

# SAFETY DATA SHEET

According to Occupational Health and Safety (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Malaysia Regulation 2013

**Mixture Ethylene Oxide 9% / Carbon Dioxide 91%**

## Section 1. Identification of the hazardous chemical and of the supplier

**Product identifier** : Mixture Ethylene Oxide 9% / Carbon Dioxide 91%  
**CAS number** : Not available.  
**Product type** : Liquefied gas.

### Relevant identified uses of the substance or mixture and uses advised against

<b>Identified uses</b>
Medical sterilization
<b>Uses advised against</b>
Not applicable

### Manufacturer or Supplier's details

**Manufacturer** : Balchem Sdn. Bhd.  
No. 37, Lorong Sungai Puloh 1A/KU6, Taman Teknologi Gemilang,  
Kaw.Perindustrian Sg. Puloh, 41050, Klang, Selangor, Malaysia  
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**Emergency telephone number (with hours of operation)** : Malaysia  
Balchem Sdn. Bhd. T: +603 3290 2263 / +603 3290 7863  
National Poison Center Malaysia: +604 6536 999  
Mon-Fri (8am-10pm), Sat, Sun & Public Holiday (8am - 5pm)

Australia APEC & Regional  
CARECHEM 24 24h (Telephone advice: English, French, German, Dutch)  
+61280144558 +32 1458 4545(BIG)

## Section 2. Hazards identification

**Classification of the substance or mixture** : GASES UNDER PRESSURE - Liquefied gas  
ACUTE TOXICITY (inhalation) - Category 4  
GERM CELL MUTAGENICITY - Category 1B  
CARCINOGENICITY - Category 1B  
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3

### GHS label elements

**Hazard pictograms** :



**Signal word** : Danger

**Hazard statements** : H280 - Contains gas under pressure; may explode if heated.  
H332 - Harmful if inhaled.  
H336 - May cause drowsiness or dizziness.  
H340 - May cause genetic defects.  
H350 - May cause cancer.

### Precautionary statements

**Prevention** : P201 - Obtain special instructions before use.  
P281 - Use personal protective equipment as required.  
P271 - Use only outdoors or in a well-ventilated area.  
P261 - Avoid breathing gas.

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- Response** : P308 + P313 - IF exposed or concerned: Get medical advice or attention.  
P304 + P312 - IF INHALED: Call a POISON CENTER or doctor if you feel unwell.
- Storage** : P405 - Store locked up.  
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.
- Disposal** : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

**Other hazards which do not result in classification** : None known.

## Section 3. Composition and information of the ingredients of the hazardous chemical

**Substance/mixture** : Mixture

Ingredient name	% by weight	CAS number
Mixture Ethylene Oxide 9% / Carbon Dioxide 91%	100	-
Carbon Dioxide	91	124-38-9
Ethylene oxide	≤9	75-21-8

Occupational exposure limits, if available, are listed in Section 8.

## Section 4. First aid measures

### Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 15 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 15 minutes. Get medical attention. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Get medical attention. If necessary, call a poison center or physician. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : Liquid can cause burns similar to frostbite.
- Inhalation** : Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
- Skin contact** : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

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**Ingestion** : Can cause central nervous system (CNS) depression. Ingestion of liquid can cause burns similar to frostbite.

## Over-exposure signs/symptoms

**Eye contact** : Adverse symptoms may include the following:  
frostbite

**Inhalation** : Adverse symptoms may include the following:  
nausea or vomiting  
headache  
drowsiness/fatigue  
dizziness/vertigo  
unconsciousness

**Skin contact** : Adverse symptoms may include the following:  
frostbite

**Ingestion** : Adverse symptoms may include the following:  
frostbite

## Indication of immediate medical attention and special treatment needed, if necessary

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments** : No specific treatment.

**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.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### Extinguishing media

**Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.

**Unsuitable extinguishing media** : None known.

**Specific hazards arising from the chemical** : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide

**Special protective actions for fire-fighters** : 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. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

**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. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

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## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** : 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. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. 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 and materials for containment and cleaning up

**Small spill** : Immediately contact emergency personnel. Stop leak if without risk.

**Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

### Precautions for safe handling

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.

