Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, EU Directives, and the Japanese Industrial Standard JIS Z 9250: 2000

NAME USED ON LABEL: **KANE ACE MX-120, MX-123, MX-125, MX-126**
SUPPLIER/MANUFACTURER'S NAME: KANEKA TEXAS CORPORATION
ADDRESS: 6161 Underwood Road
Pasadena, Texas 77507
EMERGENCY PHONE: **281-474-1836**
1-800-424-9300 or 703-527-2887 [CHEMTREC]
TECHNICAL INFORMATION PHONE: 281-447-0755
CHEMICAL NAME: Epoxy Resin Mixture
CHEMICAL FAMILY NAME: Bisphenol Epoxy Resin/Butadiene-Acrylic Copolymer Mixture
MSDS NUMBER: 02389

Section 2. COMPOSITION and INFORMATION ON INGREDIENTS

EU LABELING AND CLASSIFICATION: These products meet the definition of the following hazard class as defined by the European Community Council Directive 67/548/EEC or subsequent Directives.

EU CLASSIFICATION: Xi (Irritating); N (Dangerous for the Environment. EU RISK PHRASES: [R: 36/37/38]; [R: 43]; [R: 51/53]

EU SAFETY PHRASES: [S: (2-)]; [S: 26]; [S: 36/37/39]; [S: 45]; [S: 61]

Hazardous Ingredients:	CAS #	EINECS #	ENCS #	WT %	Hazard Symbol; Risk Phrases
Butadiene-Acrylic Copolymer	Trade Secret	Trade Secret	Trade Secret	5-35%	HAZARD CLASSIFICATION: Not applicable. RISK PHRASES: Not applicable.
This product may contain one or both of the materials listed below as the balance of the product:					
Reaction Product of Epichlorohydrin & Bisphenol A	25085-99-8	Unlisted	Unlisted	Balance	HAZARD CLASSIFICATION: Not applicable. RISK PHRASES: Not applicable.
Bisphenol-A, Diglycidyl Ether	25068-38-6	500-033-5	7-1283X		HAZARD CLASSIFICATION: Xi (Irritant); N (Dangerous for the Environment) RISK PHRASES: R: 36/38; R: 43; R: 51/53

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

See Section 16 for full text of Ingredient Risk Phrases

Section 3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a slight-yellow to opaque liquid to semi-solid with any epoxy odor. **Health Hazards:** Inhalation of mists or sprays or fumes from the product if heated may irritate the respiratory system. There is some evidence that Diglycidyl ether of Bisphenol A epoxy resins, such as the Reaction Product of Epichlorohydrin & Bisphenol A and Bisphenol-A, Diglycidyl Ether components, may cause allergic respiratory reactions in susceptible individuals. Eye contact can cause irritation. Skin contact may cause dermatitis if contact is prolonged. The Reaction Product of Epichlorohydrin & Bisphenol A and Bisphenol-A, Diglycidyl Ether components are known skin sensitizers, which can cause a severe allergic skin reaction in sensitized individuals. Ingestion of this product may be harmful. Eye or skin contact with heated material may cause burns. Thermal decomposition may yield monomer vapors. Users are advised to refer to the appropriate standards found at 29 CFR for specific personal exposure guidelines. **Flammability Hazard:** This product may ignite if substantially heated. The accumulation of dusts of this product can create a serious hazard of dust explosion. **Reactivity Hazard:** This product is not hazardously reactive. **Environmental Hazard:** Release of large quantities of this product to a terrestrial or aquatic environment may cause harm to contaminated plants and animals. **Emergency Considerations:** Emergency responders must wear proper personal protective equipment for the incident to which they are responding.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	2*
FLAMMABILITY HAZARD	(RED)	1
PHYSICAL HAZARD	(YELLOW)	0

