SAFETY DATA SHEET

PECORA CORPORATION®
Architectural Weatherproofing Products
U.S.A. • since 1862

PECORA HEALER/SEALER ACTIVATOR

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

1.1 IDENTIFICATION of the SUBSTANCE or PREPARATION

PRODUCT IDENTIFIER/TRADE NAME (AS LABELED)	**PECORA HEALER/SEALER ACTIVATOR**
OTHER MEANS OF IDENTIFICATION	None
RECOMMENDED PRODUCT USE:	Sealant Activator
RESTRICTIONS ON USE:	Other than recommended use

1.2 U.S. COMPANY/UNDERTAKING IDENTIFICATION:

U.S. 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:	November 21, 2021
REVISION DATE:	New

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 IDENTIFICATION

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

2.1.1 Classification:

Reproductive Toxicity Category 2, Acute Toxicity Cat. 3, Skin Corrosion/Damage Category 1B; Eye Corrosion/Damage Category 1, Skin Sensitization Cat. 1, Specific Target Organ Toxicity (Oral-Kidneys) Repeated Exposure Cat. 2

2.1.2 Signal Word: Danger

2.1.3 Hazard Statements:

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. H301: Toxic if swallowed. H314: Causes severe skin burns and eye damage. H317: May cause an allergic skin reaction. H318: Causes serious eye damage. H372: Causes damages to kidneys through prolonged or repeated exposure by ingestion.

2.1.4 Hazards Not Otherwise Classified (HNOC): None known.

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

2.1.6 Precautionary Statements:

2.1.6.1 Prevention:

P203: Obtain, read and follow all safety instructions before use. P260: Do not breathe vapors. 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.

2.6.1.2 Response:

P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P302 + P361 + P354: IF ON SKIN: Take off immediately all contaminated clothing. Immediately wash with water for 15 minutes. P316: Get emergency medical help immediately. P333 + P317: If skin irritation or rash occurs, get medical attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P321: Specific treatment (remove from exposure and treat symptoms).

2.6.1.3 Storage:

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

2.6.1.4 Disposal:

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

2.1.7 Hazard Symbols/Pictograms: GHS05, GHS06, GHS07, GHS08

2.2 Percent of Unknown Acute Toxicity: This product is a mixture; the following are percentages of unknown acute toxicity, by route of exposure. Oral: 0% Dermal 0%, and Inhalation: 60%.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Chemical Name	CAS #	W/W%	LABEL ELEMENTS GHS Classification under U.S. OSHA HazCom & Canadian WHMIS (HPR-GHS) 2015 Hazard Statement Codes
Formaldehyde Polymer with Benzenamine, Hydrogenated	135108-88-2	40-50	Notified Classification: Acute Oral Toxicity Cat. 3, Skin Corrosion Cat. 1C, Eye Irritation/Corrosion Cat. 1, Skin Sensitization Cat. 1, Specific Target Organ Toxicity (Oral-Kidneys) Repeated Exposure Cat. 2 Hazard Statements: H301: Toxic if swallowed. H314: Causes severe skin burns and eye damage. H318: Causes serious eye damage. H317: May cause an allergic skin reaction. H373: May cause damage to kidneys through prolonged or repeated oral exposure.
Benzyl Alcohol	100-51-6	25-45	Harmonized Classification: Acute Oral Toxicity Cat. 4, Acute Inhalation Toxicity Cat. 4 Notified Classification: Eye Corrosion/Irritation Cat. 2A Hazard Statements: H302 + H332: Harmful if swallowed or if inhaled. H319: Causes serious eye irritation.
Aminoethyl Piperazine	140-31-8	10-15	Harmonized Classification: Skin Corrosion Cat. 1B, Acute Oral Toxicity Cat. 4, Acute Dermal Toxicity Cat. 4, Skin Sensitization Cat. 1, Aquatic Chronic Toxicity Cat. 3 Notified Classification: Reproductive Toxicity Cat. 2, Acute Oral Toxicity Cat. 3, Specific Target Organ Toxicity (Inhalation-Respiratory System) Repeated Exposure Cat. 1 Hazard Statements: H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. H314: Causes severe skin burns and eye damage. H302 + H312: Harmful if swallowed or in contact with skin. H317: May cause an allergic skin reaction. H371: May cause damage to organs. H412: Harmful to aquatic life with long-lasting effects.
4,4'-Methylenebis (cyclohexylamine)	1761-71-3	1-5	Notified Classification: Reproductive Toxicity Cat. 2, Skin Corrosion Cat. 1B, Eye Irritation/Corrosion Cat. 1, Acute Oral Toxicity Cat. 4, Skin Sensitization Cat. 1, Specific Target Organ Toxicity (Oral-Kidneys) Repeated Exposure Cat. 2 Hazard Statements: H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. H314: Causes severe skin burns and eye damage. H318: Causes serious eye damage. H302: Harmful if swallowed. H317: May cause an allergic skin reaction. H373: May cause damage to liver through prolonged or repeated.
Tris-2,4,6-(dimethylamino-methyl)phenol	90-72-2	1-5	Harmonized Classification: Acute Oral Toxicity Cat. 4, Eye Corrosion/Irritation Cat. 2A, Skin Irritation Cat. 2 Notified Classification: Skin Corrosion Cat. 1C Hazard Statements: H302: Harmful if swallowed. H319: Causes serious eye irritation. H315: Causes skin irritation.

