

# Material Safety Data Sheet

**Material Name: Zinc Oxide**

**ID: C1-161**

## \*\*\* Section 1 - Chemical Product and Company Identification \*\*\*

**Part Number:** Zinc Oxide 802, Zinc White Oxzinal 802 (by French Process) and Zinc Oxide 920, Maximo 920 (by American Process)

**Chemical Name:** Zinc Oxide

**Product Use:** For Commercial Use

**Synonyms:** Zinc monoxide

### Supplier Information

Chem One Ltd.

8017 Pinemont Drive, Suite 100

Houston, Texas 77040-6519

Phone: (713) 896-9966

Fax: (713) 896-7540

Emergency # (800) 424-9300 or (703) 527-3887

### General Comments: FOR COMMERCIAL USE ONLY; NOT TO BE USED AS A PESTICIDE.

NOTE: Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

## \*\*\* Section 2 - Composition / Information on Ingredients \*\*\*

CAS #	Component	Percent
1314-13-2	Zinc Oxide	> 99

### Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Zinc compounds.

### Component Information/Information on Non-Hazardous Components

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

## \*\*\* Section 3 - Hazards Identification \*\*\*

### Emergency Overview

Zinc Oxide is a white or yellow-white solid in crystalline or powder form. Inhalation of fumes may cause metal fume fever.

Exposure to dusts may irritate eyes, skin, and respiratory tract. Will not burn. Fire and high temperatures will release toxic fumes.

Use extinguishing media suitable for surrounding fire.

### Hazard Statements

CAUTION! INHALATION OF ZINC OXIDE FUMES MAY CAUSE METAL FUME FEVER. MAY CAUSE EYE IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION. PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION. Do not breathe fumes. Avoid breathing dusts and mists. Avoid contact with eyes, skin, and clothing. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

### Potential Health Effects: Eyes

Dust may cause mild mechanical irritation to the eye.

### Potential Health Effects: Skin

No skin irritation is expected from a single short-term exposure to this product. Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis.

### Potential Health Effects: Ingestion

Zinc Oxide is of low oral toxicity. Ingestion of large doses may cause gastrointestinal irritation and vomiting. Long-time ingestion of zinc compounds can result in a chronic copper deficiency and may cause an alteration in immune responses, nausea, vomiting, headache, chills, fever, malaise, and abdominal pain.

### Potential Health Effects: Inhalation

Zinc Oxide dust is generally considered a nuisance dust, and adverse effects are unlikely when exposures are kept under reasonable control. Exposure to high quantities of the dust may cause mechanical irritation of the respiratory tract. Inhalation of Zinc Oxide fume may cause metal fume fever, an illness which lasts less than 48 hours. Symptoms are similar to those of the flu and include fever, chills, sweats, dry mouth, headache, nausea, vomiting, cough, muscle aches and pains, weakness, and difficulty breathing. These symptoms can also result from breathing finely divided Zinc Oxide dust. Some evidence exists that zinc can enter blood stream, after inhalation of fumes to form a sensitizing complex with plasma proteins that can result in allergic reaction and/or sensitization.

### HMIS Ratings: Health Hazard: 2\* Fire Hazard: 0 Physical Hazard: 0

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

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## \*\*\* Section 4 - First Aid Measures \*\*\*

### First Aid: Eyes

In case of eye contact, flush with plenty of water for 15 minutes. If irritation persists, seek medical attention.

### First Aid: Skin

Remove all contaminated clothing. For skin contact, wash thoroughly with soap and water for at least 20 minutes. Seek immediate medical attention if irritation develops or persists.

### First Aid: Ingestion

DO NOT INDUCE VOMITING, unless directed by medical personnel. Have victim rinse mouth thoroughly with water, if conscious. Never give anything by mouth to a victim who is unconscious or having convulsions. Contact a physician or poison control center immediately.

### First Aid: Inhalation

Remove source of contamination or move victim to fresh air. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult. Get immediate medical attention.

