Vanderbilt Minerals, LLC
A Wholly Owned Subsidiary of R.T. Vanderbilt Holding Company, Inc.

Material Safety Data Sheet

US
English

1 . Product and company identification

Product name VANCIDE® MZ-96

In case of emergency

Supplier/Manufacturer
Vanderbilt Minerals, LLC
30 Winfield Street
Norwalk, CT 06855

1-203-295-2140
Chemtrec: 1-800-424-9300
Outside US:
+1-703-527-3887

Chemical name Zinc dimethyldithiocarbamate
Synonym Ziram (ISO)
Material uses Industrial Preservative.
Code 46603

2 . Hazards identification

Physical state Solid. [Powder.]
Color White to cream

Emergency overview

WARNING!
HARMFUL IF INHALED OR SWALLOWED.
CAUSES EYE IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.
MAY CAUSE SKIN IRRITATION.
MAY FORM COMBUSTIBLE DUST-AIR MIXTURES.

Do not ingest. Avoid breathing dust. Avoid contact with eyes, skin and clothing. Prevent dust accumulation. Keep away from heat, sparks and flame.

Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Routes of entry Dermal contact. Eye contact. Inhalation. Ingestion.

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS no.	% by weight
zinc dimethyldithiocarbamate	137-30-4	96
inert ingredients	-	4

4 . First aid measures

Eye contact Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation Call medical doctor or poison control center immediately. Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

4 . First aid measures

Ingestion Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Notes to physician In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Medical conditions aggravated by over-exposure Pre-existing skin disorders may be aggravated by over-exposure to this product.

5 . Fire-fighting measures

Flammability of the product No specific fire or explosion hazard.

Extinguishing media

Suitable Use an extinguishing agent suitable for the surrounding fire.

Not suitable None known.

Special exposure hazards Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
sulfur oxides
metal oxide/oxides

Special protective equipment for fire-fighters Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards Acrid fumes may develop under fire conditions.

Special remarks on explosion hazards As with any dry material, pouring or allowing to free-fall or to be conveyed through chutes or pipes can accumulate and generate electrostatic sparks, potentially causing ignition of the material itself, or of any flammable materials which may come in contact with the material or its container.

6 . Accidental release measures

Personal precautions No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

6 . Accidental release measures

Large spill

Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7 . Handling and storage

Handling

Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe dust. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: Dust respirator.

Hands

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: Protective gloves should be worn under normal conditions of use.

Eyes

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If operating conditions cause high dust concentrations to be produced, use dust goggles. Recommended: safety glasses with side-shields

Skin

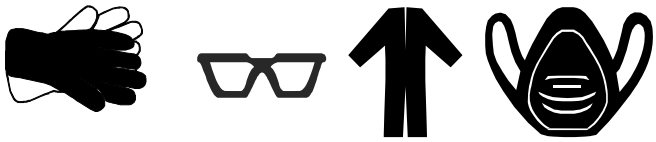
Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Recommended: Full suit.

8 . Exposure controls/personal protection

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Personal protective equipment (Pictograms)



9 . Physical and chemical properties

Physical state	Solid. [Powder.]
Color	White to cream
pH	Not available.
Boiling/condensation point	Not available.
Melting/freezing point	248.8°C (479.8°F)
Flash point	Not available.
Auto-ignition temperature	Not available.
Vapor pressure	Not available.
Density	1.71 g/cm³
Relative density	1.71
Solubility	Insoluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/water	Not available.
Viscosity	Not available.
Vapor density	Not available.
Evaporation rate	Not available.
Physical/chemical properties comments	Moderately soluble in toluene.

10 . Stability and reactivity

Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous polymerization	Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	No specific data.
Materials to avoid	No specific data.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Incompatibility with various substances	Reactive or incompatible with the following materials: oxidizing materials and acids.
Conditions of reactivity	Flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat. Acrid fumes may develop under fire conditions. As with any dry material, pouring or allowing to free-fall or to be conveyed through chutes or pipes can accumulate and generate electrostatic sparks, potentially causing ignition of the material itself, or of any flammable materials which may come in contact with the material or its container.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
zinc dimethyldithiocarbamate	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	320 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	81 mg/m³	4 hours

Conclusion/Summary Eye irritation (Rabbit): Irritant, severe ocular lesions produced.
Skin irritation (Rabbit): Slight irritant.

Chronic toxicity

Conclusion/Summary Not available.

Irritation/Corrosion

Conclusion/Summary

Skin Causes mild skin irritation. (Rabbit)

Eyes Causes eye irritation. Severe ocular lesions produced. (Rabbit)

Sensitizer

Conclusion/Summary

Skin May cause skin sensitization.

Carcinogenicity

Conclusion/Summary Long term feeding study (2 years) showed no carcinogenic response in rats fed a daily diet of 0.025% ziram. Ziram was carcinogenic to male rats causing an increase in thyroid cancer. Results from female mice are inconclusive due to virus infections during the study period. There is no known human carcinogen association after more than thirty years of application.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
zinc dimethyldithiocarbamate	-	3	-	-	-	-

Mutagenicity

Product/ingredient name	Test	Experiment	Result
zinc dimethyldithiocarbamate	-	Bacteria	Positive
	-	Mammalian-Animal	Negative

Conclusion/Summary No DNA-damaging activity in cultured rat hepatocytes, in-vitro. (Zinc dimethyldithiocarbamate)

Teratogenicity

Conclusion/Summary Teratogenic NOAEL [207 ppm] (zinc dimethyldithiocarbamate).
A teratogenic study using rats indicated that under the test conditions the product is not teratogenic at dose levels as high as 140 mg/kg//day. A rabbit study found no teratogenic effects at dose levels up to 15 mg/kg/day.

