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® FPS AQ. DISP. IND. BACTERICIDE & FUNGICIDE
EPA Reg. No. 1258-841

1. PRODUCT AND COMPANY IDENTIFICATION

REVISION DATE: 06-27-2003
SUPERCEDES: 06-02-2003
MSDS NO: 01789-0005 - 100093
SYNONYMS: Zinc pyrithione, Zinc pyridinethione
CHEMICAL FAMILY: Mercaptopyridine-N-oxide
DESCRIPTION / USE: Bactericide-fungicide antidandruff agent
FORMULA: C_{10}H_{8}N_{2}O_{2}S_{2}Zn

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>Water</td>
<td>7732-18-5</td>
<td>47 - 51</td>
</tr>
<tr>
<td>Bis(1-hydroxy-2(1H)-pyridinethionato-o,s)-(T-4)zinc</td>
<td>13463-41-7</td>
<td>48 - 52</td>
</tr>
<tr>
<td>Sodium polynaphthalene sulfonate</td>
<td>9084-06-4</td>
<td>1 - 5</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

OSHA Hazard Classification: eye and respiratory irritant, toxic by inhalation, skin irritant

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>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>NFPA</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.
Skin Contact: No significant adverse effects to health would be expected to occur from dermal contact.
Skin Absorption: May be absorbed through skin, but it is unlikely that harmful effects will occur unless contact is prolonged, repeated, and extensive.
Eye Contact: May cause severe irritation, consisting of redness, swelling, and mucous membrane discharge to the conjunctiva. Any visual impairment or corneal damage would be expected to clear within several days.
Ingestion Toxicity: Moderately 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: IF INHALED: Remove individual to fresh air. Seek medical attention if breathing becomes difficult.
Skin Contact: IF ON SKIN: Immediately flush skin with plenty of water for 15 minutes. If clothing comes in contact with the product, the clothing should be removed immediately and laundered before re-use. Call a physician.

Eyes: IF IN EYES: Immediately flush eyes with plenty of water for at least 15 minutes while holding eyelids apart. Call a physician immediately.

Ingestion: IF SWALLOWED: Call a physician immediately. DO NOT induce vomiting unless directed to do so by a physician. Never 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: Not applicable
Upper Flammable/Explosive Limit, % in air: Not applicable
Lower Flammable/Explosive Limit, % in air: Not applicable
Fire/Explosion Hazards: Material will not ignite or burn.
Extinguishing Media: Carbon dioxide, Water spray Not Applicable. - Choose extinguishing media suitable for surrounding materials.
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: None known

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: Contain all liquid 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: Place spill cleanup materials in proper container/s for proper disposal and decontaminate the entire spill area.
Additional Spill Information: Evacuate all non-essential personnel. Hazardous concentrations in air may be found in local spill area and immediately downwind. 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.
Storage: Store in a cool, dry place. Isolate from incompatible materials.
Shelf Life Limitations: Product should be agitated by physical shaking or rotating of drum periodically during prolonged periods of storage to maintain integrity of dispersion. The product should always be mixed thoroughly prior to use. Protect from freezing. Freezing will damage the integrity of the dispersion.

Incompatible Materials for Storage: ferrous metals, copper, copper alloys

Do Not Store At temperatures Above: 54 Deg. C. 130 Deg. F.
Do Not Store At Temperatures Below: 10 Deg. C. 50 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.
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: 0.35 mg/cubic meter, 8 hr TWA, Arch internal standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NIOSH Immediately Dangerous to Life or Health:

9. PHYSICAL AND CHEMICAL PROPERTIES

- Physical State: dispersion
- Color: off-white to tan
- Odor: very faint pyridine
- Molecular Weight: (Active ingredient)317.68
- pH: (@ 25 Deg. C) 6.5 - 9 Slurry
- Octanol/Water Coeff: log Pow = 0.97
- Solubility in Water: (Active ingredient)0.0006 %
- Bulk Density: 10.8 lb/gal
- Specific Gravity: 1.2
- Vapor Density: No data
- Vapor Pressure: (@ 25 Deg. C) 23 mmHg
- Evaporation Rate: No data
- Boiling Point: 100 Deg. C.
- Freezing Point: 1.5 Deg. C.
- Volatiles, % by vol.: 51 %

ZINC OMADINE® FPS AQ. DISP. IND. BACTERICIDE & FUNGICIDE
10. STABILITY AND REACTIVITY

Stability and Reactivity Summary: Stable under normal conditions. This product may become unstable at elevated temperatures after the removal of water. Not sensitive to mechanical shock. Not sensitive to static discharge. Direct exposure to ultraviolet radiation causes slow decomposition.

