



SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, the Korean ISHA (Notice 2009-68), the Japanese Industrial Standard JIS Z 7250: 2000, Mexican NOM018-STPS 2000, SPRING Singapore, REACH, CLP 1272:2208 and the Global Harmonization Standard

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY UNDERTAKING

IDENTIFICATION OF THE MIXTURE

TRADE/MATERIAL NAME:
RELEVANT USE of the SUBSTANCE:
USES ADVISED AGAINST:
SUPPLIER/MANUFACTURER'S NAME:
Address:

Business Phone:
Emergency Phone:

STI Marine Firestop Collars (MFC, MFCW, MFCT, MFCG)
Firestop Device
Other than relevant Use
STI Marine Firestop: A division of **Specified Technologies, Inc.**
210 Evans Way,
Somerville, New Jersey 08876
(908) 526-8000 (8:00am to 5:00pm Eastern Standard Time)
U.S., Canada: 1-800-255-3924 (24 hrs)
International: +1-813-248-0585 (collect-24 hrs)

EMAIL of Competent Person for Information on SDS: techserv@stimarine.com

ALL United States Occupational Safety and Health Administration (OSHA) Standard, 29 CFR Parts 1910, 1915, 1917, 1918 and 1926, and the U.S. OSHA Instruction CPL 02-02-079, July 9, 2015, U.S. State equivalent Standards, Canadian WHMIS [Controlled Products Regulations], European Union REACH and CLP EC 1272/2008, Mexican NOM018-STPS 2000, SPRING Singapore, and Japanese JIS Z7253 required information is included in appropriate sections based on the Global Harmonization Standard (GHS). This product has been classified in accordance with the hazard criteria of the countries listed above.

This product is defined as an "Article" under the U.S. Federal OSHA Hazard Communication Standard (29 CFR 1910.1200), EU Directives, and the Canadian Workplace Hazardous Materials Standard. Refer to Section 15 (Regulatory Information) for specific regulatory citations. As articles, this product presents negligible health and physical hazards under reasonably anticipated circumstances of use. Subsequently, a Safety Data Sheet is not required under Standards cited above. This document is prepared to provide persons using this product with additional safety information.

2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION, U.S. OSHA, JAPANESE JIS Z7253, EU REACH AND CLP REGULATION (EC) 1272/2008 AND THE TAIWAN REGULATION OF LABELING AND HAZARD COMMUNICATION OF DANGEROUS AND HARMFUL MATERIALS: This product has been classified per GHS Standards under U.S., European, Japanese and Taiwanese regulations. This product is an article and is not required to be classified under any regulations.
KOREAN ISHA (Notice 2009-68) LABELING AND CLASSIFICATION: As an article, this product is not subject to ISHA Notice 2009-68.

3. COMPOSITION and INFORMATION ON INGREDIENTS

Chemical Name	CAS #	EINECS or ELNICS #	Chinese IECSC Inventory	Japanese ENCS #	Korean ECL #	Taiwan NESCI ECS	WT%	LABEL ELEMENTS U.S. OSHA, REACH, CLP 1272, Japanese JIS Z7253 & GHS Classification Korean ISHA Classification Hazard Statement Codes
Graphite	7782-42-5	231-955-3	Listed	Excepted as Mineral	KE-18101	Listed	40-50	Classification Not Applicable
1,3-Butadiene Homopolymer, Hydroxy Terminated	69102-90-5	Not Listed	Listed	6-722, 6-757	KE-03730	Listed	25-30	Classification Not Applicable
Soybean Oil	8001-22-7	232-274-4	Listed	Not Listed	KE-31718	Listed	20-25	Classification Not Applicable
Methylene Bisphenyl Isocyanate	101-68-8	202-966-0	Listed	1-561	KE-35565	Listed	0.5-2.0%	PUBLISHED CLASSIFICATION U.S. OSHA, REACH, EU CLP, JAPANESE JIS Z7253, KOREAN ISHA & GHS: Classification: Carcinogenic Cat. 2, Acute Inhalation Toxicity Cat. 4, Skin Irritation Cat. 2, Eye Irritation Cat. 2A, Skin Sensitization Cat. 1B, Respiratory Sensitization Cat. 1B, STOT (Inhalation-Respiratory Irritation) SE Cat. 3, STOT RE Cat. 2 Hazard Codes: H351, H332, H315, H317, H319, H334, H335, H373
Proprietary Red Pigment Mixture				Mixture			Proprietary	Classification Not Applicable
Other Trace Ingredients							Balance	Classification Not Applicable

See Section 16 for full text of Classification

4. FIRST-AID MEASURES

DESCRIPTION OF FIRST AID MEASURES: Contaminated individuals must be taken for medical attention if any adverse effects occur. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Take a copy of label and SDS to physician or health professional with the contaminated individual. Wash clothing and thoroughly clean shoes before reuse.

