SIS 440 Marine Deck Sealant

Safety Data Sheet

1. IDENTIFICATION

Product Name:	**SIS 440 Marine Deck Sealant**
Synonyms:	TDS Deck Caulk
CAS Number:	Mixture
Recommended Product Use:	Marine Deck Seam Caulk
Restrictions on Use:	Other than recommended use
Manufacturer/Supplier:	Teakdecking Systems, Inc.
Address:	7061 15th Street East Sarasota, Florida 34243 USA
Business Phone:	+1 941 756-0600
Emergency Phone:	+1 941 756-0600

This product is sold for commercial use. This SDS has been developed to address safety concerns of those individuals working with bulk quantities of this material, as well as those of potential users of this product in industrial/occupational settings.

2. HAZARD(S) IDENTIFICATION

Health	**2***
Flammability	**1**
Physical Hazard	**0**

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe
* = Chronic

GLOBAL HARMONIZATION LABELING AND CLASSIFICATION: Classified in accordance with Global Harmonization Standard under U.S. OSHA Hazard Communication Standard, Canadian WHMIS HPR-GHS 2015.

Classification:

Germ Cell Mutagen Category 1B*, Reproductive Toxicity Category 2, Eye Corrosion/Irritation Category 2A, Skin Sensitization Category 1B, Specific Target Organ Toxicity (Blood Cells) Repeated Exposure Category 2, Aquatic Chronic Toxicity Category 3

Signal Word: Danger

Hazard Statements:

H340: May cause genetic effects*. H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. H317: May cause an allergic skin reaction. H373: May cause damage to the blood through prolonged or repeated oral exposure. H412: Harmful to aquatic life with long-lasting effects.

Hazards Not Otherwise Classified (HNOC): The Octamethylcyclotetrasiloxane component is Under Assessment as Persistent, Bioaccumulative and Toxic in the Environment (PBT) and as a Persistent Organic Pollutant (POP)

Physical Hazards Not Otherwise Classified (PHNOC): None known.

Precautionary Statements:

Prevention:

P203: Obtain, read and follow all safety instructions before use. P260: Do not breathe mist, vapors, or spray. P264 + P265: Wash hands and other contamination areas thoroughly after handling. Do not touch eyes. P270: Do not eat, drink or smoke when using this product. P271: Use only outdoors or in a well-ventilated area. P272: Contaminated work clothing should not be allowed out of the workplace. P273: Avoid release to the environment. P280: Wear protective gloves, clothing, eye protection and face protection.

Response:

P308 + P316: IF exposed or concerned: emergency Get medical help immediately. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P333 + P313: If skin irritation or rash occurs, get medical attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P317: If eye irritation persists: get medical help. P321: Specific treatment (remove from exposure and treat symptoms).

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up.

Disposal: P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

Hazard Symbols/Pictograms: GHS07, GHS08



Percent of Unknown Acute Toxicity: This product is a mixture; the following are percentages of unknown acute toxicity, by route of exposure. Oral: > 35% Dermal > 35%, and Inhalation: > 60%.

***Note:** The classification for Germ Cell Mutagen is based on the presence of benzene in a component, which cannot be determined (see following Section).

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3. COMPOSITION AND INFORMATION ON INGREDIENTS

Chemical Name	CAS #	W/W%	LABEL ELEMENTS GHS Classification under U.S. OSHA Hazard Communication Standard, Canadian WHMIS (HPR-GHS) 2015 Hazard Statement Codes
Proprietary Polydimethyl Siloxane	Proprietary	35.0-80.0	Notified Classification: Eye Irritation Cat. 2A Hazard Statement Codes: H3I9
Organic Methyl Silane	Proprietary	0.0-8.0	Notified Classification: Classification: Skin Sensitization Cat. 1B, Eye Irritation Cat 2A, STOT (Blood Effects) RE Cat. 2 Hazard Statement Codes: H317, H319, H373
Methyl tris-(methyl ethyl ketoxime) Silane	22984-54-9	0.1-0.9	Notified Classification: Carcinogenic Cat. 1, Skin Sensitization Cat. 1B, Eye Corrosion/Irritation Cat. 2A, Specific Target Organ Toxicity (Red Blood Cells) Repeated Exposure Cat. 3 Hazard Statements: H350: May cause cancer. H317: May cause an allergic skin reaction. H319: Causes serious eye irritation. H373: May causes damage to the blood through prolonged or repeated oral exposure.
Proprietary Cyclosiloxane	Proprietary	0.0-4.0	Harmonized Classification and labeling Classification: Reproductive Toxicity Cat. 2, Aquatic Chronic Toxicity Cat. 4 Hazard Statement Codes: H36 I□ H413 ADDITIONAL SELF-CLASSIFICATION: Classification: Flammable Liquid Cat. 3, Acute Oral Toxicity Cat. 4, Acute Dermal Toxicity Cat. 4 Hazard Statement Codes: H226, H302 + H312
Proprietary Phenylated Ketoxomio Silane	Proprietary	0.0-3.0	NOTIFIED CLASSIFICATION: Classification: Skin Sensitization Cat. 1B Hazard Statement Codes: H317 ADDITIONAL MFG CLASSIFICATION: Classification: STOT RE Cat. 2, Aquatic Chronic Toxicity Cat. 3 Hazard Statement Codes: H373, H412
Other components not classified, with no exposure limits and/or in less than 0.1%			Classification: Not Applicable

