SAFETY DATA SHEET

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

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

IDENTIFICATION OF THE MIXTURE
- TRADE/MATERIAL NAME: **SpecSeal® Firestop Putty (SSP 100, SSP28, SSP9S pads)**
- RELEVANT USE of the SUBSTANCE: Firestop and Sound Transmission
- USES ADVISED AGAINST: none

SUPPLIER/MANUFACTURER'S NAME: **Specified Technologies, Inc.**
- Address: 210 Evans Way, Somerville, New Jersey 08876
- Business Phone: (908) 526-8000 (8:00am to 5:00pm Eastern Standard Time)
- Emergency Phone: U.S., Canada: 1-800-255-3924 (24 hrs) International: +1-813-248-0585 (collect-24 hrs)

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

NOTE: ALL United States Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, Canadian WHMIS [Controlled Products Regulations], Mexican NOM018-STPS 2000, SPRING Singapore, and Japanese JIS Z7250 required information is included in appropriate sections based on the U.S. ANSI Z400.1-2010 format. This product has been classified in accordance with the hazard criteria of the countries listed above.

2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION AND JAPANESE JIS Z7253 LABELING AND CLASSIFICATION: This product has been classified per UN GHS Standards under U.S., Japanese and other applicable regulations that require Global Harmonization compliance.

Classification: Carcinogenic Category 2, Germ Cell Mutagen Category 2, Acute Dermal Toxicity Category 5, Eye Irritation Category 2A, Skin Irritation Category 2, Skin Sensitization Category 1, Specific Target Organ Toxicity Repeated Exposure Category 2

Signal Word: Warning

Hazard Statements: H351: Suspected of causing cancer. H341: Suspected of causing genetic effects. H313: May be harmful in contact with skin. H315: Causes skin irritation. H317: May cause an allergic skin reaction. H319: Causes serious eye irritation. H373: May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements:

Prevention: P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P260: Do not breathe vapors/fume. 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.

Response: P308 + P313: IF exposed or concerned: Get medical advice/attention. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P313: If eye irritation persists: Get medical advice/attention. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P333 + P313: If skin irritation or rash occurs: Get medical advice/attention. P312: Call a POISON CENTER or doctor if you feel unwell. P362 + P364: Take off contaminated clothing and wash it before reuse. P321: Specific treatment (remove from exposure and treat symptoms).

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

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

Hazard Symbols: GHS07, GHS08

KOREAN ISHA (Notice 2009-68) LABELING AND CLASSIFICATION: Classified in accordance with ISHA Notice 2009-68. Under ISHA, no differences in classification are applicable.

3. COMPOSITION and INFORMATION ON INGREDIENTS

Chemical Name	CAS #	Chinese IECSC Inventory	Japanese ENCS #	Korean ECL #	Taiwan NESCI ECS	WT%	LABEL ELEMENTS GHS & Japanese JIS Z7253 Classification Korean ISHA Classification GHS Hazard Codes
Aluminum Trihydrate	21645-51-2	Listed	1-17	KE-00980	Listed	50-60%	SELF CLASSIFICATION GHS & JAPANESE JIS Z7253, KOREAN ISHA: Classification: Eye Irritation Cat. 2A Hazard Codes: H319
Proprietary Polymer		Listed	Proprietary	Proprietary	Listed	20-30%	Classification Not Applicable

3. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

Chemical Name	CAS #	Chinese IECSC Inventory	Japanese ENCS #	Korean ECL #	Taiwan NESCI ECS	WT%	LABEL ELEMENTS GHS & Japanese JIS Z7253 Classification Korean ISHA Classification GHS Hazard Codes
Formaldehyde Polymer with Ammonia and Phenol	35297-54-2	Listed	Not Listed	KE-17082	Listed	10-15%	SELF CLASSIFICATION GHS & JAPANESE JIS Z7253, KOREAN ISHA: Classification: Acute Oral Toxicity Cat. 5, Skin Sensitization Cat. 1B, STOT Re Cat. 3 Hazard Codes: H303, H317, H373
Phenol	108-95-2	Listed	3-381	KE-28209	Listed	1-3%	GHS & JAPANESE JIS Z7253, KOREAN ISHA: Classification: Mutagenic Cat. 2, Acute Oral Toxicity Cat. 3, Acute Dermal Toxicity Cat. 3, Acute Inhalation Toxicity Cat. 3, Skin Corrosion Cat. 1B, STOT RE Cat. 2 Hazard Codes: H341, H301 + H311 + H331, H314, H373
Sulfuric Acid Compound with Graphite	12777-87-6	Not Listed	Not Listed	KE-32585	Listed	2-5%	SELF CLASSIFICATION GHS & JAPANESE JIS Z7253, KOREAN ISHA: Classification: Carcinogenic Cat. 2 Hazard Codes: H351i
Crystalline Silica	14808-60-7	Listed	1-548	KE-29983	Listed	Trace	SELF CLASSIFICATION GHS & JAPANESE JIS Z7253, KOREAN ISHA: Classification: Carcinogenic Cat. 1, STOT (Inhalation-Lungs) RE Cat. 2 Hazard Statement Codes: H350, H373
Formaldehyde	50-00-0	Listed	2-482	KE-17074	Listed	Trace	GHS & JAPANESE JIS Z7253, KOREAN ISHA: Classification: Carcinogenic Cat. 2, Acute Oral Toxicity Cat. 3, Acute Dermal Toxicity Cat. 3, Acute Inhalation Toxicity Cat. 3, Skin Corrosion Cat. 1B, Skin Sensitization Cat. 1 Hazard Codes: H351, H301 + H311 + H331, H314, H317
Water and Other Trace Ingredients						Balance	Classification Not Applicable

4. FIRST-AID MEASURES

DESCRIPTION OF FIRST AID MEASURES:

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

Inhalation: If fumes or vapors are inhaled, remove victim to fresh air. Seek medical attention if adverse effect continues after removal to fresh air.

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

Ingestion: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, DO NOT INDUCE VOMITING. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If victim is convulsing, maintain an open airway and obtain immediate medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: See Section 11.

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

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not determined.

AUTOIGNITION TEMPERATURE: Not available.

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

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

UNSUITABLE FIRE EXTINGUISHING MEDIA: None known.

