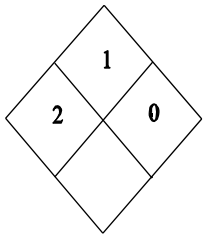
MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION



PRODUCT NAME: METAM SODIUM Manufacturers Concentrate; VAPAM® Manufacturing Concentrate; VAPAM® Technical; METAM SODIUM Manufacturing Use Concentrate
CHEMICAL NAME: Sodium N-methyldithiocarbamate solution
MOLECULAR FORMULA: $C_2H_4NNaS_2$
GENERAL USE: Soil Fumigant
PRODUCT DESCRIPTION: Orange to light yellow-green liquid with the possibility of an amine or a sulfur odor.
EPA Registration Number: 5481-416; 5481-469
Health Canada Registration Number: PCP # 19399
MSDS No.: 274_10
Current Revision Date: 15 September, 2004

MANUFACTURER:
AMVAC CHEMICAL CORPORATION
4100 E. Washington Blvd.
Los Angeles, CA 90023-4406
Ph: 323-264-3910
FAX: 323-268-1028

EMERGENCY TELEPHONE NUMBERS:
MANUFACTURER: 323-264-3910
TRANSPORTATION (24 HOURS)
CHEMTREC: 800-424-9300
OTHER
AMVAC: 323-264-3910

2. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	WT %	CAS No.
Sodium N-methyldithiocarbamate (Metam Sodium)	44.0%	137-42-8
Inert ingredients	56.0%	

Ingredients not precisely identified are proprietary or nonhazardous.
Values are not product specifications.

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)

COMPONENT	HAZARD	OSHA PEL*	ACGIH TLV*
NONE LISTED			

* Exposure Limits 8 hrs. TWA (ppm)

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

DANGER! Dilution with water may generate poisonous gases (Methyl isothiocyanate (MITC) or Hydrogen sulfide). Dilution with acids may generate flammable gases (Carbon disulfide or Monomethylamine). WARNING: Product is corrosive to skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Harmful if swallowed. Harmful if inhaled. Harmful if absorbed through the skin. Irritating to eyes, nose and throat. Do not get on skin or clothing. Avoid breathing vapor or spray mist. Do not get in eyes.

Toxic to fish. Do not contaminate water bodies.

POTENTIAL HEALTH EFFECTS

ROUTE(S) OF ENTRY: Skin contact, inhalation, ingestion, and eye contact with the liquid product. As a result of use of the product, applicators and other persons present in the area of the application can be exposed to MITC and/or hydrogen sulfide. These chemicals can be evolved as gases from the soil of an application. MITC has a garlic like odor and can be very irritating to the eyes. Hydrogen sulfide has a rotten egg odor and can be very offensive. If either odor is detected near an application of Metam, notify the applicator of the problem and take appropriate measures to minimize/avoid exposure. The nose becomes deadened to a hydrogen sulfide odor, so not being able to detect the odor any longer does not mean the exposure has ended.

SIGNS OF ACUTE OVEREXPOSURE: Overexposure to Metam Sodium as sold may result in damage to the skin, skin irritation, excessive salivation, sweating, fatigue, weakness, nausea, headache, dizziness, eye, nose, throat and respiratory tract irritation. In addition, dilution to use levels results in the release of methyl isothiocyanate (MITC) and/or hydrogen sulfide. Overexposure to MITC may result in strong skin and eye irritation, running nose, dizziness, cramps, nausea, vomiting, and mild to severe disturbances of the nervous system. Overexposure to hydrogen sulfide may result in severe irritation to the eyes and mucous membranes. In addition, exposure may result in headache, dizziness, excitement, staggering gait, diarrhea, difficult or painful urination, difficult breathing, chronic pulmonary edema, coma and death.

SIGNS OF CHRONIC OVEREXPOSURE: Same as above, plus conjunctivitis, photophobia, digestive disturbances, weight loss, general bodily weakness and blurred vision. In addition, laboratory studies have shown that exposure to the active ingredient, followed by ingestion of alcohol, may cause an adverse reaction, including low blood pressure, rapid heart beat, and flushing of the skin. Consumption of alcohol during and after exposure to this product should be avoided.

