

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 7250: 2000

NAME USED ON LABEL: KANE ACE B-GRADE POLYMERS; B-11A, B-22, B-28A, B-31, B-51, B-52, B-56, B-382, B-522, B-532, B-564, B-582, B-611, B-622, B-632 M-511

PRODUCT USE: INDUSTRIAL USES
SUPPLIER/MANUFACTURER'S NAME: KANEKA TEXAS CORPORATION

ADDRESS: 6161 Underwood Road
Pasadena, Texas 77507

EMERGENCY PHONE: 800-424-9300 or 703-527-3887 [CHEMTREC]; 281-474-1836

TECHNICAL INFORMATION PHONE: 281-447-0755

SYNONYMS: Methyl Methacrylate, Butadiene, Styrene Copolymer

CHEMICAL FAMILY: Impact Modifier Resin

FORMULA: Trade Secret

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. This is a self-classification.

EU CLASSIFICATION: Not regulated. **EU RISK PHRASES:** Not regulated.

EU SAFETY PHRASES: Not regulated.

These products consist of one of the related polymers listed below and may have trace amounts of residual monomers and stabilizers (see Section 8).

Hazardous Ingredients:	CAS #	EINECS #	ENCS #	WT %	Hazard Symbol; Risk Phrases
Trade Secret Acrylic Polymers	Trade Secret			100%	HAZARD CLASSIFICATION: Not applicable. RISK PHRASES: Not applicable.

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. These products have 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: These products are white powders with a mild acrylic ester odor. **Health Hazards:** Inhalation of dusts, particulates or fumes from these products may be irritating to the respiratory system. Eye contact can cause irritation. Skin contact may cause dermatitis if contact is prolonged. Residual monomers that may be present in these products are known skin sensitizers in humans. Skin contact may cause allergic reaction in susceptible individuals. Thermal decomposition will yield carbon monoxide, carbon dioxide, nitrogen oxides, aldehydes, and various polymer compounds. Users are advised to refer to appropriate standards found at 29 CFR (U.S. regulations) for specific personal exposure guidelines. If heated, fumes irritating to eyes and respiratory tract may develop. These fumes may contain monomers. Some of these monomers are suspect human carcinogens. Other trace monomers are known or suspect animal carcinogens, reproductive toxins and sensitizers. If heated, eye or skin contact with heated material may cause burns. Dusts from the product can mechanically irritate the eyes. **Flammability Hazard:** These products are combustible solids. The accumulation of dusts of these products can create a serious hazard of dust explosion. **Reactivity Hazard:** These products may self-react upon long standing or exposure to heat, with generation of enough heat to cause fire. **Environmental Hazard:** Release of large quantities of these products 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.

Section 3. HAZARD IDENTIFICATION (Continued)

ADDITIONAL INFORMATION: These products are only for industrial use. Do not use these products for applications such as food, pharmaceuticals or cosmetics which have possibility of direct ingestion or exposure to human body.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of occupational overexposure to these products via inhalation of dusts or particulates from the product or fumes, if heated to decomposition, and skin and eye contact. The symptoms of overexposure to these products, via route of entry, are as follows:

INHALATION: Inhalation of dusts or fumes from these products may irritate the respiratory system. Symptoms may include coughing, and sneezing. Symptoms should be relieved upon removal to fresh air.

CONTACT WITH SKIN or EYES: Dusts from these products may cause mechanical irritation to the 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. If heated, contact with skin or eyes may cause burns. Due to the presence of the trace monomers in these products, a hazard of skin sensitization exists. Susceptible individuals may experience allergic skin reaction after subsequent exposure to very small amounts of the product. Symptoms may include rash, welts, and itching skin. Contact with the eyes may cause mild irritation, pain, reddening, and watering.

SKIN ABSORPTION: The components of these products are not known to be absorbed via intact skin.

INGESTION: Ingestion is not anticipated to be a likely route of exposure to these products. If large quantities of these products are swallowed, irritation of the mouth, throat, esophagus, and other tissues of the digestive system may occur. Symptoms may include stomach pains and vomiting.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Overexposure to these products may cause the following health effects:

ACUTE: Inhalation of dusts or fumes from these products may cause irritation. 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. Due to the presence of the trace monomers in these products, a hazard of skin sensitization exists for susceptible individuals. See Section 16 (Toxicity data) for additional information.

TARGET ORGANS: ACUTE: Respiratory system, skin, eyes. CHRONIC: Skin.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

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

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, these products 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. If skin contact occurs to heated product, cover burns with dry, sterile dressing and seek medical attention.