PROTECTIVE EQUIPMENT

SEE SECTION 8

For Routine Industrial Use and Handling Applications

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

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of occupational overexposure to this product via inhalation of mists or sprays or fumes from the product if heated and skin and eye contact. The symptoms of overexposure to this product, via route of entry, are as follows:
INHALATION: Inhalation of mists or sprays or fumes from the product if heated may irritate the respiratory system. Symptoms may include coughing, and sneezing. Symptoms should be relieved upon removal to fresh air. In rare cases, this product may cause an allergic respiratory reaction that resembles asthma. Symptoms can include sneezing, runny or blocked nose, difficulty breathing, wheezing, and coughing.
CONTACT WITH SKIN or EYES: Contact with the skin is not expected to cause adverse symptoms unless exposure is prolonged, in which case dermatitis may result, with symptoms of inflammation and reddening of the skin. This product can cause dermal sensitization and allergic skin reaction in susceptible individuals. Symptoms may include redness, itching and rash. Persons who become sensitized may experience allergic reaction after exposure to very small amounts of the material. Contact with the eyes may cause mild irritation, pain, reddening, and watering. Abrasion to eye tissue may occur and irritation may be delayed by several hours. Skin or eye contact with heated material can cause thermal burns.
SKIN ABSORPTION: The components of this product are not to be absorbed via intact skin.
INGESTION: Ingestion is not anticipated to be a likely route of exposure to this product. If large quantities of this product are swallowed, irritation of the mouth, throat, esophagus, and other tissues of the digestive system may occur. Symptoms may include stomach pains and vomiting.
INJECTION: Accidental injection of this product, via laceration or puncture by a contaminated object, may cause pain and irritation in addition to the wound.
OTHER EFFECTS: Muscle and joint disorders and central nervous system disturbances have been reported in workers exposed to the Reaction Product of Epichlorohydrin & Bisphenol A component; however, there is no conclusive evidence that proves this material is solely responsible for these effects as other chemicals have been present during exposure.
HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Overexposure to this product may cause the following health effects**:**
ACUTE: Inhalation of mists or sprays or fumes from the product if heated may irritate the respiratory system. Contact with the eyes may cause mild to moderate irritation; symptoms may be delayed. Ingestion may cause irritation of the digestive system.
CHRONIC: Repeated skin contact may result in dermatitis. Exposure via inhalation and skin contact may result in sensitization and allergic reaction in susceptible individuals. See Section 16 (Toxicity data) for additional information.
TARGET ORGANS: ACUTE: Respiratory system, skin, eyes. CHRONIC: Skin, respiratory system.

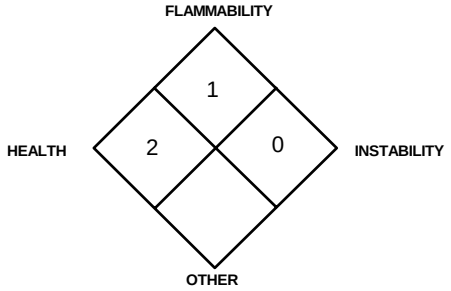
Section 4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to health professional with victim.
SKIN EXPOSURE: Under normal circumstances, this product is not expected to cause adverse effect by skin contact. While not expected, if adverse effect occurs after skin contact, begin decontamination with running water. Minimum flushing is for 15 minutes. Do not interrupt flushing. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek medical attention if adverse effect occurs.
INHALATION: If dusts, particulates or fumes from heated product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.
EYE EXPOSURE: If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Do not interrupt flushing.
INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directly by medical personnel. Have victim rinse mouth with water or give several cupfuls of water, if conscious. 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 side (head-down position, if possible) to maintain an open airway and prevent aspiration.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin or respiratory conditions may be aggravated by exposure to this product.
RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: ~248°C (~480°F)
AUTOIGNITION TEMPERATURE: Not determined.
FLAMMABLE LIMITS (in air by volume, %):
Lower (LEL): Not determined.
Upper (UEL): Not determined.
FIRE EXTINGUISHING MATERIALS:
Water Spray: YES Carbon Dioxide: YES
Foam: YES Dry Chemical: YES
Halon: YES Other: Any "ABC" Class.
UNUSUAL FIRE AND EXPLOSION HAZARDS: This product poses a slight fire hazard at elevated temperatures. When involved in a fire, this material may decompose and produce irritating vapors, acrid smoke, and toxic gases (e.g., carbon monoxide, carbon dioxide, phenolics, and various polymer compounds). When cured, this product may produce dusts if subjected to grinding or cutting that could present a hazard of an air/dust explosion if allowed to accumulate.
Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