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST- AID MEASURES

PROTECTION OF FIRST AID RESPONDERS: Rescuers should not attempt to retrieve victims of exposure to this material without adequate personal protective equipment. Rescuers should be taken for medical attention, if necessary.

DESCRIPTION OF FIRST AID MEASURES: Remove victim(s) to fresh air, as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Remove and isolate contaminated clothing and shoes. Seek immediate medical attention. Take copy of label and SDS to physician or other health professional with victim(s).

Inhalation: Not a likely route of exposure due to viscosity. If fumes or dusts of this product are produced during use and are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.
GHS Precautionary Statements for Inhalation Exposure: None applicable.

Skin Exposure: If the material contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 20 minutes. Do not interrupt flushing. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.
GHS Precautionary Statements for Skin Exposure: P264: Wash contaminated tissues after handling. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P333 + P313: If skin irritation or rash occurs, get medical attention. P362 + P364: Take off contaminated clothing and wash it before reuse.

Eye Exposure: If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 20 minutes. Do not interrupt flushing.
Precautionary Statements for Eye Exposure: P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P317: If eye irritation persists seek medical attention.

Ingestion: If this material is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directly by medical personnel. Have victim rinse mouth with water or give several cups 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 left side (head-down position, if possible) to maintain an open airway and prevent aspiration.
GHS Precautionary Statements for Ingestion Exposure: None applicable.

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4. FIRST- AID MEASURES (continued)

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by exposure to this product.

IMPORTANT SYMPTOMS AND EFFECTS, WHETHER ACUTE OR DELAYED: See Sections 2 (Hazard Identification) and 11 (Toxicological Information) for more detailed information.

Acute:

Symptoms/Effects: Fumes from heated product are an irritant to eyes and respiratory system. Direct eye contact may cause eye irritation. All potential effects are dependent on concentration and duration of exposure.
Symptoms/Effects After Inhalation of Fumes from Heated Product: Due to the paste form of the product, inhalation is only likely if the product is heated to decomposition: If heated: coughing, dry or sore throat, mucosal irritations, shortness of breath. Inhalation of fumes from product cause irritation of the respiratory tract.
Symptoms/Effects After Skin Contact: Dermatitis, dry skin.
Symptoms/Effects After Direct Eye Contact: Moderate to severe irritation of eye tissue from direct eye contact. Fumes may cause eye irritation.
Symptoms/Effects After Ingestion: Irritation of mucous membranes in the mouth, pharynx, esophagus and gastrointestinal tract.

Chronic:

Symptoms/Effects After Skin Contact: Dermatitis (dry, red skin, itching, cracking of the skin, skin inflammation), allergic skin reaction.
Symptoms/Effects After Accidental Injection/Ingestion: Possible adverse effects on the red blood cells.
Symptoms/Effects After Inhalation of Fumes from Heated Product: Possible irritation. Possible adverse effects on the red blood cells.
Symptoms/Effects No Specific Route of Exposure: Potential mutagenic, reproductive toxicity, carcinogenic effects.

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

5. FIRE-FIGHTING MEASURES

FLASH POINT: > 93.3°C (> 200°F)

AUTOIGNITION: Not tested.

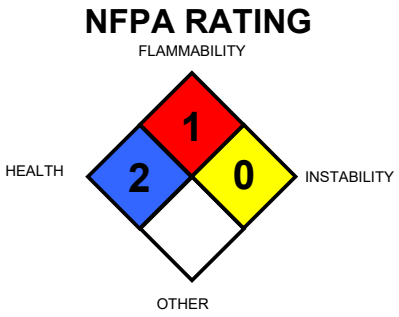
FLAMMABLE LIMITS IN AIR: Not tested.