Reproductive toxicity

Conclusion/Summary No adverse effects in three generations at 29.6 mg/kg/day for male rats and 33.8 mg/kg/day for female rats.

Other information

12 . Ecological information

Environmental effects No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure

12 . Ecological information

zinc dimethyldithiocarbamate	-	Acute EC50 0.048 mg/l	Daphnia	48 hours
	-	Acute LC50 0.0097 mg/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 3.3 cm - 1.01 g	96 hours
	-	Acute LC50 1.7 mg/l	Fish - Trout	96 hours

Conclusion/Summary Not available.

Biodegradability

Conclusion/Summary Not available.

Other adverse effects No known significant effects or critical hazards.

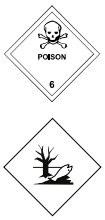
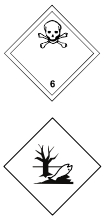
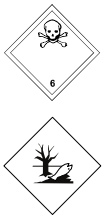
13 . Disposal considerations

Waste disposal The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

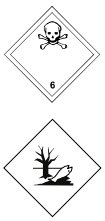
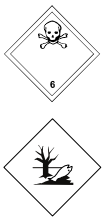
RCRA classification P205

Disposal should be in accordance with applicable regional, national and local laws and regulations.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	2588	Pesticides, solid, toxic, n.o.s. (ziram), RQ	6.1	II		**Reportable quantity** 10 lbs. (4.54 kg) **Remarks** RQ, Marine pollutant
TDG Classification	2588	Pesticides, solid, toxic, n.o.s.	6.1	II		**Remarks** Marine pollutant
ADR/RID Class	2588	Pesticides, solid, toxic, n.o.s.	6.1	II		**Remarks** Marine pollutant

14 . Transport information

IMDG Class	2588	Pesticides, solid, toxic, n.o.s. (ziram).	6.1	II		**Remarks** Marine pollutant
IATA-DGR Class	2588	Pesticides, solid, toxic, n.o.s. (ziram)	6.1	II		**Remarks** Marine pollutant

PG* : Packing group

15 . Regulatory information

HCS Classification

Highly toxic material
Irritating material
Sensitizing material

U.S. Federal regulations

United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Zinc, bis(dimethylcarbamodithioato-.kappa.S,.kappa.S')-, (T-4)-
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Zinc, bis(dimethylcarbamodithioato-.kappa.S,.kappa.S')-, (T-4)-: Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: Zinc dimethyldithiocarbamate

CERCLA: Hazardous substances.: Zinc dimethyldithiocarbamate: 10 lbs. (4.54 kg)

SARA 313

Form R - Reporting requirements

Product name	CAS number	Concentration
zinc dimethyldithiocarbamate	137-30-4	96

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: Zinc dimethyldithiocarbamate
Michigan Critical Material: The following components are listed: Zinc dimethyldithiocarbamate
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: ZIRAM; ZINC, BIS(DIMETHYLCARBAMODITHIOATO-.kappa.S,.kappa.S')-, (T-4)-
New Jersey Spill: None of the components are listed.

15 . Regulatory information

New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: None of the components are listed.
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: ZINC COMPOUNDS
Rhode Island Hazardous Substances: None of the components are listed.

California Prop. 65

Not available.

United States inventory (TSCA 8b)

All components are listed or exempted.

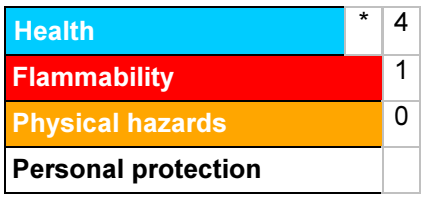
International regulations

International lists

Europe inventory: All components are listed or exempted.
Canada inventory : All components are listed or exempted.
Australia inventory (AICS): All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.

16 . Other information

Hazardous Material Information System (U.S.A.)



*** Chronic Potential**

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Other special considerations

EPA approves the agricultural use of ziram at a residual limit of 7ppm on a variety of fruits and vegetables.

Registered under EPA FIFRA. EPA Registration number 1965-79

Validation date 5/14/2013.

Print date 5/14/2013.

Date of previous issue 1/1/2013.

Information contact

Vanderbilt Global Services, LLC
Corporate Risk Management
1-203-295-2143

Indicates information that has changed from previously issued version.

Visit www.vanderbiltminerals.com for more information.

Notice to reader

16 . Other information

Information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief but is not guaranteed to be so. Nothing herein is to be construed as recommending any practice or any product in violation of any patent or in violation of any law or regulation. It is the user's responsibility to determine for himself the suitability of any material for a specific purpose and to adopt such safety precautions as may be necessary. We make no warranty as to the results to be obtained in using any material and, since conditions of use are not under our control, we must necessarily disclaim all liability with respect to the use of any material supplied by us.