SAFETY DATA SHEET

Pecora P-165 Primer

1. PRODUCT IDENTIFICATION

IDENTIFICATION of the SUBSTANCE or PREPARATION

<table>
<thead>
<tr>
<th>TRADE NAME (AS LABELED):</th>
<th>Pecora P-165</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCT DESCRIPTION:</td>
<td>Latex Paint</td>
</tr>
<tr>
<td>CHEMICAL NAME/CLASS:</td>
<td>Acrylic Latex Polymer</td>
</tr>
<tr>
<td>SYNONYMS:</td>
<td>None</td>
</tr>
<tr>
<td>RELEVANT USE:</td>
<td>Masonry Primer</td>
</tr>
<tr>
<td>USES ADVISED AGAINST:</td>
<td>Other Than Relevant Use</td>
</tr>
</tbody>
</table>

COMPANY/UNDERTAKING IDENTIFICATION:

| SUPPLIER/MANUFACTURER'S NAME: | Pecora Corporation |
| ADDRESS:                      | 165 Wambold Road, Harleysville, PA 19438 |
| EMERGENCY PHONE:              | 800-424-9300 (CHEMTREC, 24-hours) |
| BUSINESS PHONE:               | 215-723-6051 (Mon–Fri, 8 AM–5 PM ET) |
| PREPARATION DATE:             | January 1, 2012 |
| REVISION DATE:                | May 23, 2013 |

This product is sold for commercial use. This MSDS 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. ALL United States Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, and Canadian WHMIS [Controlled Products Regulations] and the Global Harmonization Standard required information is included in appropriate sections based on the U.S. ANSI Z400.1-2008 format. This product has been classified in accordance with the hazard criteria of the countries listed above.

2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION LABELING AND CLASSIFICATION: This product has been classified per GHS Standards.

Classification: Acute Oral Toxicity Cat. 5
Precautionary Statement Codes: P312

Hazard Statement Codes: H303
Signal Word: None
Hazard Symbols/Pictogram: None Applicable

PHYSICAL DESCRIPTION: This product is a viscous, colored liquid with a characteristic odor of latex.

HEALTH HAZARDS: CAUTION! May be harmful if ingested. Direct eye contact may cause irritation. Prolonged skin contact may cause irritation.

FLAMMABILITY HAZARD: This product not normally flammable or combustible, but may decompose to produce irritating fumes and gases, including ammonia, acetic acid, aluminum, titanium, carbon and nitrogen oxides.

REACTIVITY HAZARD: This product is not reactive.

ENVIRONMENTAL HAZARD: This product has not been tested for environmental impact; release of large quantity may cause harm to marine or terrestrial organisms.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS®)

<table>
<thead>
<tr>
<th>Health</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>1</td>
</tr>
<tr>
<td>Physical Hazard</td>
<td>0</td>
</tr>
</tbody>
</table>

See Section 16 for definitions of ratings

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

CANADIAN WHMIS CLASSIFICATION: Class D2B. See Section 15 (Regulatory Information) for all classification details.

U.S. OSHA REGULATORY STATUS: This material has a classification under the Global Harmonization Standard, as applied under OSHA regulations, as given earlier in this Section.

3. MATERIAL IDENTIFICATION

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>W/W%</th>
<th>GHS Classification Hazard Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Acrylic Polymer</td>
<td></td>
<td>20.0–30.0</td>
<td>Classification: Not Applicable</td>
</tr>
<tr>
<td>Nepheline Syenite</td>
<td>37244-96-5</td>
<td>10.0-25.0</td>
<td>Classification: Not Applicable</td>
</tr>
<tr>
<td>Titanium Dioxide</td>
<td>13463-67-7</td>
<td>8.0-20.0</td>
<td>Classification: Not Applicable</td>
</tr>
</tbody>
</table>

See Section 16 for full text of classification
3. MATERIAL IDENTIFICATION (Continued)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>W/W%</th>
<th>GHS Classification Hazard Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene Glycol</td>
<td>107-21-1</td>
<td>1.0-3.0</td>
<td>Classification: Acute Oral Toxicity Cat. 4</td>
</tr>
<tr>
<td>Aluminum Oxide</td>
<td>1344-28-1</td>
<td>1.0-3.0</td>
<td>Classification: Not Applicable</td>
</tr>
</tbody>
</table>

Water and other trace components. Each of the other components is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens) or is considered to be non-hazardous.

See Section 16 for full text of classification.

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 MSDS to physician or other health professional with victim(s).

INHALATION: If dusts of this material are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

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.

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.

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 cupfuls of water, if conscious. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Dermatitis or other pre-existing skin disorders may be aggravated by overexposures to this product.

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

5. FIRE-FIGHTING MEASURES

FLASH POINT: > 93°C (> 200°F)
AUTOIGNITION: Unknown.

EXTINGUISHING MEDIA:
SUITABLE EXTINGUISHING MEDIA: Use extinguishing material suitable to the surrounding fire, including foam, halon, carbon dioxide and dry chemical.
UNSUITABLE EXTINGUISHING MEDIA: None known.