Product not yet tested. The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST-AID MEASURES

4.1 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.

4.2 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).

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

4.2.1.1 GHS Precautionary Statements for Inhalation Exposure: P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. P316: Get emergency medical help immediately.

4.2.2 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.

4.2.2.1 GHS Precautionary Statements for Skin Exposure: P302 + P361 + P354: IF ON SKIN: Take off immediately all contaminated clothing. Immediately wash with water for 15 minutes. P316: Get emergency medical help immediately. P333 + P317: If skin irritation or rash occurs, get medical attention.

4.2.3 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.

4.2.3.1 GHS 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. Continue rinsing. P316: Get emergency medical help immediately.

4.2.4 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.

4.2.4.1 GHS Precautionary Statements for Ingestion Exposure: P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P316: Get emergency medical help immediately.

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

4. FIRST-AID MEASURES (Continued)

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

4.4.1 Acute:

Symptoms/Effects: Acute exposure by all routes of exposure can cause severe irritation or burns. Toxic if swallowed. All symptoms are dependent on concentration and duration of exposure.

Symptoms/Effects After Inhalation: Inhalation of fumes, mists or sprays from product can cause severe irritation or burns to the respiratory tract.

Symptoms/Effects After Skin Contact: Contact with the skin may cause severe irritation or burns to the skin.

Symptoms/Effects After Direct Eye Contact: Severe irritation or burns to eye tissue from direct eye contact; blindness may result. Fumes may cause eye moderate to severe irritation.

Symptoms/Effects After Ingestion: Severe irritation or burns to mucous membranes in the mouth, pharynx, esophagus and gastrointestinal tract. Ingestion of large quantity may be fatal.

4.4.2 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: None known.

Symptoms/Effects After Inhalation of Fumes: Lung tissue scarring and/or reduced lung function.

Symptoms/Effects No Specific Route of Exposure: Potential adverse effects on reproductive toxicity and/or fertility.

4.5 INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Flush contaminated areas with copious water. Treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

5.1 FLASH POINT: > 100°C (> 212°F)

5.2 AUTOIGNITION: Not tested.

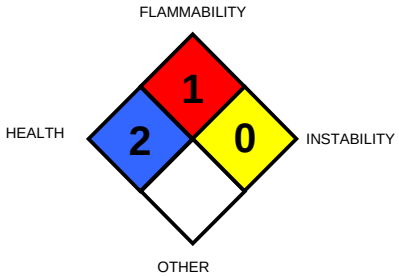
5.3 FLAMMABLE LIMITS IN AIR: Not tested.

5.4 FIRE EXTINGUISHING MEDIA: Use materials appropriate for surrounding materials. Carbon dioxide, alcohol-resistant foam, dry chemical, dry sand, limestone.