### First Aid: Notes to Physician

Treatment is symptomatic and supportive. There is no specific antidote.

METAL FUME FEVER - In the majority of cases, little treatment is needed beyond supportive care. Bed rest, analgesics, and antipyretics are administered to ease the patient through the 1st to 2nd days of symptoms.

Workers who are occupationally exposed to Zinc Oxide (dust or fumes) should have periodic examinations, including chest x-rays and pulmonary respiratory function levels. Frequent urine exam for zinc level may also be considered.

## \*\*\* Section 5 - Fire Fighting Measures \*\*\*

**Flash Point:** Not combustible.

**Method Used:** Not applicable.

**Upper Flammable Limit (UEL):** Not applicable.

**Lower Flammable Limit (LEL):** Not applicable.

**Auto Ignition:** Not applicable.

**Flammability Classification:** Not applicable.

**Rate of Burning:** Not applicable.

### General Fire Hazards

This material will not burn.

### Hazardous Combustion Products

When heated to decomposition product emits toxic fumes of Zinc Oxide.

### Extinguishing Media

Use any method suitable for the surrounding fire and other materials involved in the fire.

### Fire Fighting Equipment/Instructions

Firefighters should wear full protective clothing including self contained breathing apparatus.

**NFPA Ratings: Health: 2\* Fire: 0 Reactivity: 0 Other:**

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

## \*\*\* Section 6 - Accidental Release Measures \*\*\*

### Containment Procedures

Stop the flow of material, if this can be done without risk. Contain the discharged material. If sweeping of a contaminated area is necessary use a dust suppressant agent, which does not react with product (see Section 10 for incompatibility information).

### Clean-Up Procedures

Small releases can be cleaned-up wearing gloves, goggles and suitable body protection. In case of a large spill (in which excessive dusts can be generated), clear the affected area, protect people, and respond with trained personnel. Do not allow the spilled product to enter public drainage system or open water courses. Place all spill residues in an appropriate container and seal. Thoroughly wash the area after a spill or leak clean-up. Prevent spill rinsate from contamination of storm drains, sewers, soil or groundwater.

### Evacuation Procedures

Evacuate the area promptly and keep upwind of the spilled material. Isolate the spill area to prevent people from entering. Keep materials which burn away from spilled material. In case of large spills, follow all facility emergency response procedures.

### Special Procedures

Remove soiled clothing and launder before reuse. Avoid all skin contact with the spilled material. Have emergency equipment readily available.

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## \*\*\* Section 7 - Handling and Storage \*\*\*

### Handling Procedures

All employees who handle this material should be trained to handle it safely. Do not breathe dust. Avoid all contact with skin and eyes. Use this product only with adequate ventilation. Wash thoroughly after handling.

### Storage Procedures

Gradually absorbs carbon dioxide upon exposure to air. Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Storage areas should be made of fire-resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Use corrosion-resistant structural materials, lighting, and ventilation systems in the storage area. Floors should be sealed to prevent absorption of this material. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers).

Empty containers may contain residual particulates; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers which held this product. Keep this material away from food, drink and animal feed. Do not store this material in open or unlabeled containers. Limit quantity of material stored.

## \*\*\* Section 8 - Exposure Controls / Personal Protection \*\*\*

### Exposure Guidelines

#### A: General Product Information

Follow the applicable exposure limits.

#### B: Component Exposure Limits

##### Zinc Oxide (1314-13-2)

ACGIH: 2 mg/m<sup>3</sup> (respirable fraction) TWA;  
2 mg/m<sup>3</sup> (respirable fraction) STEL

OSHA: 15 mg/m<sup>3</sup> TWA (total dust), dust only  
5 mg/m<sup>3</sup> TWA (respirable dust), dust only  
Fume: 10 mg/m<sup>3</sup> TWA)

Fume: 10 mg/m<sup>3</sup> STEL (vacated 1989 PEL)

NIOSH: 5 mg/m<sup>3</sup>, TWA, dust only  
15 mg/m<sup>3</sup>, STEL Ceiling (15 minutes), dust only  
Fume: 5 mg/m<sup>3</sup> TWA  
Fume 10 mg/m<sup>3</sup> STEL

DFG MAK Fume: 1 mg/m<sup>3</sup> (respirable fraction) TWA  
Peak: 1•MAK, 15 minutes, average value, 1-hour interval

### Engineering Controls

Use mechanical ventilation such as dilution and local exhaust. Use a corrosion-resistant ventilation system and exhaust directly to the outside. Supply ample air replacement. Provide dust collectors with explosion vents.