PROTECTION OF FIREFIGHTERS:
SPECIAL HAZARDS ARISING FROM THE SUBSTANCE: This product is not normally flammable or combustible but can decompose if highly heated for a prolonged period. Irritating gases and fumes including ammonia, acetic acid, aluminum, carbon, nitrogen and titanium oxides may be produced.

SPECIAL PROTECTIVE ACTIONS FOR FIREFIGHTERS: 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.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: An accidental release can 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.

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.
6. ACCIDENTAL RELEASE MEASURES (Continued)

METHODS FOR CLEAN-UP AND CONTAINMENT:

All Spills: Access to the spill area should be restricted. Spread should be limited by gently covering the spill with poly pads. Scrape up or pick-up spilled material, placing in suitable containers. Absorb any residual on appropriate material, such as sand. 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.

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, dusts, vapors or mist. Do not taste or swallow. Use only with adequate ventilation. Keep away from heat and flame. In the event of a spill, follow practices indicated in Section 6: ACCIDENTAL RELEASE MEASURES.

CONDITIONS FOR SAFE STORAGE: This product is stable under ordinary conditions of handling, use and storage. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10: STABILITY AND REACTIVITY). Keep container tightly closed when not in use. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. To prolong shelf life, store at temperatures below 1-60°C (34-140°F).

PRODUCT END USE: This product is used as a sealant. Follow all industry standards for use of this product.

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.

OCCUPATIONAL/WORKPLACE EXPOSURE LIMITS/GUIDELINES:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>Guideline</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>1344-28-1</td>
<td>OSHA PEL TWA</td>
<td>15 mg/m³ (total dust), 5 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DFG MAK TWA</td>
<td>4 mg/m³ (inhalable fraction); 1.5 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DFG PREGNANCY RISK CAT.</td>
<td></td>
</tr>
<tr>
<td>Ethylene Glycol</td>
<td>107-21-1</td>
<td>ACGIH TLV STEL/CEILING</td>
<td>100 mg/m³ (ceiling)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OSHA PEL STEL/CEILING</td>
<td>Vacated 1989 PEL: 125 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DFG MAK TWA</td>
<td>10 mg/m³ (skin)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DFG PEAK</td>
<td>2×MAK 15 minute average value, 1-hr interval, 4 per shift (skin)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DFG PREGNANCY RISK CAT.</td>
<td></td>
</tr>
<tr>
<td>Nepheline Syenite</td>
<td>37244-96-5</td>
<td>None Established</td>
<td>None Established</td>
</tr>
<tr>
<td>Proprietary Acrylic Polymer</td>
<td>None Established</td>
<td>None Established</td>
<td></td>
</tr>
<tr>
<td>Titanium Dioxide</td>
<td>13463-67-7</td>
<td>ACGIH TLV TWA</td>
<td>10 mg/m³ NIC: 1 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OSHA PEL TWA</td>
<td>15 mg/m³ (total dust)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NIOSH REL</td>
<td>Lowest feasible concentration (LOQ 0.2 mg/m³)</td>
</tr>
</tbody>
</table>

NE = Not Established. NIC = Notice of Intended Change  See Section 16 for Definitions of Terms Used.


EYE/FACE PROTECTION: Use approved safety goggles or safety glasses. If necessary, refer to appropriate regulations and standards.

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

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 electrical hazards, use foot protection, as described in appropriate regulations and standards.

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 and standards.
9. PHYSICAL and CHEMICAL PROPERTIES

FORM: Viscous liquid.
MOLECULAR WEIGHT: Mixture.
ODOR THRESHOLD: Not available.
SPECIFIC GRAVITY: 1.37-1.39
RELATIVE VAPOR DENSITY (air = 1): Heavier than air.
SOLUBILITY IN WATER: Insoluble.
MELTING/FREEZING POINT: Not available.
VOC (less water and exempt): 100 Gms/L, 0.8 lbs/gal
FLASH POINT: > 93°C (> 200°F)
PH: Not available.
FLAMMABLE LIMITS (in air by volume, %): Lower: Not established; Upper: Not established.

10. STABILITY and REACTIVITY

CHEMICAL STABILITY: Stable under normal circumstances of use and handling.
CONDITIONS TO AVOID: Avoid contact with incompatible chemicals and exposure to extreme temperatures.
INCOMPATIBLE MATERIALS: This product is not compatible with strong acids and oxidizers and materials incompatible with water.
HAZARDOUS DECOMPOSITION PRODUCTS: Combustion: Thermal decomposition of this product can generate dusts, irritating fumes, and toxic gases (e.g., ammonia, acetic acid, aluminum, titanium, carbon and nitrogen oxides). Hydrolisis: None known.
POSSIBILITY OF HAZARDOUS REACTIONS/POLYMERIZATION: This product is not expected to undergo hazardous polymerization, decomposition, condensation, or self-reactivity.

11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS: The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this product are as follows:

CONTACT WITH SKIN or EYES: Contact may mildly irritate the skin and cause redness and discomfort. Prolonged or repeated skin contact may cause dermatitis (dry, red skin). Eye contact may cause redness, pain, and tearing.

SKIN ABSORPTION: No information is available on possible hazards by skin absorption.