Skin Exposure: If adverse skin effects occur, discontinue use and flush contaminated area. Seek medical attention if adverse effect occurs after flushing.

Inhalation: If heated and fumes or vapors are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if adverse effect continues after removal to fresh air.

Eye Exposure: If this particles from this product contaminates the eyes, rinse eyes under gently running water. Use sufficient force to open eyelids and then "roll" eyes while flushing. Minimum flushing is for 20 minutes. The contaminated individual must seek medical attention if any adverse effect continues after rinsing.

Ingestion: Due to the form of the product, ingestion is unlikely.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not determined.

AUTOIGNITION TEMPERATURE: Not available.

FLAMMABLE LIMITS (in air by volume, %): Not applicable.

FIRE EXTINGUISHING MEDIA: Use extinguishing materials suitable for the surrounding area.

UNSUITABLE FIRE EXTINGUISHING MEDIA: None known.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is formulated to be non-flammable and non-combustible. When involved in a fire, this material may decompose and produce irritating vapors and toxic gases (e.g., carbon and nitrogen oxides, phthalates, ammonia, formaldehyde, hydrogen cyanide, nitriles, isocyanates, nitrosamines, hydrogen chloride, and acrylic monomers).

Explosion Sensitivity to Mechanical Impact or Static Discharge: Not sensitive.

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus (SCBA) and full protective equipment. Move containers from fire area if it can be done without risk to personnel. Water spray can be used to cool fire-exposed containers. Water fog or spray can also be used by trained firefighters to disperse this product's vapors and to protect personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: If this product is contaminated by chemical products, this situation should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. Call CHEMTREC (1-800-424-9300) for emergency assistance. Or if in Canada, call CANUTEC (613-996-6666). The atmosphere must at least 19.5 percent Oxygen before non-emergency personnel can be allowed in the area without Self-Contained Breathing Apparatus and fire protection.

6. ACCIDENTAL RELEASE MEASURES (Continued)

PERSONAL PROTECTIVE EQUIPMENT: Proper protective equipment should be used.

Small and Large Spills: Wear sturdy gloves to protect against cuts, eye protection, and appropriate body protection. Steel-toed boots are recommended to protect against injury to feet.

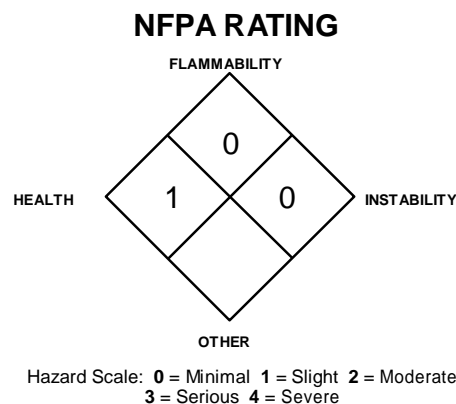
METHODS FOR CLEAN-UP AND CONTAINMENT: Spills of this product present minimal hazard.

Small and Large Spills: This product can be picked-up and should be disposed of properly if the product cannot be reclaimed.

All Spills: Place all residue in appropriate containment and seal. Take other measures to protect human health and the environment as necessary. Rinse area with soap and water solution and follow with a water rinse. Decontaminate the area thoroughly. Do not mix with wastes from other materials. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations). For spills on water, contain, minimize dispersion and collect. Dispose of recovered material and report spill per regulatory requirements.

ENVIRONMENTAL PRECAUTIONS: Run-off water may be contaminated by other materials and should be contained to prevent possible environmental damage.

REFERENCE TO OTHER SECTIONS: See information in Section 8 (Exposure Controls – Personal Protection) and Section 13 (Disposal Considerations) for additional information.



7. HANDLING and USE

PRECAUTIONS FOR SAFE HANDLING: If during the use of this product, dusts, particulates or fumes are generated, avoid breathing, or skin or eye contact. Avoid touching heated product. Wash hands thoroughly after handling this product or containers of this product.

CONDITIONS FOR SAFE STORAGE: Store this product in a cool, dry location, away from sources of intense heat. Store away from incompatible materials (see Section 10, Stability and Reactivity), water, heat and flame.

SPECIFIC END USE(S): This product is for use as a sealant. Follow all industry standards for use of this product.

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, if necessary. Collect all rinsates and dispose of according to applicable Federal, State, and local procedures.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/CONTROL PARAMETERS:

Ventilation and Engineering Controls: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below (if applicable). Exhaust directly to the outside, taking necessary precautions for environmental protection.