NFPA RATING



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

SPECIAL FIRE-FIGHTING PROCEDURES: Avoid scattering burning material. Fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move fire-exposed containers if it can be done without risk to firefighters. If possible, firefighters should control run-off water to prevent environmental contamination. Rinse contaminated equipment with soapy water before returning such equipment to service.

Section 6. ACCIDENTAL RELEASE MEASURES

SPILL RESPONSE PROCEDURES: Small releases can be cleaned-up using a damp sponge or polypad, avoiding all skin contact by wearing gloves. Responders should wear appropriate goggles, and suitable body protection during the clean-up operations to avoid inhalation of mists or sprays and contamination of the eyes. Dispose of spilled product appropriately. No other response is normally necessary for clean-up. Larger releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. Self-Contained Breathing Apparatus must be selected if releases occur in confined or poorly-ventilated areas, or in situations in which the level of oxygen is below 19.5%. Absorb spilled product with polypads or other non-reactive absorbent material. Rinse area with soap and water solution, followed by a water rinse. Close-off sewers and take other measures to protect human health and the environment, as necessary. Decontaminate the area thoroughly. Place all spill residue in appropriate container which is properly labeled. Seal the container immediately and dispose of in accordance with U.S. Federal, State and local regulations and those of Canada and its provinces and those of EU Member States and Japan (see Section 13, Disposal Considerations).

Section 7. HANDLING and USE

WORK AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing mists or sprays generated of this product. Use in a well-ventilated location. Wipe-down area routinely to avoid the accumulation of product.
STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Bags of this product must be properly labeled. Store product in a cool, dry location, away from direct sunlight, or sources of intense heat. Store away from incompatible materials (see Section 10, Stability and Reactivity). Recommended storage is below 4.4°C (40°F). The maximum temperature that the product should be subjected to while thawing is 37.7°C (100°F). Do not heat in bulk quantities as dangerous exothermic reaction can occur. Keep containers tightly closed when not in use. Inspect all incoming bags before storage to ensure containers are properly labeled and not damaged. All equipment used in the handling of this material should be electrically grounded.
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.

Section 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

INTERNATIONAL EXPOSURE LIMITS FOR COMPONENTS: Currently, there are no international exposure limits established for components of this product. Please refer below to organization exposure limit information (if available).

EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLV		OSHA-PEL		NIOSH		NIOSH	OTHER
		TWA ppm	STEL ppm	TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	ppm
Butadiene-Acrylic Copolymer	Trade Secret	NE	NE	NE	NE	NE	NE	NE	NE
Reaction Product of Epichlorohydrin & Bisphenol A	25085-99-8	NE	NE	NE	NE	NE	NE	NE	NE
(Chloromethyl)oxirane, 4,4'-(1-methylethylidene)bisphenol Copolymer	25068-38-6	NE	NE	NE	NE	NE	NE	NE	NE

NE = Not Established. See Section 16 for Definitions of Terms Used.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposures are below limits provided above (where applicable). Prudent practice is to ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: None needed under normal circumstances of use. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If respiratory protection is needed, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, and the European Standard EN149, and EU member states, as well as requirements of Japan. 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 OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Splash goggles or safety glasses may be worn if operations can generate mists or sprays. If necessary, refer to U.S. OSHA 29 CFR 1910.133, the Canadian CSA Standard Z94.3-M1982, *Industrial Eye and Face Protectors*, the European Standard EN166 or applicable Standards of Japan for further information.