INGESTION: May be harmful if swallowed. If the product is swallowed, it may mildly irritate the mouth, throat, and other tissues of the gastrointestinal system and may cause nausea, vomiting, and diarrhea.

INHALATION: Overexposure to vapors of this product generated during curing, or dusts of this product generated during use after curing may mildly irritate the respiratory tract and cause coughing and sneezing.

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

TARGET ORGANS: Acute: Skin, eyes, respiratory system. Chronic: Skin.
CHRONIC EFFECTS: Prolonged or repeated skin contact may cause dermatitis (dry, red skin).

TOXICITY DATA: There are currently no toxicity data available for this product; the following toxicology information is available for components greater than 1% in concentration.

ALUMINUM OXIDE:
LD₅₀ (Intraperitoneal-Mouse) > 3600 mg/kg

TCL₀ (Inhalation-Rabbit) 200 mg/m³/5 hours/28 weeks-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi, chronic pulmonary edema; Related to Chronic Data: death

TCL₀ (Inhalation-Rabbit) 200 mg/m³/5 hours/28 weeks-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi; Lungs, Thorax, or Respiration: chronic pulmonary edema; Related to Chronic Data: death

TDL₀ (Intraperitoneal-Rabbit) 90 mg/kg: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: tumors

TDL₀ (Implant-Rat) 200 mg/kg: Tumorigenic: neoplastic by RTECS criteria; Tumorigenic: tumors at site of application

TD (Implant-Rat) 200 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria, tumors at site of application

ETHYLENE GLYCOL (continued):
TDL₀ (Implant-Rat) 0.012%/3 days

Standard Draize Test (Eye-Rabbit) 0.012%/3 days

Standard Draize Test (Eye-Rabbit) 500 µg/24 hours: Mild

Standard Draize Test (Eye-Rabbit) 100 µg/1 hour: Mild

Standard Draize Test (Eye-Rabbit) 0.012 ppm/3 days

Standard Draize Test (Eye-Rabbit) 1440 µg/6 hours: Moderate

Open Irritation Test (Skin-Rabbit) 555 mg: Mild

TDL₀ (Oral-Rat) 24 gm/kg: Brain and Coverings: recordings from specific areas of CNS; Sense Organs and Special Senses (Eye): mydriasis (pupillary dilation); Lungs, Thorax, or Respiration: other changes

TDL₀ (Oral-Rat) 15 gm/kg: Peripheral Nerve and Sensation: sensory change involving peripheral nerve; Gastrointestinal: ulceration or bleeding from small intestine; Kidney/Ureter/Bladder: renal function tests depressed

TDL₀ (Oral-Rat) 1195 mg/kg: Peripheral Nerve and Sensation: sensory change involving peripheral nerve; Kidney/Ureter/Bladder: renal function tests depressed

TDL₀ (Oral-Rat) 2000 mg/kg: Brain and Coverings: recordings from specific areas of CNS; Brain and Coverings: other degenerative changes

TDL₀ (Oral-Rat) 24 gm/kg: Brain and Coverings: other degenerative changes; Behavioral: ataxia, coma

TDL₀ (Oral-Rat) 16 gm/kg: Behavioral: coma; Kidney/Ureter/Bladder: renal function tests depressed; Nutritional and Gross Metabolic: metabolic acidosis

ETHYLENE GLYCOL: Standard Draize Test (Eye-Rabbit) 0.012%/3 days

Standard Draize Test (Eye-Rabbit) 500 µg/24 hours: Mild

Standard Draize Test (Eye-Rabbit) 100 µg/1 hour: Mild

Standard Draize Test (Eye-Rabbit) 0.012 ppm/3 days

Standard Draize Test (Eye-Rabbit) 1440 µg/6 hours: Moderate

Open Irritation Test (Skin-Rabbit) 555 mg: Mild

TDL₀ (Oral-Rat) 24 gm/kg: Brain and Coverings: recordings from specific areas of CNS; Sense Organs and Special Senses (Eye): mydriasis (pupillary dilation); Lungs, Thorax, or Respiration: other changes

TDL₀ (Oral-Rat) 15 gm/kg: Peripheral Nerve and Sensation: sensory change involving peripheral nerve; Gastrointestinal: ulceration or bleeding from small intestine; Kidney/Ureter/Bladder: renal function tests depressed

TDL₀ (Oral-Rat) 1195 mg/kg: Peripheral Nerve and Sensation: sensory change involving peripheral nerve; Kidney/Ureter/Bladder: renal function tests depressed

TDL₀ (Oral-Rat) 2000 mg/kg: Brain and Coverings: recordings from specific areas of CNS; Brain and Coverings: other degenerative changes

TDL₀ (Oral-Rat) 24 gm/kg: Brain and Coverings: other degenerative changes; Behavioral: ataxia, coma

TDL₀ (Oral-Rat) 16 gm/kg: Behavioral: coma; Kidney/Ureter/Bladder: renal function tests depressed; Nutritional and Gross Metabolic: metabolic acidosis

