Section 1 - Product and Company Information

Product Name               ZINC CHLORIDE, ANHYDROUS, POWDER, 99.995+%
Product Number             429430
Brand                      ALDRICH
Company                    Sigma-Aldrich
Address                    3050 Spruce Street
                          SAINT LOUIS MO 63103 US
Technical Phone:           800-325-5832
Fax:                       800-325-5052
Emergency Phone:          314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name                           CAS #         SARA 313
ZINC CHLORIDE                            7646-85-7       Yes

Formula         ZnCl2
Synonyms        Butter of zinc * Chlorure de zinc (French) * Zinc butter * Zinc chloride fume (ACGIH:OSHA) * Zinc (chlorure de) (French) * Zinc dichloride * Zinco (cloruro di) (Italian) * Zinkchlorid (German) * Zinkchloride (Dutch)

RTECS Number:   ZH1400000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Corrosive.
Harmful if swallowed. Causes burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Target organ(s): Kidneys. Liver.

HMIS RATING
HEALTH: 3*
FLAMMABILITY: 0
REACTIVITY: 1

NFPA RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

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

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. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Store in a cool dry place. Handle and store under nitrogen.

SPECIAL REQUIREMENTS
Very hygroscopic.
Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS
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<thead>
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<th>Country</th>
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<th>Type</th>
<th>Value</th>
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<td>TWA</td>
<td>1 MG/M3 (FUME)</td>
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<td>PEL</td>
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<tr>
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<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>2 MG/M3</td>
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EXPOSURE LIMITS
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<th>Source</th>
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<td>NDSP</td>
<td>-</td>
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</table>

Section 9 - Physical/Chemical Properties

Appearance
Physical State: Solid
Color: White
Form: Powder Crystalline

Property | Value | At Temperature or Pressure
Molecular Weight | 136.28 AMU |
pH | 5 | 20 °C Concentration: 100 g/l
BP/BP Range | 732 °C | 760 mmHg
MP/MP Range | 293 °C |
Freezing Point | N/A |
Vapor Pressure | 1 mmHg | 428 °C
Vapor Density | N/A |
Saturated Vapor Conc. | N/A |
SG/Density | 2.907 g/cm3 |
Bulk Density | 1.4 – 1.8 kg/l |
Odor Threshold | N/A |
Volatile% | N/A |
VOC Content | N/A |
Water Content | N/A |
Solvent Content | N/A |
Evaporation Rate | N/A |
Viscosity | N/A |
Surface Tension           N/A
Partition Coefficient     N/A
Decomposition Temp.       N/A
Flash Point               N/A
Explosion Limits          N/A
Flammability              N/A
Autoignition Temp         N/A
Refractive Index          N/A
Optical Rotation          N/A
Miscellaneous Data        N/A
Solubility                Solubility in Water:soluble

N/A = not available

Section 10 - Stability and Reactivity

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

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Hydrogen chloride gas, Zinc/zinc oxides, Zinc oxide fumes may also form.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns.
Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: Harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Liver. Kidneys.

SIGNS AND SYMPTOMS OF EXPOSURE
Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA
Oral
Rat
350 mg/kg
LD50

Intraperitoneal
Rat
58 MG/KG

Intravenous
Rat
3690 UG/KG
LD50

Oral
Mouse
329 mg/kg
LD50

Intraperitoneal
Mouse
24 MG/KG
LD50

Subcutaneous
Mouse
330 MG/KG
LD50

Intravenous
Mouse
9090 UG/KG
LD50

Oral
Guinea pig
200 mg/kg
LD50

CHRONIC EXPOSURE - CARCINOGEN

Species: Hamster
Route of Application: Parenteral
Dose: 17 MG/KG

Species: Chicken
Route of Application: Parenteral
Dose: 15 MG/KG

CHRONIC EXPOSURE - TERATOGEN

Species: Mouse
Dose: 12500 UG/KG
Route of Application: Intraperitoneal
Exposure Time: (11D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 2 MMOL/L
Cell Type: fibroblast
Mutation test: DNA damage

Species: Human
Dose: 180 UMOL/L
Cell Type: lymphocyte
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 360 UMOL/L
Cell Type: lymphocyte
Mutation test: DNA inhibition

Species: Human
Dose: 2 MG
Cell Type: lymphocyte
Mutation test: Other mutation test systems

Species: Rat
Dose: 700 MG/KG
Cell Type: Ascites tumor
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Parenteral
Dose: 16 MG/KG
Mutation test: DNA inhibition

Species: Mouse
Route: Oral
Dose: 18 GM/KG
Exposure Time: 30D
Mutation test: Cytogenetic analysis

Species: Mouse
Dose: 6 MG/KG
Cell Type: S. typhimurium
Mutation test: Host-mediated assay

Species: Hamster
Dose: 180 UMOL/L
Cell Type: Embryo
Mutation test: Morphological transformation.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 155 MG/KG
Route of Application: Oral
Exposure Time: (33D MALE)
Result: Endocrine:Change in gonadotropins. Endocrine:Change in LH. Paternal Effects: Other effects on male.

Species: Rat
Dose: 6 GM/KG
Route of Application: Oral
Exposure Time: (77D MALE/77D PRE-21D POST)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Behavioral.

Species: Rat
Dose: 30 GM/KG
Route of Application: Intraperitoneal
Exposure Time: (7-8D PREG)
Result: Effects on Embryo or Fetus: Fetal death. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat
Dose: 37500 UG/KG
Route of Application: Parenteral
Exposure Time: (10D PREG)
Result: Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive).

Species: Mouse
Dose: 20500 UG/KG
Route of Application: Intraperitoneal
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rabbit
Dose: 29184 UG/KG
Route of Application: Intravaginal
Exposure Time: (1D PRE)
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: NOEC
Species: Selenastrum capricornutum resp.
Time: 96 h
Value: 0.05 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: 0.2 mg/l

Test Type: LC50 Fish
Species: Cyprinus carpio
Time: 96 h
Value: 0.4 - 2.2 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 5.4 mg/l

Section 13 - Disposal Considerations
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Zinc chloride, anhydrous
UN#: 2331
Class: 8
Packing Group: Packing Group III
Hazard Label: Corrosive
PIH: Not PIH

IATA
Proper Shipping Name: Zinc chloride, anhydrous
IATA UN Number: 2331
Hazard Class: 8
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: C-N
Indication of Danger: Corrosive. Dangerous for the environment.
R: 22-34-50/53
Risk Statements: Harmful if swallowed. Causes burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 26-36/37/39-45-60-61
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Corrosive.
Risk Statements: Harmful if swallowed. Causes burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Target organ(s): Kidneys. Liver.

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. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.