SUITABLE FIRE EXTINGUISHING MEDIA: Use materials appropriate for surrounding materials. ABC extinguishers, carbon dioxide, foam, dry chemical and flooding quantities of water.

UNSUITABLE EXTINGUISHING MEDIA: None known.

SPECIAL HAZARDS ARISING FROM THE PRODUCT: Not sensitive to mechanical impact. This product may ignite if exposed to direct flame or is heated to its flash point. Closed containers may develop pressure and rupture in event of fire. Irritating or toxic substances may be emitted upon thermal decomposition.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: May be sensitive.



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

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

GHS Precautionary Statements Fire Response: Not applicable.

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6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: An accidental release may result in a fire. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. Eliminate any possible sources of ignition and provide maximum explosion-proof ventilation. Use only non-sparking tools and equipment during the response. 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. Avoid contact with water.

PERSONAL PROTECTIVE EQUIPMENT: Responders should wear the level of protection appropriate to the type of chemical released, the amount of the material spilled, and the location where the incident has occurred.

Small Spills: For releases of 1 drum or less, Level D Protective Equipment (gloves, chemical resistant apron, boots, and eye protection) should be worn.

Large Spills: Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield, and Tyvek suit. Minimum level of personal protective equipment for releases in which the level of oxygen is less than 19.5% or is unknown must be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit, fire-retardant clothing and boots, hard hat, and Self-Contained Breathing Apparatus.**

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP:

All Spills: Eliminate all sources of ignition prior to spill response. Access to the spill area should be restricted. Spread should be limited by gently covering the spill with polypads. Absorb spilled liquid with clay, sand, polypads, or other suitable inert absorbent materials. All contaminated absorbents and other materials should be placed in an appropriate container and seal. Do not mix with wastes from other materials. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations). Dispose of recovered material and report spill per regulatory requirements. Remove all residue before decontamination of spill area. Clean spill area with soap and copious amounts of water. Monitor area for combustible vapor levels and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, and that levels are below applicable LELs (see Section 5 – Fire Fighting Measures) before non-response personnel are allowed into the spill area. Purge equipment with inert gas prior to reuse.

GHS Statements for Spill Response: None applicable.

ENVIRONMENTAL PRECAUTIONS: Minimize use of water to prevent environmental contamination. Prevent spill or rinsate from contaminating storm drains, sewers, soil or groundwater. Place all spill residues in a suitable container and seal. Do not discharge effluent containing this product into streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

OTHER INFORMATION: U.S. regulations may require reporting of spills of this material that reach surface waters if a sheen is formed. If necessary, the toll-free phone number for the US Coast Guard National Response Center is 1-800-424-8802.

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

7. HANDLING and STORAGE

PRECAUTIONS FOR SAFE HANDLING: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat or drink while handling this material. Avoid contact with eyes, skin, and clothing. Avoid breathing fumes, vapors or mist. Do not taste or swallow. Use only with adequate ventilation. Wash hands after handling this product. Contaminated clothing needs to be laundered prior to reuse. Keep away from heat and flame. In the event of a spill, follow practices indicated in Section 6: ACCIDENTAL RELEASE MEASURES. Keeping work areas clean is essential. Use work surfaces that can be easily decontaminated. Maintain good personal hygiene.

GHS Statements for Safe Handling: P203: Obtain, read and follow all safety instructions before use. P260: Do not breathe mist, vapors, or spray. P264 + P265: Wash hands and other contamination areas thoroughly after handling. Do not touch eyes. P270: Do not eat, drink or smoke when using this product. P271: Use only outdoors or in a well-ventilated area. P272: Contaminated work clothing should not be allowed out of the workplace. P280: Wear protective gloves, clothing, eye protection and face protection.

CONDITIONS FOR SAFE STORAGE INCLUDING ANY INCOMPATIBILITIES: 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. Material should be stored in secondary containers or in a diked area, as appropriate. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Have appropriate extinguishing equipment in the storage area (such as sprinkler systems or portable fire extinguishers). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Empty containers may contain residual product; therefore, empty containers should be handled with care. Store container below 27°C (80°F) to avoid possible reactions related to heat and overpressure of containers. This product is not compatible with oxidizers, strong acids, strong bases, alkaline earths, alkaline metals and isocyanates.