HAND PROTECTION: None needed under normal circumstances of use. If necessary, refer to U.S. OSHA 29 CFR 1910.138 appropriate Standards of Canada, the European Standard DIN EN 374 and applicable Standards of Japan.

BODY PROTECTION: If necessary, use body protection appropriate for task (e.g., Tyvek suit, rubber apron). If necessary, refer to appropriate Standards of Canada, the European Standard DIN EN 465 or Standards of Japan. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136 and the Canadian CSA Standard Z195-M1984, *Protective Footwear*.

Section 9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY (water = 1): Not applicable.
BOILING POINT: Not applicable.
SPECIFIC GRAVITY (water = 1): 1.1-1.2
SOLUBILITY IN WATER: Negligible.
EVAPORATION RATE (n-BuAc = 1): Not applicable.
ODOR THRESHOLD: Not applicable.
PERCENT VOLATILES: Not determined.
SPECIFIC VOLUME: Not applicable.
MELTING POINT: Not available.
pH: Not applicable.
MOLECULAR WEIGHT: Not available.
EXPANSION RATIO: Not applicable.
VAPOR PRESSURE: Not applicable.
LOG COEFFICIENT WATER/OIL DISTRIBUTION: Not determined.
APPEARANCE, ODOR AND COLOR: This product is a slight-yellow to opaque liquid to semi-solid with any epoxy odor.
HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance is a good warning property for this material in event of an accidental release.

Section 10. STABILITY and REACTIVITY

STABILITY: Stable under conditions of normal temperature and pressure. Contact with aliphatic amines can cause polymerization.

DECOMPOSITION PRODUCTS: Thermal decomposition products include carbon monoxide, carbon dioxide, phenolics, and various polymer compounds.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is incompatible with oxidizing materials, Lewis or mineral acids, mineral and organic bases, amines. Avoid unintended contact with water, especially if material is molten as this can cause violent reactions and splatter hot material or ignite other flammable materials nearby.

HAZARDOUS POLYMERIZATION: Will not occur with product by itself. Contact of more than 1 lb (0.5 kg) of product with aliphatic amines will result in irreversible polymerization with generation of considerable heat.

CONDITIONS TO AVOID: Contact with incompatible materials and exposure to extreme temperatures.

Section 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Currently, there are no LD_{50} or LC_{50} toxicological data for the Reaction Product of Epichlorohydrin component of this product. Toxicity data are available for the Bisphenol-A, Diglycidyl Ether component of this product and are presented below.

BISPHENOL-A, DIGLYCIDYL ETHER:

Standard Draize Test (Eye -Rabbit, adult) 100 mg Mild irritation effects
Standard Draize Test (Skin-rabbit) 2 mg/24 hours: Severe
Standard Draize Test (Skin-rabbit) 500 µL/24 hours: Moderate
Standard Draize Test (Skin-Guinea Pig, adult) 2750 mg/55 days-intermittent
LD (Oral-rat) > 5 gm/kg: Nutritional and Gross Metabolic: other changes
LD_{50} (Oral-rat) > 1 gm/kg
LD_{50} (Oral-Rat) 30 g/kg
LD_{50} (Oral-Rat) 1100 mg/kg
LD_{50} (Oral-rat) 10,700 µL/kg
LD_{50} (Oral-Rat) 13,600 mg/kg
LD_{50} (Oral-Rat) 11,400 mg/kg
LD_{50} (Oral-Mouse) 20 g/kg
LD_{50} (Oral-mouse) > 500 mg/kg

BISPHENOL-A, DIGLYCIDYL ETHER (continued):

