



CGC Products, LLC
10948 Poplar Avenue
Fontana, CA 92337

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MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, and Canadian WHMIS Standards

Section 1. Chemical Products and Company Identification

Product Name/Trade Name: CGC S-200

Other Names: Spherical Glass-like Particles

Use: Lightweight filler/aggregate

Manufacturer: CGC Products LLC

Address: 10948 Poplar Avenue, Fontana, CA 92337

Emergency Phone: 1-909-349-3501 (M-F, 8am-5pm)

Business Phone: 1-909-349-3501 (M-F, 8am-5pm)

Effective Date: April 16, 2007. Check to verify the latest version or translation availability.

NOTE: As of the date of the preparation of this document, the information contained herein is believed to be accurate.

Section 2. Hazard Identification

Emergency Overview:

Product Description: This product is a gray, free flowing powder.

Health Hazards: This product may mildly to moderately irritate contaminated skin, eyes, mucous membranes and other tissues.

Flammability Hazards: This product is not flammable. If this product is involved in a fire, the decomposition products generated will include irritating vapors and toxic gases (including oxides of silicon, sodium, aluminum, potassium, magnesium, iron, and calcium).

Reactivity Hazards: This product is not reactive.

Environmental Hazards: This product may mildly to moderately irritate contaminated terrestrial animals, contaminated plants, and aquatic life.

Emergency Considerations: Emergency responders should wear appropriate protection for situation to which they respond.

Primary Routes of Entry and Potential Health Effects: 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 this material may mildly to moderately irritate the respiratory system and cause irritation of the mucus membranes, coughing, sneezing, and nasal congestion.

Repeated and prolonged inhalation overexposures to dusts generated by crushing or abrading this material may cause exposure to the Crystalline Silica component of this product. Crystalline Silica can cause silicosis (scarring of the lung) and increases the risk of bronchitis, tuberculosis, lung cancer, renal disease, and scleroderma (a disease affecting the connective tissue of the skin, joints, blood vessels, and internal organs). Some studies suggest that cigarette smoking increases the risk of silicosis, bronchitis and lung cancer in persons also exposed to crystalline silica.

Acute, massive exposure to the Crystalline Silica component of this product may cause Acute silicosis, a sub-chronic disease. It is a rapidly progressive, incurable lung disease that is typically fatal. Symptoms include, but are not limited to, shortness of breath, cough, fever, weight-loss and chest pain. Such exposure may cause



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pneumoconiosis and pulmonary fibrosis.

2. Hazard Identification (Continued)

Primary Routes of Entry and Potential Health Effects (continued):

Ingestion: Ingestion is not anticipated to be a likely route of exposure to this product. If this product is swallowed, it may cause gastric discomfort, nausea, vomiting, and diarrhea.

Eye Contact: Eye contact may cause mechanical irritation. Symptoms of eye overexposure can include redness and tearing.

Skin Contact: This product may cause mechanical irritation. Symptoms of overexposure may include redness and mild irritation. Prolonged or repeated skin contact may cause dermatitis (dry, red skin).

Skin Absorption: Skin absorption is not a significant route of overexposure for this product.

Injection: Injection is not anticipated to be a significant route of overexposure for this product. Injection of this product (via puncture with a contaminated object) can cause pain and irritation in addition to the wound.

Health Effects or Risks From Exposure: An Explanation In Lay Terms. Overexposure to this product may cause the following health effects:

Acute: Exposures can mildly to moderately irritate the eyes, skin, and any other exposed tissue.

Chronic: Prolonged or repeated skin contact may cause dermatitis (dry, red skin). Repeated and prolonged inhalation overexposures to the Crystalline Silica component of this product can cause silicosis (scarring of the lung). Refer to Section 11 (Toxicology Information) for additional information on this product's components.

Target Organs:

Acute: Skin, eyes, respiratory system.

Chronic: Skin, respiratory system.