GHS Statements for Storage: P403 + P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up.

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8. EXPOSURE CONTROLS - PERSONAL PROTECTION

CONTROL PARAMETERS, INCLUDING OCCUPATIONAL EXPOSURE GUIDELINES AND THE SOURCE OF THOSE VALUES:

U.S. Occupational/Workplace Exposure Limits/Guidelines:

Chemical Name	CAS #	Guideline	Value
Calcium Carbonate	1317-65-3	ACGIH TWA NIOSH TWA	15 mg/m^3 (total dust); 5 mg/m^3 (respirable fraction) 10 mg/m^3 (total dust); 5 mg/m^3 (respirable fraction)
Carbon Black	1333-86-4	ACGIH TLV TWA OSHA PEL TWA NIOSH REL TWA NIOSH REL STEL DFG MAKs TWA and PEAK	3 mg/m^3 (inhalable fraction) 3.5 mg/m^3 (inhalable fraction) 3.5 mg/m^3 (inhalable fraction); 0.1 i mg/m^3 n the presence of PAHs. See Pocket Guides Apps. A and C See Pocket Guides Apps. A and C As inhalable Dust
Octamethylcyclotetra-silane	556-67-2	AIHA WEEL TWA	10 ppm OARS Workplace Environmental Exposure Level
Quartz (Crystalline Silica)	14808-60-7	OSHA PEL TWA NIOSH REL TWA NIOSH REL STEL	0.005 mg/m^3 (respirable dust); 1/2 the value calculated from the respirable dust formulae for Quartz** 0.005 mg/m^3 (respirable dust); See NIOSH Pocket Guide Appendix A See NIOSH Pocket Guide Appendix A **This standard applies to any operations or sectors for which the Respirable crystalline silica standard, 1910.1053, is stayed or is otherwise *Respirable dust 14464-46-1 not in effect.

See Section 16 for Definitions of Terms Used.

BIOLOGICAL MONITORING AND THE SOURCE OF THOSE VALUES:

ACGIH Biological Exposure Indices (BEIs): Currently, no following BEI's have been established for components.

ENGINEERING CONTROLS:

Ventilation and Engineering Controls: Use with adequate, explosion proof ventilation to ensure exposure levels are maintained below the limits provided further in this section.

INDIVIDUAL PROTECTION MEASURES, SUCH AS PERSONAL PROTECTIVE EQUIPMENT: The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with applicable standards in the countries this SDS covers. Please reference applicable regulations and standards for relevant details.

United States Standards: U.S. OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including the Respiratory Protection Standard (29 CFR 1910.134); Eye Protection Standard 29 CFR 1910.13; Hand Protection Standard 29 CFR 1910.138; Foot Protection Standard 29 CFR 1910.136).

Canada: Canadian CSA Respiratory Standard Z94.4-93-02; CSA Eye Protection Standard Z94.3-M1982, Industrial Eye and Face Protectors; Canadian CSA Foot Protection Standard Z195-M1984, *Protective Footwear*).

Eye/Face Protection: Use approved safety goggles or safety glasses. If necessary, refer to appropriate regulations.

Skin Protection: Wear chemical impervious gloves (e.g., Nitrile or Neoprene). Use triple gloves for spill response. If necessary, refer to appropriate regulations.

Body Protection: Use body protection appropriate for task (e.g., lab coat, coveralls, Tyvek suit). If necessary, refer to the OSHA Technical Manual (Section VII: Personal Protective Equipment) or appropriate Standards of Canada. 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 chemical hazards, wear appropriate protective footwear. If necessary, refer to appropriate regulations.

Respiratory Protection: If mists or sprays from this product are created during use, use appropriate respiratory protection. If necessary, use only respiratory protection authorized in appropriate regulations. 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 appropriate regulations.