LD_{50} (Oral-Mouse) 15,600 mg/kg
LD_{50} (Intraperitoneal-Rat) 1400 mg/kg
LD_{50} (Intraperitoneal-Rat) 1780 mg/kg
LD_{50} (Intraperitoneal-Rat) 2200 mg/kg
LD_{50} (Intraperitoneal-rat) 2400 mg/kg: Behavioral: somnolence (general depressed activity); Gastrointestinal: peritonitis
LD_{50} (Intraperitoneal-Mouse) 4000 mg/kg
LD_{50} (Skin-rat) > 2 gm/kg
LD_{50} (Skin-rat) > 1200 mg/kg
LD_{50} (Skin-mouse) > 1270 mg/kg
LD_{50} (Skin-Rabbit, adult) > 20 mL/kg
TDLo (Oral-rat) 273 gm/kg/26 weeks-continuous: Kidney, Urethra, Bladder: changes in bladder weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain
TDLo (Skin-Guinea Pig, adult) 6111 mg/kg (10-66 days preg.): Reproductive effects

BISPHENOL-A, DIGLYCIDYL ETHER (continued):

TDLo (Skin-mouse) 166 gm/kg/2 years-intermittent: Tumorigenic: Carcinogenic by RTECS criteria; Blood: lymphoma, including Hodgkin's disease
TDLo (Skin-mouse) 16480 mg/kg/2 years-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: tumors; Skin and Appendages: tumors
TDLo (Intramuscular-rat) 9600 mg/kg/12 days-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain
Mutation in Microorganisms-Salmonella typhimurium 1 mmol/plate
Mutation in microorganisms-Salmonella typhimurium: 500 nmol
Microsomal Mutageniticity Assay-Salmonella typhimurium 2100 nmol/plate
DNA Damage-Escherichia coli 1 mmol/L

GENERAL TOXICITY INFORMATION: Routine use of this product should cause only transient irritation by all routes of exposure. Prolonged skin contact may cause dermatitis. Prolonged eye contact may result in mechanical abrasion to the eye, causing delayed irritation. Certain individuals may be susceptible to respiratory and skin sensitization and subsequent allergic reaction.

SUSPECTED CANCER AGENT: The polymers of this product are not found on the following lists: U.S. FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are neither considered to be nor suspected to be cancer causing agents by these agencies, but see section 3 for possible trace quantities of listed monomers.

IRRITANCY OF PRODUCT: Inhalation of dusts or fumes from heated product may cause respiratory irritation. Prolonged, skin contact may cause irritation. Eye contact can cause irritation, with the possibility of delayed symptoms.

SENSITIZATION TO THE PRODUCT: Exposure via inhalation and skin contact may result in sensitization and allergic reaction in susceptible individuals.

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

Mutagenicity**:** The components of this product are not reported to cause mutagenic effects in humans.
Embryotoxcity**:** The components of this product are not reported to cause embryotoxic effects in humans.
Teratogenicity**:** The components of this product are not reported to cause teratogenic effects in humans.
Reproductive Toxicity: The components of this product are not reported to cause adverse reproductive effects in humans.

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.

ACGIH BIOLOGICAL EXPOSURE INDICES: There are no ACGIH Biological Exposure Indices (BEIs) determined for the components of this product.

Section 12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: No data currently, available. This product is not expected to bio-degrade significantly in the environment. The following are environmental data for the component of this product.

BISPHENOL-A, DIGLYCIDYL ETHER:
Biodegradability: ~12% (modified Sturm method)

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No data currently available. This product may be harmful to contaminated plant and animal life (especially if large quantities are released).

EFFECT OF CHEMICAL ON AQUATIC LIFE: No data currently available. This product may be harmful to contaminated aquatic plant and animal life (especially if large quantities are released). The following are aquatic toxicity data for the Bisphenol-A, Diglycidyl Ether component of this product.

BISPHENOL-A, DIGLYCIDYL ETHER:
LC_{50} (rainbow trout) 96 hours = 1.5 mg/L

BISPHENOL-A, DIGLYCIDYL ETHER (component):
LC_{50} (zebra fish) 96 hours = 2.4 mg/L

BISPHENOL-A, DIGLYCIDYL ETHER (component):
EC_{50} (*Daphnia*) 24 hours = 3.6 mg/L

Section 13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Kaneka Texas has not determined whether this material constitutes a hazardous waste per US EPA regulations.