ETHYLENE GLYCOL (continued):
TDL₀ (Child) 5500 mg/kg: Behavioral: general anesthetic; Lungs, Thorax, or Respiration: respiratory stimulation; Kidney/Ureter/Bladder: other changes

TDL₀ (Oral-Human) 786 mg/kg: Behavioral: convulsions or effect on seizure threshold, coma; Gastrointestinal: hypermotility, diarrhea

LD₅₀ (Oral-Human) 398 mg/kg: Behavioral: headache; Gastrointestinal: nausea or vomiting; Liver: other changes

LD₅₀ (Oral-Human) 1.43 mL/kg

LD₅₀ (Unreported-Man) 1637 mg/kg

LD₅₀ (Unreported-Human) 70 mg/kg: Cardiac: change in rate; Lungs, Thorax, or Respiration: acute pulmonary edema; Liver: other changes

TCLo (Inhalation-Human) 140 mg/m³/30 days-intermittent: Lungs, Thorax, or Respiration: cough

TCLo (Inhalation-Human) 22 mg/m³: Kidney/Ureter/Bladder: proteinuria

TCLo (Inhalation-Human) 10.000 mg/m³: Sense Organs and Special Senses (Eye): lacrymation; Lungs, Thorax, or Respiration: cough; other changes

DNA Inhibition (Human Lymphocyte) 320 mmol/L

LD₅₀ (Oral-Rat) 4700 mg/kg

LD₅₀ (Oral-Mouse) 5500 mg/kg

LD₅₀ (Oral-Dog) 5500 mg/kg: Kidney/Ureter/Bladder: other changes

LD₅₀ (Oral-Cat) 1650 mg/kg: Kidney/Ureter/Bladder: other changes

LD₅₀ (Oral-Cat) 2000 mg/kg

LD₅₀ (Oral-Guinea Pig) 6610 mg/kg: Behavioral: somnolence (general depressed activity); Gastrointestinal: other changes; Kidney/Ureter/Bladder: other changes

LD₅₀ (Oral-Guinea Pig) 6600 mg/kg

LD₅₀ (Skin-Rabbit) 9530 µL/kg

LD₅₀ (Intraperitoneal-Rat) 5010 mg/kg

LD₅₀ (Intraperitoneal-Mouse) 5614 mg/kg: Lungs, Thorax, or Respiration: chronic pulmonary edema; Kidney/Ureter/Bladder: changes in both tubules and glomeruli; Blood: changes in spleen

LD₅₀ (Intraperitoneal-Mouse) 1700 mg/kg

LD₅₀ (Subcutaneous-Rat) 2800 mg/kg

LD₅₀ (Subcutaneous-Rat) 3260 mg/kg

LD₅₀ (Subcutaneous-Mouse) 2700 mg/kg

LD₅₀ (Subcutaneous-Rabbit) 19.500 mg/kg

LD₅₀ (Intravenous-Mouse) 300 mg/kg

ETHYLENE GLYCOL:

Pecora P-165 Primer Page 4 of 10 May 23, 2013
TCLo (Inhalation-Mouse) 1 mg/m³/122 days-intermittent: Sense Organs and Special Senses (Eye):

TCLo (Inhalation-Rat) 0.02 gm/m³/2 weeks-intermittent: Behavioral: aggression

TCLo (Inhalation-Rat) 0.003 gm/m³/228 days-intermittent: Brain and Coverings: other degenerative changes; Behavioral: general anesthetic

TCLo (Inhalation-Rat) 0.02 gm/m³/154 days-intermittent: Vascular: BP lowering not characterized in other developmental abnormalities

TCLo (Inhalation-Mouse) 10 mg/m³/122 days-intermittent: Related to Chronic Data: death

TCLo (Inhalation-Rat) 2500 mg/m³/6 hours: female 6-15 day(s) after conception: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: skeletal system

TCLo (Oral-Rat) 50 gm/kg/1 years-continuous: Related to Chronic Data: death; Behavioral: fluid intake; Kidney/Ureter/Bladder: changes in bladder weight

TDLo (Oral-Rat) 1000 mg/kg/7 days-intermittent: Kidney/Ureter/Bladder: proteinuria; Nutritional and Gross Metabolic: changes in phosphorus; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases

TDLo (Oral-Rat) 26,150 mg/kg/10 days-continuous: Kidney/Ureter/Bladder: changes in tubules (including acute tubular necrosis, acute tubular necrosis); Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TDLo (Oral-Rat) 33,750 mg/kg/15 days-intermittent: Kidney/Ureter/Bladder: changes in kidney weight; Reproductive: Maternal Effects: uterus, cervix, vagina

TDLo (Oral-Rat) 18,750 mg/kg/15 days-intermittent: Kidney/Ureter/Bladder: other changes

TDLo (Oral-Rat) 25,000 mg/kg/10 days-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Rat) 10.9 gm/kg/7 days-intermittent: Kidney/Ureter/Bladder: proteinuria; Nutritional and Gross Metabolic: changes in calcium; Nutritional and Gross Metabolic: changes in phosphorus; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases

TDLo (Oral-Rat) 14,4 L/kg/2 weeks-intermittent: other changes; changes in liver weight

