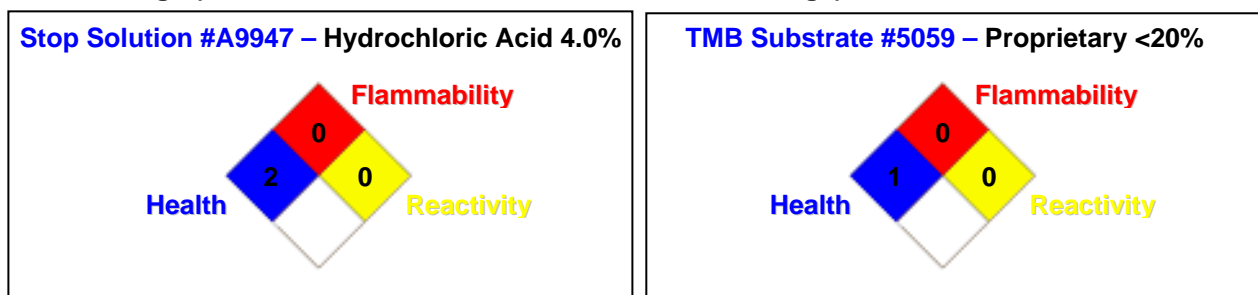
- 5.1 **Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, or alcohol-resistant foam.
- 5.2 **Special Fire Fighting Procedures:** This material will not significantly contribute to the intensity of a fire. Use extinguishing material suitable to the surrounding fire. Utilize proper 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 kit 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 #A9947	TMB Substrate #5059
5.4.1 Flash Point	Non Combustible	170° C
5.4.2 Auto-ignition Temperature	Not Applicable	Not Applicable
5.4.3 Upper / Lower Explosion Limit	Not Applicable	Not Applicable

5.5 NFPA Ratings (see Section 16 for definitions of numerical 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 kit are unlikely. Personnel who have received basic chemical safety training can generally handle small-scale releases, such as one (1) container of this kit. Utilize safety glasses, protective gloves, and lab coat/apron when responding to spills involving the components of this kit. Absorb liquid and place in container suitable for disposal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures or appropriate standards of Canada or the EU (see Section 13, Disposal Considerations).

SECTION 7 – Handling and Storage

- 7.1 Handling:** As with all chemicals, avoid getting components within this kit ON YOU or IN YOU. Wash exposed areas thoroughly after using this kit. 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. **Not for use by the 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 in vitro diagnostic use – Not for use by general public!*

SECTION 8 – Exposure Control and Personal Protection

8.1 Exposure Limits:

CAS#	Chemical Name	OSHA (PEL)	ACGIH (TLV)	MAK
7647-01-0	Hydrochloric Acid	7 mg/m ³	3 mg/m ³ (ceiling)	7.6 mg/m ³
--	Proprietary	2400 mg/m ³	NE	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 or face shield are recommended to prevent eye contact with components of this kit.

Hand Contact:

Impervious gloves (nitrile or equivalent) should be worn to prevent hand contact with components of this kit.

Skin Contact:

Lab Coat or similar garment should be worn.

8.2.3 Wash hands thoroughly after handling components of this kit.

8.2.4 Environmental Controls: No special environmental controls are required.

SECTION 9 – Physical and Chemical Properties

Characteristic	Stop Solution #A9947 Hydrochloric Acid 4.0%	TMB Substrate #5059 Proprietary <20%
Boiling Point (°C)	Not Available	81° C
Melting Point (°C)	Not available	Not available
Specific Gravity	Not available	1.033
Vapor Pressure (mm Hg)	Not available	0.29 mm @ 20° C
Vapor Density (AIR = 1)	Not available	3.4
Evaporation Rate (Ether = 1)	Not available	Not available
pH	<1.0	Neutral
Solubility in Water	Soluble	Soluble
Appearance and Odor	Clear, Mild Odor	Clear, Mild Odor

SECTION 10 – Stability and Reactivity

Characteristic	Stop Solution #A9947 Hydrochloric Acid 4.0%	TMB Substrate #5059 Proprietary <20%
Stability	Stable	Stable
Conditions to Avoid	Incompatible materials	Incompatible materials
Materials to avoid (Incompatibilities)	Strong oxidizing agents; silver compounds; chlorites; strong alkalis	Strong oxidizing agents and excessive temperatures
Hazardous Decomposition or Byproducts	Thermal decomposition may release toxic fumes of CO, CO ₂ , Nitrogen oxides and Hydrogen Chloride Gas	Thermal decomposition may release toxic fumes of CO, CO ₂ and Nitrogen oxides
Hazardous Polymerization	Has not been reported	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 Hydrochloric Acid (RTECS: #MW4025000):

Irritation Data:

Rodent - rabbit	5 mg/30S	Mild
Human	4%/24H	Mild

Toxicity Data:

LDLo - Lowest published lethal dose	Oral	Human - man	2857 ug/kg	Vascular - BP lowering not characterized in autonomic section Lungs, Thorax, or Respiration - respiratory depression Gastrointestinal - changes in structure or function of esophagus
LDLo - Lowest published lethal dose	Oral	Human - woman	420 uL/kg	Behavioral - excitement Cardiac - pulse rate Kidney/Ureter/Bladder - hematuria
LCLo - Lowest published lethal concentration	Inhalation	Human	1300 ppm/30M	Details of toxic effects not reported other than lethal dose value
LCLo - Lowest published lethal concentration	Inhalation	Human	3000 ppm/5M	Details of toxic effects not reported other than lethal dose value
LD50 - Lethal dose, 50 percent kill	Intraperitoneal	Rodent - mouse	40142 ug/kg	Details of toxic effects not reported other than lethal dose value
LD50 - Lethal dose, 50 percent kill	Oral	Rodent - rabbit	900 mg/kg	Details of toxic effects not reported other than lethal dose value
LCLo - Lowest published lethal concentration	Inhalation	Rodent - rabbit	4413 ppm/30M	Lungs, Thorax, or Respiration - acute pulmonary edema Lungs, Thorax, or Respiration - other changes Liver - fatty liver degeneration
LC50 - Lethal concentration, 50 percent kill	Inhalation	Rodent - rat	45000 mg/m3/5M	Lungs, Thorax, or Respiration - acute pulmonary edema
LC50 - Lethal concentration, 50 percent kill	Inhalation	Mammal - species unspecified	0.1 gm/m3	Details of toxic effects not reported other than lethal dose value

The following data is available for the TMB Substrate preparation: No toxicological data available

11.2 Primary Routes of Exposure:

Overexposures to components within this kit are not expected. Common routes of exposure may include absorption, 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 from components within this kit may cause irritation to the respiratory tract.

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

SKIN ABSORPTION: General irritation at area of contact / absorption may occur. Component within TMB Substrate is readily absorbed by skin.

INGESTION: If components within this kit are swallowed, irritation of the mouth, throat, and other tissues of the gastro-intestinal system may occur.

INJECTION: Accidental injection from components within this kit may cause burning, reddening, and swelling in addition to the wound. Symptoms of such exposure may 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 may result in dermatitis or eye irritation.

11.5 Symptoms of Overexposure:

Symptoms of overexposure to Hydrochloric Acid (4%) and/or TMB Substrate (<20%) 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.

To the best of our knowledge, the chemical, physical, and toxicological properties for the components within this kit have not been thoroughly investigated.

11.6 Medical Exposure Aggravated by Exposure:

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

11.7 Carcinogenicity:

CHEMICAL NAME	ACGIH	IARC	NTP	OSHA
Hydrochloric Acid	No	No	No	No
Proprietary	No	No	No	No

SECTION 12 – Ecological Information

12.1 Ecotoxicity – Not Available

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

12.2 Mobility: Mobility data are not available for the components of this kit.

12.3 Persistence and Degradability

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

12.4 Bioaccumulative Potential

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 (i.e., 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:	Chemical Kits
HAZARD CLASS NUMBER and DESCRIPTION:	Class 9, Miscellaneous
UN IDENTIFICATION NUMBER:	UN 3316
DOT LABEL(S) REQUIRED:	Class 9
PACKAGING GROUP:	N/A

NORTH AMERICAN RESPONSE GUIDEBOOK NUMBER (2000): **171**

MARINE POLLUTANT: **No component is designated as a DOT Marine Pollutant**

Per 49 CFR 172.102, Chemical kits are excepted from specification packaging requirements when packaged in combination packaging. Chemical kits are also excepted from labeling and placarding requirements except when offered for transportation or transported by air. Chemical kits may be transported in accordance with the consumer commodity and ORM exceptions in 49 CFR 173.156 provided they meet all required conditions. Kits that are carried on board transport vehicles for first aid or operating purposes are not subject to these requirements.