Workplace Exposure Limits/Control Parameters: The following exposure limits are not expected to apply to the product, due to its solid form. Limits are given in the event of involvement in a fire or other situation in which fumes, vapors or aerosols are produced.

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR								
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER	
		TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	IDLH mg/m ³	mg/m ³	
1,3-Butadiene Homopolymer Hydroxy Terminated	69102-90-5	NE	NE	NE	NE	NE	NE	NE	NE	
Graphite	7782-42-5	2 (resp. fract.)	NE	15 mppcf (based on impinger samples counted by light field techniques)		2.5 (resp. dust)		NE	NE	DFG MAK: TWA = 1.5 (respirable fraction); 4 (inhalable fraction) DFG MAK Pregnancy Risk Classification: C
Methylene Bisphenyl Isocyanate	101-68-8	0.051	NE	NE	0.2 (ceiling)	0.05	0.2 (ceiling) 10 min.	75 ppm		DFG MAKs: TWA: 0.05 (inhalable fraction); Skin PEAK: 1•MAK 15 min. average value, 4 per shift, 1-hr interval, 0.1 (ceiling); Skin Danger of Sensitization of the Skin and Airways DFG MAK Pregnancy Risk Classification: C Carcinogen: EPA-D, EPA-CBD, IARC-3, MAK-4
Soybean Oil Exposure limits given are for vegetable Oil Mist	8001-22-7	NE	NE	15 (total dust.), 5 (resp. fract.)	NE	10 (total dust.), 5 (resp. fract.)	NE	NE	NE	NE

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

International Occupational Exposure Limits: Currently, the following additional exposure limit values have been established by various countries for the components of this mixture. More current limits may be available; individual countries should be consulted to determine if newer limits are available. As with limits given previously in this Section, these limits are not necessarily applicable due to the form of the product.

GRAPHITE:

Belgium: TWA = 2 mg/m³ (resp. dust), MAR 2002
Denmark: TWA = 2.5 mg/m³ (respirable), MAY 2011
Finland: TWA = 2 mg/m³, NOV 2011
France: VME = 2 mg/m³, FEB 2006
Germany: MAK = 1.5 mg/m³, resp, 2011
Germany: MAK = 4 mg/m³, inhal, 2011
Iceland: TWA = 2.5 mg/m³ (resp. dust), NOV 2011
Japan: OEL = 0.5 mg/m³ (respirable), 2 mg/m³ (total), MAY 2012
Korea: TWA = 10 mg/m³, 2006
Korea: TWA = 2.5 mg/m³, 2006
Mexico: TWA = 2 mg/m³, 2004
The Netherlands: MAC-TGG = 2 mg/m³, 2003
New Zealand: TWA = 3 mg/m³ (respirable dust), JAN 2002

GRAPHITE (continued):

Peru: TWA = 2 mg/m³, JUL 2005
Sweden: TWA = 0.2 f/cc, JUN 2005
Sweden: TWA = 5 mg/m³, JUN 2005
Switzerland: MAK-W = 5 mg/m³, inhal, JAN 2011
Switzerland: MAK-W = 2.5 mg/m³, resp, JAN 2011
In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV
Australia: TWA = 0.02 mg(NCO)/m³, STEL 0.07 mg(NCO)/m³, JUL 2008
Austria: MAK-TMW = 0.005 ppm (0.05 mg/m³); KZW = 0.01 ppm (0.1 mg/m³), sen, 2007

METHYLENE BISPHENOL ISOCYANATE:

Belgium: TWA = 0.005 ppm (0.052 mg/m³), MAR 2002
Denmark: TWA = 0.005 ppm (0.05 mg/m³), OCT 2002
France: VME = 0.01 ppm (0.1 mg/m³), VLE = 0.02 ppm (0.2 mg/m³), FEB 2006

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

EXPOSURE LIMITS/CONTROL PARAMETERS (continued):

International Occupational Exposure Limits (continued):

METHYLENE BISPHENOL ISOCYANATE (continued):

Germany: MAK = 0.05 mg/m³, inhal, 2011

Hungary: TWA = 0.05 mg/m³, STEL = 0.05 mg/m³, SEP 2000

Iceland: TWA = 0.005 ppm (0.05 mg/m³), STEL = 0.01 ppm (0.1 mg/m³), sen, NOV 2011

Japan: OEL = 0.05 mg/m³, A1 sen, MAY 2012

Korea: TWA = 0.005 ppm (0.055 mg/m³), 2006

Mexico: TWA = 0.005 ppm (0.051 mg/m³), 2004

The Netherlands: MAC-TGG = 0.05 mg/m³, 2003

New Zealand: TWA = 0.02 mg(NCO)/m³; STEL = 0.07 mg(NCO)/m³, sen, JAN 2002

METHYLENE BISPHENOL ISOCYANATE (continued):