5.5 UNSUITABLE EXTINGUISHING MEDIA: Use of water should only be used in flooding quantities due to potential toxic aqueous solutions. Fire run-off water should not be allowed to enter storm drains, streams or other bodies of water.

5.6 SPECIAL HAZARDS ARISING FROM THE PRODUCT: Combustible; may ignite due to high temperatures in a fire. In fire conditions, this product may generate highly toxic and flammable ammonia gas. Personnel should fight fire up-wind of the fire. Not sensitive to mechanical impact. Closed containers may develop pressure and rupture in event of fire.

NFPA RATING



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

5.6.1 Explosion Sensitivity to Mechanical Impact: Not sensitive.

5.6.2 Explosion Sensitivity to Static Discharge: Due to flammability, high concentration of fumes or vapors from this product may be ignited by static discharge.

5.7 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, resistant to ammoniacal compounds. Move containers from fire area if it can be done without risk to personnel. Prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: Evacuate area of spill. An accidental release may result in a fire due to potential formation of ammonia gas. 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.

6.2 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.

6.2.2 All 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.**

6.3 METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP:

6.3.1 All Spills: Evacuate non-response personnel. Access to the spill area should be restricted. Spread should be limited by gently covering the spill with polypads. Eliminate all sources of ignition prior to spill response. Dike spill area to prevent spread. Absorb spilled liquid with limestone, sand, polypads, or other suitable inert absorbent 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. Monitor area for amine levels to ensure no toxic or corrosive amine materials sill remain. Purge equipment with inert gas prior to reuse.

6. ACCIDENTAL RELEASE MEASURES (Continued)

6.4 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.

6.5 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.

6.6 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

7.1 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. 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. Discard any contaminated leather clothing articles such as shoes. Maintain good personal hygiene.

7.1.1 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.

7.2 CONDITIONS FOR SAFE STORAGE INCLUDING ANY INCOMPATIBILITIES: Post signs in storage areas warning of flammability, toxicity and corrosivity hazards. Keep containers 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. Store in steel containers, above ground and diked. Do not store in reactive metal containers such as copper, iron, magnesium or zinc. Store away from acids or other incompatible materials. 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.

7.2.1 Incompatibilities: Due to components, this product may be incompatible with sodium hypochlorite, organic and mineral acids, nitric oxides, nitrosating agents, reactive metals, peroxides, oxidizing agents and materials reactive with hydroxyl compounds. Due to amine content, this product may attack certain metals, including copper, aluminum, zinc and galvanized metals.

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

7.3 PRODUCT USE: This product is an activator for sealant product. Follow all industry standards for use of this product.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

8.1 CONTROL PARAMETERS, INCLUDING OCCUPATIONAL EXPOSURE GUIDELINES OR BIOLOGICAL EXPOSURE LIMITS AND THE SOURCE OF THOSE VALUES:

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

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

Chemical Name	CAS #	Guideline	Value
Benzyl Alcohol	100-51-6	DFG MAK TWA AIHA WEEL TWA DFG MAK Pregnancy Risk Cat.	5 ppm; 22 mg/m^3 (can also occur as vapor or aerosol); skin 10 ppm C

See Section 16 for Definitions of Terms Used.

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

8.2 INDIVIDUAL PROTECTION MEASURES, SUCH AS PERSONAL PROTECTIVE EQUIPMENT: The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including the Respiratory Protection Standard (29 CFR 1910.134), Eye Protection Standard 29 CFR 1910.13, the Hand Protection Standard 29 CFR 1910.138, and the Foot Protection Standard 29 CFR 1910.136), equivalent standards of Canada (including the Canadian CSA Respiratory Standard Z94.4-93-02, the CSA Eye Protection Standard Z94.3-M1982, Industrial Eye and Face Protectors and the Canadian CSA Foot Protection Standard Z195-M1984, *Protective Footwear*). Please reference applicable regulations and standards for relevant details.

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

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

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

8.2 INDIVIDUAL PROTECTION MEASURES, SUCH AS PERSONAL PROTECTIVE EQUIPMENT (continued):

8.2.3 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.

8.2.4 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.