TDLo (Oral-Rat) 120 mg/kg/6 hours: changes in bone marrow (not otherwise specified)

TDLo (Oral-Rat) 14 mg/kg/3 days-intermittent: Kidney/Ureter/Bladder: other changes

TDLo (Oral-Rat) 438 gm/kg/2 years-continuous: Behavioral: fluid intake; Kidney/Ureter/Bladder: changes in tubes (including acute renal failure, acute tubular necrosis); Related to Chronic Data: death

TDLo (Oral-Rat) 85,230 mg/kg/90 days-continuous: Kidney/Ureter/Bladder: changes in bladder weight; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Nutritional and Gross Metabolic: changes in phosphorus

TDLo (Oral-Rat) 12 mg/kg/6 days-intermittent: Nutritional and Gross Metabolic: changes in calcium; Nutritional and Gross Metabolic: changes in phosphorus; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases

TDLo (Oral-Rat) 1000 mg/kg/7 days-intermittent: Kidney/Ureter/Bladder: other changes in urine composition

TDLo (Oral-Rat) 10.9 gm/kg/1 years-continuous: Related to Chronic Data: death; Behavioral: fluid intake; Kidney/Ureter/Bladder: urine volume increased

TDLo (Oral-Rat) 146 mg/kg/1 years-continuous: Behavioral: food intake (animal); Nutritional and Gross Metabolic: changes in phosphorus

TDLo (Oral-Rat) 10.9 mg/kg/8 weeks-continuous: Kidney/Ureter/Bladder: proteinuria; Nutritional and Gross Metabolic: changes in calcium, changes in phosphorus

TDLo (Oral-Rat) 18.2 gm/kg/1 years-continuous: Kidney/Ureter/Bladder: other changes in urine composition

TDLo (Oral-Rat) 10.9 gm/kg/1 years-continuous: Related to Chronic Data: death; Behavioral: fluid intake; Kidney/Ureter/Bladder: other changes in urine composition

TDLo (Oral-Rat) 42 mg/kg/8 weeks-continuous: Kidney/Ureter/Bladder: other changes in urine composition, other changes

TDLo (Oral-Rat) 8580 mg/kg/15 days-intermittent: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: skeletal system
TOXICITY DATA (continued):

ETHYLENE GLYCOL (continued):

TDLo (Oral-Rat) 12.5 mg/kg: female 6-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: craniofacial (including nose and tongue), musculoskeletal system; Effects on Newborn: live birth index (measured after birth), other measures of fertility

TDLo (Oral-Rat) 51.94 mg/kg: male 11 week(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct

TDLo (Oral-Rat) 18.8 mg/kg: female 6-20 day(s) after conception: Reproductive: Fertility: abortion; Effects on Newborn: stillbirth

TDLo (Oral-Mouse) 33.75 mg/kg: female 6-20 day(s) after conception: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Effects on Newborn: viability index (e.g., # alive at day 4 per # born alive), growth statistics (e.g.,% reduced weight gain)

TDLo (Oral-Mouse) 31.75 mg/kg: female 6-20 day(s) after conception: Reproductive: Specific Developmental Abnormalities: musculoskeletal system; Effects on Newborn: live birth index (measured after birth)

TDLo (Oral-Rat) 28,000 mg/kg: female 6-19 day(s) after conception: Reproductive: Fertility: abortion; Effects on Newborn: stillbirth

TDLo (Oral-Mouse) 31.75 mg/kg: female 6-20 day(s) after conception: Reproductive: Fertility: litter size (e.g. # fetuses per litter; measured before birth); Effects on Newborn: viability index (e.g., # alive at day 4 per # born alive), growth statistics (e.g.,% reduced weight gain)

TDLo (Oral-Mouse) 546 mg/kg/13 weeks-continuous: Liver: hepatocellular necrosis, renal; Kidney/Ureter/Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Mouse) 1081 g/kg/2 years-continuous: Liver: hepatocellular necrosis, renal; Kidney/Ureter/Bladder: changes in tubules (including acute renal failure, acute tubular necrosis)

TDLo (Oral-Mouse) 88,720 mg/kg/8 days-intermittent: Related to Chronic Data: death

TDLo (Oral-Mouse) 29.4 mg/kg/7 days-continuous: Related to Chronic Data: death

TDLo (Oral-Mouse) 117.6 mg/kg/14 days-continuous: Related to Chronic Data: death

TDLo (Oral-Mouse) 82.3 g/kg/14 weeks-continuous: Related to Chronic Data: death

TDLo (Oral-Mouse) 15,000 mg/kg/10 days-continuous: Skin and Appendages: hair; Nutritional and Gross Metabolic: weight loss or decreased weight gain; Liver: changes in liver weight

TDLo (Oral-Mouse) 294,000 mg/kg/15 weeks-continuous: Kidney/Ureter/Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Reproductive: Paternal Effects: testes, epididymis, sperm duct; Nutritional and Gross Metabolic: weight loss or decreased weight gain

TDLo (Oral-Mouse) 7500 mg/kg: female 6-15 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: musculoskeletal system