### PERSONAL PROTECTIVE EQUIPMENT

*The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132). Please reference applicable regulations and standards for relevant details.*

#### Personal Protective Equipment: Eyes/Face

Wear safety glasses (or goggles). . If necessary, refer to U.S. OSHA 29 CFR 1910.133.

#### Personal Protective Equipment: Skin

Wear impervious gloves, boots and coveralls to avoid skin contact. If necessary, refer to U.S. OSHA 29 CFR 1910.138.

#### Personal Protective Equipment: Respiratory

If airborne concentrations are above the applicable exposure limits, use NIOSH-approved respiratory protection. An approved dust and mist air-purifying respirator may be adequate. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

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## \*\*\* Section 8 - Exposure Controls / Personal Protection (Continued) \*\*\*

### Personal Protective Equipment: Respiratory (continued)

The following NIOSH Guidelines for Zinc Oxide dusts and fumes (as Zn) are presented for further information.

Up to 50 mg/m<sup>3</sup>: Any dust, mist and fume respirator or any supplied air respirator (SAR).

Up to 125 mg/m<sup>3</sup>: Any supplied air respirator (SAR) operated in a continuous-flow mode or any powered, air-purifying respirator with a dust, mist and fume filter.

Up to 250 mg/m<sup>3</sup>: Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter; or any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode; or any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter; or any self-contained breathing apparatus with a full facepiece; or any supplied-air respirator with a full facepiece.

Up to 500 mg/m<sup>3</sup>: Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode; or any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape: Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter; or any appropriate escape-type, self-contained breathing apparatus.

### Personal Protective Equipment: General

Have an eyewash fountain and safety shower available in the work area. Use good hygiene practices when handling this material including changing and laundering work clothing after use.

## \*\*\* Section 9 - Physical & Chemical Properties \*\*\*

### Physical Properties: Additional Information

The data provided in this section are to be used for product safety handling purposes. Please refer to Product Data Sheets, Certificates of Conformity or Certificates of Analysis for chemical and physical data for determinations of quality and for formulation purposes.

<b>Appearance:</b>	White or yellow-white	<b>Odor:</b>	Odorless
<b>Physical State:</b>	Solid	<b>pH:</b>	6.7
<b>Vapor Pressure:</b>	Not applicable	<b>Vapor Density:</b>	Not applicable
<b>Boiling Point:</b>	Not applicable	<b>Freezing/Melting Point:</b>	1975 deg C (3587 deg F) [for 802]; 1800 deg C (3272 deg F) [for 920]
<b>Solubility (H2O):</b>	Insoluble	<b>Specific Gravity:</b>	5.67 (water = 1)
<b>Evaporation Rate:</b>	Not applicable	<b>Particle Size:</b>	0.21-0.266 microns (for 802); < 44 microns (for 920)
<b>Bulk Density:</b>	Not applicable	<b>Other Solubilities:</b>	Soluble in ammonium chloride; insoluble in alcohol
<b>Softening Point:</b>	Not applicable	<b>Chemical Formula:</b>	ZnO
<b>Molecular Weight:</b>	81.38		

## \*\*\* Section 10 - Chemical Stability & Reactivity Information \*\*\*

### Chemical Stability

Stable.

### Chemical Stability: Conditions to Avoid

Heat and incompatible materials.

### Incompatibility

Zinc Oxide and chlorinated rubber reacts violently @ 215 deg C. Contact with magnesium and linseed oil can cause violent reaction. Contact with strong acids may cause vigorous reaction. Contact with strong bases will form water-soluble zincates.