If mixed with other chemicals, the person using the product must determine if the waste mixture meets the definition of any hazard class and dispose of in accordance with appropriate U.S. Federal, State, and local regulations, or the applicable standards of Canada and its Provinces, those of EU Member States and of Japan.

U.S. EPA WASTE NUMBER: Not applicable.

Section 14. TRANSPORTATION INFORMATION

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Not Regulated
HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable
UN IDENTIFICATION NUMBER: Not Applicable
PACKING GROUP: Not Applicable
DOT LABEL(S) REQUIRED: Not Applicable
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable
MARINE POLLUTANT: The components of this product are not classified by the DOT as a Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is not considered as hazardous goods, per the regulations of Transport Canada. The components of this product are not designated by the TDG to be Marine Pollutants.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) DESIGNATION: This product is not considered as dangerous goods, per rules of IATA.

INTERNATIONAL MARITIME ORGANIZATION (IMO): This product is not considered as dangerous goods, per rules of the IMO. The components of this product are not designated by the IMO to be Marine Pollutants.

JAPAN SHIP SAFETY LAW, PORT REGULATION LAW: This product is not regulated according to Japan Ship Safety Law.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is not considered by the United Nations Economic Commission for Europe to be dangerous goods.

Section 15. REGULATORY INFORMATION

ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the 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.

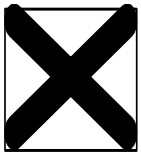
U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory or are excepted as polymers of listed compounds applies per 40 CFR 723.259(e)(2).
OTHER U.S. FEDERAL REGULATIONS: Not applicable.
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The components of this product are not on the California Proposition 65 Lists.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The Reaction Product of Epichlorohydrin & Bisphenol A components are on the DSL Inventory. The Butadiene-Acrylic Copolymer is not listed.
OTHER CANADIAN REGULATIONS: Not applicable.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS: The components of this product are not on the CEPA Priority Substances Lists.
CANADIAN WHMIS CLASSIFICATION AND SYMBOL: Class D2B: Materials Causing Other Toxic Effects – Sensitization.

ADDITIONAL EUROPEAN COMMUNITY INFORMATION:
EUROPEAN EINECS INVENTORY: The components of this product are listed or are excepted as polymers.
EU LABELING AND CLASSIFICATION: This product meets the following definition, per the European Community Council Directives.

EU CLASSIFICATION: Xi (Irritating); N (Dangerous for the Environment)
EU RISK PHRASES: [R: 36/37/38]: Irritating to eyes, respiratory system and skin. [R: 43]: May cause sensitization by skin contact. [R: 51/53]: Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.
EU SAFETY PHRASES: [S:(1/2)]* Keep locked up and out of the reach of children.* **This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.* [S: 26]: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. [S: [S: 36/37/39]: Wear suitable protective clothing, gloves and eye/face protection. [S: 45]: In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)., [S: 61]:Avoid release to the environment. Refer to special instructions/Safety Data Sheet.
EUROPEAN COMMUNITY ANNEX II HAZARD SYMBOLS:



ADDITIONAL JAPANESE REGULATIONS:
JAPANESE ENCS INVENTORY: Some components of this product are not on the ENCS Inventory.
POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: The components of this product are not listed under the Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

Section 16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
800/441-3365

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Kaneka Texas Corporation's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

DEFINITIONS OF TERMS

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

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

EXPOSURE LIMITS IN AIR:

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

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

DFG MAK Pregnancy Risk Group Classification: Group A: A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

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.

LOQ: Limit of Quantitation.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

NIOSH RELs: NIOSH's Recommended Exposure Limits.

PEL-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. 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.