3. HAZARDS IDENTIFICATION, cont'd

OTHER POTENTIAL HEALTH EFFECTS: Laboratory studies have shown some carcinogenic effects and some developmental effects in laboratory animals. *In vitro* laboratory studies have shown some evidence of mutagenicity, but there is no conclusive evidence *in vivo*. Exposure monitoring studies conducted during agricultural applications of Metam sodium have shown that human exposure is extremely low; therefore, any potential risk to humans from Metam sodium exposure is considered minimal.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Impaired pulmonary function and preexisting eye problems may be aggravated. Preexisting skin diseases may also be aggravated by exposure to the decomposition products.

Care should be exercised and all label instructions should be followed, in the handling of products containing Metam Sodium.

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4. FIRST AID MEASURES

EYES: Immediately flush the eyes with copious amounts of clear, cool running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. Contact a physician immediately. If there will be a delay in getting medical attention, rinse the eyes for at least another 15 minutes.

INHALATION: Remove victim to fresh air. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration. If breathing is difficult, give oxygen. Contact a physician immediately.

INGESTION: Immediately dilute the swallowed product by giving large quantities of water, but do not induce vomiting. If vomiting occurs, give fluids again. Have a physician determine if condition of patient will permit induction of vomiting or evacuation of stomach. Never give anything by mouth to an unconscious person. Contact a physician immediately.

SKIN: Immediately flush all affected areas with large amounts of clear water for at least 15 minutes. Remove contaminated clothing. Do not attempt to neutralize with chemical agents. Wash clothing before reuse. If skin irritation develops, contact a physician immediately.

NOTE TO PHYSICIANS: Treat symptomatically. Contact your local, state, or national poison control center for further information.

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5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

Flash Point: > 200°F (TCC)
Autoignition Temperature: Not available

5. FIRE FIGHTING MEASURES, cont'd

Flammable Limits:
Lower flammable limit: Not available
Upper flammable limit: Not available

EXPLOSIVITY:

Mechanical Impact:	Not available. Not expected to be sensitive to mechanical impact.
Static Discharge:	Not available
Rate of Burning:	Not available
Explosive Power:	Not available

HAZARDOUS COMBUSTION PRODUCTS: This product can release toxic fumes of methylisothiocyanate (MITC) and hydrogen sulfide, as well as nitrogen oxides, when heated to decomposition or diluted with water.

EXTINGUISHING MEDIA: This product is not flammable. However, this product may support combustion under fire conditions and will generate toxic fumes under fire conditions. Base extinguisher media on surrounding materials. **NOTE:** Dilution with water may cause generation of flammable and toxic fumes of MITC and Hydrogen sulfide. See **Chemical Stability** information in SECTION 10.

FIRE FIGHTING INSTRUCTIONS: Evacuate nonessential personnel from the area. Wear self-contained breathing apparatus and impervious clothing. Clean all clothing before reuse.

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6. ACCIDENTAL RELEASE MEASURES

GENERAL: Use adequate ventilation and air-supplied respirators, as well as impervious clothing and safety goggles. Contact with moisture in the soil can generate the flammable and toxic gases MITC and Hydrogen sulfide. Keep bystanders upwind and away from the spill.

SMALL SPILL: Cover with absorbent (clay, sawdust, straw, kitty litter, etc.), to absorb the liquid and vapors. Sweep into an open drum. Clean the area with common powdered household detergent and a stiff brush and just enough water to make a slurry. Absorb and sweep into the same open drum. Rinse with water, absorb, and add to the waste drum. Close the drum and dispose of properly.

LARGE SPILL: Dike the spill to prevent contamination of local water sources. Siphon the majority of the liquid into drums for use or disposal, depending on the circumstances. Clean the area as described for a small spill.

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7. HANDLING AND STORAGE

HANDLING: Prevent skin contact. Do not breathe fumes. Wear appropriate personal protective equipment. Wash thoroughly and change clothes after handling. See product label for more detailed handling procedures.