Zinc Oxide reacts with hydrochloric acid to produce zinc chloride. Zinc Oxide reacts with sulfuric acid to produce zinc sulfate.

### Hazardous Decomposition

When heated to decomposition, product emits toxic fumes of Zinc Oxide.

### Hazardous Polymerization

Will not occur.

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## \*\*\* Section 11 - Toxicological Information \*\*\*

### Acute and Chronic Toxicity

#### A: General Product Information

Zinc Oxide dust is generally considered a nuisance dust, and adverse effects are unlikely when exposures are kept under reasonable control. Dust may cause mild mechanical irritation to the eye. No skin irritation is expected from a single short-term exposure to this product.

Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis. Zinc Oxide is not readily absorbed following ingestion and has a low oral toxicity. Ingestion of large doses may cause gastrointestinal irritation and vomiting. Exposure to high quantities of the dust may cause mechanical irritation of the respiratory tract. Inhalation of Zinc Oxide fume may cause metal fume fever, an illness which lasts less than 48 hours. Symptoms are similar to those of the flu and include fever, chills, sweats, dry mouth, headache, nausea, vomiting, cough, muscle aches and pains, weakness, and difficulty breathing. These symptoms can also result from breathing finely divided Zinc Oxide dust. Leukocytosis, often with a predominance of immature polymorphonuclear leukocytes, is common in individuals with metal fume fever and typically persists until the patient has been afebrile for about 12 hours. The no-effect level for induction of metal fume fever is in the range of 5 to 15 mg/m<sup>3</sup>. Clinically latent liver dysfunction has been reported in 15 of 25 workers exposed to very high levels of Zinc Oxide (50 mg/m<sup>3</sup>), as evidenced by abnormal levels in liver function tests. Other references in the literature report that hepatic abnormalities are not common adverse effects attributed to Zinc Oxide exposure. Chronic exposure to large quantities of Zinc Oxide dust may cause dermatitis, boils, eye irritation, and gastrointestinal disturbances.

#### B: Component Analysis - LD<sub>50</sub>/LC<sub>50</sub>

##### Zinc Oxide (1314-13-2)

LD<sub>50</sub> (Oral-Mouse) 7950 mg/kg; LD<sub>50</sub> (Intraperitoneal-Rat) 240 mg/kg; LC<sub>50</sub> (Inhalation-Mouse) 2500 mg/m<sup>3</sup>

#### B: Component Analysis - TDLo/TCLo/LD/LDLo

##### Zinc Oxide (1314-13-2)

LD (Oral-Rat) > 8437 mg/kg; LDLo (Oral-Human) 500 mg/kg; TCLo (Inhalation-Human) 600 mg/m<sup>3</sup>: cough, dyspnea, other changes; TCLo (Inhalation-Guinea pig) 5900 µg/m<sup>3</sup>/3 hours/3 days-intermittent: change in blood or tissue levels: phosphatases, dehydrogenases; TCLo (Inhalation-Guinea pig) 4600 µg/m<sup>3</sup>/3 hours/6 days-intermittent: other changes, changes in lung weight; TDLo (Oral-Rat) 17431 mg/kg/90 days-continuous: Behavioral: changes in motor activity (specific assay); TDLo (Oral-Rat) 6846 mg/kg; female 1-22 day(s) after conception: Reproductive: Specific Developmental Abnormalities: homeostasis; stillbirth; Effects on Newborn: growth statistics; TDLo (Oral-Chicken) 32,203 mg/kg/4 weeks-continuous: changes in growth hormone; evidence of thyroid hypofunction; weight loss or decreased weight gain; TDLo (Oral-Domestic mammal) 3584 mg/kg/4 weeks-intermittent: changes in structure or function of endocrine pancreas; changes in serum composition; changes in metals, not otherwise specified

### Carcinogenicity

#### A: General Product Information

No information available.