HMIS Ratings: Health = 1, Flammability = 0, Reactivity = 0

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

Section 3. Hazardous Ingredients/Identity Information

Substance Name	CAS Number	Proportion (% by weight)
Phosphorus Pentoxide	1314-56-3	0.1-0.5
Sulfur Trioxide	7446-11-9	0.1-0.5
Titanium Dioxide	13463-67-7	0.1-0.9
Magnesium Oxide	1309-48-4	1-5
Calcium Oxide	1305-78-8	5-10
Aluminum (III) Oxide	1344-28-1	10-17
Crystalline Silica	14808-60-7	1-3
Other components. Each of the other components is considered non-hazardous OR is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		Balance

None of the other components in this product contribute significantly to the hazards associated with this product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the U.S. Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent standards, and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).

NOTE: ALL Canadian WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.



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Section 4. First-Aid Measures

Victims of chemical exposure must be taken for medical attention if any adverse effects occur. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to physician or health professional with victim.

Ingestion: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING. Have victim rinse mouth with water if conscious. 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.

Eye Contact: If this product contaminates the eyes, rinse eyes under gently running water. Use sufficient force to open eyelids and then "roll" eyes while flushing. Minimum flushing is for 15 minutes. Do NOT interrupt flushing. Victim must seek medical attention if adverse effects occur.

Skin Contact: If this product contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Do NOT interrupt flushing. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek medical attention if adverse effects occur.

Inhalation: If this product is inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Victim should seek immediate medical attention if any adverse exposure symptoms develop.

Medical Conditions Aggravated By Exposure: Pre-existing skin or respiratory disorders (e.g., asthma, emphysema, pneumonia or restrictive lung diseases) may be aggravated by overexposures to this product. Provide oxygen if necessary. Pulmonary function tests, chest X-rays, and nervous system evaluations may prove useful. Lung scarring from crystalline silica may also increase risks to pulmonary tuberculosis. Consultation with an ophthalmologist is recommended if eye exposure causes tissue damage.

Recommendations To Physicians: Treat symptoms and eliminate exposure.

Section 5. Fire-Fighting Measures

Flash Point: Not flammable.

Autoignition Temperature: Not established.

Flammable Limits (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

Fire and Explosion Hazards: If involved in a fire, this material may decompose and produce irritating vapors and toxic gases (e.g., oxides of silicon, sodium, aluminum, potassium, magnesium, iron, and calcium).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Water Spray: NO

Carbon Dioxide: OK

Foam: OK

Dry Chemical: OK

Halon: OK

Other: Any "ABC" Class

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

NFPA Ratings: Health = 1, Flammability = 0, Reactivity = 0

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



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Section 6. Accidental Release Measures

Spill and Leak Response: For small releases, take basic hygiene precautions. Lightweight gloves and eye protection should be worn if airborne dusts may be generated during the cleanup process. Sweep up, vacuum, or wipe up spilled material with damp sponge or polypad, avoiding the generation of dusts. Trained personnel using pre-planned procedures should respond to large releases that are not immediately controlled. In case of a non-incident spill, clear the affected area, protect people, and respond with trained personnel. The Minimum Personal Protective Equipment recommended for response to non-incident releases should be dust mask, gloves, eye protection, and suitable body protection. Sweep up or vacuum spilled solid (an explosion-proof vacuum should be used). Decontaminate the area thoroughly. Place all spill residue in an appropriate container and seal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations and those of Canada and its Provinces (see Section 13, Disposal Considerations)

Section 7. Handling and Storage

Work Practices and Hygiene Practices: 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. Avoid breathing airborne dusts of this product. Use in a well-ventilated location. Remove contaminated clothing immediately. Wash thoroughly after handling this product, equipment contaminated with this product, and containers of this product. Follow SPECIFIC USE INSTRUCTIONS supplied with product.