9. PHYSICAL and CHEMICAL PROPERTIES

9.1 FORM: Liquid.
9.2 COLOR: Amber.
9.3 MOLECULAR WEIGHT: Mixture.
9.4 MOLECULAR FORMULA: Mixture.
9.5 ODOR: Ammonia-like.
9.6 ODOR THRESHOLD: Not determined.
9.7 BOILING POINT: > 200°C (> 392°F)
9.8 FREEZING POINT: Not determined.
9.9 DENSITY (@ 21°C): 64.301 lb/ft^3
9.10 RELATIVE DENSITY/SPECIFIC GRAVITY (water = 1): 1.03g/cm^3
9.11 VAPOR DENSITY: (air = 1): > 1
9.12 VAPOR PRESSURE (@ 21°C):< 1 mmHg
9.13 pH: Alkaline.
9.14 SOLUBILITY IN WATER: < 0.1 g/L
9.15 OTHER SOLUBILITIES: Not known.
9.16 EVAPORATION RATE (nBuAc = 1): Not available.
9.17 VOLATILE ORGANIC COMPOUNDS (VOC): Not available.
9.18 FLAMMABILITY: May be combustible.
9.19 FLASH POINT: > 100°C (> 212°F)
9.20 AUTOIGNITION TEMPERATURE: Not determined.
9.21 FLAMMABLE LIMITS IN AIR: Not tested.
9.22 PERCENT VOLATILE BY VOLUME: Not determined.
9.23 COEFFICIENT WATER/OIL DISTRIBUTION: Not available.
9.24 VISCOSITY: Not available.
9.25 HOW TO DETECT THIS SUBSTANCE (WARNING PROPERTIES): The odor and color of this product may act as a warning property in the event of an accidental release.

10. STABILITY and REACTIVITY

10.1 REACTIVITY: This product is not known to be reactive under normal circumstances of use and handling.
10.2 CHEMICAL STABILITY: Stable under normal circumstances of use and handling.
10.3 POSSIBILITY OF HAZARDOUS REACTIONS/POLYMERIZATION: This product is not expected polymerize. Contact with acids may cause a violent reaction with the generation of heat and toxic ammonia gas and other compounds.
10.4 CONDITIONS TO AVOID: Avoid contact with incompatible chemicals and exposure to ignition sources, prolonged heating or extreme temperatures.
10.5 INCOMPATIBLE MATERIALS: This product is not compatible with oxidizers, mineral and organic acids, reactive metals, materials with hydroxyl compounds. This product may corrode aluminum, copper since and galvanized metals. For a greater list of incompatibilities, see Section 7.
10.6 HAZARDOUS DECOMPOSITION PRODUCTS:

10.6.1 Combustion: Thermal decomposition of this product can generate aldehydes, ammonia gas, carbon and nitrogen oxides, nitric acids, nitrosamines and flammable hydrocarbons.

10.6.2 Hydrolysis: In fire situations, nitrogen oxide can be formed, which can react with water to form corrosive nitric acid.

11. TOXICOLOGICAL INFORMATION

11.1 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:

11.1.1 Contact with Skin: Causes moderate to severe irritation or burns, depending on the duration of skin contact. May cause skin sensitization in persons sensitive to components. See information under 'Sensitization' further in this section.

11.1.2 Contact with Eyes: Contact with fumes may cause moderate to severe irritation of the eyes. Direct eye contact may cause severe irritation, burns or damage to eye tissue; blindness may result.

11.1.3 Skin Absorption: Amines and nitrosamines can be absorbed via intact skin. Prolonged skin contact may have adverse effects due to absorption. This may be accelerated by any corrosive skin damage. Symptoms may include difficulty breathing, nausea, and adverse central nervous system effects.

11. TOXICOLOGICAL INFORMATION (Continued)

11.1 POTENTIAL HEALTH EFFECTS (continued):

11.1.4 Ingestion: Although ingestion is unlikely in the workplace, if swallowed, severe irritation or burns to mucous membranes in the mouth, pharynx, esophagus and gastrointestinal tract may occur. Ingestion may also cause nausea, vomiting, abdominal pain, difficulty breathing, central nervous system effects including, headache, dizziness and confusion. Ingestion of large quantity may cause respiratory failure or may be fatal.