TDLo (Oral-Mouse) 7500 mg/kg: female 6-15 day(s) after conception: Reproductive: Specific Developmental Abnormalities: craniofacial (including nose and tongue), musculoskeletal system

TDLo (Oral-Mouse) 21,750 mg/kg: female 6-15 day(s) after conception lactating female 21 day(s) post birth: Reproductive: Effects on Newborn: live birth index (measured after birth), growth statistics (e.g.,% reduced weight gain), delayed effects

TDLo (Oral-Mouse) 88,720 mg/kg: female 7-14 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Effects on Newborn: stillbirth, live birth index (measured after birth)

TDLo (Oral-Mouse) 15 mg/kg: female 6-15 day(s) after conception: Reproductive: Maternal Effects: uterus, cervix, vagina: Fertility: pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea), other measures of fertility

TDLo (Oral-Mouse) 88,720 mg/kg: female 7-14 day(s) after conception: Reproductive: Effects on Newborn: live birth index (measured after birth), viability index (e.g., # alive at day 4 per # born alive), growth statistics (e.g.,% reduced weight gain)

TDLo (Oral-Mouse) 413 mg/kg: male 15 week(s) pre-mating female 15 week(s) pre-mating: 3 week(s) post-mating: Effects on Newborn: live birth index (measured after birth); Specific Developmental Abnormalities: craniofacial (including nose and tongue), musculoskeletal system

TDLo (Oral-Mouse) 1.7 g/kg: Multi-generations: Reproductive: Specific Developmental Abnormalities: musculoskeletal system; Effects on Newborn: growth statistics (e.g.,% reduced weight gain)

TDLo (Oral-Mouse) 850 mg/kg: Multi-generations: Reproductive: Specific Developmental Abnormalities: urogenital system
11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

**TITANIUM DIOXIDE (continued):**

TCLo (Inhalation-Mouse) 10 mg/m^3/6 hours/13 weeks- intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

TCLo (Inhalation-Mouse) 10 mg/m^3/13 weeks- intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediate): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Mouse) 50 mg/m^3/13 weeks- intermittent: Lungs, Thorax, or Respiration: spumum; Blood: changes in cell count ( unspecified); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TCLo (Inhalation-Mouse) 250 mg/m^3/13 weeks- intermittent: Lungs, Thorax, or Respiration: spumum; Blood: changes in cell count ( unspecified); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases

TCLo (Inhalation-Hamster) 250 mg/m^3/13 weeks- intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

**CARCINOGENIC POTENTIAL:** The following table summarizes the carcinogenicity listing for the components of this product. “NO” indicates that the substance is not considered to be or suspected to be a carcinogen by the listed agency, see section 16 for definitions of other ratings.

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>EPA</th>
<th>IARC</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>PROP 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<td>Ethylene Glycol</td>
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<td>No</td>
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<tr>
<td>Nepheline Syenite</td>
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<td>No</td>
<td>No</td>
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</tr>
<tr>
<td>Proprietary Acrylic Polymer</td>
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<td>No</td>
<td>No</td>
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<tr>
<td>Titanium Dioxide</td>
<td>No</td>
<td>2B</td>
<td>No</td>
<td>Ca</td>
<td>A4, NIC: A3</td>
<td>No</td>
</tr>
</tbody>
</table>

IARC 2B: Possibly Carcinogenic to Humans. ACGIH TLV-A3: Confirmed Animal Carcinogen. ACGIH TLV-A4: Not Classifiable as a Human Carcinogen. NIOSH-Ca (Potential Occupational Carcinogen with No Further Categorization)

**IRRITANTITY OF PRODUCT:** This may mildly irritate contaminated tissue, especially if contact is prolonged. Eye irritation may be more pronounced.

**SENSITIZATION TO THE PRODUCT:** No component of this product is known to cause skin or respiratory sensitization in humans.

**TOXICOLOGICAL SYNERGISTIC PRODUCTS:** None known.

**REPRODUCTIVE TOXICITY INFORMATION:** This product has not been tested for reproductive toxicity. No component is known to have mutagenic, embryotoxic, teratogenic or reproductive toxicity effects in humans.

**BIOLOGICAL EXPOSURES INDICES (BEIs):** There are no BEI’s established for any component of this product at this time.

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.

**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. The following data are available for the Ethylene Glycol component.

**ETHYLENE GLYCOL:**

- **LD50 (Carassius auratus goldfish) 24 hours = >5,000 mg/L modified ASTM D 1345**
- **LC50 (Poecilia reticulata Guppies) 7 days = 49,300 ppm/Conditions of bioassay not specified**
- **LC50 (Rainbow trout) 96 hours = 18,500 mg/L/Conditions of bioassay not specified**
- **LC50 (Rainbow trout) 96 hours = 41,000 mg/L/At 20°C/Conditions of bioassay not specified**
- **LC50 (Crangon crangon Brown shrimp) 48 hours = >100 mg/L aerated salt water**
- **LC50 (Goldfish) 24 hours = >5000 mg/L/At 20°C static conditions**

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

**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

**PREPARING WASTES FOR DISPOSAL:** As supplied, this product would not be 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. The generator of the waste is responsible for proper waste determination and management.