Storage and Handling Practices: Employees must be trained to properly use this product. Keep container tightly closed when not in use. This product may be stored with other laboratory cleaning compounds, away from material with which it is incompatible. Contaminated waste must be properly handled. Work areas must be regularly decontaminated. Ensure containers are properly labeled. Store this product away from incompatible materials (see Section 10, Stability and Reactivity). Empty containers may contain residual product; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers that held this product.

Protective Practices During Maintenance of Contaminated Equipment: When cleaning non-disposable equipment, wear latex or butyl rubber (double gloving is recommended), goggles, and lab coat. Wipe equipment down with damp sponge or polypad. Collect all rinsates and dispose of according to applicable U.S. Federal, State, and local hazardous waste disposal regulations or those of Canada and its Provinces.

Section 8. Exposure Controls and Personal Protection

Exposure Limits/Guidelines: Inhalation overexposures to dusts generated by crushing or abrading this material may cause exposure to the components of this product.

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	IDLH mg/m ³	mg/m ³
Phosphorus Pentoxide	1314-56-3	NE	NE	NE	NE	NE	NE	NE	DFG MAK: TWA = 2 (Inhalable fraction) PEAK = 2•MAK 15 min, average value Pregnancy Risk Group C
Titanium Dioxide	13463-67-7	10	NE	15 (Total dust)	NE	Lowest feasible concentration (LOQ = 0.2)		NE	DFG MAKs: TWA = 1.5 (Inhalable Fraction) Pregnancy Risk Group: C Carcinogen: IARC-3, NIOSH-Ca, TLV-A4
Magnesium Oxide	1309-48-4	10 (Inhalable fraction)	NE	15 (Total Particulate)	NE	NE	NE	NE	DFG MAKs: TWA = 4 (Inhalable)



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									Fraction); 1.5 (Respirable fraction) Carcinogen: TLV-A4
Calcium Oxide	1305-78-8	2	NE	5	NE	2	NE	NE	NE

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

Section 8. Exposure Controls and Personal Protection (Continued)

Exposure Limits/Guidelines (continued):

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	IDLH mg/m ³	mg/m ³
Aluminum (III) Oxide	1344-28-1	10 (containing no asbestos)	NE	15 (Total dust) 5 (Resp. fraction)	NE	NE	NE	NE	DFG MAK: TWA = 1.5 (Resp. fraction) [fume] PEAK = 8•MAK 15 min, average value (fume) Carcinogen: MAK-2 (fibrous dust), TLV-A4
Crystalline Silica	14808-60-7	0.025 (Resp. Fraction)	NE	30 mg/m ³ % SiO ₂ + 2 (Total dust) 250 mppcf % SiO ₂ + 5 10 mg/m ³ % SiO ₂ + 2 Respirable dust		0.05 (Resp. dust)	NE	NE	DFG MAK: Respirable fraction Carcinogen: IARC-1, MAK-1, NIOSH-Ca, NTP-K, TLV-A2

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

Personal Protection: 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) or equivalent standards of Canada (including CSA Standard Z94.4-02 and CSA Standard Z94.3-02). Please reference applicable regulations and standards for relevant details

Respiratory: A respirator is not required for routine conditions of use of this product. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), equivalent U.S. State standards, or Canadian CSA Standard Z94.4-02. 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 OSHA's Respiratory Protection Standard (1910.134-1998).

Eye: Use approved safety goggles or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, the European Standard CR 13464:1999 and the Canadian CSA Standard Z94.3-02, *Industrial Eye and Face Protectors* for further information.

Hand: Wear chemical impervious gloves (e.g., rubber, Neoprene). Check gloves for leaks. Wash hands before putting on gloves and after removing gloves. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or the appropriate Standards of Canada.

Body/Skin: Use body protection appropriate for task (e.g., Tyvek suit, rubber apron). If necessary, refer to 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 U.S. OSHA 29 CFR 1910.136 and the Canadian CSA Standard Z195-02, *Protective Footwear*.