Hazardous Polymerization: Will not occur
Chemical Incompatibility: strong oxidizing agents
Packaging Incompatibility: ferrous metals, copper & copper alloys
Hazardous Decomposition Products: carbon monoxide, oxides of sulfur, oxides of nitrogen, carbon dioxide
Decomposition Temperature: 200 Deg. C. 392 Deg. F.

11. TOXICOLOGICAL INFORMATION

Component Animal Toxicology
Oral LD50 value:
Zinc pyrithione Oral LD50: Rat = 269 mg/kg
Dermal LD50 value:
Zinc pyrithione Dermal LD50 Rabbit > 2 g/kg
Inhalation LC50 value:
Zinc pyrithione 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:
Oral LD50 value:
Dermal LD50 value:
Inhalation LC50 value:
Skin Irritation: Primary Irritation Index Rabbit = 0.38 /8.0 This material is expected to be slightly irritating.
Eye Irritation: This material is expected to be severely irritating.
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:
Component Data:
Zinc pyrithione Reproductive and/or developmental toxicity was observed in laboratory animals only at high doses that were maternally toxic.
Mutagenicity: This chemical has been shown to be non-mutagenic based on a battery of assays.

Component Data: Zinc pyrithione 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 This material did not cause cancer in long-term animal studies.

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).
      Sheephead 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)
      Lemma gibba G3 (Duckweed) 7 day EC50: = 9.6 ug/l (measured, flow-through)
      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: Spent or discarded material is not expected to be a hazardous waste.
Potential US EPA Waste Codes: Not applicable
Disposal Methods: Dispose of by waste water treatment following Federal, State, Local, or Provincial regulations.
Components subject to land ban restrictions: No components subject to land ban restrictions.

14. TRANSPORT INFORMATION

THIS MATERIAL IS NOT REGULATED AS A DOT HAZARDOUS MATERIAL.
DOT Description (49 CFR 172.101): Land (U.S. DOT): Not Regulated
Air (IATA/ICAO): SAME AS LAND  
Water (IMO): SAME AS LAND  
Flash Point: (C) Not Applicable

Special Comments: Inhalation is not a normal route of absorption relative to transportation.

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: Applicable to this product
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: Not listed  
New Jersey: Not listed  
Massachusetts: Not listed

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

16. OTHER INFORMATION

MSDS REVISION  
STATUS:  
Section(s) Revised: 1,3,4,7,11,12

MAJOR REFERENCES:
• MB Research Laboratories, Inc. Spinnerstown, Pennsylvania. Single Dose Oral Toxicity in Rats/LD  
• 50 in Rats. Zinc Omadine 48% dispersion, Sample #F116A. Project Number MB 85-8049 A. 1986.
• Two Year Rat Feeding Study. August 18, 1958. Dr. P. S. Larson. Virginia Medical College.
• Subacute Percutaneous Toxicity of Zinc Pyrithione in the Rabbit. October 29, 1957. Dr. P. S. Larson. Virginia Medical College.
• 15. Food and Drug Research Laboratories, Inc. 1967. Test for Eye Irritation. #88496 a and b.
• 16. Food and Drug Research Laboratories, Inc. 1967. Test for Eye Acute Dermal Toxicity. #88494 a and b; #88794 a and c.
• 20. CAS ONLINE(R)-FILE REG, Chemical Abstracts Service,Columbus,OH.
• 21. CAS ONLINE - FILE CA, Chemical Abstracts Service, Columbus, OH.

Other references available upon request.