**U.S. EPA WASTE NUMBER:** Not applicable.

14. TRANSPORTATION INFORMATION

**U.S. DEPARTMENT OF TRANSPORTATION:** 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 SHIPPING INFORMATION (IATA):** This product is NOT classified as dangerous goods, per the International Air Transport Association.

**INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO):** This product is NOT classified as dangerous goods, per the International Maritime Organization.
15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:
U.S. SARA REPORTING REQUIREMENTS: No components of this product are 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; SUDEN 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.
OTHER U.S. FEDERAL REGULATIONS: Not applicable.
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component is found on the Proposition 65 List of chemicals.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are listed on the DSL Inventory.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA Priorities Substances Lists.
CANADIAN WHMIS REGULATIONS: This product is classified as a Controlled Product, D2B (Immediate Acute Toxicity/Irritation) as per the Controlled Product Regulations.

ADDITIONAL MEXICAN REGULATIONS:
MEXICAN WORKPLACE REGULATIONS (NOM-018-STPS-2000): This product is not classified as hazardous.

16. OTHER INFORMATION

WARNINGS (per ANSI Z129.1): WARNING! HARMFUL IF INGESTED. MAY CAUSE EYE, SKIN, AND RESPIRATORY TRACT IRRITATION, ESPECIALLY IF EXPOSURE IS PROLONGED. COMBUSTIBLE-MAY IGNITE IF HIGHLY HEATED FOR PROLONGED PERIOD OR IF SUBJECT TO DIRECT FLAME. Avoid contact with eyes, skin, and clothing. Avoid breathing fumes, dusts, vapors or mist. Do not taste or swallow. Wash thoroughly after handling. Wear gloves, eye protection, respiratory protection, and appropriate body protection.

Hazard Statements:
H303: May be harmful if swallowed.
Precautionary Statements:
Prevention: None applicable.
Response: P312: Call a POISON CENTER or doctor if you feel unwell.
Storage: None applicable.
Disposal: None applicable.

GLOBAL HARMONIZATION LABELING AND CLASSIFICATION: Classified in accordance with the Global Harmonization Standard.

Classification: Acute Oral Toxicity Category 5
Signal Word: None applicable.
Hazard Statements: H303: May be harmful if swallowed.
Precautionary Statements:
Prevention: None applicable.
Response: P312: Call a POISON CENTER or doctor if you feel unwell.
Storage: None applicable.
Disposal: None applicable.

DISSCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES
The information presented in this Material Safety Data Sheet is presented in good faith based on data believed to be accurate as of the date this Material 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.

REFERENCES AND DATA SOURCES: Contact the supplier for information.
METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Bridging principles were used to classify this product.
REVISION DETAILS: May 2013: Update and revise entire MSDS to include current GHS requirements.
DATE OF PRINTING: June 12, 2013
DEFINITIONS OF TERMS

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

KEY ACRONYMS

CHEMTREC: Chemical Transportation Emergency Center, a 24-hour information and/or emergency assistance to emergency responders.

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

DFG MAKs: Federal Republic of Germany Maximum Concentrations in the workplace. Exposure limits are given as TWA (Time-Weighted Average) or PEAK (short-term exposure) values.

DFG MAK: Categories of substances that have been shown to increase the mutation frequency in the progeny of exposed mammals. 2: Gen mutant cells that have been shown to increase the mutation frequency in the progeny of exposed mammals. 3A: Substances that have been shown to induce genetic damage in germ cells of human, or which produce mutations or structural changes in mammalian chromosomes or 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 is no other information but that are structurally related to known in vivo germ cell 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 mutation is not considered in the evaluation of substances.

Detonation Hazard: Materials that are capable of detonation or explosive reaction, but require a strong initiate or must be heated under confinement before initiation; or materials that react explosively with water. Explosives: Substances that can undergo hazardous reaction, even when exposed, even if instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

DLH: 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.

LOG: Limit of Quantitation.

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

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 on the 1980 TWA and the June, 1993. Air Contaminants (Revision) Federal Register 58: 35335–35355 (on 30 June 1993). 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 to indicate a hazard of cuts, burns, or other physical injuries.

STEEL: 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 concentrations 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 workday.

TWA: Time-Weighted Average 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. P.I. 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. P.I. 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 4-hrs LC50 Rat: > 2-20 mg/l. 2 Moderate Hazard: Temporary or transitory injury may occur; prolonged exposure may affect the CNS. Skin irritation: Moderately irritating, priming irritant; sensitizer. P.I. 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 mg/kg. Inhalation Toxicity 4-hrs LC50 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; irreversible, but reversible with treatment. P.I. or Draize > 5, with destruction of dermal 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: > 200-200 mg/kg. Inhalation Toxicity 4-hrs LC50 Rat: > 0.5-2 mg/l. 4 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. Dermal Toxicity LD50 Rat or Rabbit: > 20 mg/kg. Inhalation Toxicity 4-hrs LC50 Rat: > 0.05 mg/l.