Peru: TWA = 0,005 ppm (0.051 mg/m³), JUL 2005

The Philippines: TWA = 0.02 ppm (0.2 mg/m³), JAN 1993

Poland: MAC(TWA) = 0.05 mg/m³, MAC(C) = 0.2 mg/m³, JAN 1999

Russia: STEL = 0.5 mg/m³, Skin, JUN 2003

Sweden: TWA = 0.002 ppm (0.03 mg/m³), CL = 0.005 ppm (0.05 mg/m³), Sen, JUN 2005

Switzerland: CL = 0.02 mg(NCO)/m³, skin, sen, JAN 2011

Thailand: TWA = 0.02 ppm (0.2 mg/m³), JAN 1993

In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV

PROTECTIVE EQUIPMENT: *The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including U.S. Federal OSHA Respiratory Protection (29 CFR 1910.134), OSHA Eye Protection 29 CFR 1910.133, OSHA Hard Protection 29 CFR 1910.138, OSHA Foot Protection 29 CFR 1910.136 and OSHA Body Protection 29 CFR 1910.132), equivalent standards of Canada (including CSA Respiratory Standard Z94.4-02, Z94.3-M1982, Industrial Eye and Face Protectors and CSA Standard Z195-02, Protective Footwear), or standards of Japan (including JIS T 8116:2005 for glove selection, JIS T 8150:2006 for respiratory PPE, JIS T 8147:2003 for eye protectors, and JIS T 8030:2005 for protective clothing) standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand protection, and CR 13464:1999 for face/eye protection), those of China, and Taiwan. Please reference applicable regulations and standards for relevant details.*

Respiratory Protection: Due to the form of this product, respiratory protection is not normally required. If heated and fumes are generated, maintain airborne contaminant concentrations below exposure limits listed above. For materials without listed exposure limits, minimize respiratory exposure. If necessary, use only respiratory protection authorized under appropriate regulations. Oxygen levels below 19.5% are considered IDLH by U.S. OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under U.S. OSHA's Respiratory Protection Standard (1910.134-1998).

Eye Protection: Wear splash goggles or safety glasses as appropriate for the task.

Hand Protection: Wash hands and wrists before putting on and after removing gloves. During manufacture or other similar operations, wear the appropriate hand protection for the process. Use double gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this SDS. Because all gloves are to some extent permeable and their permeability increases with time, they should be changed regularly (hourly is preferable) or immediately if torn or punctured. If necessary refer to appropriate regulations.

Skin Protection: Use appropriate protective clothing for the task (e.g., coveralls, etc.). If necessary, refer to the U.S. OSHA Technical Manual (Section VII: Personal Protective Equipment) or other appropriate regulations. Full-body chemical protective clothing is recommended for emergency response procedures. 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 and Canadian Standards.

9. PHYSICAL and CHEMICAL PROPERTIES

FORM: Rubberized solid.

MOLECULAR FORMULA: Mixture.

Not available.

FLAMMABLE LIMITS (in air by volume, %): Not available.

DECOMPOSITION TEMPERATURE: Not available.

AUTOIGNITION TEMPERATURE: Not available.

FREEZING/MELTING POINT: Not available.

VAPOR PRESSURE: Not applicable.

VAPOR DENSITY (air = 1): Not applicable.

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

SOLUBILITY IN WATER: Insoluble.

COEFFICIENT WATER/OIL DISTRIBUTION: Not established.

HOW TO DETECT THIS SUBSTANCE (warning properties in event of accidental release): The appearance may be characteristic to distinguish a release of this product.

COLOR: Red.

MOLECULAR WEIGHT: Mixture. **ODOR:**

ODOR THRESHOLD: Not available.

OXIDIZING PROPERTIES: Not applicable.

PERCENT VOLATILE: 0

FLASH POINT: Not available.

BOILING POINT: Not applicable.

SPECIFIC GRAVITY (water = 1): Not applicable.

CARB VOC: Not applicable.

SCAQMD (U.S. EPA Method 24): Not applicable.

SOLUBILITY IN SOLVENTS: Not applicable.

pH: Not applicable.

10. STABILITY and REACTIVITY

CHEMICAL STABILITY: This product is stable when properly stored at normal temperature (see Section 7, Handling and Storage).