#### B: Component Carcinogenicity

Zinc Oxide (fume and dust) are listed by the EPA as follows: EPA-D (Not Classifiable as to Human Carcinogenicity). None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

### Epidemiology

No information available.

### Neurotoxicity

No information available.

### Mutagenicity

Zinc compounds generally have not been active in genetic assays. Zinc Oxide was negative in salmonella reversion (AMES) assays, and did not alter epithelial DNA synthesis. Zinc Oxide caused chromosome damage in rats exposed by inhalation to airborne levels of 100 mcg/m(3).

### Teratogenicity

Zinc Oxide given to pregnant rats at 4,000 ppm in the diet caused resorption and deaths of fetuses. In another study, Zinc Oxide at 2 to 38 mg/day had no effect on reproduction.

### Other Toxicological Information

DNA adduct (Escherichia coli) 3000 ppm; Cytogenetic analysis (Inhalation-Rat) 100 µg/m<sup>3</sup>; Morphological transformation (Hamster-Embryo) 1 mg/L; Unscheduled DNA synthesis (Hamster-Embryo) 1 mg/L; Unscheduled DNA synthesis: Inhalation - guinea pig: 5300 µg/m<sup>3</sup>/3 hours/6 days; Sister chromatid exchange (Hamster-Embryo) 300 µg/L

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## \*\*\* Section 12 - Ecological Information \*\*\*

### Ecotoxicity

#### A: General Product Information

Acute toxic effects may include the death of animals, birds or fish and the death or low growth rate of plants. Acute effects are seen two to four days after animals or plants come into contact with Zinc Oxide. The toxicity of zinc compounds to aquatic life is related to water hardness, with increased toxicity occurring in softer waters. Chronic effects may include shortened lifespan, lower fertility, and changes in appearance or behavior.

#### B: Aquatic Toxicity

No ecotoxicity data are available for this product's components.

### Environmental Fate

No additional information.

## \*\*\* Section 13 - Disposal Considerations \*\*\*

### US EPA Waste Number & Descriptions

#### A: General Product Information

Waste, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

#### B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

### Disposal Instructions

All wastes must be handled in accordance with local, state and federal 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.

## \*\*\* Section 14 - Transportation Information \*\*\*

NOTE: The shipping classification information in this section (Section 14) is meant as a guide to the overall classification of the product. However, transportation classifications may be subject to change with changes in package size. Consult shipper requirements under I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

### US DOT Information

**Shipping Name:** Non-regulated.

**Hazard Class:** Not Applicable

**UN/NA #:** Not Applicable

**Packing Group:** Not Applicable

**Required Label(s):** None

**Additional Info.:** None.

### International Air Transport Association (IATA)

For Shipments by Air transport: We classify this product as hazardous (Class 9) when shipped by air because 49 CFR 173.140 (a). "For the purposes of this subchapter, miscellaneous hazardous material (Class 9) means a material which presents a hazard during transportation, but which does not meet the definition of any other hazard class. This class includes: (a) Any material which has an anesthetic, noxious, or other similar property which could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties."

**UN:** UN 3077

**Proper Shipping Name:** Environmentally hazardous substance, solid, n.o.s. (zinc oxide)

**Hazard Class:** 9

**Packing Group:** III

**Passenger & Cargo Aircraft Packing Instruction:** 911

**Passenger & Cargo Aircraft Maximum Net Quantity:** No Limit

**Limited Quantity Packing Instruction (Passenger & Cargo Aircraft):** Y911

**Limited Quantity Maximum Net Quantity (Passenger & Cargo Aircraft):** 30 kg

**Special Provisions:** A97

**ERG Code:** 9L

### International Maritime Organization (I.M.O.) Classification

**I.M.O. Classification:** Zinc Oxide is not regulated by the I.M.O.

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## \*\*\* Section 15 - Regulatory Information \*\*\*

### US Federal Regulations

#### A: General Product Information

Zinc and its compounds are considered toxic pollutants and priority pollutants under Section 307 (a)(1) of the Clean Water Act and are subject to effluent limitations.