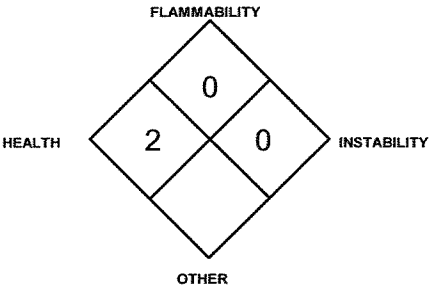
UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is formulated to be non-flammable and non-combustible. When involved in a fire, this material may decompose and produce irritating vapors and toxic gases

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: No Special protective actions for fire-fighters are anticipated.

NFPA RATING



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

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. Call CHEMTREC (1-800-424-9300) for emergency assistance. Or if in Canada, call CANUTEC (613-996-6666).

PERSONAL PROTECTIVE EQUIPMENT: Proper protective equipment should be used.

Small Spills: Wear rubber gloves.

Large Spills: Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield.

6. ACCIDENTAL RELEASE MEASURES (Continued)

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

Small Spills: Small releases can be carefully swept up or cleaned up using a damp sponge or polypads.

Large Spills: Access to the spill area should be restricted. For large spills, dike or otherwise contain spill and sweep-up or vacuum with non-sparking vacuum.

All Spills: Place all spill residue in a double plastic bag or other containment and seal. Close off sewers and take other measures to protect human health and the environment as necessary. Rinse area with soap and water solution and follow with a water rinse.

ENVIRONMENTAL PRECAUTIONS: Avoid release to the environment.

7. HANDLING and USE

PRECAUTIONS FOR SAFE HANDLING: As with all chemicals, avoid getting this material ON YOU or IN YOU. Do not eat, drink, smoke, or apply cosmetics while handling this product. Wash hands thoroughly after handling this product or containers of this product. Avoid breathing fumes or vapors. Use in a well-ventilated location.

CONDITIONS FOR SAFE STORAGE: Store containers in a cool, dry location, away from direct sunlight, sources of intense heat.

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

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely, if necessary. Collect all rinsates and dispose of according to applicable Federal, State, and local procedures.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/CONTROL PARAMETERS:

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

Workplace Exposure Limits/Control Parameters:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m³	STEL mg/m³	TWA mg/m³	STEL mg/m³	TWA mg/m³	STEL mg/m³	IDLH mg/m³	mg/m³
Aluminum Trihydrate	21645-51-2	NE	NE	NE	NE	NE	NE	NE	DFG MAKs: TWA = 4 mg/m³ (inhalable fraction); 1.5 mg/m³ (respirable fraction) DFG MAK Pregnancy Risk Classification: D
Crystalline Silica (Quartz)	14808-60-7	0.025 (resp. fract.)	NE	30 mg/m³ (total dust) / % SO_2 + 2 0.1 (vacated 1989 PEL) 250 mppcf (resp. dust) / % SiO2 + 5 or 10 mg/m³ (resp. dust) / 0.2 % SO_2 + 2		0.05 (resp. dust)	NE	50, Ca	Carcinogen: IARC-1, MAK-1 (respirable fraction), NOSH-Ca, NTP-K (respirable fraction), TLV-A2
Formaldehyde	50-00-0	SEN NIC: D-SEN, RSEN	0.37 (ceiling)	0.75 ppm See 20 CFR 1910.1048(c)	2 ppm	0.016 ppm See Pocket Guide App. A	0.1 ppm, 15 min.	20 ppm (Ca)	DFG MAKs: TWA = 0.37 PEAK = 2•MAK 15-min average value, 1-hr interval, 4 per shift; 1 (ceiling) Danger of Sensitization of the Skin DFG MAK Germ Cell Mutagen Category: 5 DFG MAK Pregnancy Risk Classification: C Carcinogen: EPA-B1, IARC-1, MAK-4, NIOSH-Ca, NTP-K, OSHA-Ca, TLV-A2
Formaldehyde Polymer with Ammonia and Phenol	35297-54-2	NE	NE	NE	NE	NE	NE	NE	NE
Phenol	108-95-2	19 (skin)	Skin	19 (skin)	Skin	19 (skin)	60 (skin) 15 min.	25 ppm	DFG MAK: Skin Carcinogen: EPA-I, EPA-D, IARC-3, MAK-3B, TLV-A4
Proprietary Polymer		NE	NE	NE	NE	NE	NE	NE	NE
Sulfuric Acid Compound with Graphite	12777-87-6	NE	NE	NE	NE	NE	NE	NE	NE

NE: Not Established. Ca: Carcinogen NIC: Notice of Intended Change DSEN: May Cause Dermal Sensitization. This notation is used to indicate the potential for dermal sensitization resulting from the interaction of an absorbed agent and ultraviolet light (i.e. photosensitization) RSEN: May Cause Respiratory Sensitization SEN: Confirmed Potential Worker Sensitization as a Result of Dermal Contact and/or Inhalation Exposure, Based on the Weight of Scientific Evidence See Section 16 for Definitions of Other Terms Used

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

International Occupational Exposure Limits: Currently, the following additional exposure limit values have been established by various countries for the components of this mixture. More current limits may be available; individual countries should be consulted to determine if newer limits are available.

ALUMINUM HYDROXIDE:
Australia: TWA = 2 mg(Al)/m³, JUL 2008
Belgium: TWA = 2 mg(Al)/m³, MAR 2002
Finland: TWA = 2 mg(Al)/m³, NOV 2011
France: VME = 2 mg(Al)/m³, FEB 2006
Korea: TWA = 2 mg(Al)/m³, 2006
New Zealand: TWA = 2 mg(Al)/m³, JAN 2002
Russia: TWA = 6 mg/m³, JUN 2003
Sweden: TWA = 1 mg(Al)/m³, JUN 2005
Switzerland: MAK-W = 3 mg/m³, resp, JAN 2011
United Kingdom: TWA = 2 mg(Al)/m³, OCT 2007
In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV

CRYSTALLINE SILICA:
Australia: TWA = 0.1 mg/m³, JUL 2008
Belgium: TWA = 0.1 mg/m³ (resp. dust), MAR 2002
Denmark: TWA = 0.1 mg/m³ (respirable), carc, MAY 2011
Denmark: TWA = 0.1 mg/m³ (resp.), carc, MAY2011
Denmark: TWA = 0.3 mg/m³ (total), MAY 2011
Finland: TWA = 0.05 mg/m³, resp. dust, SEP 2009
France: VME = 0.1 mg/m³, (resp), FEB 2006
Iceland: TWA = 0.1 mg/m³ (resp. dust), NOV 2011
Japan: OEL-C = 0.03 mg/m³ (respirable), APR 2007
Korea: TWA = 0.1 mg/m³, 2006
Mexico: TWA = 0.1 mg/m³ (respirable), 2004
The Netherlands: MAC-TGG = 0.075 mg/m³, 2003
New Zealand: TWA = 0.2 mg/m³ (respirable dust), JAN 2002
Norway: TWA = 0.1 mg/m³ (resp. dust), JAN 1999
Norway: TWA = 0.3 mg/m³ (total dust), JAN 1999
Peru: TWA = 0.05 mg/m³, JUL 2005
Russia: TWA = 1 mg/m³, STEL = 3 mg/m³, JUN 2003
Sweden: TWA = 0.1 mg/m³ (resp. dust), JUN 2005
Switzerland: MAK-W = 0.15 mg/m³, DEC 2006
Thailand: TWA = 10 mg/m³ (resp. dust), JAN 1993
Thailand: TWA = 30 mg/m³ (total dust), JAN 1993
United Kingdom: TWA = 0.1 mg/m³ (resp. dust), OCT 2007
In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV

FORMALDEHYDE:
ARAB Republic of Egypt: TWA = 2 ppm (3 mg/m³), JAN 1993
Australia: TWA = 1 ppm (1.2 mg/m³), STEL = 2 ppm (2.5 mg/m³), Carcinogen, JUL 2008
Austria: MAK-TMW = 0.5 ppm (0.6 mg/m³); KZW = 0.5 ppm (0.6 mg/m³), skin, sen, 2007
Belgium: STEL = 0.3 ppm (0.38 mg/m³), MAR 2002
Denmark: CL = 0.3 ppm (0.4 mg/m³), carc, MAY 2011
Finland: TWA = 0.3 ppm (0.37 mg/m³), CL = 1 ppm (1.2 mg/m³), NOV 2011
France: VME = 0.5 ppm, VLE 1 ppm, C3 Carcinogen, FEB 2006
Germany: MAK = 0.3 ppm (0.37 mg/m³), 2011
Hungary: TWA = 0.6 mg/m³, STEL 0.6 mg/m³, Skin, SEP 2000

FORMALDEHYDE (continued):
Iceland: TWA = 0.3 ppm (0.4 mg/m³), STEL 1 ppm (1.2 mg/m³), Sen, NOV 2011
Japan: OEL = 0.1 ppm (0.12 mg/m³), 2A Carc, A2 Sen, s1 Sen, MAY 2012
Japan: OEL = 0.2 ppm (0.24 mg/m³), MAY2012
Korea: TWA = 1 ppm (1.5 mg/m³), STEL = 2 ppm (3 mg/m³), 2006
Mexico: PEAK = 2 ppm (3 mg/m³), 2004
The Netherlands: MAC-TGG = 1.5 mg/m³, 2003
New Zealand: CL = 1 ppm (1.2 mg/m³), sen, JAN 2002
Norway: TWA = 0.5 ppm (0.6 mg/m³), JAN 1999
Peru: TWA STEL = 0,3 ppm (0,37 mg/m³), JUL 2005
The Philippines: TWA = 5 ppm (6 mg/m³), JAN 1993
Poland: MAC(TWA) = 0.5 mg/m³, MAC(STEL) = 1 mg/m³, JAN 1999
Russia: STEL = 0.5 mg/m³, Skin, JUN 2003
Sweden: TWA = 0.5 ppm (0.6 mg/m³), CL = 1 ppm (1.2 mg/m³), Carcinogen, Sen, JUN 2005
Switzerland: MAK-W = 0.3 ppm (0.37 mg/m³), KZG-W = 0.6 ppm (0.74 mg/m³), Carc 3, Sen, JAN 2011
Thailand: TWA = 3 ppm, STEL = 5 ppm, JAN 1993
Turkey: TWA = 5 ppm (6 mg/m³), JAN 1993
United Kingdom: TWA = 2 ppm (2.5 mg/m³); STEL 2 ppm (2.5 mg/m³), OCT 2007
In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV

PHENOL:
ARAB Republic of Egypt: TWA = 5 ppm (19 mg/m³), Skin, JAN 1993
Australia: TWA = 1 ppm (4 mg/m³), JUL 2008
Austria: MAK-TMW = 2 ppm (7.8 mg/m³), skin, 2007
Denmark: TWA = 2 ppm (7.8 mg/m³), Skin, MAR 2002
Denmark: TWA = 1 ppm (4 mg/m³), skin, MAY 2011
EC: TWA = 7.8 mg/m³ (2 ppm), skin, JUN 2000
Finland: TWA = 2 ppm (8 mg/m³), STEL = 4 ppm (16 mg/m³), skin, NOV 2011
France: VME = 2 ppm (7.8 mg/m³), Skin, FEB 2006
Hungary: TWA = 7.8 mg/m³, STEL = 78 mg/m³, Skin, SEP 2000
Iceland: TWA = 1 ppm (4 mg/m³), skin, NOV 2011
Japan: OEL = 5 ppm (19 mg/m³), skin, MAY 2012
Korea: TWA = 5 ppm (19 mg/m³), skin, 2006
Mexico: TWA = 5 ppm (19 mg/m³); STEL = 10 ppm (38 mg/m³) (skin), 2004
The Netherlands: MAC-TGG = 8 mg/m³, Skin, 2003
New Zealand: TWA = 5 ppm (19 mg/m³), skin, JAN 2002
Norway: TWA = 1 ppm (4 mg/m³), JAN 1999
Peru: TWA = 5 ppm (19 mg/m³), JUL 2005
The Philippines: TWA = 5 ppm (10 mg/m³), Skin, JAN 1993
Poland: MAC(TWA) = 10 mg/m³, MAC(STEL) = 20 mg/m³, JAN 1999
Russia: TWA = 0.3 mg/m³, STEL = 1 mg/m³, Skin, JUN 2003
Sweden: TWA = 1 ppm (4 mg/m³); STEL = 2 ppm (8 mg/m³), Skin, JUN 2005
Switzerland: CL 5 ppm (19 mg/m³), skin, JAN 2011
Thailand: TWA = 5 ppm (19 mg/m³), JAN 1993
Turkey: TWA = 5 ppm (19 mg/m³), Skin, JAN 1993
United Kingdom: TWA = 2 ppm (7.8 mg/m³), skin, OCT2007
In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV

PROTECTIVE EQUIPMENT: *The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including* U.S. Federal OSHA Respiratory Protection (29 CFR 1910.134), OSHA Eye Protection 29 CFR 1910.133, OSHA Hard Protection 29 CFR 1910.138, OSHA Foot Protection 29 CFR 1910.136 and OSHA Body Protection 29 CFR1910.132), *equivalent standards of Canada (including CSA Respiratory Standard Z94.4-02,* Z94.3-M1982, *Industrial Eye and Face Protectors and* CSA Standard Z195-02, *Protective Footwear),* or standards of Japan (including JIS T 8116:2005 for glove selection, JIS T 8150:2006 for respiratory PPE, JIS T 8147:2003 for eye protectors, and JIS T 8030:2005 for protective clothing). Please reference applicable regulations and standards for relevant details.

Respiratory Protection: Maintain airborne contaminant concentrations below exposure limits listed above. For materials without listed exposure limits, minimize respiratory exposure. If necessary, use only respiratory protection authorized under appropriate regulations.

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

Hand Protection: During manufacture or other similar operations, wear the appropriate hand protection for the process.

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

9. PHYSICAL and CHEMICAL PROPERTIES

FORM: Putty
MOLECULAR FORMULA: Mixture.
ODOR: Minimal.
FLAMMABLE LIMITS (in air by volume, %): Not applicable.
DECOMPOSITION TEMPERATURE: Not available.
AUTOIGNITION TEMPERATURE: Not available.
FREEZING/MELTING POINT: Not available.

COLOR: Red.
MOLECULAR WEIGHT: Mixture.
ODOR THRESHOLD: Not available.
OXIDIZING PROPERTIES: Not applicable.
PERCENT VOLATILE: Not available.
FLASH POINT: Not available.
BOILING POINT: Not available.

9. PHYSICAL and CHEMICAL PROPERTIES (Continued)

VAPOR PRESSURE: Not available.
VAPOR DENSITY (air = 1): Not available.
EVAPORATION RATE (*n*-BuAc = 1): Not Applicable
SOLUBILITY IN WATER: Insoluble.
COEFFICIENT WATER/OIL DISTRIBUTION: Not established.
SPECIFIC GRAVITY (water = 1): 1.49
CARB VOC: Not available.
SCAQMD (U.S. EPA Method 24): Not available.
SOLUBILITY IN SOLVENTS: Not available.
pH: Not available.
HOW TO DETECT THIS SUBSTANCE (warning properties in event of accidental release): The appearance may be characteristics to distinguish a release of this product.

10. STABILITY and REACTIVITY

CHEMICAL STABILITY: This product is stable when properly stored at normal temperature and pressures (see Section 7, Handling and Storage).
DECOMPOSITION PRODUCTS: Combustion: If exposed to extremely high temperatures, thermal decomposition may generate irritating fumes and toxic gases Hydrolysis: None known.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is incompatible with strong oxidizers.
POSSIBILITY OF HAZARDOUS POLYMERIZATION OR REACTION: Will not occur.
CONDITIONS TO AVOID: Avoid exposure to or contact with extreme temperatures and incompatible chemicals.

11. TOXICOLOGICAL INFORMATION

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

Inhalation: Inhalation of fumes or vapors if heated may cause irritation of the nose, throat, and lungs and cause coughing. Removal to fresh air should relieve symptoms. The trace Crystalline Silica and Formaldehyde components are known human carcinogens. Due to the form of this product, this hazard is not as significant due to viscosity and consistency of the mixture.

Contact with Skin or Eyes: Direct eye contact may cause irritation, redness, and tearing from mechanical irritation. Prolonged or repeated skin exposures may cause dermatitis (dry red skin).

Skin Absorption: The Phenol component and trace Formaldehyde component can be absorbed through intact skin. Phenol in all forms (solid, solutions and vapor) is readily absorbed through the skin and can cause harmful effects if a large area of the skin is involved or if contact is prolonged. Due to the small amount of each of these materials, the possibility of adverse effects is not expected to be significant however, skin contact should be avoided. Formaldehyde and Phenol can cause sensitization effects as described under 'Sensitization Effect's'.

SYMPTOMS OF EXPOSURE BY ROUTE OF EXPOSURE (continued):

Ingestion: Ingestion is not a significant route of occupational exposure and is unlikely to occur. If this product is swallowed, irritation of the mouth, throat, esophagus and other tissues of the digestive system may occur. Symptoms of ingestion may include nausea, vomiting, and diarrhea.

Injection: Accidental injection of this product, via laceration or puncture by a contaminated object can cause redness at the site of injection.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: Exposure to this product may cause the following health effects:

Acute: Inhalation of fumes or vapors may cause irritation of respiratory system. Eye contact may cause mechanical irritation. Eye contact with fumes can cause irritation. May be harmful if swallowed.

Chronic: Prolonged or repeated skin exposure may cause dermatitis (dry red skin).

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

TOXICITY DATA: Currently, the following toxicological data are available for components of 1% or more concentration.

ALUMINUM TRIHYDRATE:

TDLo (Oral-Child) 79 gm/kg/2 years-intermittent: Behavioral: changes in motor activity (specific assay), muscle contraction or spasticity; Musculoskeletal: osteomalacia

TDLo (Oral-Child) 122 gm/kg/4 days: Gastrointestinal: other changes; Nutritional and Gross Metabolic: body temperature increase

TDLo (Oral-Woman) 84 gm/kg: female 1-40 week(s) after conception: Reproductive: Effects on Newborn: physical

TDLo (Oral-Infant) 68040 mg/kg/24 weeks-intermittent: Musculoskeletal: osteoporosis; Nutritional and Gross Metabolic: weight loss or decreased weight gain, changes in phosphorus

TDLo (Oral-Woman) 73912.5 mg/kg/26 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Musculoskeletal: osteoporosis; Nutritional and Gross: Metabolic: changes in phosphorus

TDLo (Unreported-Infant) 39 gm/kg/24 days-intermittent: Musculoskeletal: osteomalacia