7. HANDLING AND STORAGE, cont'd

STORAGE: Do not contaminate water, food or feed by storage or disposal. Store product in a cool, dry, locked place out of reach of children. Do not store below 50°F. Product crystallizes at lower temperatures. See label for specific instructions.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: A well-ventilated area is recommended for handling Metam Sodium. Use of mechanical or local exhaust systems is recommended.

RESPIRATORY PROTECTION: A properly FIT-TESTED NIOSH/MSHA approved respirator fitted with organic vapor cartridges may be required when working with this product. Specific use regulations are listed on the label.

SKIN PROTECTION: Chemical resistant gloves, body covering clothing that has long sleeves and long pants, and chemical resistant shoes or boots, are required to prevent skin contamination. A chemical resistant apron may be required under certain circumstances. Wear clean clothes daily. Wash well with soap and water after handling this product. See the label for more specific instructions.

EYE PROTECTION: Safety glasses must be worn whenever working with chemicals. Face-sealing goggles (or full-face respirators) are required whenever ventilation is poor or a rotten egg odor is detected.

OTHER PROTECTION: An eyewash station and a safety shower should be located in the work area.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Orange to light yellow-green liquid.
Odor:	Essentially odorless to fairly strong odor of amine or sulfur.
Boiling Point:	112°C/234°F
Freezing/Melting Point:	0°C to 20°C
Vapor Pressure (mm/Hg):	24 mm Hg @ 25 °C
Vapor Density:	Not available
Specific Gravity:	1.22 g/mL @ 20°C/4°C(68°F/39°F)
Density:	10.2 lb/gal
Evaporation Rate:	1.0 as compared to water.
Percent Volatile by Vol:	56% (@ 100°C
Solubility in Water:	Miscible
pH:	9.5 - 11.0
Partition Coefficient (W/O):	Not applicable

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10. STABILITY AND REACTIVITY

CHEMICAL STABILITY (Conditions to avoid): Metam Sodium decomposes, when diluted with water, to methyl isothiocyanate (MITC, a lachrymator and moderate poison) and/or to hydrogen sulfide (a highly poisonous gas). Use the solution promptly after mixing. Do not allow the solution to stand. As originally packaged, Metam Sodium solutions are stable under normal storage conditions for up to 2 years.
Metam Sodium can also decompose to carbon disulfide and monomethylamine (both highly flammable) if contacted with a strong acid.

INCOMPATIBILITY: This product is incompatible with additional water and strong aqueous acids In addition, it is corrosive to copper, brass, and zinc, and may soften and/or discolor iron.

HAZARDOUS DECOMPOSITION PRODUCTS: When treated with water or heated to decomposition, this product can give off toxic fumes of methyl isothiocyanate (MITC), hydrogen sulfide, and nitrogen oxides. If treated with strong acids, fumes of carbon disulfide and monomethylamine will be given off.

HAZARDOUS POLYMERIZATION: This product will not polymerize.

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11. TOXICOLOGICAL INFORMATION

Information has been included for the product and for two potential decomposition products in order to help potential users to have a clearer idea of the hazards associated with this product.

Toxicological Category	Specific Application	Metam Sodium (Product)*	MITC (Decomposition)	Hydrogen sulfide (Decomposition)
INGESTION	Oral LD_{50} (rat):	812 mg/kg	55-220 mg/kg	
INHALATION	Inhalation LC_{50} (rat)	2.28 mg/L	1.9 mg/L air (1 hr)	444 ppm
DERMAL	Skin LD_{50} (rabbit)	>2020 mg/kg	33 - 202 mg/kg	
IRRITATION	Eye (rabbit) Skin (rabbit)	Mild Irritant Moderate Irritant	Corrosive Corrosive	Corrosive No information
OTHER	Skin sensitization (guinea pig)	Sensitizer	Sensitizer	No Information

TERATOGENICITY: Laboratory studies on a related Metam sodium product* have shown some developmental effects in laboratory animals.

MUTAGENICITY: Laboratory studies on a related Metam sodium product* have shown some evidence of mutagenicity *in vitro* but no conclusive evidence *in vivo*.

