FOR ANY EMERGENCY, CALL 24HOURS/ 7 DAYS: 1-800-654-6911
FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC(R): 1-800-424-9300
FOR ALL MSDS QUESTIONS & REQUESTS, CALL: 1-800-511-MSDS

PRODUCT NAME: ZINC OMADINE® POWDER, AF
EPA Reg. No. 1258-1223

1. PRODUCT AND COMPANY IDENTIFICATION

REVISION DATE: 07-29-2003
SUPERCEDES: 06-27-2003
MSDS NO: 00187-0004 - 100296
SYNONYMS: Zinc pyrithione, Zinc pyridinethione
CHEMICAL FAMILY: Mercaptopyridine-N-oxide
DESCRIPTION / USE: Bactericide-fungicide algaecide
FORMULA: \( \text{C}_{10}\text{H}_{8}\text{N}_{2}\text{O}_{2}\text{S}_{2}\text{Zn} \)
(Active ingredient)

Arch Chemicals, Inc. 501 Merritt 7 PO Box 5204 Norwalk, CT 06856-5204

2. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS or CHEMICAL NAME</th>
<th>CAS #</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bis(1-hydroxy-2(1H)-pyridinethionato-o,s)-(T-4)zinc</td>
<td>13463-41-7</td>
<td>95 - 99</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>7647-14-5</td>
<td>0.5 - 1.5</td>
</tr>
<tr>
<td>Sodium sulfate</td>
<td>7757-82-6</td>
<td>0.5 - 1.5</td>
</tr>
<tr>
<td>2-Pyridol, 1-Oxide</td>
<td>13161-30-3</td>
<td>0.5 - 1.5</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>0.5 - 1.5</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

OSHA Hazard Classification: corrosive to eyes, respiratory irritant, toxic by ingestion, toxic by inhalation

Routes of Entry: Inhalation, skin, eyes, ingestion
Chemical Interactions: No known interactions
Medical Conditions Aggravated: Diseases of muscle and nerve

Human Threshold Response Data
Odor Threshold:
Zinc omadine No data
Irritation Threshold:
Zinc omadine No data

Hazardous Materials Identification System/National Fire Protection Association Classifications

<table>
<thead>
<tr>
<th>Hazard Ratings</th>
<th>Health</th>
<th>Flammability</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMIS</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>NFPA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not established</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Immediate (Acute) Health Effects

Inhalation Toxicity: Moderately toxic by inhalation.
Inhalation Irritation: High concentrations may be slightly irritating to the eyes, nose, throat, and lungs. No significant adverse effects to health would be expected to occur from dermal contact.
Skin Contact: May be absorbed through skin, but it is unlikely that harmful effects will occur unless contact is prolonged, repeated, and extensive.
Eye Contact: Severe irritation and/or burns can occur following exposure. Direct contact may cause impairment of vision and corneal damage. Rinsing of the eye should take place immediately.
Ingestion Toxicity: Toxic if swallowed. If small quantities are ingested, vomiting will normally occur (usually within 5-10 minutes). This product is an emetic and due to this property, it is unlikely that significant quantities of material would be absorbed across the gastrointestinal tract to produce serious toxic effects. However, ingestion may produce gastrointestinal irritation with nausea, vomiting, lethargy and diarrhea.

Acute Target Organ Toxicity: Eyes

Prolonged (Chronic) Health Effects

Carcinogenicity: This material did not cause cancer in long-term animal studies.
Reproductive and Developmental Toxicity: Reproductive and/or developmental toxicity was observed in laboratory animals only at high doses that were maternally toxic.

Sensitization: This material tested negative for skin sensitization in humans and laboratory animals.
Inhalation: There are no known or reported effects from chronic exposure except for effects similar to those experienced from acute exposure.
Skin Absorption: Rodents have been observed to experience muscle weakness from prolonged oral and skin exposures. When tested in Monkeys, no such findings occurred.
Ingestion: The production of vomiting would provide protection against systemic toxicity. Chronic toxicity via this route is highly unlikely.

Chronic Target Organ Toxicity: There are no known or reported effects to humans from repeated exposure to this product.
Supplemental Health Hazard Information: No additional health information available.

4. FIRST AID MEASURES
Inhalation: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Skin Contact: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

Ingestion: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flammability Summary (OSHA): Product is not known to be flammable, combustible, pyrophoric or explosive.

Flammable Properties
Flash Point: None
Autoignition Temperature: 410 Deg. F. / 210 Deg. C.
Upper Flammable/Explosive Limit, % in air: Not applicable
Lower Flammable/Explosive Limit, % in air: Not applicable

Fire/Explosion Hazards: Material may be ignited only if preheated to high temperatures, for example in a fire. Dust may be ignitable if mixed with air in the presence of an ignition source.

Extinguishing Media: Carbon dioxide, Water spray

Fire Fighting Instructions: In case of fire, use normal fire fighting equipment including a NIOSH approved self-contained breathing apparatus (SCBA). Use water to cool containers.

Hazardous Combustion Products: Carbon monoxide, Carbon dioxide, Oxides of nitrogen, Oxides of sulfur

6. ACCIDENTAL RELEASE MEASURES

Personal Protection for Emergency Situations: Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to: boots, gloves hard hat, splash-proof goggles and impervious clothing, i.e. chemically impermeable suit.

Spill Mitigation Procedures
Air Release: Dust may be suppressed by the use of water fog. Contain all solids for treatment or neutralization.

Water Release: This material is heavier than and slightly soluble in water. Notify all downstream users of possible contamination. Divert water flow around spill if possible and safe to do so. If unable to divert, create a filtration dam to remove material.

Land Release: Remove or clean up material in powder form if possible. Avoid runoff into storm sewers and ditches which lead to waterways. As a final measure add water to solidify material after installing a proper dike to contain the mixture. Remove in a liquid form, containerize and label properly. Do not treat with other materials unless excessive dusting occurs and then add sand or a commercial absorbent and containerize.
Additional Spill Information: Evacuate all non-essential personnel. Hazardous concentrations in air may be found in local spill area and immediately downwind. Avoid creating dusts. Cover material with absorbent and moisten. Eliminate sources of ignition and collect for disposal. Stop source of spill as soon as possible and notify appropriate personnel. Dispose of spill residues per guidelines under Section 13, Disposal Consideration.

7. HANDLING AND STORAGE

Handling: Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water. Avoid contact with material, avoid breathing dust, use only in a well ventilated area, use bonding and grounding when transferring quantities of material. Avoid storage and handling conditions which lead to formation of dust clouds. Dust clouds are susceptible to ignition by electrical (static) discharge. Static charges can accumulate during shipping, unloading, pouring or conveying. To avoid fire or explosion, ground and bond containers and receiving equipment (and ground personnel) before transferring material.

Storage: Store in a cool, dry place. Isolate from incompatible materials. Avoid direct exposure to sunlight or ultraviolet (UV) light sources.

Shelf Life Limitations: Indefinite when stored in unopened container in a cool dry place at temperature below 54 Deg. C, 130 Deg. F.

Incompatible Materials for Storage: strong oxidizing agents
Do Not Store At temperatures Above: 54 Deg. C. 130 Deg. F.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Use local exhaust ventilation to maintain levels below exposure limits.

Protective Equipment for Routine Use of Product

Respiratory Protection: Wear a NIOSH approved respirator if levels above the exposure limits are possible.
Respirator Type(s): A NIOSH approved air purifying respirator with organic vapor cartridge and HEPA filter. Air purifying respirators should not be used in oxygen deficient or IDLH atmospheres or if exposure concentrations exceed ten (10) times the published limit.

Skin: Wear impervious gloves to avoid skin contact. Follow good industrial hygiene practices.

Eyes: Use chemical goggles and a faceshield. Emergency eyewash should be provided in the immediate work area.

Protective Clothing Type: Impervious

Exposure Limit Data

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>CAS #</th>
<th>OSHA PEL / STEL</th>
<th>ACGIH LIMITS</th>
<th>AIHA WEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc pyrithione</td>
<td>13463-41-7</td>
<td>None established</td>
<td>None established</td>
<td>Not Established</td>
</tr>
<tr>
<td>Zinc Pyrithione: 0.35 mg/cubic meter, 8 hr TWA, Arch internal standard</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

The IDLH has not been established for this product.

9. PHYSICAL AND CHEMICAL PROPERTIES
Physical State: powder
Color: off-white to tan
Odor: None
Molecular Weight: (Active ingredient) 317.68
pH: 6.5 - 9 (5% solution in neutral, distilled water)
Octanol/Water Coeff: No data
Solubility in Water: 8 ppm
Viscosity: Not applicable
Bulk Density: 0.35 g/cc
Specific Gravity: 1.78
Vapor Density: Not applicable
Evaporation Rate: Not applicable
Boiling Point: No data
Melting Point: 240 Deg. C. / 464 Deg. F.
Freezing Point: No data
VOC Content %w/w / lbs/gal: 0.00 / 0.00
HAP Content %w/w / lbs/gal: 0.00 / 0.00

10. STABILITY AND REACTIVITY

Stability and Reactivity Summary: Stable under normal conditions. Direct exposure to ultraviolet radiation causes slow decomposition. Avoid creating dusts as an explosive dust air mixture can be created at high concentrations. If dusts are created, ensure no sources of ignition are present. Take precautionary measures to prevent electrostatic discharges. Product is not sensitive to mechanical shock or impact.

Hazardous Polymerization: Will not occur
Chemical Incompatibility: strong oxidizing agents
Hazardous Decomposition Products: carbon monoxide, oxides of sulfur, oxides of nitrogen, carbon dioxide

11. TOXICOLOGICAL INFORMATION

Component Animal Toxicology
Oral LD50 value:
Zinc pyrithione
Derma LD50 value:
Zinc pyrithione
Inhalation LC50 value:
Zinc pyrithione

Oral LD50: Rat = 269 mg/kg
Dermal LD50 Rabbit > 2 g/kg
Inhalation LC50 (4h) nose only Rat = 0.61 mg/l (aerosol dust)
Inhalation LC50 (1h) nose only Rat = 2.4 mg/l (aerosol dust)

Product Animal Toxicity: See component data.
Oral LD50 value: Rat = 269 mg/kg
Skin Irritation: Primary Irritation Index Rabbit = 0.38 / 8.0 Not expected to be irritating to the skin.
Eye Irritation: Draize score Rabbit = 80.5 / 110 This material is expected to cause irreversible effects to the cornea with impairment of vision or corrosion to the eyes.
Skin Sensitization: Negative skin sensitizer, guinea pig - Buehler Method

Acute Toxicity: The Oral LD50 in monkeys was found to be > 1,000 mg/kg, based upon an acute toxicity study in which Zinc Omadine(R) powder was administered orally in a gelatin capsule to two male cynomolgus monkeys.

Subchronic/Chronic Toxicity: Skeletal muscle atrophy has been observed from oral and dermal exposure in rats to pyrithione compounds. Exposure to monkeys at several times the dose given to rats gave no indication of either muscle or nerve damage. Although these effects are possible with human exposure, the evaluation of the animals toxicological data makes the above effects unlikely from industrial product use.

Reproductive and Developmental Toxicity: Reproductive and/or developmental toxicity was observed in laboratory animals only at high doses that were maternally toxic.

Component Data: Zinc pyrithione

Mutagenicity: This chemical has been shown to be non-mutagenic based on a battery of assays.

Carcinogenicity: This material did not cause cancer in long-term animal studies.

Component Data: Zinc pyrithione

12. ECOLOGICAL INFORMATION

Overview: Highly/very toxic to fish and other aquatic organisms. Toxic to wildlife and domestic animals.