DECOMPOSITION PRODUCTS: Combustion: If exposed to extremely high temperatures, thermal decomposition may generate irritating fumes and toxic gases (e.g., carbon and nitrogen oxides, phthalates, ammonia, formaldehyde, hydrogen cyanide, nitriles, isocyanates, nitrosamines, hydrogen chloride, and acrylic monomers). Hydrolysis: None known.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is incompatible with strong oxidizers.

POSSIBILITY OF HAZARDOUS POLYMERIZATION OR REACTION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure to or contact with extreme temperatures and incompatible chemicals.

11. TOXICOLOGICAL INFORMATION

SYMPTOMS OF EXPOSURE BY ROUTE OF EXPOSURE: The health hazard information provided below is pertinent to employees using this product in an occupational setting. The following paragraphs describe the symptoms of exposure by route of exposure.

11. TOXICOLOGICAL INFORMATION (Continued)

SYMPTOMS OF EXPOSURE BY ROUTE OF EXPOSURE (continued):

Inhalation: If this product is heated, inhalation of fumes or vapors may cause irritation of the nose, throat, and lungs and cause coughing. Due to the isocyanate component, inhalation of fumes may cause respiratory sensitization and allergic reaction.

Contact with Skin or Eyes: Due to the form of the product, contact with the eyes is unlikely, unless heating causes fumes. Fumes may cause tearing and stinging to the eyes. Although this product contains a skin sensitizer, due to form of the product, skin sensitization is not likely.

Skin Absorption: Due to form of product, skin absorption is not a likely route of exposure.

Ingestion: Ingestion is not a likely route of exposure, due to the form of the product.

Injection: Injection is not likely, due to the form of the product.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.

Exposure to this product may cause the following health effects:

Acute: Inhalation of fumes or vapors may cause irritation of respiratory system and eyes.

Chronic: Inhalation of fumes may cause respiratory sensitization.

TARGET ORGANS: Acute: Skin, eyes, respiratory system. Chronic: Respiratory system.

TOXICITY DATA: No toxicity data are presented for components due to product form.

CARCINOGENICITY: Due to the physical nature of this product, carcinogenicity is not a hazard.



SENSITIZATION OF PRODUCT: Due to the isocyanate component, inhalation of fumes may cause respiratory sensitization and allergic reaction. Symptoms may include difficulty breathing, coughing and wheezing.

IRRITANCY OF PRODUCT: Inhalation of fumes or vapors may cause respiratory irritation and eye irritation.

REPRODUCTIVE TOXICITY INFORMATION: Components of this product have no reported mutagenic, embryotoxic or teratogenic toxicity.

ACGIH BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, there are no ACGIH Biological Exposure Indices (BEIs) determined for components.

DEGREE OF EFFECT TO THE HEALTH OF THE POLLUTING AGENT OF ENVIRONMENT OF WORK (per Mexican NOM-010 STPS-1999): 0

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD	(BLUE)	1	
FLAMMABILITY HAZARD	(RED)	0	
PHYSICAL HAZARD	(YELLOW)	0	
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8
For Routine Industrial Use and Handling Applications			

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

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: As an article, this product will not be mobile in soil.

PERSISTENCE AND BIODEGRADABILITY: No specific information is available regarding persistence and biodegradability.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential.

ECOTOXICITY: This product has not been tested for aquatic or animal toxicity. All releases to terrestrial, atmospheric and aquatic environments should be avoided.

OTHER ADVERSE EFFECTS: The components of this product are not listed as having ozone depletion potential.

RESULTS OF PBT and vPvB ASSESSMENT: The Methylene Biphenyl Isocyanate component is a Suspected PBT/vPvB compound. PBT and vPvB assessments are part of the chemical safety report required for some substances in European Union Regulation (EC) 1907/2006, Article 14.

ENVIRONMENTAL EXPOSURE CONTROLS: Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials.

U.S. EPA WASTE NUMBER: Not applicable.

EWC WASTE CODES: 16 01 21: Hazardous components other than those mentioned in 16 01 07 to 16 01 11 and 16 01 13 and 16 01 14

14. TRANSPORTATION INFORMATION

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

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

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA): This product is not classified as dangerous goods under rules of IATA.

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION: This product is not classified as Dangerous Goods by the International Maritime Organization.

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

OFFICIAL MEXICAN STANDARD; REGULATION FOR THE TRANSPORT OF DANGEROUS GOODS AND RESIDUES: This product is not classified as Dangerous Goods, per transport regulations of Mexico.

SINGAPORE STANDARD 286: PART A: This product has no requirements under the Specification for Caution Labeling for Hazardous Substances, Part 4: Marking of Packages, Containers and Vehicles, as it does not meet the criteria for any hazard class under this regulation.

TRANSPORT IN BULK ACCORDING TO THE IBC CODE: See the information under the individual jurisdiction listings for IBC information.

