MATERIAL SAFETY DATA SHEET (MSDS)
VAPORMATE™

DATE: February 2010 Version 2

Ref. No.: MS019

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name VAPORMATE™

Chemical Formula C_3-H_6-O_2 (16.7% by weight)
CO_2 (83.3% balance)

Company Identification
African Oxygen Limited
23 Webber Street
Johannesburg, 2001
Tel. No: (011) 490-0400
Fax No: (011) 490-0506

EMERGENCY NUMBER **0860111185 or (011) 873 4382 (24 hours)**

Synonym(s) ETHYL FORMATE IN CARBON DIOXIDE

Use(s) FUMIGANT
INDUSTRIAL APPLICATIONS

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation: Preparation.

Contains the following components:
Carbon dioxide (83.3% by weight)
CAS Nr: 124-38-9

Ethyl formate 16.7% by weight
CAS Nr: 109-94-4

3 HAZARDS IDENTIFICATION

Dangerous preparation in the sense of the SANS 10234:2008 guidelines

Classification
Liquefied gas
Highly flammable liquid and vapour
Harmful if inhaled
Causes serious eye irritation
May cause respiratory irritation

Risk advice to man and the environment
Contact with liquid may cause cold burns/frost bite.

4 FIRST AID MEASURES

Eye/Skin Contact: For liquid spillage immediately flush with water for at least 15 minutes. Obtain medical assistance. Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Launder clothing before reuse.

Ingestion or Swallowing: Ingestion is not considered a potential route of exposure.

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Low concentrations of CO_2 cause increased respiration and headache. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped. Harmful by inhalation.

5 FIRE FIGHTING MEASURES

Specific hazards
Exposure to fire may cause containers to rupture/explode. Vapormate™ is very flammable.

Hazardous combustion products
Incomplete combustion may form carbon monoxide.

Suitable extinguishing media
All known extinguishants can be used.

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.

Special protective equipment for fire fighters
In confined space use self-contained breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Evacuate area. Ensure adequate air ventilation. Eliminate ignition sources.

Environmental precautions
Try to stop release. Prevent from entering sewers/drains, basements and workpits, or any place where its accumulation can be dangerous. Reduce vapour with fog or fine water spray.

Clean up methods
Ventilate area. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost). Hose down area with water. Prevent runoff water from entering drains/sewers Wash contaminated equipment or sites of leaks with copious quantities of water.

7 HANDLING AND STORAGE

Safe Handling
Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Purge air from system before introducing gas. Do not allow back-feed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Keep away from ignition sources (including static discharges). Refer to supplier's handling instructions.

Storage
Secure cylinders to prevent them form falling. Segregate from oxidant gases and other oxidants in store. Keep container below 50°C in a well ventilated place.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit value

Value type	Comp.	Value	Note
Germany - AGW	CO2	5.000 ppm	TRGS 900
Germany - AGW	C3-H6-O2	100 ppm	TRGS 900

Biological Limits
No biological limit allocated

Engineering Controls
During application this product is vaporized into a gas tight fumigation space, therefore ventilation is not normally required. Maintain vapour levels below the recommended exposure standard.

Personal protection
Ensure adequate ventilation. Protect eyes, face and skin from liquid splashes. Wear breathing respirator. Do not smoke while handling product. Carry working gloves and protection shoes while handling gas cylinders. Keep self contained breathing apparatus readily available for emergency use.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	C_3-H_6-O_2 (16.7%) CO_2 (83.3%)
Colour	None
Odour	Sweet ester
Relative density (Air = 1) @ 101,325 kPa	1.63
Boiling Point (CO_2)	-78.5 ºC
Boiling Point (Ethyl Formate)	-44.3 ºC

Melting Point (CO_2)	-56.6 ºCSolubility
(CO_2 in water)	0.759cm^3/cm^3

10 STABILITY AND REACTIVITY

Stability and reactivity
This material is stable under normal conditions of storage.
Can form explosive mixture with air.
May react violently with oxidants.
Materials to Avoid Moist carbon dioxide is corrosive, hence acid resistant materials are required (aluminium, stainless steel). Incompatible with oxidising agents (nitrates, oxygen), halogens (chlorine, bromine), acids (nitric acid) and some chlorides. Most rubbers and plastics are affected by carbon dioxide.