FLAMMABILITY HAZARD:

0 Minimal Hazard: Materials that will not burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes. 1 Slight Hazard: Materials that must be protected from ignition or fire; ignition is unlikely or moderate; no serious or major fire danger. 2 Moderate Hazard: Materials that are not likely to cause serious or major fire hazard. 3 Serious Hazard: Materials that are likely to cause significant fire hazard. 4 Life-threatening; major or permanent damage may result from single or repeated exposures; extremely toxic; irreversible injury may result from brief contact. Materials that burn during exposure 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 III-B); Most Ordinary combustible materials (such as wood, paper, fabric, etc.).

Physical Hazard:

0 Water Reactivity: Materials that do not react with water. Organic Peroxides: Materials that do not polymerize, decompose, or self-react; or with water under any condition.

1 Water Reactivity: Materials that react with water, but do not polymerize, decompose, or self-react; or with water under any condition.

2 Water Reactivity: Materials that may react with water; with water under conditions that may cause a slight hazard or have a projection hazard. A mass explosion is one that affects almost the entire load of the package, or that involves virtually instantaneous explosion of almost the entire contents of the package.

3 Water Reactivity: Materials that may react explosively with water.

4 Water Reactivity: Materials that react explosively with water without requiring heat or confinement. Organic Peroxides: Materials that are capable of detonation or explosive reaction, but require a strong initiate or must be heated under confinement before initiation; or materials that react explosively with water. Explosives: Substances that can undergo hazardous reaction, even if instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

Hazardous Materials Identification System Hazard Ratings: This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

4 Life-threatening; major or permanent damage may result from single or repeated exposures; extremely toxic; irreversible injury may result from brief contact. Materials that burn during exposure 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 III-B); Most Ordinary combustible materials (such as wood, paper, fabric, etc.). 2 Moderate Hazard: Materials that are not likely to cause serious or major fire hazard. 3 Serious Hazard: Materials that are likely to cause significant fire hazard. 4 Life-threatening; major or permanent damage may result from single or repeated exposures; extremely toxic; irreversible injury may result from brief contact. Materials that burn during exposure 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 III-B); Most Ordinary combustible materials (such as wood, paper, fabric, etc.).
DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION

HAZARD RATINGS (Continued)

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 toxicity greater than 10,000 ppm. Dusts and mists with an LC50 for acute toxicity greater than 200 mg/L. Lethal concentration of air for acute oral toxicity greater than 2000 mg/kg. Dusts and mists with an LC50 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 toxicity greater than 500 ppm but less than or equal to 10,000 ppm. Dusts and mists with an 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 with an LD50 for acute oral toxicity greater than 50 mg/kg but less than or equal to 200 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. 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 lacrhamytrants. 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 and possibly irreversible injury to the eyes or respiratory system. 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 than one-fifth its LC50 for acute inhalation toxicity, if its LC50 is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 1 or degree of hazard 2. Dusts and mists with an 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 ignite when exposed to air at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. 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 one-fifth its LC50 for acute inhalation toxicity, if its LC50 is less than or equal to 1000 ppm. Dusts and mists with an acute inhalation toxicity less than or equal to 0.5 mg/L. Materials whose LC50 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 do not have a flash point under typical fire fighting conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. Materials that will not burn in air when exposed to a temperature of 186°C (360°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 186°C (360°F) for a period of 5 minutes in accordance with Annex D of NFPA 704. Liquids, solids, and semi-solids having a flash point at or above 94°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the Method of Testing for Sustained Combustibility, per 49 CFR 173, Appendix H or the UN Recommendations on the Transport of Dangerous Goods, Model Regulations (current edition) and the International Maritime Code and the 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 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 fire fighting conditions give off sufficient vapor or gas/air mixture that will ignite and burn with a flame. UEL Lowest concentration of a flammable vapor or gas/air mixture that will ignite and burn with a flame. UEL Highest degree of hazard. HAZARDOUS MATERIALS: Materials that are sensitive to thermal or mechanical shock 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 100 W/mL. 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 400 W/mL or greater. FLAMMABILITY LIMITS IN AIR: The upper limit 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. LLel Lowest concentration of a flammable vapor or gas/air mixture that will ignite and burn with a flame. UEL Highest degree of hazard. 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 provided: LD50 Lethal Dose (solids and liquids) that kills 50% of the exposed animals within 30 days of exposure. Inhalation LC50: Lethal Concentration (gases) that kills 50% of the exposed animals. ppm Concentration expressed in parts per million of air or water. mg/L 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. MTD Lowest dose to cause a symptom. TDI LD50 and LDI or LC50 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. Substances (2A, 2B, etc.) are also used. Other Information: BEI, ACGIH Biological Exposure Indices, represent the average exposure of workers who are exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REPRODUCTIVE TOXICITY INFORMATION: A teratogen 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 (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

ECOLOGICAL INFORMATION:

LC: Effect concentration in water. BCF: Bioconcentration Factor, which is used to determine if a substance can accumulate in life forms or affect the reproductive processes of a plant or animal. TLV: Median threshold limit. log KCw or log KCf: Coefficient of Oil/Water Distribution is used to assess a substance’s behavior in the environment.

REGULATORY INFORMATION: This section explains the impact of various laws and regulations on the material.

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 product’s package label.

CANADA: