1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Zinc oxide
Product Number: 96479
Brand: Sigma-Aldrich
Supplier: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone: +1 800-325-5832
Fax: +1 800-325-5052
Emergency Phone #: (314) 776-6555
Preparation Information: Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
No known OSHA hazards

GHS Classification
Skin irritation (Category 3)
Eye irritation (Category 2B)
Acute aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H316 Causes mild skin irritation.
H320 Causes eye irritation.
H400 Very toxic to aquatic life.

Precautionary statement(s)
P273 Avoid release to the environment.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification
Health hazard: 0
Flammability: 0
Physical hazards: 0

NFPA Rating
Health hazard: 0
Fire: 0
Reactivity Hazard: 0
Potential Health Effects

Inhalation  May be harmful if inhaled. May cause respiratory tract irritation.
Skin      May be harmful if absorbed through skin. May cause skin irritation.
Eyes      May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : OZn
Molecular Weight : 81.39 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
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<td></td>
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<tr>
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<td>1314-13-2</td>
</tr>
<tr>
<td>EC-No.</td>
<td>215-222-5</td>
</tr>
<tr>
<td>Index-No.</td>
<td>030-013-00-7</td>
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</table>

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Zinc/zinc oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

**Conditions for safe storage**
Keep container tightly closed in a dry and well-ventilated place.
Keep in a dry place.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
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<tr>
<td>Zinc oxide</td>
<td>1314-13-2</td>
<td>TWA</td>
<td>5 mg/m³</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
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<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>2 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
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<td>Remarks</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>10 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>TWA</td>
<td></td>
<td></td>
<td>15 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
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<tr>
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<td>TWA</td>
<td></td>
<td></td>
<td>5 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
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<td></td>
<td></td>
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<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
</tbody>
</table>

**Personal protective equipment**

**Respiratory protection**
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Eye protection**
Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

**Skin and body protection**
impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Hygiene measures**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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9. **PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Form: powder</td>
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<tr>
<td></td>
<td>Colour: white</td>
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<tr>
<td>Safety data</td>
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<tr>
<td></td>
<td>Melting point/freezing point:</td>
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<td>Boiling point: no data available</td>
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<tr>
<td></td>
<td>Flash point: not applicable</td>
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<td></td>
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<td></td>
<td>Autoignition temperature: no data available</td>
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<td>Lower explosion limit: no data available</td>
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<td></td>
<td>Water solubility: no data available</td>
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<tr>
<td></td>
<td>Partition coefficient: n-octanol/water: no data available</td>
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<tr>
<td></td>
<td>Relative vapour density: no data available</td>
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<tr>
<td>Odour</td>
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<tr>
<td>Odour Threshold</td>
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</tr>
<tr>
<td>Evaporation rate</td>
<td>no data available</td>
</tr>
</tbody>
</table>

10. **STABILITY AND REACTIVITY**

**Chemical stability**
Stable under recommended storage conditions.

**Possibility of hazardous reactions**
no data available

**Conditions to avoid**
no data available

**Materials to avoid**
Strong oxidizing agents

**Hazardous decomposition products**
Hazardous decomposition products formed under fire conditions. - Zinc/zinc oxides
Other decomposition products - no data available

11. **TOXICOLOGICAL INFORMATION**
Acute toxicity

Oral LD50
LD50 Oral - mouse - 7,950 mg/kg

Inhalation LC50
LC50 Inhalation - mouse - 2,500 mg/m3

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Mild eye irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Genotoxicity in vitro - Hamster - Embryo
 Unscheduled DNA synthesis

Genotoxicity in vitro - Hamster - Embryo
Morphological transformation.

Genotoxicity in vitro - Hamster - Embryo
Sister chromatid exchange

Genotoxicity in vivo - guinea pig - Inhalation
Unscheduled DNA synthesis

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Teratogenicity
Developmental Toxicity - rat - Oral
Specific Developmental Abnormalities: Homeostasis Effects on Newborn: Stillbirth. Effects on Newborn: Growth statistics (e.g., reduced weight gain).

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available
Aspiration hazard
do data available

Potential health effects

<table>
<thead>
<tr>
<th>Route</th>
<th>Effects</th>
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<td>Inhalation</td>
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<tr>
<td>Ingestion</td>
<td>May be harmful if swallowed.</td>
</tr>
<tr>
<td>Skin</td>
<td>May be harmful if absorbed through skin. May cause skin irritation.</td>
</tr>
<tr>
<td>Eyes</td>
<td>May cause eye irritation.</td>
</tr>
</tbody>
</table>

Signs and Symptoms of Exposure
Zinc oxide dust or fume can irritate the respiratory tract. Prolonged skin contact can produce a severe dermatitis called oxide pox. Exposure to high levels of dust or fume can cause metallic taste, marked thirst, coughing, fatigue, weakness, muscular pain, and nausea followed by fever and chills. Severe overexposure may result in bronchitis or pneumonia with a bluish tint to the skin. Prolonged or repeated exposure can cause reversible liver enzyme abnormalities, diarrhea.

Synergistic effects
no data available

Additional Information
RTECS: ZH4810000

12. ECOLOGICAL INFORMATION

Toxicity
- Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 1.1 mg/l - 96.0 h
- Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 0.098 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
- UN number: 3077
- Class: 9
- Packing group: III
- EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide)
Marine pollutant: Marine pollutant

IATA
- UN number: 3077
- Class: 9
- Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Zinc oxide)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
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<td>2007-03-01</td>
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SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

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Pennsylvania Right To Know Components

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New Jersey Right To Know Components

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California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information
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