

MATERIAL SAFETY DATA SHEET (MSDS)

VAPORMATE

(Please ensure that this MSDS is received by an appropriate person)

Date: June 2016

Ref: MS019

Version 1

## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

### 1.1 Product identifier

**Product name** VAPORMATE

**Synonym(s)** ETHYL FORMATE IN CARBON DIOXIDE • PRODUCT CODE: 0279

### 1.2 Uses and uses advised against

**Use(s)** FUMIGANT • INDUSTRIAL APPLICATIONS

### 1.3 Details of the supplier of the product

**Supplier name** BOC Kenya Limited

Kitui Road Industrial Area

P.O BOX 18010-00500 Nairobi, Kenya

Tel. No: (254) 020 6944000

**EMERGENCY No. or (+254)719 069000 or 020 6944000**

(24hrs)

<http://www.boc.co.ke/en/index.html>

## 2. HAZARDS IDENTIFICATION

### 2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO AUSTRALIAN WHS REGULATIONS

**GHS classification(s)** Flammable Gases: Category 1  
Serious Eye Damage / Eye Irritation: Category 2A  
Gases Under Pressure: Liquefied gas  
Toxic if inhaled

### 2.2 Label elements

**Signal word** DANGER

**Pictogram(s)**



**Hazard statement(s)**

H220 Extremely flammable gas.  
H280 Contains gas under pressure; may explode if heated.  
H319 Causes serious eye irritation.  
H331 Toxic if inhaled

**Prevention statement(s)**

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
P264 Wash thoroughly after handling.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.

**Response statement(s)**

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.  
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
P381 Eliminate all ignition sources if safe to do so.

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**Storage statement(s)**

P410 + P403 Protect from sunlight. Store in a well-ventilated place.

**Disposal statement(s)**

None allocated.

**2.3 Other hazards**

No information provided.

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**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

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**3.1 Substances / Mixtures**

Ingredient	CAS Number	EC Number	Content (v/v)
ETHYL FORMATE	109-94-4	203-721-0	16.7%
CARBON DIOXIDE	124-38-9	204-696-9	Remainder

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**4. FIRST AID MEASURES**

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**4.1 Description of first aid measures**

<b>Eye</b>	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
<b>Inhalation</b>	If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Apply artificial respiration if not breathing. Give oxygen if available.
<b>Skin</b>	Cold burns: Remove contaminated clothing and gently flush affected areas with cold water for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in cold water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.
<b>Ingestion</b>	Ingestion is not considered a potential route of exposure. Due to product form and application, ingestion is considered unlikely.
<b>First aid facilities</b>	No information provided.

**4.2 Most important symptoms and effects, both acute and delayed**

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility / consciousness. Victim may not be aware of asphyxiation. Low concentrations of CO<sub>2</sub> cause increased respiration and headache.

**4.3 Immediate medical attention and special treatment needed**

Treat symptomatically.

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**5. FIRE FIGHTING MEASURES**

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**5.1 Extinguishing media**

Use water fog to cool containers from protected area.

**5.2 Special hazards arising from the substance or mixture**

Extremely flammable liquefied gas mixture.

**5.3 Advice for firefighters**

Temperatures in a fire may cause cylinders to rupture. Cool cylinders or containers exposed to fire by applying water from a protected location. Remove cool cylinders from the path of the fire. Evacuate the area if unable to keep cylinders cool. Do not approach cylinders or containers suspected of being hot.

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**5.4 Hazchem code**

2YE  
2 Fine Water Spray.  
Y Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Contain spill and run-off.  
E Evacuation of people in and around the immediate vicinity of the incident should be considered.

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**6. ACCIDENTAL RELEASE MEASURES**

**6.1 Personal precautions, protective equipment and emergency procedures**

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the MSDS.

**6.2 Environmental precautions**

Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous.

**6.3 Methods of cleaning up**

Carefully move material to a well-ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

**6.4 Reference to other sections**

See Sections 8 and 13 for exposure controls and disposal.

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**7. HANDLING AND STORAGE**

**7.1 Precautions for safe handling**

Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.

**7.2 Conditions for safe storage, including any incompatibilities**

Do not store near incompatible materials. Cylinders should be stored below 45°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well-ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits. The treated storage area should be equipped with a suitable system monitoring for air levels of ethyl formate, formic acid and carbon dioxide.

**7.3 Specific end use(s)**

No information provided.

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## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1 Control parameters

#### Exposure standards

Ingredient	TWA		STEL	
	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Carbon dioxide	5000	9000	30000	54000
Ethyl formate	100	303	--	--

#### Biological limits

No biological limit values have been entered for this product.

### 8.2 Exposure controls

- **Engineering controls** During application this product is vaporized into a gas tight fumigation space, therefore, mechanical ventilation to an external exhaust system is to be installed in all areas where this gas has the potential to accumulate. Ensure fumigation area is fully ventilated before re-entry. Maintain vapour levels below the recommended exposure standard.

<b>PPE</b>	<b>Eye / Face</b>	Wear splash-proof goggles.
	<b>Hands</b>	Wear leather or cotton gloves.
	<b>Body</b>	Wear long sleeved shirt, long pants and safety boots.
	<b>Respiratory</b>	Wear a type AX (Organic Vapour) respirator where levels of ethyl formate are above 100ppm and carbon dioxide lower than 5000ppm. Where Self Contained Breathing Apparatus (SCBA) where levels of Carbon Dioxide above 5000 ppm (at any level of ethyl formate). Where the boiling point is < 65°C, use an AX filter type.



## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

Appearance	Autoignition temperature	Decomposition temperature	Viscosity
Odour	Explosive properties	Oxidising properties	Odour threshold
Flammability	COLOURLESS GAS		
Flash point	SLIGHT ODOUR		
Boiling point	EXTREMELY FLAMMABLE		
Melting point	NOT AVAILABLE		
Evaporation rate	-78.5°C (Carbon dioxide)		
pH	-56.6°C (Carbon dioxide)		
Vapour density	NOT APPLICABLE		
Specific gravity	NOT APPLICABLE		
Solubility (water)	1.63 (Air = 1)		
Vapour pressure	NOT APPLICABLE		
Upper explosion limit	0.759 cm <sup>3</sup> /cm <sup>3</sup> (Carbon dioxide)		
Lower explosion limit	NOT AVAILABLE		
Partition coefficient	NOT AVAILABLE		

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**10. STABILITY AND REACTIVITY**

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**10.1 Reactivity**

Carefully review all information provided in sections 10.2 to 10.6.

**10.2 Chemical stability**

Stable under recommended conditions of storage.

**10.3 Possibility of hazardous reactions**

Polymerization will not occur.

**10.4 Conditions to avoid**

Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

**10.5 Incompatible materials**

Moist carbon dioxide is corrosive, hence acid resistant materials are required (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.

**10.6 Hazardous decomposition products**

This material will not decompose to form hazardous products other than that already present.

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**11. TOXICOLOGICAL INFORMATION**

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**11.1 Information on toxicological effects**

<b>Acute toxicity</b>	May be harmful if inhaled. Headache, dizziness, lassitude, nausea and vomiting may occur in some cases.
<b>Skin</b>	Contact with the liquefied material may cause frostbite injury.
<b>Eye</b>	Irritating to the eyes. Contact may result in irritation, lacrimation, pain and redness. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.
<b>Sensitization</b>	Not classified as causing skin or respiratory sensitisation.

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<b>Mutagenicity</b>	Not classified as a mutagen.
<b>Carcinogenicity</b>	Not classified as a carcinogen.
<b>Reproductive</b>	Not classified as a reproductive toxin.
<b>STOT – single exposure</b>	Asphyxiant. Effects are proportional to oxygen displacement. Over exposure may result in dizziness, drowsiness, weakness, fatigue, breathing difficulties and unconsciousness.
<b>STOT – repeated</b>	Not classified as causing organ effects from repeated exposure.

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**exposure**

**Aspiration** Not classified as causing aspiration.

## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

No information provided.

### 12.2 Persistence and degradability

No information provided.

### 12.3 Bio accumulative potential

No information provided.

### 12.4 Mobility in soil

No information provided.

### 12.5 Other adverse effects

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. When discharged to the atmosphere, carbon dioxide may contribute to the greenhouse effect.

## 13. DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

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

**Legislation** Dispose of in accordance with relevant local legislation.

## 14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	3161	3161	3161
14.2 Proper Shipping Name	LIQUEFIED GAS, FLAMMABLE, N.O.S. (Contains ethyl formate)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (Contains ethyl formate)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (Contains ethyl formate)
14.3 Transport hazard class	2.1	2.1	2.1
14.4 Packing Group	None Allocated	None Allocated	None Allocated

14.5 Environmental hazards No information provided

### 14.6 Special precautions for user

**Hazchem code** 2YE

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## 15. REGULATORY INFORMATION

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### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**Poison schedule**      Classified as a Schedule 6 (S6).

#### **Classifications**

Safework criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.



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**16. OTHER INFORMATION****Additional information**

All entrances to the fumigated area must be placarded with "DANGER, area under fumigation, DO NOT ENTER, unless wearing appropriate personal protective equipment". The placard should also carry a skull & crossbones pictogram.

APPLICATION SYSTEM: Vapourmate is vapourised into an enclosed gas tight fumigation space to allow the fumigant to penetrate deep into the commodity being treated for the recommended exposure time period. Only approved (20 M pa) dispensing equipment can be used with Vapourmate.

**PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:**

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

**HEALTH EFFECTS FROM EXPOSURE:**

It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application.

**OTHER INFORMATION**

Ensure that cylinder is separated from the driver and that outlet relief device is not obstructed

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**Abbreviations**

CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m <sup>3</sup>	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

**Report status**

This document has been compiled by BOC on behalf of the manufacturer, importer or supplier of the product and serves as their Material Safety Data Sheet ('MSDS').

It is based on information concerning the product which has been provided to BOC by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While BOC has taken all due care to include accurate and up-to-date information in this MSDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, BOC accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this MSDS.

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