SAFETY DATA SHEET

1. Identification

Product identifier **Vapam® Soil Fumigant**

Other means of identification

Synonyms	Metam Sodium * Metam * VAPAM
Product registration number	62355
SDS No.	141

Recommended use of the chemical and restrictions on use

Recommended use	Soil Fumigant.
Restrictions on use	No other uses are advised. Keep out of the Reach of Children!

Details of manufacturer or importer

Manufacturer

Company name	American Vanguard Australia Pty Ltd	
Address	Unit 4, 482 Kingsford Smith Drive Hamilton, Queensland 4007 Australia	
Telephone	American Vanguard Australia Pty Ltd	07 3555 1980 (office hours)
Website	www.amvac.com	
E-mail	avaenquiries@amvac.com	
Emergency phone number	IXOM ERS	1800 033 111 (24 hours)
	Poison Informations Centre	13 11 26

2. Hazard(s) identification

Classification of the hazardous chemical

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2
	Sensitisation, skin	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1

Label elements, including precautionary statements

Hazard symbol(s)

Corrosion | Exclamation mark | Environment

Signal word Warning

Hazard statement(s)

May be corrosive to metals.
Harmful if swallowed.
Harmful if inhaled.
Causes skin irritation.
Causes eye irritation.
May cause an allergic skin reaction.
Very toxic to aquatic life.
Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

Prevention	Keep only in original packaging. Avoid breathing mist/vapours. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Wear protective gloves.
Response	IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell. Rinse mouth. IF ON SKIN: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE/doctor if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Absorb spillage to prevent material damage.
Storage	Not applicable.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Other hazards which do not result in classification	None known.
Supplemental information	Metham (or Metam) is a methyl isothiocyanate (MITC) precursor.

3. Composition/information on ingredients

Mixture

Identity of chemical ingredients	CAS number and other unique identifiers	Concentration of ingredients
Sodium Methyldithiocarbamate Metam Sodium Metam	137-42-8	423 g/L
Other non-hazardous ingredients	-	to 100 %

Composition comments This is a commercial product whose exact ratio of components may vary slightly.

4. First aid measures

Description of necessary first aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a poison centre or doctor/physician if you feel unwell.
Skin contact	Call a poison centre or doctor/physician if you feel unwell. Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison centre immediately. Rinse mouth. Do not induce vomiting without advice from poison centre. Never give anything by mouth to a victim who is unconscious or is having convulsions.
Personal protection for first aid responders	In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

Symptoms caused by exposure	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 sulphide. 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 sulphide 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. Chronic exposure may also cause 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 heartbeat, and flushing of the skin. Consumption of alcohol during and after exposure to this product should be avoided.
Medical attention and special treatment	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed. Contact the Poison Information Centre (13 11 26 from anywhere in Australia) for further information (0800 764 766 in New Zealand).

5. Firefighting measures

Extinguishing media

Suitable extinguishing media	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media	Material reacts with water. Dilution with water may cause generation of flammable and toxic fumes of MITC and Hydrogen sulphide. See Chemical Stability information in Section 10.
Specific hazards arising from the chemical	Material reacts with water. This product can release toxic fumes of methyl isothiocyanate (MITC) and hydrogen sulphide, as well as nitrogen oxides, when heated to decomposition or diluted with water. Fire may produce irritating, corrosive and/or toxic gases.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Firefighting equipment/instructions	Evacuate the area promptly. Move containers from fire area if you can do so without risk.
Hazchem code	2X
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Wear appropriate personal protective equipment.
For emergency responders	Keep unnecessary personnel away. Ensure adequate ventilation. Avoid breathing mist/vapours. Avoid contact with skin, eyes or clothing. Use personal protection recommended in Section 8 of the SDS.
Environmental precautions	Avoid release to the environment. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.
Methods and materials for containment and cleaning up	Prevent entry into waterways, sewer, basements or confined areas. Large Spills: Stop the flow of material, if this is without risk. Dyke the spilled material, where this is possible. 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. Small Spills: Absorb spillage with non-combustible, absorbent material. Scoop up used absorbent into drums or other appropriate container. Scrub the area with detergent and water. Rinse with water. Pick up wash liquid with additional absorbent and place in a disposable container. Never return spills to original containers for reuse.

7. Handling and storage

Precautions for safe handling	Read label before use. Keep out of the reach of children. Keep away from food, drink and animal feeding stuffs. Avoid breathing mist or vapour. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. When using, do not eat, drink or smoke. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse.
Conditions for safe storage, including any incompatibilities	Keep away from food, drink and animal feeding stuffs. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls and personal protection

Control parameters Follow standard monitoring procedures.