TDLo (Oral-Rat) 15 mg/kg: Gastrointestinal: other changes

TDLo (Oral-Rat) 8040 mg/kg/67 days-continuous: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Nutritional and Gross Metabolic: changes in phosphorus

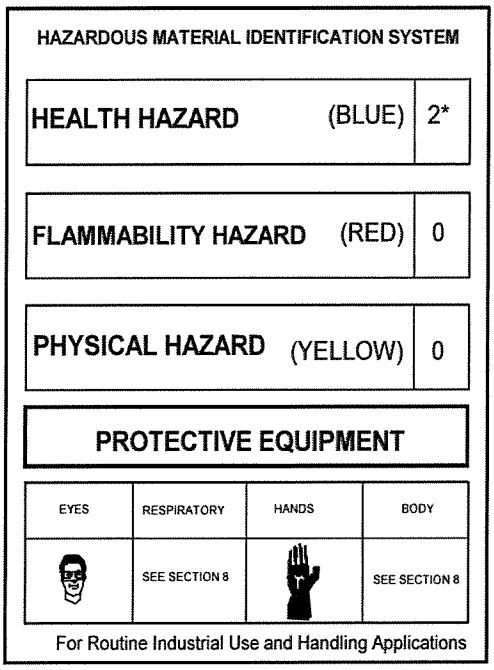
TDLo (Oral-Mouse) 80,880 mg/kg/23 weeks-continuous: Liver: other changes; Musculoskeletal: other changes; Nutritional and Gross Metabolic: changes in metals, not otherwise specified

TDLo (Intraperitoneal-Rat) 150 mg/kg

TDLo (Intraperitoneal-Rat) 6240 mg/kg/26 weeks-intermittent: Blood: pigmented or nucleated red blood cells; Nutritional and Gross Metabolic: weight loss or decreased weight gain, changes in iron

TDLo (Intraperitoneal-Rat) 1920 mg/kg/8 weeks-intermittent: Blood: microcytosis with or without anemia

TDLo (Intraperitoneal-Rat) 960 mg/kg/4 weeks-intermittent: Blood: changes in erythrocyte (RBC) count



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

TOXICITY DATA (continued):

ALUMINUM TRIHYDRATE:

TDLo (Oral-Child) 79 gm/kg/2 years-intermittent: Behavioral: changes in motor activity (specific assay), muscle contraction or spasticity; Musculoskeletal: osteomalacia

TDLo (Oral-Child) 122 gm/kg/4 days: Gastrointestinal: other changes; Nutritional and Gross Metabolic: body temperature increase

TDLo (Oral-Woman) 84 gm/kg: female 1-40 week(s) after conception: Reproductive: Effects on Newborn: physical

TDLo (Oral-Infant) 68040 mg/kg/24 weeks-intermittent: Musculoskeletal: osteoporosis; Nutritional and Gross Metabolic: weight loss or decreased weight gain, changes in phosphorus

TDLo (Oral-Woman) 73912.5 mg/kg/26 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Musculoskeletal: osteoporosis; Nutritional and Gross: Metabolic: changes in phosphorus

TDLo (Unreported-Infant) 39 gm/kg/24 days-intermittent: Musculoskeletal: osteomalacia

TDLo (Oral-Rat) 15 mg/kg: Gastrointestinal: other changes

TDLo (Oral-Rat) 8040 mg/kg/67 days-continuous: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Nutritional and Gross Metabolic: changes in phosphorus

TDLo (Oral-Mouse) 80,880 mg/kg/23 weeks-continuous: Liver: other changes; Musculoskeletal: other changes; Nutritional and Gross Metabolic: changes in metals, not otherwise specified

TDLo (Intraperitoneal-Rat) 150 mg/kg

TDLo (Intraperitoneal-Rat) 6240 mg/kg/26 weeks-intermittent: Blood: pigmented or nucleated red blood cells; Nutritional and Gross Metabolic: weight loss or decreased weight gain, changes in iron

TDLo (Intraperitoneal-Rat) 1920 mg/kg/8 weeks-intermittent: Blood: microcytosis with or without anemia

TDLo (Intraperitoneal-Rat) 960 mg/kg/4 weeks-intermittent: Blood: changes in erythrocyte (RBC) count

PHENOL:

LDLo (Oral-Human) 14 gm/kg: Behavioral: muscle weakness; Lungs, Thorax, or Respiration: cyanosis

LDLo (Oral-Human) 140 mg/kg: Behavioral: hallucinations, distorted perceptions; Skin and Appendages: sweating

LDLo (Oral-Infant) 10 mg/kg: Behavioral: muscle weakness; Lungs, Thorax, or Respiration: cyanosis

TDLo (Parenteral-Man) 105.3 mg/kg: Peripheral Nerve and Sensation: sensory change involving peripheral nerve; Lungs, Thorax, or Respiration: dyspnea; Kidney/Ureter/Bladder: renal function tests depressed

TDLo (Unreported-Man) 5714 µg/kg: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified

IC_{50} (*In vitro*-Human Liver) 3.02 mmol/L/24 hours: In Vitro Toxicity Studies: cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

IC_{50} (*In vitro*-Human Liver) 9.67 mmol/L/24 hours: In Vitro Toxicity Studies: cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

IC_{50} (*In vitro*-Human Liver Tumor) 10 mmol/L/24 hours: *In Vitro* Toxicity Studies: cell protein synthesis

IC_{50} (*In vitro*-Human Liver Tumor) 3.47 mmol/L/24 hours: In Vitro Toxicity Studies: cell membrane integrity: cytoplasmic enzymes leakage (lactate dehydrogenase, ATP enzymes etc.), cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

IC_{50} (*In vitro*-Human Liver Tumor) 14.66 mmol/L/24 hours: In Vitro Toxicity Studies: cell membrane integrity: cytoplasmic enzymes leakage (lactate dehydrogenase, ATP enzymes etc.), cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

IC_{50} (*In vitro*-Human HeLa Cell) 100 mg/L/24 hours: *In Vitro* Toxicity Studies: cell membrane integrity: cytoplasmic enzymes leakage (lactate dehydrogenase, ATP enzymes etc.)