INHALATION: If dusts or fumes from these products are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. If adverse effect continues after removal to fresh air, seek medical attention.

EYE EXPOSURE: If these products 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. If eye exposure occurs to heated product, cover eye with dry, sterile dressing and seek immediate medical attention.

Section 4. FIRST-AID MEASURES (Continued)

INGESTION: If these products are 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 these products.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: 400-470°C (752-878°F)

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: These products are combustible and will ignite if heated above 400-470°C (752-878°F). When involved in a fire, these products may decompose and produce irritating vapors, acrid smoke, and toxic gases (e.g., aldehydes, carbon monoxide, carbon dioxide, nitrogen oxides, ethylene, acrylic acid and formaldehyde). An accumulation of large amounts of dust or large dust clouds from these products in air can cause a severe risk of an air/dust explosion. These products may self-react upon long standing or exposure to heat, with generation of enough heat to cause fire.

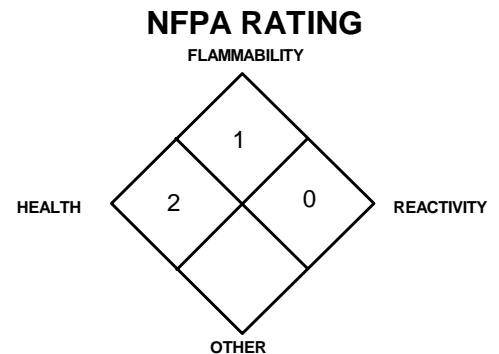
Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Although these products are not sensitive to static discharge, dusts of these products can be ignited by static discharge, especially if large amounts of dusts are allowed to accumulate. All equipment in used in the handling of these products should be electrically grounded.

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 swept-up or cleaned-up using a damp sponge. Responders should wear appropriate goggles, and suitable body protection during the clean-up operations to avoid inhalation of dusts and dust contamination of the eyes. Dispose of spilled product appropriately. No other response is normally necessary for clean-up. Spills of these products are not hazardous unless other chemicals are involved. In the event of involvement with other chemicals, releases should be responded to by trained personnel using pre-planned procedures. Eliminate all ignition sources. Ventilate the spill area without creating dusty conditions. 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%. Sweep-up or vacuum spilled solid (an explosion-proof vacuum should be used). Rinse area with soap and water solution, followed by a water rinse. Floor may be slippery; use care to avoid falling. 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 EC Member States and Japan (see Section 13, Disposal Considerations).



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

Section 7. HANDLING AND STORAGE

WORK AND HYGIENE PRACTICES: As with all chemicals, avoid getting these products ON YOU or IN YOU. Wash thoroughly after handling these products. Do not eat, drink, smoke, or apply cosmetics while handling these products. Avoid breathing vapors or mists generated by these products. Use in a well-ventilated location. Wipe-down area routinely to avoid the accumulation of dusts.

STORAGE AND HANDLING PRACTICES: All employees who handle these products should be trained to handle them safely. Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Do not cause static spark; ground all equipment. Systems must be designed to safely handle and convey a material capable of causing a dust explosion.

Do not store near high temperature, boilers, heaters, hot pipes, flames or oxidizing agents. Keep area ventilated. Since material can burn, consider limiting indoor storage to areas equipped with appropriate automatic sprinkler systems. Improper storage conditions may shorten safe storage time. Since these products may degrade over time, and in order to avoid possible self-ignition, it is recommended that unused material be properly disposed of after 3 years. Do not store in direct sunlight. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Empty containers may contain residual material; therefore, empty containers should be handled with care.

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

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposures are below limits provided below. Prudent practice is to ensure eyewash/safety shower stations are available near areas where these products are used. All mechanical ventilation should be grounded due to potential accumulation of dusts.

EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLV		OSHA-PEL		NIOSH			OTHER
		TWA	STEL	TWA	STEL	TWA	STEL	IDLH	
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
THESE PRODUCTS ARE A MIXTURE OF THE FOLLOWING POLYMERS Exposure limits are for Particulates, not Otherwise Classified (PNOC):									
Trade Secret Acrylic Polymers Exposure limits are for Particulates, not Otherwise Classified (PNOC)	Trade Secret	NE	NE	50 mppcf or 15 (total dust) 15 mppcf or 5 (respirable fraction)		NE	NE	NE	DFG MAK: TWA = 4 (inhalable fraction); 1.5 (respirable fraction) general dusts
THE FOLLOWING STABILIZERS MAY BE PRESENT IN THESE PRODUCTS:									
Trade Secret Stabilizers	Trade Secret	NE	NE	NE	NE	NE	NE	NE	NE
May contain trace amounts of the following, as a result of out-gassing or residual monomers:									
1,3-Butadiene	106-99-0	2	NE	1	5	Reduce to lowest Feasible Concentration: LOQ 0.19	2000 (10% of LEL)	DFG MAK: Germ Cell Mutagen Class: 2 Carcinogen: EPA-B2, EPA-CaH, IARC-2A, MAK-1, NIOSH-Ca, NTP-K, TLV-A2	
Butyl Acrylate	141-32-2	2 (SEN)	SEN	10 (vacated 1989 PEL)	NE	10	NE	DFG MAKs: TWA = 2 (danger of sensitization of the skin) PEAK = 2•MAK, 15 min., average value, 1-hr interval DFG MAK Pregnancy Risk Class: D Carcinogen: IARC-3, TLV-A4	

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

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

Section 8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

EXPOSURE LIMITS/GUIDELINES (continued):

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							OTHER
		ACGIH-TLV		OSHA-PEL		NIOSH			
		TWA ppm	STEL ppm	TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	
May contain trace amounts of the following, as a result of out-gassing or residual monomers (continued):									
t-Butyl Alcohol	75-65-0	100	NE	100	150 (vacated 1989 PEL)	100	150	1400 (based on 10% of LEL)	DFG MAKs: TWA = 20 PEAK = 4•MAK, 15 min., average value, 1-hr interval DFG MAK Pregnancy Risk Class: D Carcinogen: TLV-A4
Divinylbenzene	1321-74-0	10	NE	10 (vacated 1989 PEL)	NE	10	NE	NE	NE
n-Dodecyl Mercaptan	112-55-0	0.1	NE	NE	NE	NE	0.5 (ceiling) 15 min.	NE	NE
t-Dodecyl Mercaptan	25103-58-6	NE	NE	NE	NE	NE	NE	NE	Arkema Manufacturer Recommended TWA = 5 ppm, 8-hr
Methyl Methacrylate	80-62-6	50 (SEN)	100 (SEN)	100	NE	100	NE	1000	DFG MAKs: TWA = 50 (danger of sensitization of the skin) PEAK = 2•MAK, 15 min. average value, 1-hr interval DFG MAK Pregnancy Risk Class: D Carcinogen: EPA-E, EPA-NL, IARC-3, TLV-A4
Styrene	100-42-5	20	40	100 50 (vacated 1989 PEL)	200 (ceiling); 600 (5 min. peak in any 3 hrs) 100 (vacated 1989 PEL)	50	100	700	DFG MAKs: TWA = 20 PEAK = 2•MAK, 15 min. average value, 1-hr interval DFG MAK Pregnancy Risk Class: C Carcinogen: IARC-2B, MAK-5, TLV-A4
4-Vinyl Cyclohexene	100-40-3	0.1	NE	NE	NE	NE	NE	NE	AIHA WEELs: TWA = 5 Carcinogen: IARC-2B, MAK-2, TLV-A3
Other Trace Monomers in Concentrations Below their Exposure Limits									

NE = Not Established. ND = Not Determined SEN = Sensitizer. See Section 16 for Definitions of Terms Used.

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

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 EC 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). Also refer to the other requirements of that standard. During processing operations which involve application of heat, evaluate the need for vapor control equipment and/or respiratory protection as specified in the table listing "Minimum Requirements for Respiratory Protection for Airborne Butadiene" of OSHA's 1,3-Butadiene Standard, 29 CFR 1910.1051. Also refer to the other requirements of that standard. Also, evaluate the need for vapor control equipment and/or respiratory protection as specified in 29 CFR 1910.1045. The following are NIOSH respiratory guidelines for the trace residuals that have a concentration that meets or exceeds their NIOSH REL exposure limit.

1,3-BUTADIENE

CONCENTRATION RESPIRATORY PROTECTION

At Concentrations Above THE NIOSH REL, or Where There is NO REL, at Any Detectable Concentration: Any Self-Contained Breathing Apparatus (SCBA) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any Supplied-Air Respirator (SAR) that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary Self-Contained Breathing Apparatus (SCBA) operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern, or any appropriate escape-type, SCBA.

Section 8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION: NIOSH respiratory protection equipment guidelines (continued):

STYRENE

CONCENTRATION RESPIRATORY PROTECTION

Up to 500 ppm: Any Chemical Cartridge Respirator with organic vapor cartridge(s), or any Supplied-Air Respirator (SAR).