Occupational exposure limits

Australia. National Workplace OELs (Workplace Exposure Standards for Airborne Contaminants, Appendix A)

Decomposition	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	STEL	21 mg/m3
		15 ppm
	TWA	14 mg/m3
		10 ppm

US. ACGIH Threshold Limit Values

Decomposition	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	STEL	5 ppm
	TWA	1 ppm

UK. EH40 Workplace Exposure Limits (WELs)

Decomposition	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	STEL	14 mg/m3
		10 ppm
	TWA	7 mg/m3
		5 ppm

Germany. DFG MAK List (advisory OELs). Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area (DFG)

Decomposition	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	TWA	7.1 mg/m3
		5 ppm

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines No exposure standards allocated.

Appropriate engineering controls Mechanical ventilation or local exhaust ventilation may be required. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, for example personal protective equipment (PPE)

Eye/face protection Safety glasses with side shields or tight fitting chemical goggles should be used whenever hazardous chemicals are being handled. A full face respirator should be worn whenever there is a chance of splashing or misting.

Skin protection

Hand protection Wear protective gloves.

Other Wear appropriate chemical resistant clothing.

Respiratory protection For exposures that may exceed the TLV, a respirator with either an organic vapour-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G) is required. A full-face respirator or a SCBA may be required if misting or splashing are possible.

Thermal hazards Not applicable.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid.

Colour Light yellow-green

Odour Essentially odourless to fairly strong odour of amine or sulphur.

Odour threshold Not available.

pH 9.5 - 11

Melting point/freezing point 0 °C (32 °F)

Initial boiling point and boiling range	112 °C (233.6 °F)
Flash point	> 93 °C (> 200 °F) Closed cup
Evaporation rate	1 (compared to water)
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit – upper (%)	Not available.
Vapour pressure	24 mm Hg (25 °C (77 °F))
Vapour density	Not available.
Relative density	1.21 at 20 °C/4 °C (68 °F/39 °F)
Solubility(ies)	
Solubility (water)	Miscible.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other physical and chemical parameters	
Molecular formula	C2-H4-N-S2.Na
Molecular weight	129.18 g/mol

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport. May be corrosive to metals.
Chemical stability	Material is stable under normal conditions. Metam Sodium decomposes, when diluted with water, to methyl isothiocyanate (MITC, a lachrymator and moderate poison) and/or to hydrogen sulphide (a highly poisonous gas). Use the solution promptly after mixing. Do not allow the solution to stand. Metam Sodium can also decompose to carbon disulphide and monomethylamine (both highly flammable) if contacted with a strong acid.
Possibility of hazardous reactions	Hazardous polymerisation does not occur.
Conditions to avoid	Contact with incompatible materials. Contact with water liberates flammable gas.
Incompatible materials	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 discolour iron.
Hazardous decomposition products	When treated with water or heated to decomposition, this product will give off toxic fumes of methyl isothiocyanate (MITC), hydrogen sulphide, and nitrogen oxides. If treated with strong acids, fumes of carbon disulphide and monomethylamine will be given off.

11. Toxicological information

Information on possible routes of exposure

Inhalation	Harmful if inhaled.
Skin contact	Causes skin irritation. May cause an allergic skin reaction.
Eye contact	Causes eye irritation.
Ingestion	Harmful if swallowed.

Symptoms related to exposure

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 sulphide. 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 sulphide 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.
Chronic exposure may also cause 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.

Impaired pulmonary function and preexisting eye problems may be aggravated. Preexisting skin diseases may also be aggravated by exposure to the decomposition products.

Acute toxicity

Harmful if swallowed. Harmful if inhaled.

Product	Species	Test Results
Vapam® Soil Fumigant		
Acute		
Dermal		
LD50	Rabbit	> 2020 mg/kg
Inhalation		
LC50	Rat	2.28 mg/l
Oral		
LD50	Rat	812 mg/kg

Decomposition	Species	Test Results
Methyl isothiocyanate (MITC) (CAS 556-61-6)		
Acute		
Dermal		
LD50	Rabbit	33 mg/kg

Skin corrosion/irritation

Causes skin irritation.

Irritation Corrosion - Skin

Vapam® Soil Fumigant

Result: Moderate Irritant
Species: Rabbit

Serious eye damage/irritation

Causes eye irritation.

Irritation Corrosion - Eye

Vapam® Soil Fumigant

Result: Mild Irritant
Species: Rabbit

Respiratory or skin sensitisation

Skin sensitisation

May cause an allergic skin reaction.