Open Irritation Test (Skin-Rabbit) 535 mg: Severe

Standard Draize Test (Skin-Rabbit) 100 mg: Mild

Standard Draize Test (Eye-Rabbit) 5 mg: Severe

Standard Draize Test (Eye-Rabbit) 400 µL/30 seconds: Severe

Rinsed with Water (Eye-Rabbit) 5 mg/30 seconds: Mild

LC_{50} (Inhalation-Rat) 316 mg/m^3

LC_{50} (Inhalation-Rat) 316 mg/m^3/4 hours

LC_{50} (Inhalation-Mouse) 177 mg/m^3

LC_{50} (Inhalation-Mouse) 177 mg/m^3/4 hours

LD_{50} (Oral-Rat) 317 mg/kg: Behavioral: convulsions or effect on seizure threshold

LD_{50} (Oral-Rat) 512 mg/kg

LD_{50} (Oral-Mouse) 270 mg/kg

LD_{50} (Oral-Mammal-Species Unspecified) 500 mg/kg

LD_{50} (Skin-Rat) 1500 mg/kg

LD_{50} (Skin-Rat) 669 mg/kg: Behavioral: tremor; Kidney/Ureter/Bladder: hematuria; Skin and Appendages: cutaneous sensitization, experimental (after topical exposure)

LD_{50} (Skin-Rabbit) 630 mg/kg

LD_{50} (Intraperitoneal-Rat) 127 mg/kg

LD_{50} (Intraperitoneal-Mouse) 180 mg/kg

LD_{50} (Subcutaneous-Rat) 300 mg/kg

LD_{50} (Subcutaneous-Mouse) 344 mg/kg

LD_{50} (Intravenous-Mouse) 112 mg/kg: Behavioral: tremor

IC_{10} (*In vitro*-Rat Liver) 1.12 mmol/L/24 hours: *In Vitro* Toxicity Studies: cell membrane integrity: cytoplasmic enzymes leakage (lactate dehydrogenase, ATP enzymes etc.), cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

IC_{10} (*In vitro*-Rat Lung) 0.03 gm/L/24 hours: In Vitro Toxicity Studies: cell membrane integrity (prelabeled cells): release of radioactive isotopes ([51Cr], [3H]-thymidine, [3H]-proline, [35S]- or [75Se]-methionine, 5-[125I]-2-deoxy-uridine) or fluorescent dyes (bis-carboxyethyl-carboxyfluorescein (BCECF) or calcein-AM) TIVIEQ

IC_{10} (*In vitro*-Rat Lung) 0.2 gm/L/24 hours: *In Vitro* Toxicity Studies: cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

IC_{10} (*In vitro*-Chicken Neurons) 7470 µmol/L/21 hour.....*In Vitro* Toxicity Studies: cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

PHENOL (continued):

IC_{10} (*In vitro*-Chicken Neurons) 1862 µmol/L/21 hours: *In Vitro* Toxicity Studies: cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc

IC_{10} (*In vitro*-Chicken Neurons) 614 µmol/L/20 hours: *In Vitro* Toxicity Studies: cell viability (lysosomal damage): neutral red assay etc.

IC_{50} (*In vitro*-Rat Liver) 3.3 mmol/L/24 hours: *In Vitro* Toxicity Studies: cell membrane integrity: cytoplasmic enzymes leakage (lactate dehydrogenase, ATP enzymes etc.), cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc.

IC_{50} (*In vitro*-Rat Lung) 1 gm/L/24 hours: In Vitro Toxicity Studies: cell viability (mitochondrial reductase assays): MTT, XTT, MTS, WSTs assays etc.

IC_{50} (*In vitro*-Rat Lung) 0.36 gm/L/24 hours: In Vitro Toxicity Studies: cell membrane integrity (prelabeled cells): release of radioactive isotopes ([51Cr], [3H]-thymidine, [3H]-proline, [35S]- or [75Se]-methionine, 5-[125I]-2-deoxy-uridine) or fluorescent dyes (bis-carboxyethyl-carboxyfluorescein (BCECF) or calcein-AM)

TDLo (Oral-Mouse) 2800 mg/kg/10 days-intermittent: Behavioral: tremor, ataxia

TDLo (Skin-Mouse) 329 mg/kg/30 minutes: Skin and Appendages: primary irritation (after topical exposure); Biochemical: Metabolism (Intermediary): other, effect on inflammation or mediation of inflammation

TDLo (Skin-Mouse) 88.9 µL/kg: Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Skin-Mouse) 16 gm/kg/40 weeks-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Skin and Appendages: tumors

TDLo (Intraperitoneal-Rat) 650 mg/kg/17 days-intermittent: Blood: other changes

TDLo (Intraperitoneal-Rat) 600 mg/kg: female 12-14 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TDLo (Intraperitoneal-Mouse) 300 mg/kg: Nutritional and Gross Metabolic: body temperature decrease

TDLo (Intraperitoneal-Mouse) 300 mg/kg: Immunological Including Allergic: hypersensitivity delayed

TCLo (Inhalation-Rat) 110 mg/m^3/4 hours: Behavioral: somnolence (general depressed activity); Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: proteases

TCLo (Inhalation-Rat) 150 ug/m^3/8 hours/26 weeks-intermittent: Kidney/Ureter/Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases

TCLo (Inhalation-Rat) 5 mg/m^3/4 hours/17 weeks-intermittent: Liver: liver function tests impaired; Endocrine: effect on menstrual cycle; Blood: changes in leukocyte (WBC) count

TCLo (Inhalation-Rat) 100 µg/m^3/24 hours/61 days-continuous: Behavioral: muscle contraction or spasticity; Blood: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase

TCLo (Inhalation-Rat) 0.5 mg/m^3/4 hours/122 days-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: multiple enzyme effects

TCLo (Inhalation-Mouse) 15 ppm/6 minutes: Lungs, Thorax, or Respiration: respiratory depression

LCLo (Inhalation-Rat) 232 mg/m^3/ 4 hours

LCLo (Inhalation-Mouse) 110 mg/m^3/4 hours

Mutation Test Systems-Not Otherwise Specified (Human HeLa cell) 17 mg/L

Mutation Test Systems-Not Otherwise Specified (Human Lymphocyte) 5 µmol/L

DNA Inhibition (Human HeLa Cell) 1 mmol/L

Sister Chromatid Exchange (Human Lymphocyte) 5 µmol/L

Cytogenetic Analysis (Human Cells-Not Otherwise Specified) 300 µmol/L/30 hours

Mutation in Microorganisms (Bacteria-*Salmonella typhimurium*) 40 µmol/plate

Mutation in Microorganisms (Mouse Lymphocyte) 300 mg/L

Mutation in Microorganisms (Microorganism-Not Otherwise Specified) 200 mg/L/8 hours