Ventilation and Engineering Controls: Use with adequate ventilation. During decontamination of work surfaces, workers should wear the same equipment recommended in Section 6 (Accidental Release Measures) of this MSDS. Ensure eyewash/safety shower stations are available near areas where this product is used.



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Section 9. Physical and Chemical Properties

Appearance, Odor, And Color: This product is a gray, free flowing powder.

Vapor Pressure (Air = 1): Not Established.

Boiling Point: Not Established.

Freezing/Melting Point: Not Established.

Odor Threshold: Odorless.

pH: Not Applicable.

How to Detect This Substance (warning properties): The appearance may act as a distinguishing characteristic associated with this product.

Specific Gravity: Not Established.

Solubility in Water: Insoluble.

Evaporation Rate (Water = 1): Not Established.

Density: Not Established.

Section 10. Stability and Reactivity

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

Conditions to Avoid: Avoid extreme temperatures and contact with incompatible chemicals.

Materials with Which Substance Is Incompatible: This product is incompatible with strong oxidizers, hydrofluoric acid, magnesium, manganese trifluoride, sodium, and xenon hexafluoride.

Decomposition Products: If exposed to extremely high temperatures, thermal decomposition may generate irritating fumes and toxic gases (e.g., oxides of silicon, sodium, aluminum, potassium, magnesium, iron, and calcium).

Hazardous Polymerization: Will not occur.

Section 11. Toxicological Information

Toxicity Data: There are currently no toxicity data available for this product; the following toxicology information is available for components greater than 1 % in concentration. Inhalation overexposures to dusts generated by crushing or abrading this material may cause exposure to the components of this product.

Aluminum Oxide:

TDLo (intrapleural, rat) = 90 mg/kg; Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: tumors

TDLo (implant, rat) = 200 mg/kg; Tumorigenic: neoplastic by RTECS criteria, tumors at site of application

TD (implant, rat) = 200 mg/kg; Tumorigenic: equivocal tumorigenic agent by RTECS criteria, tumors at site of application

Crystalline Silica:

TCLo (Inhalation-Human) 16 mppcf/8 hours/17.9 years-intermittent: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis), cough, dyspnea

LCLo (Inhalation-Human) 300 $\mu\text{g}/\text{m}^3/10$ years-intermittent: Liver: other changes

LDLo (Intravenous-Rat) 90 mg/kg

LDLo (Intravenous-Mouse) 40 mg/kg

LDLo (Intravenous-Dog) 20 mg/kg

LDLo (Intratracheal-Rat) 200 mg/kg: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis)

LDLo (Intratracheal-Rat) 250 mg/kg: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis), other changes

LD (Intratracheal-Mouse) > 20 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases

TCLo (Inhalation-Rat) 200 mg/kg: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis),

other changes; Nutritional and Gross Metabolic: changes in iron

TCLo (Inhalation-Rat) 1 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 80 mg/m³/26 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis); Blood: changes in spleen; Immunological Including Allergic: decrease in cellular immune response

TCLo (Inhalation-Rat) 108 mg/m³/6 hours/3 days-intermittent: Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases, Enzyme inhibition, induction, or change in blood or tissue levels: other oxidoreductases, Metabolism (Intermediary): other proteins

TCLo (Inhalation-Rat) 15 mg/m³/26 weeks-intermittent: Lungs, Thorax, or Respiration: other changes

Crystalline Silica (continued):

TCLo (Inhalation-Rat) 58 mg/m³/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Endocrine: changes in thymus weight; Blood: changes in leukocyte (WBC) count

TCLo (Inhalation-Rat) 0.74 mg/m³/2 years-intermittent: Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Rat) 10 mg/m³/75 days-intermittent: Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Rat) 50 mg/m³/6 hours/71 weeks-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Liver: tumors