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9. PHYSICAL and CHEMICAL PROPERTIES

FORM: Paste.
COLOR: Various.
MOLECULAR WEIGHT: Mixture.
MOLECULAR FORMULA: Mixture.
ODOR: Mild.
ODOR THRESHOLD: Not determined.
BOILING POINT: Not available.
FREEZING/MELTING POINT: Not available.
RELATIVE DENSITY/SPECIFIC GRAVITY (water = 1): 1.36
VAPOR DENSITY: (air = 1): > 1
VAPOR PRESSURE: Not available.
pH: Not available.
SOLUBILITY IN WATER: Not soluble.
OTHER SOLUBILITIES: Not known.
EVAPORATION RATE (nBuAc = 1): Not available.
VOLATILE ORGANIC COMPOUNDS (VOC): < 50 g/L
FLAMMABILITY: Not flammable.
FLASH POINT: > 93.3°C (> 200°F)
AUTOIGNITION TEMPERATURE: Not determined.
FLAMMABLE LIMITS IN AIR: Not tested.
PERCENT VOLATILE BY VOLUME: Not determined.
COEFFICIENT WATER/OIL DISTRIBUTION: Not available.
VISCOSITY: Not determined.
HOW TO DETECT THIS SUBSTANCE (WARNING PROPERTIES): The viscous form and odor of this product may act as a warning property in the event of an accidental release.

10. STABILITY and REACTIVITY

REACTIVITY: This product is not known to be reactive under normal circumstances of use and handling.
CHEMICAL STABILITY: Stable under normal circumstances of use and handling.
POSSIBILITY OF HAZARDOUS REACTIONS/POLYMERIZATION: This product is not expected polymerize.
CONDITIONS TO AVOID: Avoid contact with incompatible chemicals and exposure to ignition sources, prolonged heating or extreme temperatures.
INCOMPATIBLE MATERIALS: This product is not compatible with oxidizers, strong acids, strong bases, alkaline earths, alkaline metals and isocyanates.
HAZARDOUS DECOMPOSITION PRODUCTS:
Combustion: Thermal decomposition of this product can generate carbon, silane, and nitrogen oxides and amines.
Hydrolysis: None known.

11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS: The most significant routes of occupational exposure are contact with skin and eyes. The symptoms of exposure to this product are as follows:
Contact with Skin: Causes skin irritation. Depending on the duration of skin contact, skin exposure can cause reddening, discomfort or irritation. Contains multiple compounds that may cause skin sensitization and allergic reaction in susceptible individuals. Symptoms can include reddening of skin, rash, welts and itching. Prolonged or repeated skin contact may cause dermatitis (dry, red skin). Once sensitized, exposure to very small amount can cause reactions.
Contact with Eyes: Direct eye contact may cause serious eye irritation. Contact with fumes from heated product and the eyes can cause irritation, reddening and watering.
Skin Absorption: Prolonged skin contact may be harmful by skin absorption as described under ingestion or inhalation.
Ingestion: Although ingestion is unlikely in the workplace, if swallowed, irritation of the mouth, throat, and other tissues of the gastro-intestinal system can occur, as well as cause nausea, vomiting, and diarrhea.

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11. TOXICOLOGICAL INFORMATION (CONTINUED)

Inhalation: Effects by inhalation are not likely to the paste form of the product. If heated to decomposition, inhalation of fumes may cause respiratory irritation. Exposure to vapors of this product generated during curing, or dusts of this product generated during use after curing may mildly irritate the respiratory tract may irritate the tissues of the nose, mouth, throat, and upper respiratory system. Symptoms of exposure may include coughing, sneezing, and difficulty breathing.

Injection: Accidental injection of this product (e.g., puncture with a contaminated object) may cause burning, redness, and swelling in addition to the wound.

DELAYED and IMMEDIATE EFFECTS and CHRONIC EFFECTS FROM SHORT-TERM and LONG-TERM EXPOSURE:

Short-Term: Direct eye contact may cause irritation. Skin contact and inhalation of fumes from heating the product may be irritating.

Long-Term: Prolonged or chronic skin contact may cause dermatitis or skin sensitization and allergic reaction in susceptible individuals. Prolonged exposure may cause adverse effects on red blood cells.

TARGET ORGANS:

Short Term: Skin, eyes, respiratory system.

Long Term: Skin, respiratory system, red blood cells.

OVERALL ACUTE TOXICITY ESTIMATES (ATE) FOR PRODUCT:

Oral ATE: > 3100 mg/kg (> 35% unknown)

Dermal ATE: > 2400 mg/kg (> 35% unknown)

Inhalation Vapor ATE: > 169 mg/L (> 60% unknown)

TOXICITY DATA FOR COMPONENTS: The following toxicology data are available for components greater than 1% in concentration. Due to the large amount of data, only human data, LD50 Oral-Rat or Mouse, LD50 Skin-Rat or Mouse, LC50 Inhalation-Rat or Mouse and skin irritation data are provided in this SDS.

