Section 1 - Product and Company Information

Product Name: ZINC OXIDE, 99+, A.C.S. REAGENT
Product Number: 251607
Brand: ALDRICH
Company: Sigma-Aldrich
Street Address: 3050 Spruce Street
City, State, Zip, Country: SAINT LOUIS MO 63103 US
Technical Phone: 314 771 5765
Emergency Phone: 414 273 3850 Ext. 5996
Fax: 800 325 5052

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZINC OXIDE</td>
<td>1314-13-2</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Formula: ZnO
Synonyms: Actox 14 * Actox 16 * Actox 216 * AI3-00277 *
Akro-zinc bar 85 * Akro-zinc bar 90 * Amalox *
Azo-33 * Azo-55 * Azo-66 * Azo-77 * Azodox-55 *
Azodox-55TT * Azo-55TT * Azo-66TT * Azo-77TT *
Protox type 166 * Protox type 167 * Protox type 168 * Protox type 169 * Protox type 267 * Protox type 268 * Red Seal 9 * Snow White * Unichem ZO *
Vandem VAC * Vandem VOC * White seal-7 * XX 78 *
XX 203 * XX 601 * Zinca 20 * Zincite * Zincoid *
Zinc oxide (ACGIH:OSHA) * Zinc oxide fume (OSHA) *
Zinc White * ZN-0401 E 3/16" * Zn 0701T

RTECS Number: ZH4810000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Harmful.
Harmful by inhalation.

HMIS RATING
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING
HEALTH: 1
FLAMMABILITY: 0
Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes,
skin, and clothing. Avoid prolonged or repeated exposure.

**STORAGE**

Suitable: Keep tightly closed.

**Section 8 - Exposure Controls / PPE**

**ENGINEERING CONTROLS**

Safety shower and eye bath. Mechanical exhaust required.

**PERSONAL PROTECTIVE EQUIPMENT**

Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

**GENERAL HYGIENE MEASURES**

Wash thoroughly after handling.

**EXPOSURE LIMITS, RTECS**

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>5 MG/M3</td>
</tr>
<tr>
<td>USA</td>
<td>MSHA</td>
<td>Standard-air TWA</td>
<td>5 MG/M3 (FUME)</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA</td>
<td>PEL</td>
<td>8H TWA 5 MG/M3, FUME AND RESPI</td>
</tr>
<tr>
<td>New Zealand</td>
<td>OEL</td>
<td>Remarks: check ACGIH TLV</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>NIOSH</td>
<td>TWA</td>
<td>5 MG/M3</td>
</tr>
<tr>
<td>USA</td>
<td>NIOSH</td>
<td>STEL</td>
<td>10 MG/M3</td>
</tr>
</tbody>
</table>

**EXPOSURE LIMITS**

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td>5 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>10 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Section 9 - Physical/Chemical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td><strong>Physical State:</strong> Solid</td>
<td></td>
</tr>
<tr>
<td><strong>Color:</strong> White</td>
<td></td>
</tr>
<tr>
<td><strong>Form:</strong> Powder</td>
<td></td>
</tr>
<tr>
<td><strong>Molecular Weight:</strong> 81.37 AMU</td>
<td></td>
</tr>
<tr>
<td><strong>pH:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>BP/BP Range:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>MP/MP Range:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Freezing Point:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Vapor Pressure:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Vapor Density:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Saturated Vapor Conc.:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>SG/Density:</strong> 5.61 g/cm3</td>
<td></td>
</tr>
<tr>
<td><strong>Bulk Density:</strong> N/A</td>
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<tr>
<td><strong>Odor Threshold:</strong> N/A</td>
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<tr>
<td><strong>Volatile%:</strong> N/A</td>
<td></td>
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<tr>
<td><strong>VOC Content:</strong> N/A</td>
<td></td>
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<tr>
<td><strong>Water Content:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Solvent Content:</strong> N/A</td>
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<tr>
<td><strong>Evaporation Rate:</strong> N/A</td>
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<tr>
<td><strong>Viscosity:</strong> N/A</td>
<td></td>
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<tr>
<td><strong>Surface Tension:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Partition Coefficient:</strong> N/A</td>
<td></td>
</tr>
</tbody>
</table>
Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Zinc/zinc oxides.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: Harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

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 exposure can cause: Reversible liver enzyme abnormalities. Diarrhea, peptic ulceration and gastrointestinal hemorrhage may also occur.

TOXICITY DATA

Oral
Human
500 mg/kg
LDLO

Intraperitoneal
Rat
240 MG/KG
LD50

Oral
Mouse
7950 mg/kg
LD50
Inhalation
Mouse
2,500 mg/m3
LC50

IRRITATION DATA

Skin
Rabbit
500 mg
24H
Remarks: Mild irritation effect

Eyes
Rabbit
500 mg
24H
Remarks: Mild irritation effect

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 6846 MG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG)
Result: Specific Developmental Abnormalities: Homeostasis
Effects on Newborn: Stillbirth. Effects on Newborn: Growth
statistics (e.g., reduced weight gain).

CHRONIC EXPOSURE - MUTAGEN

Species: Rat
Route: Inhalation
Dose: 100 UG/M3
Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 1 MG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Hamster
Dose: 1 MG/L
Cell Type: Embryo
Mutation test: Unscheduled DNA synthesis

Species: Hamster
Dose: 300 UG/L
Cell Type: Embryo
Mutation test: Sister chromatid exchange

Species: Guinea pig
Route: Inhalation
Dose: 5300 UG/M3/3H/6D
Mutation test: Unscheduled DNA synthesis

Section 12 - Ecological Information

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xn
Indication of Danger: Harmful.
R: 20
Risk Statements: Harmful by inhalation.
S: 7/9
Safety Statements: Keep container tightly closed and in well-ventilated place.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Harmful.
Risk Statements: Harmful by inhalation.
Safety Statements: Keep container tightly closed and in well-ventilated place.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements - zinc compounds.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: 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.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.
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