MATERIAL SAFETY DATA

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: SODIUM OMADINE® 40% AQ SOL INDUSTRIAL FUNGICIDE/BACTERICIDE
EPA Reg. No. 1258-843

1. PRODUCT AND COMPANY IDENTIFICATION

REVISION DATE: 06-27-2003
SUPERCEDES: 06-27-2003
MSDS NO: 00071-0004 - 100040
SYNONYMS: Sodium pyrithione; 2-pyridinethiol-1-oxide, sodium salt; 1-hydroxy-2 (1H) - pyridinethione, sodium salt
CHEMICAL FAMILY: Organic salt (Active ingredient)
DESCRIPTION / USE: Industrial biocide
FORMULA: C₅H₄NOSNa 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>Water</td>
<td>7732-18-5</td>
<td>50 - 55</td>
</tr>
<tr>
<td>2-Pyridinethiol, 1-oxide, sodium salt</td>
<td>3811-73-2</td>
<td>40 - 45</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>7647-14-5</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Pyridine, 2,2'-dithiobis-, 1,1'-dioxide</td>
<td>3696-28-4</td>
<td>0.1 - 1</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

OSHA Hazard Classification: eye and 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:
2-Pyridinethiol, 1-oxide, sodium salt No data

Irritation Threshold:
2-Pyridinethiol, 1-oxide, sodium salt 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>1</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: Not expected to cause significant toxicity unless there is prolonged exposure to high concentrations.

Inhalation Irritation: High concentrations may be slightly irritating to the eyes, nose, throat, and lungs.

Skin Contact: Skin contact may cause minor irritation consisting of transient redness and/or swelling.

Skin Absorption: Slightly toxic if absorbed by skin.

Eye Contact: Contact may cause moderate irritation consisting of transient redness, swelling, and mucous membrane discharge to the conjunctiva. Exposure to the human eye has been reported to produce a noticeable stinging response that is relieved upon rinsing the eyes. Reversible irritation with no impairment of vision nor adverse health effects have been reported following exposure. No corneal involvement or visual impairment is expected.

Ingestion Irritation: Ingestion may cause irritation of the gastrointestinal tract and gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting, lethargy or diarrhea.

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: None known

Prolonged (Chronic) Health Effects

Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. Sodium Omadine was administered orally and dermally to laboratory animals and was found not to induce tumor formation as compared to control animals.

Reproductive and Developmental Toxicity: No reproductive or developmental risk to humans is expected from exposure to this product.

Sensitization: This material tested negative for skin sensitization in animals.

Inhalation: There are no known or reported effects from chronic exposure except for effects similar to those experienced from acute exposure.

Skin Contact: Prolonged or repeated exposure may cause minor irritation.

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. If respiratory irritation develops, call a physician.

Skin Contact: IF ON SKIN: Flush skin with water for 15 minutes. Call a physician if irritation develops.

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: Immediately drink water to dilute. Consult a physician if symptoms develop. 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: This material is not expected to burn unless all the water is boiled away. The remaining compounds may be ignitable.

Extinguishing Media: 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: Carbon monoxide, Carbon dioxide, Oxides of sulfur, Oxides of nitrogen, Sodium oxide

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, impervious gloves, hard hat, splash-proof goggles, impervious clothing, i.e., chemically impermeable suit, self-contained breathing apparatus. Clean up spills immediately, observing precautions in Section 8.

Spill Mitigation Procedures
- Air Release: Vapors may be suppressed by the use of water fog. Contain all liquid for treatment or neutralization.
- Water Release: This material is heavier than water. This material is miscible in water. Stop water flow or divert water flow around spill if possible and safe to do so. Contain all liquid for treatment or neutralization. Notify all downstream users of possible contamination. Continue to handle as described in land spill.
Land Release: Absorb spill with inert material (e.g., dry sand, clay, earth or commercial absorbent), then place in a chemical waste container. Place spill cleanup materials in proper container/s for proper disposal and decontaminate the entire spill area.

Additional Spill Information: Stop source of spill as soon as possible and notify appropriate personnel. Utilize emergency response personal protection equipment prior to the start of any response. Dispose of spill residues per guidelines under Section 13, Disposal Consideration. Decontaminate all clothing and the spill area using a detergent and flush with large amounts of water.

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 ventilated location, away from oxidizers, heat, flame, or other incompatible conditions. Keep container(s) closed. Store away from heat. Do not expose to direct light.

Shelf Life Limitations: One year minimum if stored in the original container in a cool, dry place.

Incompatible Materials for Storage: strong oxidizing agents, concentrated acids

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.

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>ACGIH WEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Pyridinethiol, 1-oxide, sodium salt</td>
<td>3811-73-2</td>
<td>None established</td>
<td>None established</td>
<td>Not Established</td>
</tr>
<tr>
<td>2-Pyridinethiol, 1-oxide, sodium salt</td>
<td>Arch internal standard: 0.35 mg/cubic meter (TWA); MAK: 1mg/cubic meter (TWA)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chemical Name

The IDLH has not been established for this product.