Calcium Carbonate:
LD_{50} (Oral-Rat) 2000 mg/kg
LD_{50} (Skin-Rabbit) 2000 mg/kg

Phenyl tris-(methyl ethyl ketoxime) Silane:
LD_{50} (Oral-Rat) > 2000 mg/kg
LD_{50} (Skin-Rabbit) > 2000 mg/kg

Proprietary Siloxane:
LD_{50} (Oral-Rat) > 15,400 mg/kg
LD_{50} (Skin-Rabbit) > 2000 mg/kg
LC_{50} (Inhalation-Rat) 7 hours: > 8750 mg/L

Proprietary Silicon Dioxide:
LD_{50} (Oral-Rat) > 5000 mg/kg

Proprietary Silicon Dioxide:
LD_{50} (Oral-Rat) > 5000 mg/kg
LD_{50} (Skin-Rat) > 2000 mg/kg
LC_{50} (Inhalation-Rat) 4 hours: > 5.01 mg/L

Stearic Acid (continued):
Standard Draize Test (Skin-Human) 75 mg/3 days-intermittent: Mild
LD_{50} (Oral-Human) 14,286 mg/kg
Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Moderate
LD_{50} (Oral-Rat) 4600 mg/kg
LD_{50} (Skin-Rabbit) > 5000 mg/kg

REPEATED DOSE TOXICITY:

Phenyl tris-(methyl ethyl ketoxime) Silane: Based on available data and in accordance with CLP Regulation (EC) No 1272/2008, the substance is classified as STOT Rep. Exp. 2 (target organ: red blood cells) since significant toxic effects were observed in a 90-day repeated-dose study (oral) conducted in experimental animals within value ranges of 10 - 100 mg/kg bw/day.

CARCINOGENIC POTENTIAL: This product contains no carcinogens in concentrations of 0.1 percent or greater.

IRRITANCY OF PRODUCT: This product is irritating by eye and skin exposure. Fumes from heated product may be irritating to the respiratory system and eyes. Direct eye contact may cause serious irritation.

Skin Irritation:

Phenyl tris-(methyl ethyl ketoxime) Silane: In guinea pig maximization test skin sensitization testing (EEC method B.6, OECD guideline 406 and EPA OPPS 870.2600), the test item produced evidence of skin sensitization (delayed contact hypersensitivity) in six of the ten test animals, and therefore the substance is considered to have the potential to cause skin sensitization.

Eye Irritation: No specific studies available for components.

SENSITIZATION TO THE PRODUCT: Multiple components have been classified as skin sensitizers as indicated below.

Skin Sensitization:

N-(2-Aminoethyl)-N'-(3-trimethoxy-siyl)propyl) Ethylenediamine: In two guinea pig maximization studies conduct to OECD 406, N-(2-Aminoethyl)-N'-(3-(trimethoxysilyl)propyl)ethylenediamine provoked a positive reaction in 30% and 100% of test animals. As such, this compound is considered to be a skin sensitizer. This is supported by an LLNA test. Classified as Skin Sensitizer Category 1A per Regulation (EC) No. 1272/2008.

Phenyl tris-(methyl ethyl ketoxime) Silane: In guinea pig maximization test skin sensitization testing (EEC method B.6, OECD guideline 406 and EPA OPPS 870.2600), the test item produced evidence of skin sensitization (delayed contact hypersensitivity) in six of the ten test animals, and therefore the substance is considered to have the potential to cause skin sensitization.

Respiratory Sensitization: No data.

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11. TOXICOLOGICAL INFORMATION (CONTINUED)

ENDOCRINE TOXICITY: No component is known or suspected to be an endocrine disruptor.

REPRODUCTIVE TOXICITY INFORMATION: This product has not been tested for reproductive toxicity.

Mutagenicity:

Quartz/Crystalline Silica: ECHA Properties of Concern: Suspected Mutagen: The outcome in CTA assay is positive according to ISSCTA.

Embryotoxicity/Teratogenicity: No data.

Reproductive Toxicity:

Octamethylcyclotetrasiloxane: Octamethylcyclotetrasiloxane has a harmonized classification as Reproductive Category 2 in Annex VI of Regulation 1272/2008. This was based on the available data at the time for its demonstrated effects on female fertility in rats. However, subsequent research has shown the fertility effects are associated with exposure of the female rat during the critical ovulatory phase and that exposure during the ovulatory phase induces a delay/suppression of the pre-ovulatory LH surge and subsequent ovulation. Differences in the regulation of the pre-ovulatory LH surge and the criticality of timed events with regard to rat versus human support that the observed high-dose effect of Octamethylcyclotetrasiloxane on female rat fertility should not be considered relevant to humans. The available data suggest that Octamethylcyclotetrasiloxane does not require classification for effects on development or male fertility.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: This product has not been tested for mobility in soil.

