

4. FIRST AID MEASURES

4.1 Eye contact	Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
4.2 Skin contact	Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
4.3 Inhalation	Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Maintain airway, blood pressure and respiration. Keep warm and at rest. Treat symptomatically and supportively. Get medical attention immediately. Qualified medical personnel should consider administering oxygen.
4.4 Ingestion	If vomiting occurs, keep head lower than hips to help prevent aspiration. Treat symptomatically and supportively. Get medical attention if needed.
4.5 Indication of immediate medical attention and notes for physician	The following antidote has been recommended. However, the decision as to whether the severity of poisoning requires administration of any antidote and actual dose required should be made by qualified medical personnel.
Poisoning From Zinc Salts :	Give calcium disodium edetate 15-25 mg/kg (0.08-0.125 ml of 20% solution per kilogram of body weight) in 250-500 ml of 5% dextrose intravenously over a 1 to 2 hour period twice daily. The maximum dose should not exceed 50 mg/kg/day. The drug should be given in 5-day courses with a rest period of at least 2 days between courses. After the first course, subsequent courses should not exceed 50 mg/kg/day. Daily urinalyses should be done during the treatment period. The dosage should be reduced if any unusual urinary findings appear. For intramuscular administration, give 12.5 mg/kg body weight every 4-6 hours. Dilute each dose with an equal volume of 1% procaine. Dose limitation is the same as that given above. (Dreisbach, Handbook of Poisoning, 12th Ed.). Antidote should be administered by qualified medical personnel.

5. FIRE FIGHTING MEASURES

- 5.1 Suitable (and unsuitable) extinguishing media
- 1) Suitable extinguishing media : Regular dry chemical, carbon dioxide, water, regular foam.
 - 2) Unsuitable extinguishing media : No data available.
 - 3) Larger fires : Use regular foam or flood with fine water spray.
- 5.2 Specific hazards arising from the chemical
- 1) Thermal decomposition products : Oxides of zinc and carbon.
 - 2) Fire and explosion hazard
Slight fire hazard when exposed to heat or flame. Dust-air mixtures may ignite or explode

5.3 Special protective equipment and precautions for fire-fighters

Move container from fire area if you can do it without risk. Do not scatter spilled material with high-pressure water streams. Dike fire-control water for later disposal. Use agents suitable for type of surrounding fire. Avoid breathing hazardous vapors, keep upwind.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Sweep up and place in suitable clean dry containers for reclamation or later disposal. Do not flush spilled material into sewer. Keep unnecessary people away.

6.2 Environmental precautions and protective procedures

- 1) Air spill : No data available
- 2) Land spill : No data available
- 3) Water spill : No data available

6.3 Methods and materials for containment and cleaning up

- 1) Small spills : No data available
- 2) Large spills : No data available

7. HANDLING AND STORAGE

7.1 Precautions for safe handling : Handle in accordance with all current regulations and standards.

7.2 Conditions for safe storage(including any incompatibilities)

Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Store in a cool, dry place. Store in a tightly closed container.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1 Control parameters

1) Occupational exposure limit values

5 mg/m³ OSHA TWA (respirable fraction) ; 10 mg/m³ OSHA TWA (total dust)

10 mg/m³ ACGIH TWA (total dust)

5 mg/m³ NIOSH recommended 10 hour TWA (respirable fraction) ; 10 mg/m³ NIOSH recommended 10 hour TWA (total dust)

Subject to EPCRA Section 313 Annual Toxic Chemical Release Reporting

OSHA revoked the final rule limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338).

2) Biological limit values : No data available

8.2 Appropriate engineering controls

Provide local exhaust ventilation to meet published exposure limits. Ventilation equipment should be explosion-proof if explosive concentrations of dust, vapor or fume are present.

8.3 Personal protective equipment

1) Respiratory protection

The following respirators are recommended based on information found in the physical data, toxicity and health

effects sections. They are ranked in order from minimum to maximum respiratory protection. The specific respirator selected must be based on contamination levels found in the work place, must be based on the specific operation, must not exceed the working limits of the respirator and must be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA). Any dust and mist respirator. Any air-purifying respirator with a high-efficiency particulate filter. Any powered air-purifying respirator with a dust and mist filter. Any powered air-purifying respirator with a high-efficiency particulate filter. Any type 'C' supplied-air respirator operated in the pressure-demand or other positive pressure or continuous-flow mode. Any self-contained breathing apparatus.

For firefighting and other immediately dangerous to life or health conditions :

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. 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.

2) Eye Protection

Employee must wear splash-proof or dust-resistant safety goggles to prevent eye contact with this substance.

Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

3) Hands protection : Protective gloves are not required but recommended.

4) Body protection : Protective clothing not required. Avoid repeated or prolonged contact with this substance.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance (physical state, color etc) : White powder / Bead

9.2 Odor : Slight characteristic odor

9.3 Odor threshold : No data available

9.4 pH : 6.5~7.5(33% Slurry)

9.5 Melting point/freezing point : 123 °C

9.6 Initial boiling point and boiling range : Decomposition

9.7 Flash point : 277 °C (OC)

9.8 Evaporation rate : Not applicable

9.9 Flammability (solid, gas) : No data available

9.10 Upper/lower flammability or explosive limits : 0.002%

9.11 Vapor pressure : 2.71E -15 mmHg at 25 °C (estimated)

9.12 Solubility : 4.81E-15 g/100ml (water) (estimated)

9.13 Vapor density : Not applicable

9.14 Relative density : 1.1

9.15 Partition coefficient: n-octanol/water : 1.2

9.16 Auto-ignition temperature : 420 °C

9.17 Decomposition temperature : No data available

9.18 Viscosity : No data available

9.19 Formula mass : 632.3

10. STABILITY AND REACTIVITY

10.1 Chemical stability and possibility of hazardous reactions

Stable under normal temperatures and pressures. Will not polymerize.

10.2 Conditions to avoid

Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

10.3 Incompatible materials : Oxidizing materials. Alkalies.

10.4 Hazardous decomposition products : Thermal decomposition products: oxides of zinc and carbon.

11. TOXICOLOGICAL INFORMATION

11.1 Information on the likely routes of exposure

May cause irritation. Additional effects may include difficulty breathing. May cause diarrhea. No information available on significant adverse effects.

11.2 Health hazards information

1) Acute toxicity

Oral : LD50 >5,000 mg/kg (Rat)

Dermal : No data available

Inhalation : LC50 >50 mg/l (Rat)

2) Skin corrosion/irritation : May cause irritation.

3) Serious eye damage/irritation : May cause irritation.

4) Respiratory sensitization : No data available

5) Skin sensitization : No data available

6) Carcinogenicity : Not listed as a carcinogen or suspected carcinogen by NTP, IARC or OSHA.

7) Germ cell mutagenicity : No data available

8) Reproductive toxicity : No data available

9) Specific target organ toxicity (single exposure) : May cause respiratory irritation.

10) Specific target organ toxicity (repeated exposure) : No data available

11) Aspiration hazard : No data available

12. ECOLOGICAL INFORMATION

12.1 Aquatic and terrestrial ecotoxicity

1) Fish : No data available

2) Crustacea : No data available

3) Algae : No data available

12.2 Persistence and degradability

1) Persistence : No data available

2) Degradability : BOD5/COD 0.138

12.3 Bioaccumulative potential

- 1) Bioaccumulation : No data available
- 2) Biodegradability : No data available
- 12.4 Mobility in soil : No data available
- 12.5 Other adverse effects : No data available

13. DISPOSAL CONSIDERATIONS

- 13.1 Disposal method : Observe all federal, state and local regulations when disposing of this substance.
- 13.2 Disposal precaution : Observe all federal, state and local regulations when disposing of this substance.

14. TRANSPORT INFORMATION

- 14.1 UN number : No classification currently assigned.
- 14.2 UN proper shipping name : Not applicable
- 14.3 Transport hazard class : Not applicable
- 14.4 Packing group : Not applicable
- 14.5 Marine pollutant : No
- 14.6 Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises : No data available

15. REGULATORY INFORMATION

15.1 Chemical inventories

- 1) USA (TSCA) : Listed
- 2) Canada (DSL/NDSL) : Listed on the DSL
- 3) European Union (EINECS/ELINCS) : Listed (EC number : 209-151-9)
- 4) Japan (ENCS) : Listed
- 5) Korea (ECL) : Listed
- 6) Australia (AICS) : Listed
- 7) New Zealand (NZIOC) : Listed
- 8) Phillipines (PICCS) : Listed
- 9) China (IECSC) : Listed

15.2 US regulations

- 1) EPCRA Section 302 : None
- 2) EPCRA 311/312 Hazard Categories : None
- 3) EPCRA 313 chemical : Yes

15.3 EU regulations

Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

- 1) Risk phrases : This product is not classified according to EU legislation.
- 2) Europe inventory : All components are listed or exempted.

15.4 Other regulations

- 1) Rotterdam Convention substance : None
- 2) Stockholm Convention substance : None
- 3) Montreal Protocol substance : None

16. OTHER INFORMATION

16.1 Information source and reference

IUCLID Chemical Data Sheet, EC-ECB

The Chemical Database, The Department of Chemistry at the University of Akron(<http://ull.chemistry.uakron.edu/erd>)

TOXNET, U.S. National Library of Medicine(<http://toxnet.nlm.nih.gov>)

산업중독편람, 신광출판사

Corporate Solution From Thomson Micromedex(<http://csi.micromedex.com>)

International Chemical Safety Cards(ICSC)(<http://www.nihs.go.jp/ICSC>)

화학물질정보시스템, 국립환경과학원(<http://ncis.nier.go.kr>)

ECOTOX Database, EPA(<http://cfpub.epa.gov/ecotox>)

ECB-ESIS(European chemical Substances Information System)(<http://ecb.jrc.it/esis>)

위험물정보관리시스템, 소방방재청(<http://hazmat.nema.go.kr>)

16.2 Issuing date : 2010.12.01.

16.3 Revision date and number : 1st

16.4 Others

- 1) Product information : See technical literature for details of suitable applications of this product.
- 2) Note

The purpose of the above information is to describe the products only in terms of health and safety requirements. The information given should no, therefore, be construed as guaranteeing specific properties or as a specification. Customers should satisfy themselves as to the suitability and completeness of such information for their own particular use.