11.1.5 Inhalation: Inhalation of mists, sprays or fumes of this product may cause moderate to severe irritation or burns to the nose, throat, esophagus and lungs, depending on concentration and duration of exposure. Inhalation may cause adverse central nervous system effects as described under 'Ingestion'. Inhalation of large quantity can cause permanent damage to the lungs or respiratory failure.

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

11.1.7: Other Effects: None known.

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

11.2.1 Short-Term: Depending on concentration and duration of exposure, exposure by all routes of exposure can cause moderate to severe irritation or burns. High concentration exposure by inhalation or ingestion may be fatal; eye contact may cause blindness. Skin contact may cause scaring.

11.2.2 Long-Term: Prolonged or chronic exposure to low concentration by inhalation may cause decrease in lung function. Prolonged or chronic skin exposure to low concentration may cause scaring, thickening of skin, dermatitis and skin sensitization.

11.3 TARGET ORGANS:

11.3.1 Short Term: Skin, eyes, respiratory system.

11.3.2 Long Term: Skin, respiratory system.

11.4 OVERALL ACUTE TOXICITY ESTIMATES (ATE) FOR PRODUCT:

11.4.1 Oral ATE: 118-248 mg/kg (0% unknown)

11.4.2 Dermal ATE: 2049 mg/kg (0% unknown)

11.4.3 Inhalation Vapor ATE: 10,445 mg/kg (60% unknown)

11.5 TOXICITY DATA: 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. Contact Pecora for more information.

Aminoethyl Piperazine:
LD_{50} (Oral-Rat) 2097 mg/kg
LD_{50} (Skin-Rabbit) 24 hours: 866 mg/kg

Benzyl Alcohol:
LD_{50} (Oral-Rat) 1620 mg/kg
LD_{50} (Skin-Rabbit) 24 hours: 2000 mg/kg
LC_{50} (Inhalation-Rat) 4 hours: 4178 mg^3

Formaldehyde Polymer with Benzenamine, Hydrogenated:
LD_{50} (Oral-Rat) > 50-300 mg/kg

Formaldehyde Polymer with Benzenamine, Hydrogenated:
LD_{50} (Skin-Rabbit) 24 hours: > 1000 mg/kg

4,4'Methylenebis(cyclohexylamine):
LD_{50} (Oral-Rat) 380 mg/kg
LC_{50} (Skin-Rat) 2011 mg/kg
LC_{50} (Inhalation-Rat) 6 hours: > 0.4 vapor

Tris-2,4,6-(Dimethylaminomethyl)phenol:
LD_{50} (Oral-Rat) 2169 mg/kg
LD_{50} (SkinRabbit) 1000 mg/kg

11.6 CARCINOGENIC POTENTIAL: No component is listed by any agency tracking the carcinogenic of chemical compounds; no component has been given a GHS rating of carcinogenicity.

11.5 IRRITANCY OF PRODUCT: This product is corrosive by all routes of exposure.

11.6 SENSITIZATION TO THE PRODUCT:

11.6.1 Respiratory Sensitization: No data.

11.6.2 Skin Sensitization: Multiple components have been classified as a skin sensitizers.

Aminoethyl Piperazine: Positive in guinea pig maximization test. Positive results were also obtained in a cross challenge with several structurally similar alkyleneamines.

4-4'-Methylenedicyclohexanamine: 4-4'-Methylenedicyclohexanamine was tested in a guinea pig sensitization assay and found to be a weak sensitizer.

Tris-2,4,6-(dimethylaminomethyl)phenol: Tris-2,4,6-(dimethylaminomethyl)phenol was tested guinea pig skin sensitization tests (Safepharm Standard Method Number OECD 6). Results indicated no skin reactions at the 48-hour observation. The test material produced an 11 percent (2/19) sensitization rate and was classified as a mild sensitizer to guinea pig skin.

11.7 TOXICOLOGICAL SYNERGISTIC PRODUCTS: None known.

11.8 REPRODUCTIVE TOXICITY INFORMATION: This product has not been tested for reproductive toxicity. Some information is available for components.