Skin Sensitisation

Vapam® Soil Fumigant

Result: Sensitiser
Species: Guinea pig

Germ cell mutagenicity

No evidence of mutagenicity "in vivo", but some evidence has been observed "in vitro", in mutagenicity animal testing.

Carcinogenicity

Limited evidence of a carcinogenic effect.

Reproductive toxicity

This product has shown some developmental effects but has not shown any reproductive effects in laboratory animals.

Specific target organ toxicity - single exposure

Not available.

Specific target organ toxicity - repeated exposure

Not available.

Aspiration hazard

Not available.

Chronic effects

Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects. 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.

Decomposition		Species	Test Results
Hydrogen sulphide (CAS 7783-06-4)			
Aquatic			
Acute			
Crustacea	EC50	Scud (Gammarus pseudolimnaeus)	0.062 mg/l, 2 days
Fish	LC50	Fathead minnow (Pimephales promelas)	0.007 mg/l, 96 hours
Methyl isothiocyanate (MITC) (CAS 556-61-6)			
Aquatic			
Acute			
Crustacea	LC50	Water flea (Daphnia magna)	0.18 - 0.56 mg/l, 48 hours
			0.032 - 0.1 mg/l, 14 days

Persistence and degradability Product decomposes rapidly in wet environments.

Bioaccumulative potential Decomposes rapidly - will not bioaccumulate.

Partition coefficient n-octanol / water (log Kow)	
Sodium Methyldithiocarbamate	< 1
Methyl isothiocyanate (MITC)	0.94

Mobility in soil This product decomposes when diluted with water and the decomposition products will leach from the soil.

Other adverse effects Not available.

13. Disposal considerations

Disposal methods Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Residual waste Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal methods/information).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

ADG

- **UN number** 3266
- **UN proper shipping name** CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (Metam Sodium)
- **Transport hazard class(es)**
  - **Class** 8
  - **Subsidiary risk** -
- **Packing group** III
- **Environmental hazards** No
- **Hazchem code** 2X
- **Special precautions for user** Not available.

RID

- **UN number** 3266
- **UN proper shipping name** CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (Metam Sodium)
- **Transport hazard class(es)**
  - **Class** 8
  - **Subsidiary risk** -
  - **Label(s)** 8
- **Packing group** III
- **Environmental hazards** Yes
- **Special precautions for user** Not available.

IATA

UN number	3266
UN proper shipping name	Corrosive liquid, basic, inorganic, n.o.s. (Metam Sodium 42%)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	No
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	3266
UN proper shipping name	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (Metam Sodium 42%), MARINE POLLUTANT
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

ADG

IATA; IMDG; RID

Marine pollutant

General information IMDG Regulated Marine Pollutant.

15. Regulatory information

Safety, health and environmental regulations

National regulations This Safety Data Sheet was prepared in accordance with Australia Model Code of Practice for the preparation of Safety Data Sheets for Hazardous Chemicals.

Australia Medicines & Poisons Appendix A

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix B

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix D

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix E

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix F

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix G

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix H

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix I

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix J

Poisons schedule number not allocated.

Australia Medicines & Poisons Appendix K

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 10

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 2

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 3

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 4

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 5

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 6

Sodium Methyldithiocarbamate (CAS 137-42-8)

Australia Medicines & Poisons Schedule 7

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 8

Poisons schedule number not allocated.

Australia Medicines & Poisons Schedule 9

Poisons schedule number not allocated.

High Volume Industrial Chemicals (HVIC)

Not listed.

Importation of Ozone Deleting Substances (Customs(Prohibited imports) Regulations 1956, Schedule 10)

Not listed.

National Pollutant Inventory (NPI) substance reporting list

Not listed.

Prohibited Carcinogenic Substances

Not regulated.

Prohibited Substances (National Model Regulation for the control of Workplace Hazardous Substances, Schedule 2 NOHSC:1005 (1994) as amended)

Not listed.

Restricted Carcinogenic Substances

Not regulated.

Restricted Importation of Organochlorine Chemicals (Customs(Prohibited Imports) Regulations 1956, Schedule 9)

Not listed.

International regulations

Stockholm Convention

Not applicable.

Rotterdam Convention

Not applicable.

Kyoto Protocol

Not applicable.

Montreal Protocol

Not applicable.

Basel Convention

Not applicable.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Issue date 26-June-2019

Revision date 15-April-2022

Disclaimer This information is provided for the limited guidance to the user. While American Vanguard 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.

American Vanguard Australia Pty Ltd cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use.

Revision information Hazard(s) identification: Storage