Sex Chromosome Loss and Non-Disjunction (Insect-*Drosophila melanogaster* Ovary) 100 ppm

Gene Conversion and Mitotic Recombination (Mold-*Aspergillus nidulans*) 15 µmol/L

DNA Damage (Mammal-Species Unspecified Lymphocyte) 250 mmol/L

Micronucleus Test (Oral-Mouse) 265 mg/kg

Micronucleus Test (Intraperitoneal-Mouse) 265 mg/kg

Micronucleus Test (Hamster Lung) 4 mmol/L

Micronucleus Test (Hamster Ovary) 175 mg/L

Micronucleus Test (Hamster Embryo) 500 mg/L/4 hours

DNA Inhibition (Oral-Mouse) 20 gm/kg

DNA Inhibition (Mouse Lymphocyte) 800 µmol/L

DNA Inhibition (Hamster Lung) 1900 µmol/L

Cytogenetic Analysis (Multiple Routes-Fish-Not Otherwise Specified) 300 nL/L

Cytogenetic Analysis (Hamster Ovary) 2 gm/L

Cytogenetic Analysis (Hamster Embryo) 100 µmol/L

Unscheduled DNA Synthesis (Oral-Rat) 4 gm/kg

Unscheduled DNA Synthesis (Hamster Embryo) 3 µmol/L

DNA Damage (Mouse Lymphocyte) 1500 µmol/L

Mutation Test Systems-Not Otherwise Specified (Mouse Cells-Not Otherwise Specified) 2500 µmol/L

Mutation Test Systems-Not Otherwise Specified (Rabbit Bone Marrow) 250 µmol/L

Mutation in Mammalian Somatic Cells (Mouse Lymphocyte Mouse Lymphocyte) 1890 µmol/L

Mutation in Mammalian Somatic Cells (Hamster Embryo) 3 mmol/L

Morphological Transformation (Hamster Embryo) 10 µmol/L

Sister Chromatid Exchange (Hamster Ovary) 300 mg/L

Sister Chromatid Exchange (Hamster Embryo) 1 mmol/L

POLYBUTENE:

TCLo (Inhalation-Rat) 700 mg/m^3/7 hours/2 weeks-intermittent: Liver: changes in liver weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain

11. TOXICOLOGICAL INFORMATION (Continued)

IRRITANCY OF PRODUCT: Inhalation of fumes or vapors may cause respiratory irritation. Eye contact may cause irritation. Eye contact with fumes may cause irritation. Prolonged skin contact may cause irritation.

CARCINOGENIC POTENTIAL OF COMPONENTS: Components of this product are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

CRYSTALLINE SILICA: ACGIH-TLV-A2 (Suspected Human Carcinogen); IARC-1 (Carcinogenic to Humans); MAK-1 (Substances that Cause Cancer in Man and Can Be Assumed to Make a Significant Contribution to Cancer Risk); NIOSH-Ca (Potential Occupational Carcinogen with No Further Categorization); NTP-K (Known to Be a Human Carcinogen)

FORMALDEHYDE: ACGIH-TLV-A2 (Suspected Human Carcinogen); EPA-B1 (Probable Human Carcinogen-Limited Evidence of Carcinogenicity from Epidemiological Studies), IARC-1 (Carcinogenic to Humans); MAK-4 (Substances with Carcinogenic Potential for Which Genotoxicity Plays No or at Most a Minor Role. No significant contribution to human cancer risk is expected, provided the MAK value is observed.); NIOSH-Ca (Potential Occupational Carcinogen with No Further Categorization); NTP-K (Known to Be a Human Carcinogen); OSHA-Ca (Carcinogen Defined with No Further Categorization)

PHENOL: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); EPA-I (Data are Inadequate for an Assessment of Human Carcinogenic Potential); EPA-D (Not Classifiable as to Human Carcinogenicity); IARC-3 (Unclassifiable as to Carcinogenicity in Humans); MAK-3B (Substances for Which in vitro tests or animal studies have yielded evidence of carcinogenic effects that is not sufficient for classification of the substance in one of the other categories. Further studies are required before a final classification can be made.)

The remaining components are not found on the following lists: U.S. EPA, U.S. NTP, U.S. OSHA, U.S. NIOSH, GERMAN MAK, IARC, or ACGIH and therefore is neither considered to be nor suspected to be a cancer-causing agent by these agencies.

REPRODUCTIVE TOXICITY INFORMATION: This product is not expected or reported to cause human mutagenic, embryotoxic, teratogenic or reproductive toxicity effects. The following gives information on possible effects from components.

Mutagenicity: Formaldehyde is considered mutagenic, based on positive results (e.g. chromosomal aberrations in lung cells) observed in studies with live animals. In occupational exposure studies, which are limited by such problems as low numbers of workers studied and mixed exposures, both positive and negative results (micronuclei, sister chromatid exchanges (SCEs), chromosome aberrations in lymphocytes or cheek and nose cells) and a negative result (abnormal sperm) were obtained.(19,44,46,81) However, positive results (SCEs in lymphocytes, DNA-protein crosslinks in lymphocytes) were obtained in 2 reasonably well-conducted studies.

Embryotoxicity/Teratogenicity: No component is known to cause human embryotoxicity or teratogenicity. Animal studies are inconclusive or have not shown embryotoxicity or teratogenicity.

Reproductive Toxicity: There is insufficient evidence to determine if Formaldehyde causes reproductive toxicity in humans. Despite limitations, the few animal studies available do not suggest that Formaldehyde exposure will affect fertility.

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

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

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

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

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. The mineral components are not expected to biodegrade to great extent.

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

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

OTHER ADVERSE EFFECTS: This material is not listed as having 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

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

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or metal waste pails or drums. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

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

U.S. EPA WASTE NUMBER: Not applicable.

14. TRANSPORTATION INFORMATION

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

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

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

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

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

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

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

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

15. REGULATORY INFORMATION

UNITED STATES REGULATIONS:

U.S. SARA Reporting Requirements: The 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 as follows.