ENVIRONMENTAL HAZARDS: This material does not meet the criteria of environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID, and ADN) and is not listed in Annex III under MARPOL 73/78.

15. REGULATORY INFORMATION

UNITED STATES REGULATIONS:

U.S. SARA Reporting Requirements: As an article, this product is 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 Hazard Categories (Section 311/312, 40 CFR 370-21): ACUTE: No; CHRONIC: No; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No

U.S. SARA Threshold Planning Quantity (TPQ): As an article, this product is not subject to Threshold Planning Quantities, per 40 CFR 370.20.

U.S. CERCLA Reportable Quantity (RQ): Not applicable.

U.S. TSCA Inventory Status: Components of this product are listed on the TSCA Inventory.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): No component is on the California Proposition 65 lists.

CANADIAN REGULATIONS:

Canadian DSL/NDSL Inventory Status: Components are on the DSL or NDSL Inventories.

Canadian Environmental Protection Act (CEPA) Priorities Substances Lists: Components are not on the CEPA Priorities Substances Lists.

Canadian WHMIS Classification and Symbols: As an article, this product is not subject to the Controlled Product Regulations.

EUROPEAN REGULATIONS:

Safety, Health, and Environmental Regulations/Legislation Specific for the Product: Under Annex XVII of REACH, Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles, Entry 56, due to the Methylene Bisphenyl Isocyanate component, the following restrictions to the product apply in the EU:

1. Shall not be placed on the market after 27 December 2010, as a constituent of mixtures in concentrations equal to or greater than 0,1 % by weight of MDI for supply to the general public, unless suppliers shall ensure before the placing on the market that the packaging:

(a) contains protective gloves which comply with the requirements of Council Directive 89/686/EEC (*);

(b) is marked visibly, legibly and indelibly as follows, and without prejudice to other Community legislation concerning the classification, packaging and labelling of substances and mixtures:

'Persons already sensitised to diisocyanates may develop allergic reactions when using this product';

'Persons suffering from asthma, eczema or skin problems should avoid contact';

This product should not be used under conditions of poor ventilation unless a protective mask with an appropriate gas filter (i.e. type A1 according to standard EN 14387) is used.'

2. By way of derogation, paragraph 1(a) shall not apply to hot melt adhesives.

Chemical Safety Assessment: No data available. The chemical safety assessment is required for some substances according to European Union Regulation (EC) 1907/2006, Article 14.

REACH List of Pre-Registered Substances: Graphite: Registered; Methylene Bisphenyl Isocyanate: Registered; Soybean Oil: Pre-registered; 1,3-Butadiene Homopolymer, Hydroxy Terminated: No information; Proprietary Red Pigment: No information.

CHINESE REGULATIONS:

Chinese Inventory of Existing Chemical Substances Status: As an article, this product is not subjected to requirements under the Chinese Inventory of Existing Chemical Substances (IECSC).

JAPANESE REGULATIONS:

Japanese ENCS: As an article, this product is not subjected to requirements under ENCS Inventory.

Japanese Ministry of Economy, Trade, and Industry (METI) Status: As an article, this product is not subjected to requirements under the Japanese METI.

Poisonous and Deleterious Substances Control Law: As an article, this product is not subjected to requirements under the Poisonous and Deleterious Substances Control Law.

KOREAN REGULATIONS:

Korean Existing Chemicals List (ECL) Status: As an article, this product is not subjected to requirements under the Korean ECL Inventory.

15. REGULATORY INFORMATION (Continued)

MEXICAN REGULATIONS:

Mexican Workplace Regulations (NOM-018-STPS-2000): This product is not classified as hazardous.

SINGAPORE REGULATIONS:

List of Controlled Hazardous Substances: As an article, this product is not subjected to requirements under the Singapore List of Controlled Substances.

Code of Practice On Pollution Control Requirements: As an article, this product is not subjected to requirements under the Singapore Code of Practice on Pollution Control.

TAIWANESE REGULATIONS:

Taiwan Existing Chemical Substances Inventory Status: As an article, this product is not subjected to requirements under the Taiwan Existing Chemicals List.

16. OTHER INFORMATION

LABELING (Precautionary Statements) ANSI LABELING (Z129.1): **CAUTION! FUMES GENERATED BY HEATING OR MAY CAUSE MILD IRRITATION BY INHALATION AND EYE CONTACT. INHALATION OF FUMES MAY CAUSE RESPIRATORY SENSITIZATION IN PERSONS SUSCEPTIBLE TO ISOCYANATES.** Avoid breathing fumes or vapors. Wear appropriate eye, hand, and body protection. Avoid exposure to elevated temperatures. **FIRST-AID:** In case of adverse effects after contact, flush skin or eyes with plenty of water for at least 20 minutes while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, foam, dry chemical, or CO₂. **IN CASE OF SPILL:** Pick-up waste product and place in suitable container. Place residual in appropriate container and seal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations. Consult Safety Data Sheet for additional information.