NIOSH Immediately Dangerous to Life or Health:

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: liquid

Color: pale amber
Odor: mild pyridine
Molecular Weight: (Active ingredient) 149.2
pH: (@ 25 Deg. C) 8.5 - 10.5 (10% solution in neutral, distilled water)
Octanol/Water Coeff: 0.00015
Solubility in Water: (Active ingredient) 54.7%
Viscosity: No Data
Bulk Density: (@ 25 Deg. C) 1.2 - 1.3 g/cc
Specific Gravity: (@ 25 Deg. C) 1.2 - 1.3
Vapor Density: No data
Vapor Pressure: (@ 25 Deg. C) 19 mmHg
Evaporation Rate: 0.8 (n-Butyl acetate = 1)
Boiling Point: 109 Deg. C.
Freezing Point: -30 - -25 Deg. C.
-22 - -13 Deg. F.
Vapor Density: No data
Vapor Pressure: 19 mmHg
Evaporation Rate: 0.8 (n-Butyl acetate = 1)
Boiling Point: 109 Deg. C.
Freezing Point: -30 - -25 Deg. C.
-22 - -13 Deg. F.

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. Decomposes slowly. Product is not sensitive to mechanical shock or impact. Not sensitive to static discharge.

Hazardous Polymerization: Will not occur
Conditions to Avoid: Evaporation of the product High temperatures
Chemical Incompatibility: strongly water-reactive materials
Hazardous Decomposition Products: carbon monoxide, carbon dioxide, oxides of sulfur, oxides of nitrogen, sodium oxide
Decomposition Temperature: No data
Product May Be Unstable At Temperatures Above: 250 Deg. C (482 Deg. F)

11. TOXICOLOGICAL INFORMATION

Component Animal Toxicology
Oral LD50 value:
2-Pyridinethiol, 1-oxide, sodium salt Oral LD50: Rat = 750 mg/kg
Dermal LD50 value:
2-Pyridinethiol, 1-oxide, sodium salt Dermal LD50 Rabbit = 700 mg/kg
Inhalation LC50 value:
2-Pyridinethiol, 1-oxide, sodium salt Inhalation LC50 (4h) Rat = 1.1 mg/l

Product Animal Toxicity:
Oral LD50 value: Rat = 1500 mg/kg
Dermal LD50 value: Rabbit = 1800 mg/kg
Inhalation LC50 value: Inhalation LC50 (4h) Rat = 2.8 mg/l
Skin Irritation: Primary Irritation Index Rabbit = 1.08 /8.0 This material is expected to be slightly irritating.
Eye Irritation: Draize score Rabbit = 17 /110 This material caused systemic toxicity and death when administered to the eyes of rabbits. These effects were not seen when this product was administered to the eyes of monkeys. No adverse health effects are expected following eye contact in humans. This material is expected to be slightly irritating.
Skin Sensitization: Negative skin sensitizer - Guinea Pig Maximization Method (Magnusson-Kligman)

Acute Toxicity: May cause skin, eye and mucous membrane irritation (includes upper respiratory tract).
May cause lethargy and diarrhea from ingestion.

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: The Omadine in this product does not exert a direct effect on reproductive performance or post-natal development. This material does not produce fetal malformations from dermal exposure. Fetal toxicity and skeletal malformations were noted, but only at doses which produced maternal toxicity. It is judged that the hazard to human health from this effect is not significant.

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

Carcinogenicity: Sodium Omadine was administered orally and dermally to laboratory animals and was found not to induce tumor formation as compared to control animals.

12. ECOLOGICAL INFORMATION

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

Ecological Toxicity Values:
2-Pyridinethiol, 1-oxide, sodium salt
Rainbow trout (Salmo gairdneri) 96 hr. LC50: $= 6.6 - 8 $ug/l (measured, static)
Daphnia magna, 48 hr. LC50: $= 22 $ug/l (nominal, static)
Bobwhite quail 8 day dietary LC50: $= 3075$ ppm (40% aqueous Sodium Omadine)
Mallard duck 8 day dietary LC50: $= 10033$ ppm (40% aqueous Sodium Omadine)
Bobwhite quail Oral LD50: $= 441$ mg/kg (40% aqueous Sodium Omadine)
Bobwhite quail acute oral LD50: $= 200$ mg/kg (94.9% aqueous Sodium Omadine)
Mallard duck acute oral LD50: $= 92$ mg/kg (94.9% aqueous Sodium Omadine)

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: Dispose of by incineration 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

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 number
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
No 313-listed chemicals in this product

Clean Air Act VOC Section 111 Sodium acetate

State Right-to-Know Regulations Status of Ingredients
Pennsylvania: Not listed
New Jersey: Not listed
Massachusetts: Not listed

16. OTHER INFORMATION
MAJOR REFERENCES:

- International Research and Development Corporation, Mattawan, Michigan. Thirteen Week Subchronic Inhalation Toxicity Study on Na Omadine in Rats. Study No. 397-042. 1989.
- Toxicol Laboratories Limited, Ledbury, Herefordshire, ENGLAND. 104 Week Oral (Gavage) Combined Carcinogenicity and Toxicity Study in Rat. Sodium Omadine. Protocol No. OLA/3/C.
• Toxicol Laboratories Limited, Ledbury, Herefordshire, ENGLAND. 80 Week Dermal Carcinogenicity Study in the Mouse. Sodium Omadine. Study No. OLA/7/C.
• Acute Toxicity of Sodium Omadine; 40% Aqueous Solution to Daphnia Magna, Aquatic Environmental Sciences Laboratory, Union Carbide Corp., Tarrytown, NY. Olin Reference #1065. February 18, 1976.

Other references available upon request.