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:	Chemical Kit
HAZARD CLASS NUMBER and DESCRIPTION:	Class 9, Miscellaneous
UN IDENTIFICATION NUMBER:	UN 3316
DOT LABEL(S) REQUIRED:	Class 9
PACKAGING GROUP:	III
Packing Instruction (Limited Quantity)	915 (Y915)

Small quantities of Class 9 materials may be shipped as “Chemical Kit”, 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 g or 30 mL; the total net quantity of Dangerous Goods in each outer package is limited to 1 kg or 1000 mL.

SECTION 15 – Regulatory Information

15.1 U.S. Federal and State Regulations

	Stop Solution #A9947 Hydrochloric Acid 4.0%	TMB Substrate #5059 Proprietary <20%
40 CFR 355.30/355.40 - SECTION 302	Not Listed	Not Listed
40 CFR 302.4 – SECTION 304	Not Listed	Not Listed
40 CFR 372.65 – SECTION 313	Not Listed	Not Listed

U.S. SARA SECTION 311/312 FOR KIT:

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:

CERCLA RQ = 5000 lbs.

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

Components in this kit are 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:

Hydrochloric Acid	7647-01-0	Present
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15.2 Label Information

ANSI Z129.1	Stop Solution #A9947 / TMB Substrate #5059	Kit Package
Labeling:	CAUTION: Harmful if swallowed. Eye and skin irritant.	CAUTION: Kit components may be harmful if swallowed, inhaled, or absorbed through skin. Components may be eye and skin irritants.
Label Precautions:	Do not swallow or take internally. 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. 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 kit 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 kit 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 kit are listed on the DSL Inventory.

CANADIAN WHMIS SYMBOLS:

Stop Solution #A9947: Hydrochloric Acid, 4%



Class E

Corrosive Material

TMB Substrate #5059: Proprietary



Class D2B

Toxic Material

15.4 HMIS Ratings (See Page 10 for Definition of Ratings):


Stop Solution #A9947 – 4.0% Hydrochloric Acid

Health	2 *
Flammability	0
Physical Hazard	0
Protective Equipment	B

TMB Substrate Buffer #5059 – <20% Proprietary

Health	1 *
Flammability	1
Physical Hazard	1
Protective Equipment	B

15.5 EU Labeling Classification:

<p>Classification:</p> <p>Stop Solution #A9947 4.0% Hydrochloric Acid</p> <p>No Danger Symbol</p>	<p>Risk Phrases:</p> <p>None</p> <p>Safety Phrases:</p> <p>S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.</p> <p>S37/39: Wear suitable gloves and eye/face protection.</p> <p>S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).</p>
<p>Classification:</p> <p>TMB Substrate Buffer #5059 <20% Proprietary</p> <p>Xi  Irritant</p>	<p>Risk Phrases:</p> <p>R36/38 Irritating to eyes and skin</p> <p>R66 Repeated exposure may cause skin dryness or cracking</p> <p>Safety Phrases:</p> <p>S16 Keep away from sources of ignition - No smoking</p> <p>S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice</p> <p>S37/39 Wear suitable gloves and eye/face protection</p> <p>S45 In case of accident or if you feel unwell seek medical advice immediately</p>

15.6 Japan: Existing and New Chemical Substances (ENCS): Hydrochloric Acid 7647-01-0 1-215

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. For details on NFPA 704 visit www.nfpa.org.

PREPARED BY: Quidel Corporation
 10165 McKellar Court
 San Diego, CA 92121
 1-800-874-1517

SUPERCEDES: Not Applicable

The information above is provided in good faith. It is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability, fitness for a particular purpose or of any other type, expressed or implied, with respect to products described or data or information provided, and we assume no liability resulting from the use of such products, data or information. Users should make their own investigations to determine the suitability of the information for their particular purposes, and the user assumes all risk arising from their use of the material. The user is required to comply with all laws and regulations relating to the purchase, use, storage and disposal of the material, and must be familiar with and follow generally accepted safe handling procedures. In no event shall Quidel be liable for any claims, losses, or damages of any individual or for lost profits or any special, indirect, incidental, consequential or exemplary damages of any kind, howsoever arising, even if Quidel has been advised of the possibility of such damages.

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 that 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; single overexposure can be fatal). * Indicates chronic hazard. 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).

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: 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".

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: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - 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/m³** 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 **TDLo**, the lowest dose to cause a symptom and **TCLo** 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 that 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.