TCLo (Inhalation-Mouse) 1475 $\mu\text{g}/\text{m}^3/8$ hours/21 weeks-intermittent: Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Mouse) 4932 $\mu\text{g}/\text{m}^3/24$ hours/39 weeks-continuous: Endocrine: changes in spleen weight; Immunological Including Allergic: decrease in humoral immune response

TCLo (Inhalation-Mouse) 40 mg/kg: Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Mouse) 40 mg/kg: Immunological Including Allergic: decrease in cellular immune response

TCLo (Inhalation-Mouse) 160 mg/kg/2 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Immunological Including Allergic: autoimmune

TCLo (Inhalation-Guinea Pig) 28 mg/m³/3 weeks-intermittent: Lungs, Thorax, or Respiration: other



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- changes, changes in lung weight; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: other Enzymes
- TCLo (Inhalation-Hamster) 3 mg/m³/6 hours/78 weeks-intermittent: Lungs, Thorax, or Respiration: fibrosis (interstitial), changes in lung weight
- TCLo (Inhalation-Monkey) 10 mg/m³/818 days-intermittent: Lungs, Thorax, or Respiration: other changes
- TCLo (Inhalation-Mammal-Domestic) 1000 gm/m³/10 days-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases
- TDLo (Oral-Rat) 120 gm/kg: Gastrointestinal: hypermotility, diarrhea, other changes
- TDLo (Intratracheal-Rat) 240 mg/kg/1 hour: Lungs, Thorax, or Respiration: other changes, changes in lung weight; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases
- Crystalline Silica (continued):**
- TDLo (Intratracheal-Rat) 1.5 mg/kg: Lungs, Thorax, or Respiration: fibrosis (interstitial)
- TDLo (Intratracheal-Rat) 15.69 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: other Enzymes
- TDLo (Intratracheal-Rat) 25 mg/kg: Lungs, Thorax, or Respiration: cough, other changes, other changes
- TDLo (Intratracheal-Rat) 150 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases
- TDLo (Intratracheal-Rat) 10 mg/kg: Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases
- TDLo (Intratracheal-Rat) 2.88 mg/kg/12 weeks-intermittent: Blood: other changes, changes in leukocyte (WBC) count
- TDLo (Intratracheal-Rat) 11.52 mg/kg/12 weeks-intermittent: Lungs, Thorax, or Respiration : other changes; Blood: other changes, changes in leukocyte (WBC) count
- TDLo (Intratracheal-Rat) 240 µg/kg/12 weeks-intermittent: Lungs, Thorax, or Respiration: sputum; Immunological Including Allergic: decrease in cellular immune response
- TDLo (Intratracheal-Rat) 960 µg/kg/12 weeks-intermittent: Lungs, Thorax, or Respiration: sputum; Immunological Including Allergic: decrease in cellular immune response; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: multiple enzyme effects
- TDLo (Intratracheal-Rat) 111 mg/kg: Tumorigenic: carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors
- TDLo (Intratracheal-Rat) 100 mg/kg/19 weeks-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: tumors
- TDLo (Intratracheal-Mouse) 80 mg/kg: Lungs, Thorax, or Respiration: fibrosis (interstitial); Immunological Including Allergic: increase in cellular immune response; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation
- TDLo (Intratracheal-Mouse) 16.7 mg/kg: Lungs, Thorax, or Respiration: acute pulmonary edema



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Section 11. Toxicological Information (Continued)

Toxicity Data (continued):

Crystalline Silica (continued):

TDLo (Intratracheal-Mouse) 80 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary) - effect on inflammation or mediation of inflammation
TDLo (Intratracheal-Mouse) 100 mg/kg: Tumorigenic: increased incidence of tumors in susceptible strains
TDLo (Implant-Mouse) 900 mg/kg: Tumorigenic: neoplastic by RTECS criteria; Gastrointestinal: tumors; Tumorigenic: tumors at site of application
TDLo (Implant-Rat) 4554 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria, tumors at site of application
TDLo (Implant-Mouse) 4000 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Kidney/Ureter/Bladder: tumors
TDLo (Implant-Mouse) 20 mg/kg: Lungs, Thorax, or Respiration: fibrosing alveolitis; Immunological Including Allergic: increase in cellular immune response; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation
TDLo (Intraperitoneal-Rat) 45 mg/kg: Tumorigenic: carcinogenic by RTECS criteria, tumors at site of application