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. The trace Octamethylcyclotetrasiloxane component is Under Assessment as Persistent, Bioaccumulative and Toxic in the Environment (PBT) and as a Persistent Organic Pollutant (POP).

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential. The trace Octamethylcyclotetrasiloxane component is Under Assessment as Persistent, Bioaccumulative and Toxic in the Environment (PBT).

ECOTOXICITY: This product has not been tested for aquatic or animal toxicity. All release to terrestrial, atmospheric and aquatic environments should be avoided. The following aquatic toxicity data are available for components that present toxicity hazards to aquatic organisms.

Octamethyl Cyclotetrasiloxane:

LC_{50} (*Oncorhynchus mykiss* Rainbow trout) 14 days = 10 µg/L

LC_{50} (*Lepomis macrochirus* Bluegill) 96 hours = > 1000 mg/L

LC_{50} (*Brachydanio rerio* Zebra danio) 96 hours = >500 mg/L

Phenyl tris-(methyl ethyl ketoxime) Silane:

EC_{50} (*Daphnia magna* Giant water flea) 48 hours: > 101 mg/L

LC_{50} (*Oncorhynchus mykiss* rainbow trout) 96 hours: 89.8 mg/L

EC_{50} (*Selenastrum capricornutum* algae) 72 hours: 22 mg/L

OTHER ADVERSE EFFECTS: This product is not expected to have any ozone depletion potential.

ENDOCRINE DISRUPTORS: No component has been shown to be or is suspected to cause endocrine disruption to terrestrial or aquatic animals.

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

GHS Statements for Environmental Exposure Controls: P273: Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

U.S. PREPARING WASTES FOR DISPOSAL: As supplied, this product should be tested to see if it meets the criteria of a hazardous waste as defined by U.S. federal regulation (40 CFR 261) if discarded or disposed. State and local regulations may differ from federal regulations. he generator of the waste is responsible for proper waste determination and management.

GHS Statements for Disposal: P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

U.S. EPA Waste Number: None applicable.

CANADIAN HAZARDOUS WASTE REGULATIONS: As supplied, this product should be tested to see if it meets the criteria of hazardous wastes per Canadian Environmental Protection Agency) regulations and the Canadian Environmental Protection Act, 1999 (CEPA).

CEPA Substances Lists: Currently, no component of this found is found on the CEPA Priority Substances Lists.

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14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT): Not regulated per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS (TDG): Not regulated per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): Not regulated per the International Air Transport Association.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): Not regulated per the International Maritime Organization.

15. REGULATORY INFORMATION

This is not an exhaustive list of regulations that may impact this product under applicable jurisdictions.

U.S. REGULATIONS:

U.S. SARA Reporting Requirements: No component of this product is 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: Yes; CHRONIC: Yes; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No

U.S. TSCA Inventory Status: All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

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

U.S. Clean Air Act (CA 112r) Threshold Quantity (TQ): Not applicable.

California Safe Drinking Water And Toxic Enforcement Act (Proposition 65): The Carbon Black and Quartz (Crystalline Silica) are listed on the Proposition 65 lists, but only as airborne, unbound particles of respirable size, which is not applicable to this product. As such, the Proposition 65 warning for these compounds is not applicable to this product.

CANADIAN REGULATIONS:

Canadian DSL/NDSL Inventory Status: The components of this product listed by CAS# in Section 3 of this SDS are on the DSL Inventory.

Canadian Environmental Protection Act (CEPA) Priorities Substances Lists: Not applicable.

Canadian WHMIS (HPR-GHS) 2015 Classification and Symbols: See Section 2 Hazard Identification.

16. OTHER INFORMATION

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS®)

Health	**2***
Flammability	**1**
Physical Hazard	**0**

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe
* = Chronic

HMIS® is a registered trademark of the National Paint and Coatings Association.

16.2 REFERENCES AND DATA SOURCES: Contact the supplier for information.

16.3 METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Global Harmonization Standard (GHS) criteria were used to classify this product.

16.4 DATE OF PREPARATION: May 24, 2024

16.5 REVISION DETAILS: New.

16.6 DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information presented in this Safety Data Sheet is presented in good faith based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. In no case shall the descriptions, information, data or designs provided be considered a part of our terms and conditions of sale.