11.8.1 Mutagenicity: No components have been classified as probable or suspected mutagens; no human or animal data found.

11.8.2 Embryotoxicity/Teratogenicity: The following component has been listed by companies who manufacture it (Notified Classification) in the EU ECHA database as a Category 2 Reproductive Toxin.

Aminoethyl Piperazine: Aminoethyl Piperazine was tested in rabbits in an OECD 414 guideline study. Oral administration of the test item was from Day 6 to 28 of gestation. Aminoethylpiperazine at 150 mg/kg/day was associated with abnormal feces output, reductions in food consumption and body weight gain along with a decrease in embryofetal survival, decrease in fetal and gravid uterine weight and a decrease in fetal bone ossification. The OECD 414 rabbit study indicates that AEP is a developmental toxicant due to post-implantation loss at the high dose group (150 mg/kg/day). Therefore, Aminoethyl Piperazine is classifiable as a Category 2 reproductive/developmental toxicant under GHS.

11.8.3 Reproductive Toxicity: The following information is available for one component.

4-4'-Methylenedicyclohexanamine: Although there is a Notified Classification of this compound being a Cat. 2 Reproductive Toxin, This substance is not a reproductive toxicant, as only minor effects were observed in reproductive and developmental parameters at doses characterized by adult systemic toxicity.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

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

12.2 PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability.

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

12.4 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 are aquatic toxicity data for some components.

Aminoethyl Piperazine:
LC_{50} (*Pimephales promelas* Fathead minnow) 96 hours: 2190 mg/L
EC_{50} (*Daphnia magna* Giant water flea) 10 hours: 230 mg/L
EC_{50} (Freshwater algae) 72 hours: 1000 mg/L

Benzyl Alcohol:
LC_{50} (*Pimephales promelas* Fathead minnow) 96 hours: 460 mg/L
EC_{50} (*Daphnia magna* Giant water flea) 48 hours: 230 mg/L
EC_{50} (*Desmodesmus subspicatus* Green algae) 72 hours: 43.9 mg/L

Formaldehyde Polymer with Benzenamine, Hydrogenated:
LC_{50} (*Poecilia reticulata* Rainbow guppy) 96 hours: 63 mg/L

Formaldehyde Polymer with Benzenamine, Hydrogenated:
EC_{50} (*Daphnia magna* Giant water flea) 48 hours: 15.4 mg/L
EC_{50} (*Pseudokirchernella subcapita* Green algae) 72 hours: 770 mg/L

4,4'Methylenebis(cyclohexylamine):
LC_{50} (*Leuciscus idus* Golden orfe) 96 hours: > 100 mg/L
EC_{50} (*Daphnia magna* Giant water flea) 48 hours: 9.24 mg/L
EC_{50} (*Desmodesmus subspicatus* Green algae) 72 hours: 100 mg/L

Tris-2,4,6-(Dimethylaminomethyl)phenol:
LC_{50} (*Cyprinus carpio* Carp) 96 hours: 100 mg/L
EC_{50} (*Pseudokirchernella subcapita* Green algae) 72 hours: 46.7 mg/L

12.4.1 GHS Statements for Environmental Hazards: None.

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

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

12.7 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

13.1 PREPARING WASTES FOR DISPOSAL: As supplied, this product is not 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.

13.1.1 None applicable.

13.2 U.S. EPA WASTE NUMBER: Wastes of this product should be tested to see if they meet the criteria of D002 (Waste Characteristic-Corrosivity) and/or D001 (Waste Characteristic-Ignitability).

14. TRANSPORTATION INFORMATION

14.1 U.S. DEPARTMENT OF TRANSPORTATION (DOT): Per U.S. DOT regulations, under 49 CFR 172.101.

UN Identification Number:	UN 2735
Proper Shipping Name:	Polyamines, liquid, corrosive, n.o.s. (mixed cycloaliphatic amines, heterocyclic amine)
Hazard Class Number and Description:	8 (Corrosive)
Packing Group:	PG III
DOT Label(s) Required:	Class 8 (Corrosive)
North American Emergency Response Guidebook Number (2020):	153

Marine Pollutant: No component is listed as a Marine Pollutant (as defined by 49 CFR 172.101.