GLOBAL HARMONIZATION, U.S. OSHA, JAPANESE JIS Z7253, EU REACH AND CLP REGULATION (EC) 1272/2208 AND THE TAIWAN REGULATION OF LABELING AND HAZARD COMMUNICATION OF DANGEROUS AND HARMFUL MATERIALS: This product has been classified per GHS Standards under U.S., European, Japanese and Taiwanese regulations. This product is and article and is not required to be classified under any regulations.

KOREAN ISHA (Notice 2009-68) LABELING AND CLASSIFICATION: As an article, this product is not subject to ISHA Notice 2009-68.

REVISION DETAILS: January 27, 2017: Up-date SDS to include EU REACH and CLP 1272 compliance.

REFERENCES AND DATA SOURCES: Contact the supplier for information.

METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Criteria of the GHS were used for classification.

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc. • PO Box 1961, Hilo, HI 96721-1961 • (800) 441-3365

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DEFINITION OF TERMS

A large number of abbreviations and acronyms appear on a SDS. 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 MAKs: Federal Republic of Germany Maximum Concentration Values in the workplace. Exposure limits are given as TWA (Time-Weighted Average) or PEAK (short-term exposure) values.

DFG MAK Germ Cell Mutagen Categories: 1: Germ cell mutagens that have been shown to increase the mutant frequency in the progeny of exposed humans. 2: Germ cell mutagens that have been shown to increase the mutant frequency in the progeny of exposed mammals. 3A: Substances that 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 that 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 that 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.

LQ: Limit of Quantitation.

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: 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 there is a danger of cutaneous absorption.

EXPOSURE LIMITS IN AIR (continued):

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

WEEL: Workplace Environmental Exposure Limits from the AIHA.

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. Mechanical irritation may occur. PII or Draize = 0. **Eye Irritation:** Essentially non-irritating, minimal effects clearing in < 24 hours. Mechanical irritation may occur. Draize = 0. **Oral Toxicity LD₅₀ Rat > 5000 mg/kg. Dermal Toxicity LD₅₀ Rat or Rabbit > 2000 mg/kg. Inhalation Toxicity 4-hrs LC₅₀ Rat > 20 mg/L. 1 Slight Hazard:** Minor reversible injury may occur; may irritate the stomach if swallowed; may defat the skin and exacerbate existing dermatitis. **Skin Irritation:** Slightly or mildly irritating. PII or Draize > 0 < 5. **Eye Irritation:** Slightly to mildly irritating, but reversible within 7 days. Draize > 0 ≤ 25. **Oral Toxicity LD₅₀ Rat > 500–5000 mg/kg. Dermal Toxicity LD₅₀ Rat 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; prolonged exposure may affect the CNS. **Skin Irritation:** Moderately irritating; primary irritant; sensitizer. PII or Draize ≥ 5, with no destruction of dermal tissue. **Eye Irritation:** Moderately to severely irritating; reversible corneal opacity; corneal involvement or irritation clearing in 8–21 days. Draize = 26–100, with reversible effects. **Oral Toxicity LD₅₀ Rat > 50–500 mg/kg. Dermal Toxicity LD₅₀ Rat 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 cause destruction of dermal tissue, skin burns, and 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 LD₅₀ Rat 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 exposures; extremely toxic; irreversible injury may result from brief contact. **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 LD₅₀ Rat 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. **1 Slight Hazard:** Materials that must be pre-heated before ignition can occur. Material requires considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur. This usually includes the following: 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) (i.e. OSHA Class IIB); and Most ordinary combustible materials (e.g. wood, paper, etc.).