Crystalline Silica (continued):

TDLo (Intraperitoneal-Rat) 90 mg/kg/4 weeks-intermittent: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Blood: lymphoma, including Hodgkin's disease
TDLo (Intraperitoneal-Rat) 450 mg/kg/4 weeks-intermittent: Tumorigenic: neoplastic by RTECS criteria; Gastrointestinal: tumors
TDLo (Intravenous-Rat) 90 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Blood: lymphoma, including Hodgkin's disease
TDLo (Intrapleural-Rat) 90 mg/kg: Tumorigenic: carcinogenic by RTECS criteria; Blood: lymphoma, including Hodgkin's disease
TDLo (Intrapleural-Hamster) 83 mg/kg: Tumorigenic: neoplastic by RTECS criteria, tumors at site of application
TD (Intrapleural-Rat) 200 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: bronchiogenic carcinoma
TD (Intrapleural-Rat) 100 mg/kg: Tumorigenic: carcinogenic by RTECS criteria; Blood: lymphoma, including Hodgkin's disease; Lungs, Thorax, or Respiration: tumors

Crystalline Silica (continued):

TD (Intrapleural-Rat) 100 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration: fibrosis, focal (pneumoconiosis), tumors
TD (Intrapleural-Rat) 100 mg/kg: Tumorigenic: neoplastic by RTECS criteria; Lungs, Thorax, or Respiration: tumors
Micronucleus Test (Human-Lung) 40 $\mu\text{g}/\text{cm}^2$
Micronucleus Test (Hamster-Lung) 160 $\mu\text{g}/\text{cm}^2$
DNA Damage (Intratracheal-Rat) 3 mg/kg
Magnesium Oxide:
TCLo (inhalation, human) = 400 mg/m^3
TCLo (inhalation, rat) = 1120 $\mu\text{g}/\text{m}^3/24$ hours/continuous; Brain and Coverings: recordings from specific areas of CNS; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase
TDLo (Intratracheal, hamster) = 480 mg/kg/30 weeks/intermittent; Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Sense Organs and Special Senses (Olfaction): tumors; Lungs, Thorax, or Respiration: tumors

Irritancy of Product: This product may mildly to moderately irritate contaminated tissue.

Sensitization of Product: No component of this product is known to cause human skin or respiratory sensitization.

Suspected Cancer Agent: The components of these products are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

Aluminum Oxide: MAK-2 Compound (Substances which are considered to be carcinogenic); ACGIH-TLV-A4 Compound (Not Classifiable as a Human Carcinogen).

Crystalline Silica: IARC-1 (Carcinogenic to Humans); MAK-1 (Substances That Cause Cancer in Man); NIOSH-Ca (Potential occupational carcinogen, with no further categorization); NTP-K (Known to be a Human Carcinogen); ACGIH-TLV-A2 (Suspected Human Carcinogen);

Magnesium Oxide: ACGIH-TLV-A4 Compound (Not Classifiable as a Human Carcinogen).

Sodium Hydroxide: Sodium Hydroxide has been implicated as a cause of cancer of the esophagus in individuals who have ingested it. The cancer may develop 12 to 42 years after the ingestion incident. Similar cancers have been observed at the sites of severe thermal burns. These cancers may be due to tissue destruction and scar formation rather than the Sodium Hydroxide itself.

Titanium Dioxide: Listed as IARC-3 (Unclassifiable as to Carcinogenicity in Humans), NIOSH-Ca (Potential occupational carcinogen, with no further categorization), and TLV-A4 (Not Classifiable as Human Carcinogen).