All materials may present hazards and should be used with caution. Because many factors may affect processing or application/use, we recommend that you make tests to determine the suitability of a product for your particular purpose prior to use. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices or applicable federal, state, or local laws or regulations. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

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16. OTHER INFORMATION (CONTINUED)

DEFINITIONS OF TERMS

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

KEY ACRONYMS:

CHEMTREC: Chemical Transportation Emergency Center, a 24-hour emergency information and/or emergency assistance to emergency responders.
CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.
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.
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.
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 LD_{50} Rat*: > 5000 mg/kg. *Dermal Toxicity LD_{50} Rat or Rabbit*: > 2000 mg/kg. *Inhalation Toxicity 4-hrs LC_{50} Rat*: > 20 mg/L. **1** Slight Hazard: Minor reversible injury may occur; 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 LD_{50} Rat*: > 500–5000 mg/kg. *Dermal Toxicity LD_{50} Rat or Rabbit*: > 1000–2000 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: > 2–20 mg/L. **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 LD_{50} Rat*: > 50–500 mg/kg. *Dermal Toxicity LD_{50} Rat or Rabbit*: > 200–1000 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: > 0.5–2 mg/L. **3** Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation*: Severely irritating and/or corrosive; may 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 LD_{50} Rat*: > 1–50 mg/kg. *Dermal Toxicity LD_{50} Rat or Rabbit*: > 20–200 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: > 0.05–0.5 mg/L. **4** Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure; 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 LD_{50} Rat*: ≤ 1 mg/kg. *Dermal Toxicity LD_{50} Rat or Rabbit*: ≤ 20 mg/kg. *Inhalation Toxicity LC_{50} 4-hrs Rat*: ≤ 0.05 mg/L.
FLAMMABILITY HAZARD: 0 Minimal Hazard: Materials that will not burn in air when exposure to a temperature of 815.5°C (1500°F) for a period of 5 minutes. **1** Slight Hazard: Materials that must be pre-heated before ignition can occur. Material 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) (e.g., OSHA Class IIIB); and Most ordinary combustible materials (e.g., wood, paper, etc.).

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) (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); 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) (e.g., 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*: Packing Group II oxidizers. 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 (or low risk) for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature.

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16. OTHER INFORMATION (CONTINUED)

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued): 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*: Packing 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. *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 LC_{50} for acute inhalation toxicity greater than 10,000 ppm. Dusts and mists with an LC_{50} for acute inhalation toxicity greater than 200 mg/L. Materials with an LD_{50} for acute dermal toxicity greater than 2000 mg/kg. Materials with an LD_{50} 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 LC_{50} for acute inhalation toxicity greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists with an LC_{50} for acute inhalation toxicity greater than 10 mg/L but less than or equal to 200 mg/L. Materials with an LD_{50} 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 LD_{50} 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 LC_{50} 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 LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Dusts and mists with an LC_{50} for acute inhalation toxicity greater than 2 mg/L but less than or equal to 10 mg/L. Materials with an LD_{50} 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 LD_{50} 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 LC_{50} 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 LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Dusts and mists with an LC_{50} for acute inhalation toxicity greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials with an LD_{50} 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 LD_{50} 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 LC_{50} 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 LC_{50} for acute inhalation toxicity, if its LC_{50} is less than or equal to 1000 ppm. Dusts and mists whose LC_{50} for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD_{50} for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD_{50} for acute oral toxicity is less than or equal to 5 mg/kg.

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 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) (e.g., 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 *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) (e.g., Class II and Class IIIA liquids.)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): 2 (continued): 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) (e.g., 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. **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) (e.g., 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.

INSTABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions. Materials that have an 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 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 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 are sensitive to localized thermal or mechanical shock 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.

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. LD_{50}: Lethal Dose (solids & liquids) that kills 50% of the exposed animals. LC_{50}: 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/m^3: Concentration expressed in weight of substance per volume of air. mg/kg: Quantity of material, by weight, administered to a test subject, based on their body weight in kg. TDLo: Lowest dose to cause a symptom. TCLo: Lowest concentration to cause a symptom. TDo, LDLo, and LDo, or TC, TCo, LCLo, and LCo: 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.

REPRODUCTIVE INFORMATION:

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical that causes damage to a developing embryo (e.g., 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.

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. TC: Transport Canada. 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.

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