#### B: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4):

##### Zinc Oxide (1314-13-2)

SARA 304 Although Zinc Oxide does not have a specific CERCLA RQ, Zinc Compounds are considered as CERCLA hazardous substances.

SARA 313: Form R reporting required for 1.0% de minimus concentration (related to Zinc compounds)

SARA 302 (EHS TPQ) There are no specific Threshold Planning Quantities for Citric Acid. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.

#### C: Sara 311/312 Tier II Hazard Ratings:

Component	CAS #	Fire Hazard	Reactivity Hazard	Pressure Hazard	Immediate Health Hazard	Chronic Health Hazard
Zinc Oxide	1314-13-2	No	No	No	Yes	Yes

### State Regulations

#### A: General Product Information

Other state regulations may apply.

#### B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Zinc Oxide	1314-13-2	Yes	Yes	Yes	Yes	Yes	Yes

#### **CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):**

This product contains trace amounts of lead and cadmium. WARNING. This product contains trace amounts of chemical compounds that are known to the State of California to cause cancer or reproductive harm.

### Other Regulations

#### A: General Product Information

Not determined.

#### B: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS
Zinc Oxide	1314-13-2	Yes	Yes	Yes

#### C: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Zinc Oxide	1314-13-2	1% item 1717 (1326)

### ANSI Labeling (Z129.1):

**CAUTION!** MAY CAUSE EYE IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION. PROLONGED OR REPEATED CONTACT MAY CAUSE SKIN IRRITATION. INHALATION OF FUMES IF HEATED TO DECOMPOSITION MAY CAUSE METAL FUME FEVER. Avoid breathing dusts and mists. Do not breathe fumes. Do not taste or swallow. Do not get on skin or in eyes. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, faceshields, suitable body protection, and NIOSH-approved respiratory protection, as appropriate. **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. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with inert material. Place residue in suitable container. Consult Material Safety Data Sheet for additional information.

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**\*\*\* Section 16 - Other Information \*\*\***

### Other Information

Chem One Ltd. ("Chem One") shall not be responsible for the use of any information, product, method, or apparatus herein presented ("Information"), and you must make your own determination as to its suitability and completeness for your own use, for the protection of the environment, and for health and safety purposes. You assume the entire risk of relying on this Information. In no event shall Chem One be responsible for damages of any nature whatsoever resulting from the use of this product or products, or reliance upon this Information. By providing this Information, Chem One neither can nor intends to control the method or manner by which you use, handle, store, or transport Chem One products. If any materials are mentioned that are not Chem One products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed. Chem One makes no representations or warranties, either express or implied of merchantability, fitness for a particular purpose or of any other nature regarding this information, and nothing herein waives any of Chem One's conditions of sale. This information could include technical inaccuracies or typographical errors. Chem One may make improvements and/or changes in the product (s) and/or the program (s) described in this information at any time. If you have any questions, please contact us at Tel. 713-896-9966 or E-mail us at Safety@chemone.com.

### Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration

**Contact:** Sue Palmer-Koleman, PhD

**Contact Phone:** (713)-896-9966

### Revision Log

08/18/00 10:50 AM SEP Changed company name, Sect 1 and 16, from Corporation to Ltd.  
8/21/00 8:45 PM HDF Added CA Prop 65 Statement regarding trace amounts of lead and cadmium, Sect 14.  
06/02/01 9:31 AM HDF Checked exposure limits; made changes to Sect 9; overall review, add SARA 311/312 Haz Ratings.  
08/20/01 6:10 PM CLJ Add Shipments by Air information to Section 14, Changed contact to Sue, non-800 Chemtrec Num.  
09/30/03 9:10 PM HDF General review of entire MSDS. Up-graded Section 3 Health Hazard information, HMIS categories.  
Up-dated exposure limits to Section 8. Up-dated 14 Transportation Information.  
06/22/05 4:38PM Update IATA Section 14

This is the end of MSDS # C1-161