The other components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

Reproductive Toxicity Information: Listed below is information concerning the effects this product and its components on human and animal reproductive systems.

Mutagenicity: The components of this product are not reported to cause human mutagenic effects.

Embryotoxicity: The components of this product are not reported to cause human embryotoxic effects.

Teratogenicity: The components of this product are not reported to cause human teratogenic effects.

Reproductive Toxicity: The components of this product are not reported to cause human reproductive effects.

*A **mutagen** is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryo toxin** is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical that causes*



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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.

ACGIH Biological Exposure Indices (BEIs): Currently, ACGIH Biological Exposure Indices (BEIs) have not been determined for the components of this product.

Section 12. Ecological Information

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

Environmental Stability: This product will be relatively stable under ambient environmental conditions.

Effect of Material on Plants or Animals: No specific information is currently available on the effect of this product on plants or animals in the environment. This product may irritate contaminated plant and animal life, especially if released to the environment in large quantities.

Effect of Chemical on Aquatic Life: No information is currently available on the effect of this product on aquatic plants or animals in the environment. Release of this product to an aquatic environment may irritate aquatic plant and animal life in contaminated bodies of water, especially in large quantities.

Section 13. Disposal Considerations

Preparing Wastes for Disposal: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada and its Provinces. 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.

U.S. EPA Waste Number: Not applicable.

Section 14. Transportation Information

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

Proper Shipping Name: Not Regulated.

Hazard Class Number and Description: Not applicable.

UN Identification Number: Not applicable.

Packing Group: Not applicable.

Dot Label(s) Required: Not applicable.

Emergency Response Guidebook Number (2004): Not applicable.

Marine Pollutant: No component of this product is classified by the U.S. DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

Transport Canada Transportation of Dangerous Goods Regulations: This product is not classified as Dangerous Goods, per regulations of Transport Canada.

Section 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, and are listed as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Aluminum Oxides (fibrous forms)	No	No	Yes
Sulfur Trioxide	Yes	Yes	No

U.S. SARA Hazard Categories (Section 311/312, 40 CFR 370.2): ACUTE: No; CHRONIC: No; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No



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U.S. SARA Threshold Planning Quantity: Sulfur Trioxide = 100 lb (45.4 kg)

U.S. CERCLA Reportable Quantity (RQ): Sulfur Trioxide = 100 lb (45 kg)

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

Other U.S. Federal Regulations: Not applicable.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): Components of this product are not on the California Proposition 65 lists.

Section 15. Regulatory Information (Continued)

United States Regulations (continued):

ANSI Labeling (Z129.1): CAUTION! MAY CAUSE RESPIRATORY TRACT, SKIN, AND EYE IRRITATION. Do not taste or swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing dusts. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear appropriate eye, hand, and body protection. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, do not induce vomiting. If victim is fully conscious, give a cupful of water. Never give by mouth to an unconscious person. Get medical attention immediately. Wash clothing before reuse. Destroy contaminated shoes. **IN CASE OF FIRE:** Use water fog, foam, dry chemical, or CO₂. **IN CASE OF SPILL:** Wipe up spilled material. Place residual in appropriate container and seal. Consult Material Safety Data Sheet for additional information.

Canadian Regulations:

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

Other Canadian Regulations: Not applicable.

Canadian Environmental Protection Act (CEPA) Priorities Substances Lists: The components of this product are not on the CEPA Priorities Substances Lists.

Canadian WHMIS Classification and Symbols: Not applicable.