DEFINITION OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): 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 with air. This usually includes the following: 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); and Solids and semisolids (e.g. viscous and slow flowing as asphalt) 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. This usually includes the following: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 38°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (100°F) (i.e. 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); and 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 that will burn readily. This usually includes the following: 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) (i.e. OSHA Class IA); and Materials that ignite spontaneously when exposed to air at a temperature of 54.4°C (130°F) or below (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. **Compressed Gases:** No Rating. **Pyrophorics:** No Rating. **Oxidizers:** No 0 rating. **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 violently. **Explosives:** Division 1.5 & 1.6 explosives. 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 oxidizers; 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 explosion 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 explosives. Explosive substances where the explosive effects 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 oxidizers. Solids: any material that, in either 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. **Reactivities:** Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential (or low risk) 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 1.3 explosives. 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:** Packaging Group I oxidizers. 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 (or moderate risk) 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 explosives. 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 (or high risk) 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 with an LC₅₀ for acute inhalation toxicity greater than 10,000 ppm. Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 200 mg/L. Materials with an LD₅₀ for acute dermal toxicity greater than 2000 mg/kg. Materials with an LD₅₀ for acute oral toxicity greater than 2000 mg/kg. Materials essentially non-irritating to the respiratory tract, eyes, and skin. **1** Materials that, under emergency conditions, can cause significant irritation. Gases and vapors with an LC₅₀ for acute inhalation toxicity greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 10 mg/L but less than or equal to 200 mg/L. Materials with an LD₅₀ for acute dermal toxicity greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials that slightly to moderately irritate the respiratory tract, eyes and skin. Materials with an LD₅₀ for acute oral toxicity greater than 500 mg/kg but less than or equal to 2000 mg/kg. **2** Materials that, under emergency conditions, can cause temporary incapacitation or residual injury. Gases with an LC₅₀ for acute inhalation toxicity greater than 3,000 ppm but less than or equal to 5,000 ppm. 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. Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 2 mg/L but less than or equal to 10 mg/L.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

HEALTH HAZARD (continued): 2 (continued): Materials with an LD₅₀ for acute dermal toxicity greater than 200 mg/kg but less than or equal to 1000 mg/kg. 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. Materials whose LD₅₀ for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. **3** Materials that, under emergency conditions, can cause serious or permanent injury. Gases with an LC₅₀ for acute inhalation toxicity greater than 1,000 ppm but less than or equal to 3,000 ppm. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater 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. Dusts and mists with an LC₅₀ for acute inhalation toxicity greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials with an LD₅₀ for acute dermal toxicity greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials corrosive to the skin. Cryogenic gases that cause frostbite and irreversible tissue damage. Compressed liquefied gases with boiling points below -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials with an LD₅₀ for acute oral toxicity greater than 5 mg/kg but less than or equal to 50 mg/kg. **4** Materials that, under emergency conditions, can be lethal. Gases with an LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than ten times its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 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.

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 of NFPA 704. **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 according with Annex D of NFPA 704. Liquids, solids, and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class III B 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 *Recommendations 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% 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 the 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). Most ordinary combustible materials. Solids containing greater than 0.5% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **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 III A 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 with 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% 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 (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 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% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. 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% 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: 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.

DEFINITION OF TERMS (Continued)

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 vapor to form an ignitable mixture with air near the surface of the liquid or within the test vessel used. **Autoignition Temperature:** Minimum temperature of a solid, liquid, or gas required to initiate or cause self-sustained combustion in air with no other source of ignition. **LEL:** Lowest concentration of a flammable vapor or gas/air mixture that will ignite and burn with a flame. **UEL:** Highest concentration of a flammable vapor or gas/air mixture that will ignite and burn with a flame.

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. **LD₅₀:** Lethal Dose (solids & liquids) that kills 50% of the exposed animals. **LC₅₀:** Lethal Concentration (gases) that 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. **TDLo:** Lowest dose to cause a symptom. **TCLo:** Lowest concentration to cause a symptom. **TD₀,** **LDLo,** and **LD₀,** or **TC,** **TC₀,** **LCLo,** and **LC₀:** Lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** **IARC:** International Agency for Research on Cancer. **NTP:** National Toxicology Program. **RTECS:** Registry of Toxic Effects of Chemical Substances. **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: Effect concentration in water. **BCF:** Bioconcentration Factor, which is used to determine if a substance will concentrate in life forms that consume contaminated plant or animal matter. **TLm:** Median threshold limit. **log K_{ow}** or **log K_{oc}:** Coefficient of Oil/Water Distribution is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S.:

EPA: U.S. Environmental Protection Agency. **ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association that establishes exposure limits. **OSHA:** U.S. Occupational Safety and Health Administration. **NIOSH:** National Institute of Occupational Safety and Health, which is the research arm of OSHA. **DOT:** U.S. Department of Transportation. **SARA:** Superfund Amendments and Reauthorization Act. **TSCA:** U.S. Toxic Substance Control Act. **CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act. Marine Pollutant status according to the DOT; CERCLA or Superfund; and various state regulations. This section also includes information on the precautionary warnings that appear on the material's package label.

CANADA:

WHMIS: Canadian Workplace Hazardous Materials Information System. **TC:** Transport Canada. **DSL/NDSL:** Canadian Domestic/Non-Domestic Substances List.

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 Union (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. **METI** is the Japanese Ministry of Economy, Trade, and Industry.