14.2 TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS (TDG): Per regulations of Transport Canada.

UN Identification Number:	UN 2735
Proper Shipping Name:	Polyamines, liquid, corrosive, n.o.s. (mixed cycloaliphatic amines, heterocyclic amine)
Hazard Class Number and Description:	8 (Corrosive)
Packing Group:	PG III
Hazard Shipping Label(s) Required:	Class 8 (Corrosive)
Special Provisions:	16
Excepted Quantities:	E1
Explosive Limit & Limited Quantity Index:	5 L
ERAP Index:	None
Passenger Carrying Ship Index:	None
Passenger Carrying Road Or Rail Vehicle Index:	5 L

Marine Pollutant: No components of this product meet the criteria of the Canadian TDG to be Marine Pollutants.

14.3 INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): Per the International Air Transport Association.

UN Identification Number:	UN 2735
Proper Shipping Name:	Polyamines, liquid, corrosive, n.o.s. (mixed cycloaliphatic amines, heterocyclic amine)
Hazard Class or Division:	8 (Corrosive)
Hazard Label(s) Required:	Class 8 (Corrosive)
Packing Group:	III
Excepted Quantities:	E1

14. TRANSPORTATION INFORMATION (Continued)

14.3 INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (continued)):

Passenger and Cargo Aircraft Packing Instruction:	852
Passenger and Cargo Aircraft Maximum Net Quantity per Pkg.:	5 L
Passenger and Cargo Aircraft Limited Quantity Packing Instruction:	Y841
Passenger and Cargo Aircraft Limited Quantity Maximum Net Quantity per Pkg.:	10 L
Cargo Aircraft Only Packing Instruction:	856
Cargo Aircraft Only Maximum Net Quantity per Pkg.:	60 L
Special Provisions:	A3, A803
ERG Code:	8L

14.4 INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): Per the International Maritime Organization.

UN No.:	2735
Proper Shipping Name:	Polyamines, liquid, corrosive, n.o.s. (mixed cycloaliphatic amines, heterocyclic amine)
Hazard Class Number:	8 (Corrosive)
Labels:	Class 8 (Corrosive)
Packing Group:	III
Special Provisions:	223, 274
Limited Quantities:	5 L
Excepted Quantities:	E1
Packing:	Instructions: P001, LP01; Provisions: None
IBCs:	Instructions: IBC03; Provisions: None
Tanks:	Instructions: T7; Provisions: TP1, TP28
EmS:	F-A, S-B
Stowage Category:	Category A.
Segregation:	SGG18; SG35

Marine Pollutant: No component of this product meets the criteria of the IMO to be a Marine Pollutant.

15. REGULATORY INFORMATION

15.1 U.S. REGULATIONS:

15.1.1 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.

15.1.2 U.S. SARA Hazard Categories (Section 311/312, 40 CFR 370-21): ACUTE: Yes; CHRONIC: Yes; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No

15.1.3 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.

15.1.2 U.S. SARA Hazard Categories (Section 311/312, 40 CFR 370-21): ACUTE: Yes; CHRONIC: Yes; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No

15.1.3 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.

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

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

15.1.6 California Safe Drinking Water And Toxic Enforcement Act (Proposition 65): No components are listed on the Proposition 65 lists.

15.2 CANADIAN REGULATIONS:

15.2.1 Canadian DSL/NDSL Inventory Status: The components of this product are on the DSL Inventory.

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

15.2.3 Canadian WHMIS (HPR-GHS) 2015 Classification and Symbols: See Section 16 in Classification and Symbols under HPR-GHS 2015.

16. OTHER INFORMATION

16.1 HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS®)

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

See Section 16 for definitions of ratings

0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate * = 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: Bridging principles were used to classify this product.

16.4 DATE OF PREPARATION: November 21, 2021

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.

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 a 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. *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.). **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.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): **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).

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. **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.

DEFINITIONS OF TERMS (Continued)

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 according with Annex D of NFPA 704. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according with Annex D of NFPA 704. Liquids, solids, and semisolids having a flash point at or above 93.4°C (200°F) (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.) 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.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): **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.