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Formaldehyde	Yes	Yes	Yes
Phenol	Yes	Yes	Yes

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

U.S. SARA Threshold Planning Quantity (TPQ): Formaldehyde: 500 lb (27.2 kg); Phenol: 500 lb (27.2 kg)

U.S. CERCLA Reportable Quantity (RQ): Formaldehyde: 100 lb (45.4 kg); Phenol: 1000 lb (454 kg)

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

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): The Crystalline Silica and Formaldehyde (gas) components are on the California Proposition 65 lists. WARNING! This product contains compounds known to the State of California to cause Cancer. This product contains trace amounts of a suspected human carcinogen by inhalation; however, this hazard is not expected to be significant due to viscosity and consistency of the mixture.

CANADIAN REGULATIONS:

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

Canadian Environmental Protection Act (CEPA) Priorities Substances Lists: The Phenol and Formaldehyde components are on the CEPA Priorities Substances 2 List.

Canadian WHMIS Classification and Symbols: This product would be categorized as a Controlled Product, D2B (Other Toxic Effects-Potential Carcinogenic and Mutagenic Effect, Irritation, Skin Sensitization) as per the Controlled Product Regulations.

CHINESE REGULATIONS:

Chinese Inventory of Existing Chemical Substances Status: Components listed by CAS# are listed on the Chinese Inventory of Existing Chemical Substances (IECSC), or are not listed, per information in Section 2.

JAPANESE REGULATIONS:

Japanese ENCS: Components listed by CAS# are on the ENCS Inventory, are excepted, or are not listed, per information in Section 2.

Japanese Ministry of Economy, Trade, and Industry (METI) Status: Components are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese METI.

Poisonous and Deleterious Substances Control Law: Components are not listed as a Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

KOREAN REGULATIONS:

Korean Existing Chemicals List (ECL) Status: Components listed by CAS# are listed on the Korean ECL Inventory, or are not listed, per information in Section 2.

MEXICAN REGULATIONS:

Mexican Workplace Regulations (NOM-018-STPS-2000): This product is classified as hazardous.

SINGAPORE REGULATIONS:

List of Controlled Hazardous Substances: Components listed by CAS# are not listed on the Singapore List of Controlled Substances.

Code of Practice on Pollution Control Requirements: The components identified by CAS# in Section 2 (Composition and Information on Ingredients) NOT are subject to the requirements under the Singapore Code of Practice on Pollution Control.

TAIWANESE REGULATIONS:

Taiwan Existing Chemical Substances Inventory Status: Components listed by CAS# are listed on the Taiwan Existing Chemicals List.

16. OTHER INFORMATION

REFERENCES AND DATA SOURCES: Contact the supplier for information.
METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Criteria of the GHS were used for classification.
PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc. • PO Box 1961, Hilo, HI 96721-1961 • (800) 441-3365
DATE OF PRINTING: January 24, 2017
REVISED: January 3, 2017
REVISION DETAILS: Reviewed January 3, 2017, no changes.

DEFINITION OF TERMS

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

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

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

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

DFG MAK Germ Cell Mutagen Categories: 1: Germ cell mutagens that have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens that have been shown to increase the mutant frequency in the progeny of exposed mammals. **3A:** Substances that have been shown to induce genetic damage in germ cells of human of animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. **3B:** Substances that are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*; in exceptional cases, substances for which there are no *in vivo* data, but that are clearly mutagenic in vitro and structurally related to known in vivo mutagens. **4:** Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) **5:** Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DFG MAK Pregnancy Risk Group Classification: Group A: A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A–C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

IDLH: Immediately Dangerous to Life and Health. This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

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 exposures; extremely toxic; irreversible injury may result from brief contact. *Skin Irritation*: Not appropriate. Do not rate as a 4, based on skin irritation alone. *Eye Irritation*: Not appropriate. Do not rate as a 4, based on eye irritation alone. *Oral Toxicity 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.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): **1** Slight Hazard: Materials that must be pre-heated before ignition can occur. Material requires considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur. This usually includes the following: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C (200°F) (i.e. OSHA Class 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; **3 (continued):** Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp); and Solids and semisolids (e.g. viscous and slow flowing as asphalt) that readily give off flammable vapors. **3** Serious Hazard: Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions. This usually includes the following: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 38°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (100°F) (i.e. OSHA Class IB and IC); Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air (e.g., dusts of combustible solids, mists or droplets of flammable liquids); and Materials that burn extremely rapidly, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). **4** Severe Hazard: Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and that will burn readily. This usually includes the following: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. OSHA Class IA); and Materials that ignite spontaneously when exposed to air at a temperature of 54.4°C (130°F) or below (pyrophoric).

PHYSICAL HAZARD: **0** *Water Reactivity*: Materials that do not react with water. *Organic Peroxides*: Materials that are normally stable, even under fire conditions and will not react with water. *Explosives*: Substances that are Non-Explosive. *Compressed Gases*: No Rating. *Pyrophorics*: No Rating. *Oxidizers*: No 0 rating. *Unstable Reactives*: Substances that will not polymerize, decompose, condense, or self-react.). **1** *Water Reactivity*: Materials that change or decompose upon exposure to moisture. *Organic Peroxides*: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy violently. *Explosives*: Division 1.5 & 1.6 explosives. Substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases*: Pressure below OSHA definition. *Pyrophorics*: No Rating. *Oxidizers*: Packaging Group III oxidizers; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives*: Substances that may decompose condense, or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosion hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors. **2** *Water Reactivity*: Materials that may react violently with water. *Organic Peroxides*: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives*: Division 1.4 explosives. Explosive substances where the explosive effects are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases*: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: 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.

DEFINITION 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.

HEALTH HAZARD (continued): **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) (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 related *Manual of Tests and Criteria* (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85% by weight. Liquids that have no fire point when tested by ASTM D 92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup*, up to the boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Most ordinary combustible materials. Solids containing greater than 0.5% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air. Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class 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) (i.e. Class IB and IC liquids). Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with representative diameter less than 420 microns (40 mesh).

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily. Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5% by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

INSTABILITY HAZARD: **0** Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

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.

ECOLOGICAL INFORMATION:

EC: Effect concentration in water. BCF: Bioconcentration Factor, which is used to determine if a substance will concentrate in life forms that consume contaminated plant or animal matter. TLm: Median threshold limit. log K_{OW} or log K_{OC}: Coefficient of Oil/Water Distribution is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S.:

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

CANADA:

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

JAPAN:

METI: Ministry of Economy, Trade and Industry.