Hazardous Decomposition Products None

11 TOXICOLOGICAL INFORMATION

Health Hazard Summary: Harmful to respiratory system. May be irritating to eyes and skin. Carbon dioxide is normally present in the air at a concentration of 340ppm by volume. Accelerated breathing and heart rate may occur with exposure above the normal level. Carbon dioxide can be fatal with exposure to very high concentrations. Long term exposure to CO_2 has no known health effects. Exposure to high concentrations of ethyl formate may cause toxic effects, including dizziness or suffocation, dyspnea and pulmonary oedema. Ethyl formate is a narcotic and may cause CNS depression leading to death due to circulatory and respiratory failure without convulsions or coma.

Skin & eye contact: May be irritating to skin and eyes.

Inhalation: Harmful. Inhalation of vapours may cause dizziness or suffocation.
Ingestion: Ingestion is considered unlikely due to product form.

12 ECOLOGICAL INFORMATION

Environment: This product is used as an insect fumigant. Uncontrolled release of this product may cause damage to the environment. Do not allow product to enter waterways. Carbon dioxide in the atmosphere contributes to the “greenhouse effect”. Does not contain Class I or II ozone depleting chemicals

13 DISPOSAL CONSIDERATIONS

Waste disposal: Cylinders should be returned to the manufacturer or supplier for disposal of contents.

Disposal of packaging: The disposal of containers must only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ADR/RID

Class	2	Classification Code	2F

UN number and proper shipping name
UN 3161 Liquefied gas, flammable, n.o.s.
UN 3161 Liquefied gas, flammable, n.o.s.

Labels	2.1	Hazard number	23

IMDG

Class	2.1

UN number and proper shipping name
UN 3161 Liquefied gas, flammable, n.o.s.

Labels	2.1
Packing Instruction	P200
EmS	FD,SU

IATA

Class	2.1

UN number and proper shipping name
UN 3161 Liquefied gas, flammable, n.o.s.

Labels	2.1
Packing Instruction	P200

Other transport information: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the cylinder valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

15 REGULATORY INFORMATION

SUPPLEMENT TO SANS 10234:2008 for Ethyl Formate
Edition 1
Annex A Index No. 608-011-00-8

Precautionary Statement code	Hazard Statement	Hazard Statement Code	Hazard Statement
P210	Keep away from heat/sparks/open flames/hot surfaces – No smoking	H225	Highly flammable liquid in vapour
P233	Keep container tightly closed	H319	Causes serious eye irritation
P240	Ground/bond container and receiving equipment	H332	Harmful if inhaled
P241	Use explosion-proof electrical/ventilating/equipment	H335	May cause respiratory irritation
P242	Use only non-sparking tools		
P243	Take precautionary measures against static discharge		
P261	Avoid breathing dust/fume/gas/mist/vapours/spray		
P264	Wash hands, clothing, PPE after handling		
P270	Do not eat, drink or smoke when using this product		
P271	Use only outdoors or in a well ventilated area		
P280	Wear protective gloves/protective clothing/eye protection/face protection		
P304+P340	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing		
P312	Call a POISON CENTRE or doctor/physician if you feel unwell		
P321	Specific treatment (reference to supplemental first-aid instruction)		
P303+P361+P353	IF ON SKIN (or hair): Immediately remove/take off all contaminated clothing. Immediately rinse skin with water/shower		
P363	Wash contaminated clothing before re-use		
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing		
P337+P313	If eye irritation persists: Get medical advice/attention		
P370+P378	In case of fire: use any extinguishants		
P403+P235	Store in a well ventilated place and keep cool		
P403+P233	Store in a well-ventilated place and keep the container tightly closed		
P501	Dispose of contents/container as a hazardous waste		

16 OTHER INFORMATION

Ensure operators understand the flammability hazard. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

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