Section 16. Other Information

WARNING

WARNING: AVOID BREATHING SILICA DUST

This product contains respirable crystalline silica, which is known to the State of California and is considered by IARC and NIOSH to be a cause of cancer from some occupational sources. Breathing excessive amounts of respirable silica dust can also cause a disabling and potentially fatal lung disease called silicosis, and has been linked with other diseases. Some studies suggest smoking may increase these risks. When handling: (1) minimize the creation of dust; work in outdoor areas with ample ventilation; (2) use only outdoors or in well-ventilated areas; (3) warn others in the immediate area; (4) wear a properly-fitted, NIOSH-approved dust mask or respirator (e.g. N-95) in accordance with applicable government regulations and manufacturer instructions. During clean-up, use HEPA vacuums or wet cleanup methods—*never* dry sweep. For further information, refer to our Material Safety Data Sheet available by calling 1-909-349-3501. **FAILURE TO ADHERE TO OUR WARNINGS AND MSDS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.**

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This form has been prepared to meet current Federal OSHA hazard communication regulations and is offered without any warranty or guarantee of any type. CGC Products LLC cannot control the use of its products, and therefore specifically disclaims liability and responsibility arising from the use, misuse and alteration of its products.

The information contained on this MSDS was produced without independent scientific or medical studies analyzing the



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effects of silica upon human health. The information contained herein is based upon scientific and other data CGC Products LLC believes is valid and reliable and provides the basis for this MSDS. The information contained herein relates only to specific materials listed in the document. It does not address the effects of silica when used in combination with other materials or substances, or when used in other processes. Because conditions of use are beyond CGC Products LLC control, the company makes no representations, guarantees or warranties, either express or implied warranties as to the fitness of the product for use, and assume no liability related to the information contained above.

CGC Products LLC requires, as a condition of use of its products, that purchasers comply with all applicable Federal, State, and Local health and safety laws, regulations, orders, requirements, and strictly adhere to all instructions and warnings which accompany the product.

Prepared By:

CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
800/441-3365
July 5, 2007

Date of Printing:

DEFINITION OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. 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 MAK Germ Cell Mutagen Categories: **1:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals. **3A:** Substances which 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 which 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 which 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.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

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-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by

OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order.

SKIN: Used when there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: 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: 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.

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.



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HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

HEALTH HAZARD:

0 (Minimal Hazard: No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ Rat:* < 20 mg/L.);

1 (Slight Hazard: Minor reversible Injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 2-20 mg/L); **2** (Moderate Hazard: Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 mg/L.) **3** (Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.05-0.5 mg/L.); **4** (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation:* Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation:* Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD₅₀ Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* ≤ 0.05 mg/L).

FLAMMABILITY HAZARD:

0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); **1** (Slight Hazard-

Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, Including: 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, or; 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 in air, Including: 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; Solids and semisolids 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, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°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]; 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 which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric].



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DEFINITION OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued):

3 (Water Reactivity): Materials that may form explosive reactions with water. *Organic Peroxides:* Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives:* Division 1.2 – 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 \geq 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics:* No Rating. *Oxidizers:* Packing Group I 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 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-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 to cause significant heat generation or explosion.).

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: 0 (materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. **1** (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. **2** (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. 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. **3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or

equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin.



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**NATIONAL FIRE PROTECTION ASSOCIATION
HAZARD RATINGS (continued):**

HEALTH HAZARD (continued): 3 (continued): 4 (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: 0 Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. **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 accordance with Annex D. 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 *Recommendation 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 percent 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 a 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). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed up flash point of the solvent. Most ordinary combustible materials. **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 in 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 percent 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 (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 a representative diameter less than 420 microns (40 mesh). **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 ppm. **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.



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DEFINITION OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

INSTABILITY HAZARD (continued): 0 (continued): 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 vapors to form an ignitable mixture with air. **Autoignition Temperature**: The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

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. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration

expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDL_o**, the lowest dose to cause a symptom and **TCL_o** the lowest concentration to cause a symptom; **TD_o**, **LDL_o**, and **LD_o**, or **TC**, **TC_o**, **LCL_o**, and **LC_o**, the lowest dose (or concentration) to cause lethal or toxic effects.

Cancer Information: The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. 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 is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S. and CANADA:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **ACGIH**: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.