SKIN: Used when a there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:

This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD:

0 (Minimal Hazard: No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation*: Essentially non-irritating. PII or Draize = "0". *Eye Irritation*: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD_{50} Rat*: < 5000 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC_{50} Rat*: < 20 mg/L.); **1** (Slight Hazard: Minor reversible Injury may occur; slightly or mildly irritating. *Skin Irritation*: Slightly or mildly irritating. *Eye Irritation*: Slightly or mildly irritating. *Oral Toxicity LD_{50} Rat*: > 500-5000 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 1000-2000 mg/kg. *Inhalation Toxicity LC_{50}* 4-hrs *Rat*: > 2-20 mg/L);

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

HEALTH HAZARD (continued):

2 (Moderate Hazard: Temporary or transitory injury may occur. *Skin Irritation*: Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation*: Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD_{50} Rat*: > 50-500 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 200-1000 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: > 0.5-2 mg/L.);**3** (Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation*: Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation*: Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD_{50} Rat*: > 1-50 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: > 20-200 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: > 0.05-0.5 mg/L.); **4** (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation*: Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation*: Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD_{50} Rat*: ≤ 1 mg/kg. *Dermal Toxicity LD_{50}Rat or Rabbit*: ≤ 20 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: ≤ 0.05 mg/L).

FLAMMABILITY HAZARD:

0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); **1** (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; **2** (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, Including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of course dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.);**3** (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); **4** (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric]).

PHYSICAL HAZARD:

0 (*Water Reactivity*: Materials that do not react with water. *Organic Peroxides*: Materials that are normally stable, even under fire conditions and will not react with water. *Explosives*: Substances that are Non-Explosive. Unstable *Compressed Gases*: No Rating. *Pyrophorics*: No Rating. *Oxidizers*: No "0" rating allowed. *Unstable Reactives*: Substances that will not polymerize, decompose, condense or self-react.); **1** (*Water Reactivity*: Materials that change or decompose upon exposure to moisture. *Organic Peroxides*: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. *Explosives*: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases*: Pressure below OSHA definition. *Pyrophorics*: No Rating. *Oxidizers*: Packaging Group III; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives*: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.);

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

2 (*Water Reactivity*: Materials that may react violently with water. *Organic Peroxides*: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives*: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases*: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group II Solids: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. *Unstable Reactives*: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature);

3 (*Water Reactivity*: Materials that may form explosive reactions with water. *Organic Peroxides*: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives*: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases*: Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group I Solids: any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3.:2 potassium bromate/cellulose mixture. Liquids: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); **4** (*Water Reactivity*: Materials that react explosively with water without requiring heat or confinement. *Organic Peroxides*: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. *Explosives*: Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. *Compressed Gases*: No Rating. *Pyrophorics*: Add to the definition of Flammability "4". *Oxidizers*: No "4" rating. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: **0** (materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. **1** (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. **2** (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers. **3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC_{50} for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD_{50} for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD_{50} for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD (continued): **2 (continued):** Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC_{50} for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD_{50} for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD_{50} for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: **0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according with Annex D. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the *Method of Testing for Sustained Combustibility*, per 49 CFR 173, Appendix H or the UN *Recommendation on the Transport of Dangerous Goods, Model Regulations* (current edition) and the related *Manual of Tests and Criteria* (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed up flash point of the solvent. Most ordinary combustible materials. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

INSTABILITY HAZARD: **0** Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL.

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

INSTABILITY HAZARD (continued): **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the **N**ational **F**ire **P**rotection **A**ssociation (**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:

Human and Animal Toxicology: 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_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - 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^3** 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**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information: BEI** - ACGIH 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:

EU is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S. and CANADA:

ACGIH: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). **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 which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.

EUROPEAN and INTERNATIONAL:

The DFG: This is the Federal Republic of Germany's Occupation Health Agency, similar to the U.S. OSHA. **EU** is the European Community (formerly known as the **EEC,** European Economic Community). **EINECS:** This is the European Inventory of Now-Existing Chemical Substances. The **ARD** is the European Agreement Concerning the International Carriage of Dangerous Goods by Road and the **RID** are the International Regulations Concerning the Carriage of Dangerous Goods by Rail. **AICS** is the Australian Inventory of Chemical Substances. **MITI** is the Japanese Minister of International Trade and Industry