Up to 700 ppm: Any SAR operated in a continuous-flow mode, or any Chemical Cartridge Respirator with a full facepiece and organic vapor cartridge(s), or any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any Powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any appropriate escape-type, SCBA.

EYE PROTECTION: Splash goggles or safety glasses may be worn if operations can generate dusts. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, 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 Economic Community or Japan.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

VAPOR DENSITY (water = 1): Not applicable.

BOILING POINT: Not applicable.

SPECIFIC GRAVITY (water = 1): 0.9-1.1

SOLUBILITY IN WATER: Insoluble.

EVAPORATION RATE (n-BuAc = 1): Not applicable.

ODOR THRESHOLD: Not applicable.

PERCENT VOLATILES: 3 %

LOG COEFFICIENT WATER/OIL DISTRIBUTION: Not determined.

APPEARANCE, ODOR AND COLOR: These products are white powders with mild acrylic ester odor.

SPECIFIC VOLUME: Not applicable.

MELTING POINT: Not available.

pH: Not available.

MOLECULAR WEIGHT: Not available.

EXPANSION RATIO: Not applicable.

VAPOR PRESSURE: Not applicable.

Section 10. STABILITY AND REACTIVITY

STABILITY: Stable under conditions of normal temperature and pressure. These products may self-react upon long standing or exposure to heat, with generation of enough heat to cause fire.

DECOMPOSITION PRODUCTS: Thermal decomposition products include aldehydes, carbon monoxide, carbon dioxide, nitrogen oxides. Thermal decomposition may also yield monomers including methyl methacrylate, styrene, and other acrylates.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: These products are incompatible with oxidizing acids, amines, strong caustics, alkalies.

HAZARDOUS POLYMERIZATION: Will not occur.

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

Section 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Currently, there are no toxicological data available for these products. Similar polymers have an LD₅₀ Oral-Mouse > 10,000 mg/kg.

GENERAL TOXICITY INFORMATION: Routine use of these products should cause only transient irritation by all routes of exposure.

SUSPECTED CANCER AGENT: This compound is not listed by agencies tracking the carcinogenic potential of chemical compounds. The trace monomers and stabilizers are listed as follows:

1,3-BUTADIENE: ACGIH TLV-A2 (Suspected Human Carcinogen); EPA-B2 (Probable Human Carcinogen, Sufficient Evidence from Animal Studies; Inadequate Evidence or No Data from Epidemiologic Studies); EPA-CaH (Carcinogenic to Humans); IARC-2A (Probably Carcinogenic to Humans); MAK-1 (Substances that Cause Cancer in Man and Can Be Assumed to Make a Significant Contribution to Cancer Risk); NIOSH-Ca (Potential Occupational Carcinogen, with No Further Categorization); NTP-K (Known to Be a Human Carcinogen)

BUTYL ACRYLATE: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

4-METHYL-2,6-di-t-BUTYL-PHENOL: IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

METHYL METHACRYLATE: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); EPA-E (Evidence of Non-Carcinogenicity for Humans); EPA-NL (Not Likely to Be Carcinogenic in Humans); IARC-3 (Possibly Carcinogenic to Humans)

STYRENE: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-2B (Possibly Carcinogenic to Humans); MAK-5 (Substances with Carcinogenic and Genotoxic Effects, the Potency of Which is Considered to Be So Low that, Provided the MAK and BAT Values are Observed, No Significant Contribution to Human Cancer Risk is to Be Expected)

Section 11. TOXICOLOGICAL INFORMATION (Continued)

IRRITANCY OF PRODUCT: Prolonged, skin or eye contact may cause irritation.

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

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

Mutagenicity: The polymers of these products are not reported to cause mutagenic effects in humans.

Embryotoxicity: The polymers of these products are not reported to cause embryotoxic effects in humans.

Teratogenicity: The polymers of these products are not reported to cause teratogenic effects in humans.

Reproductive Toxicity: The polymers of these products 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 polymer components of these products.

Section 12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: No data currently available. These products are not expected to bio-degrade significantly in the environment.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No data currently available.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No data currently available. These products will float on water if released and can be mechanically removed.

Section 13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: As supplied, these products do not meet the definition of a hazardous waste. Recover, reclaim or recycle the product, as appropriate. May be disposed of as a solid waste, sealed in an appropriate container. If mixed with other chemicals, it the person using these products 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 EC Member States and of Japan.

U.S. EPA WASTE NUMBER: Not applicable.