Ecological Toxicity Values:

Zinc pyrithione

Rainbow trout (Salmo gairdneri) 96 hr. LC50: = 0.0032 mg/l (measured, flow-through).
Fathead minnow, 96 hr. LC50: = 0.0026 mg/l (measured, flow-through).
Sheepshead minnow 96 hr. LC50: = 0.4 mg/l (measured, static).
Daphnia magna, 48 hr. LC50: = 0.0082 mg/l (measured, flow-through).
Daphnia magna, 48 hr. EC50: = 0.034 mg/l (measured, flow-through).
Daphnia magna, 21 day EC50 (chronic toxicity): = 29 ug/l (measured, flow-through).
Mysid shrimp 96 hr. LC50: = 6.3 ug/l (measured, flow-through).
Crassostrea virginica (Eastern oyster) 96H EC50 = 22 ug/l (measured, flow-through).
Selenastrum capricornutum (freshwater algae) 120 hr. EC50 = 28 ug/l (measured, static).

Corophium volutator (Pallas) (sediment-dwelling amphipod) (dry sediment weight basis): 10 day LC50: = 4.4 mg/kg
Northern bobwhite quail acute oral LD50: = 60 mg/kg
Northern bobwhite quail dietary LC50: = 1110 ppm
Mallard duck dietary LC50: > 5000 ppm
13. DISPOSAL CONSIDERATIONS

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

Waste Disposal Summary: If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

Potential US EPA Waste Codes: Not applicable

Disposal Methods: As a nonhazardous solid waste it should be disposed of in accordance with local, state and federal regulations by disposal in a secure chemical landfill.

Components subject to land ban restrictions: No components subject to land ban restrictions.

14. TRANSPORT INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT Description (49 CFR 172.101):

Land (U.S. DOT): TOXIC SOLID, ORGANIC, N.O.S. (CONTAINS ZINC PYRITHIONE), 6.1, UN2811, PGIII

Air (IATA/ICAO): TOXIC SOLID, ORGANIC, N.O.S. (CONTAINS ZINC PYRITHIONE), 6.1, UN 2811, PG III

Water (IMO): TOXIC SOLID, ORGANIC, N.O.S. (CONTAINS ZINC PYRITHIONE), 6.1, UN 2811, PG III

Flash Point: (C) Not applicable

Hazard Label/Placard: (Primary) TOXIC

Emergency Response Guide Number: 154

15. REGULATORY INFORMATION

UNITED STATES:

Toxic Substances Control Act (TSCA): The components of this product are listed on the TSCA Inventory of Existing Chemical Substances.

Pesticide acceptance indication: US EPA Registration Number: See label for registration information

FIFRA Listing of Pesticide Chemicals (40 CFR 180): This product is regulated under the Federal Insecticide, Fungicide and Rodenticide Act. It must be used for purposes consistent with its labeling.

Superfund Amendments and Reauthorization Act (SARA) Title III:

Hazard Categories Sections 311/312 (40 CFR 370.2):

Health: Acute
Physical: None

Extremely Hazardous Substance Section 302 - Threshold Planning Quantity:
Not applicable
Reportable Quantity (40 CFR 302.4):
None listed

Supplier Notification Requirements (40 CFR 372.45), 313 Reportable Components
Zinc Compounds form R reporting required for 1.0% de minimis concentration

State Right-to-Know Regulations Status of Ingredients
Pennsylvania: Sodium sulfate (solution)
New Jersey: Not listed
Massachusetts: Sodium sulfate (solution)

CANADA: Domestic Substances List: This product is on the Canadian Domestic Substances List.

16. OTHER INFORMATION

MSDS REVISION
Revised to meet the ANSI standard of 16 sections.

STATUS:

MAJOR REFERENCES:

- Two Year Rat Feeding Study. August 18, 1958. Dr. P. S. Larson. Virginia Medical College.
- Industrial Bio-Test Laboratories, Inc. 1972. Acute Oral Toxicity Study with Zinc Omadine in Albino Rats. IBT #A911
• Food and Drug Research Laboratories, Inc. 1967. Test for Eye Irritation. #88496 a and b.
• Food and Drug Research Laboratories, Inc. 1967. Test for Eye Acute Dermal Toxicity. #88494 a and b; #88794 a and c.
• Industrial Bio-Test Laboratories, Inc. 1972. Teratogenic Study with Zinc Omadine in Albino Rats. IBT #B346.

Other references available upon request.