11. TOXICOLOGICAL INFORMATION, cont'd

CARCINOGENICITY: Laboratory studies on a related Metam sodium product* have shown some carcinogenic effects in laboratory animals.
REPRODUCTIVE TOXICITY: Laboratory studies on a related Metam sodium product* have shown no evidence of reproductive toxicity in laboratory animals.
TOXICOLOGICALLY SYNERGISTIC PRODUCTS: No data is available for Metam sodium products.

* The data in this section was generated using Metam Sodium solutions with 42% active ingredient.

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12. ECOLOGICAL INFORMATION

This product is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

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13. DISPOSAL CONSIDERATIONS

Disposal must be at an approved waste facility for chemical wastes. The empty container must be triple rinsed prior to disposal. Consult the label and Federal, State, or local disposal authorities for the actual method(s) to be followed.

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14. TRANSPORTATION INFORMATION

DOT Class:	8
UN Number:	UN3266
IMDG Class (sea):	8
Marine Pollutant:	Yes
IATA (air):	8
Packing Group:	III
Hazard Label(s):	CORROSIVE
ADR Class (road):	Not listed in ADR
Proper Shipping Name(s):	Corrosive liquid, basic, inorganic, n.o.s.(Metam Sodium 44%), Marine Pollutant
Reportable Quantity:	No

PACKAGING

General Description:	Bulk

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15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

This product is registered under EPA/FIFRA Regulations. It is a violation of Federal Law to use this product in any manner inconsistent with its labeling. Read and follow all label directions. This product is excluded from listing requirements under EPA/TSCA.

When these products are used for small areas they are considered to be RESTRICTED USE PESTICIDES. Due to acute toxicity, retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's Certification.

CANADIAN REGULATIONS:

This product is registered under the Pest Control Product Act of Canada (CPR). It is a violation of Canadian Law to use this product in any manner inconsistent with its labeling. Read and follow all label directions.

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

SARA TITLE III DATA

Section 311 & 312 Hazard Categories:

Immediate Health Hazard:	Yes
Delayed Health Hazard:	Yes
Fire Hazard:	No
Reactive Hazard:	No
Sudden Pressure Release Hazard:	No

Section 302 Extremely Hazardous Substances: None

Section 313 Toxic Chemicals: Metam Sodium (CAS 137-42-8) - 44%

CERCLA/EHS Reportable Quantity (RQ): None

STATE REGULATIONS:

CALIFORNIA (Proposition 65): Warning: This product contains Metam Sodium, a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

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16. OTHER INFORMATION

MSDS Status:

Date This Revision: 15 September, 2004
Date Previous Revision: 6 February 2003
Person Responsible for Preparation: Gary A. Braden

Reasons for Revision: Changes have been made in sections 1, 2, 3, 9, 10, 11, 14, and 15 to make the information clearer to the reader.

16. OTHER INFORMATION, cont'd

DISCLAIMER:
This information is provided for the limited guidance to the user. While AMVAC believes that the information is, as of the date hereof, reliable, it is the user's responsibility to determine the suitability of the information for its purposes. The user is advised not to construe the information as absolutely complete since additional information may be necessary or desirable when particular, exceptional, or variable conditions or circumstances exist (like combinations with other materials), or because of applicable regulations. No express or implied warranty of merchantability or fitness for a particular purpose or otherwise is made hereunder with respect to the information or the product to which the information relates.

ABBREVIATIONS:

ACGIH	-	American Conference of Governmental Industrial Hygienists
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	-	Department of Transportation
EHS	-	Extremely Hazardous Substance
EPA	-	Environmental Protection Agency
FIFRA	-	Federal Insecticide, Fungicide, and Rodenticide Act
HIS	-	Health Information Service
IARC	-	International Agency for Research on Cancer
IATA	-	International Air Transport Association
IMDG	-	International Maritime Dangerous Goods
NTP	-	National Toxicology Program
OSHA	-	Occupational Safety and Health Agency
SARA	-	Superfund Amendments and Reauthorization Act
TSCA	-	Toxic Substances Control Act

This is the last page of this MSDS. There should be 9 pages.