Section 14. TRANSPORT INFORMATION

THESE PRODUCTS ARE 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: These products 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: These products are not classified as hazardous goods, per the regulations of Transport Canada. The components of these products are not designated by the TDG to be Marine Pollutants.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) DESIGNATION: These products are not classified as dangerous goods, per rules of IATA.

INTERNATIONAL MARITIME ORGANIZATION (IMO): These products are not classified as dangerous goods, per rules of the IMO. The components of these products are not designated by the IMO to be Marine Pollutants.

JAPAN SHIP SAFETY LAW, PORT REGULATION LAW: These products are not regulated according to Japan Ship Safety Law.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): These products are not classified 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: These products 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 these products. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

SECTION 302/304 EXTREMELY HAZARDOUS SUBSTANCES: Not applicable for the components of these products.

SECTION 311 HAZARD CATEGORIES:

Acute No Chronic Yes Fire No Pressure No Reactive No

SECTION 313 TOXIC CHEMICALS: Not applicable for the components of these products; for trace residual monomers: 1,3-Butadiene; Butyl Acrylate; Methyl Methacrylate; Styrene.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable for the components of these products; for trace residual monomers: 1,3-Butadiene = 10 lb (4.5 kg); Butyl Acrylate = Does not have a specific CERCLA RQ, but is a CERCLA Hazardous Substance; Methyl Methacrylate = 1000 lb (454 kg) ; Styrene = 1000 lb (454 kg)

U.S. TSCA INVENTORY STATUS: The components of these products are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: The possible 1,3-Butadiene out-gassing compound is listed as a Hazardous Air Pollutant (HAP) under the Clean Air Act. 1,3-Butadiene is listed as a Volatile Organic Compound (VOC) under the Clean Air Act, Section 111.

TSCA SECTION 8e-SUBSTANTIAL RISK REPORT: The 1,3-Butadiene trace residual monomer and several stabilizer components have reported notices of substantial risk per requirements of Section 8e.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The polymers in these products are not on the California Proposition 65 Lists. The possible out-gassing products, 1,3-Butadiene and Vinyl Cyclohexene are on the CA Proposition 65 Lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: Components listed in Section 2 (Composition and Information on Ingredients) are listed on the DSL Inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS: A proprietary stabilizer component is on the CEPA Priority Substances Lists as a Part 1, Group 1 Substance and is on the National Pollutant Release Inventory (NPRI).

CANADIAN WHMIS CLASSIFICATION AND SYMBOL: Class D2B: Materials Causing Other Toxic Effects – Sensitization.



ADDITIONAL EUROPEAN COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION: These products meet the following definition, per the European Community Council Directives.

EU CLASSIFICATION: Not regulated.

EU RISK PHRASES: Not regulated.

EU SAFETY PHRASES: Not regulated.

European Community Annex II Hazard Symbols:

Section 15. REGULATORY INFORMATION (Continued)

ADDITIONAL JAPANESE REGULATIONS:

JAPANESE ENCS INVENTORY: One of the polymer components is listed on the ENCS Inventory and one is not. All but one of the stabilizer components is not listed; the remaining stabilizers are listed. The trace monomers are listed.

POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: The components of these products 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.
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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 these products. 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 these products are 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 or 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).

EXPOSURE LIMITS IN AIR (continued):

PEL-Permissible Exposure Limit (continued): 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 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.

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.

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 LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ 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 LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 2-20 mg/L.; **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 LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 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 LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 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 LD₅₀ Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 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;.

Section 16. OTHER INFORMATION (Continued)

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued):

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 III B, 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 coarse 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.); **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*: Packaging 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. *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.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

3 (continued): *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 \geq 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packaging 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 LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ 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 LC₅₀ for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ 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 LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD₅₀ 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 LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. 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 LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ 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 LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg.

Section 16. OTHER INFORMATION (Continued)

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

HEALTH HAZARD (continued): Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ 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 accordance 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. **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:

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

INSTABILITY HAZARD (continued): 3 (continued): 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 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:

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: **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 **TDL₀**, the lowest dose to cause a symptom and **TCL₀** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LD₀₁**, 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:

EC 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:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **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**). **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:

EC is the European Community (formerly known as the **EEC**, European Economic Community). **EINECS:** This 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. **AUSTRALIAN:** **AICS** is the Australian Inventory of Chemical Substances. **The DFG:** This is the Federal Republic of Germany's Occupation Health Agency, similar to the U.S. OSHA. **EC** is the European Community (formerly known as the **EEC**, European Economic Community). **MITI** is the Japanese Minister of International Trade and Industry