**Advice on general occupational hygiene** : 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. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Store locked up. Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

## Section 8. Exposure controls/personal protection

### Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
Carbon Dioxide	<b>OSHA USECHH (Malaysia, 4/2000).</b> TWA: 5000 ppm 8 hours. TWA: 9000 mg/m <sup>3</sup> 8 hours.
Ethylene oxide	<b>OSHA USECHH (Malaysia, 4/2000).</b> TWA: 1 ppm 8 hours. TWA: 1.8 mg/m <sup>3</sup> 8 hours.

#### Biological exposure indices

No exposure indices known.

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- Appropriate engineering controls** : 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.
- 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.
- Individual protection measures**
- 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.
- Eye/face protection** : 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, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin protection**
- Hand protection** : 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. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : 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.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.
- Thermal hazards** : If there is a risk of contact with the liquid, all protective equipment worn should be suitable for use with extremely low temperature materials.

## Section 9. Physical and chemical properties and safety characteristics

### Appearance

- Physical state** : Gas.
- Color** : Not available.
- Odor** : Not available.
- Odor threshold** : Not available.
- pH** : Not applicable.
- Melting point/freezing point** : Sublimes [carbon dioxide]
- Sublimation temperature** : -79°C (-110.2°F)
- boiling range** : Not available.
- Flash point** : Not applicable.

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Evaporation rate	: Not available.
Flammability	: Not available.
Lower and upper explosion limit/flammability limit	: Not available.
Vapor pressure	: 5720 kPa (42903.48591 mm Hg) [carbon dioxide]
Relative vapor density	: 1.5 [Air = 1]
Relative density	: Not applicable.
Solubility in water	: Not available.
Partition coefficient: n-octanol/water	: Not applicable.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Not applicable.
Flow time (ISO 2431)	: Not available.
<b><u>Particle characteristics</u></b>	
Median particle size	: Not applicable.

## Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Ethylene oxide	LC50 Inhalation Gas.	Rat	800 ppm	4 hours
	LD50 Oral	Rat	72 mg/kg	-

Conclusion/Summary : Not available.

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Ethylene oxide	Eyes - Moderate irritant	Rabbit	-	6 hours 18 mg	-

#### Conclusion/Summary

Skin : Not available.

Eyes : Not available.

Respiratory : Not available.

#### Specific target organ toxicity (single exposure)

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Product/ingredient name	Category	Route of exposure	Target organs
Carbon Dioxide Ethylene oxide	Category 3 Category 3	- -	Narcotic effects Respiratory tract irritation

## Specific target organ toxicity (repeated exposure)

Not available.

## Aspiration hazard

Not available.

**Information on the likely routes of exposure** : Not available.

## Potential acute health effects

- Eye contact** : Liquid can cause burns similar to frostbite.
- Inhalation** : Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
- Skin contact** : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
- Ingestion** : Can cause central nervous system (CNS) depression. Ingestion of liquid can cause burns similar to frostbite.

## Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:  
frostbite
- Inhalation** : Adverse symptoms may include the following:  
nausea or vomiting  
headache  
drowsiness/fatigue  
dizziness/vertigo  
unconsciousness
- Skin contact** : Adverse symptoms may include the following:  
frostbite
- Ingestion** : Adverse symptoms may include the following:  
frostbite

## Delayed and immediate effects and also chronic effects from short and long term exposure

### Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

### Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

## Potential chronic health effects

Not available.

- General** : No known significant effects or critical hazards.
- Carcinogenicity** : May cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenicity** : May cause genetic defects.
- Reproductive toxicity** : No known significant effects or critical hazards.

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## Numerical measures of toxicity

### Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
Mixture Ethylene Oxide 9% / Carbon Dioxide 91%	N/A	N/A	17777.8	N/A	N/A
Ethylene oxide	N/A	N/A	800	N/A	N/A

## Section 12. Ecological information

### Toxicity

Product/ingredient name	Result	Species	Exposure
Ethylene oxide	Acute LC50 490000 µg/l Marine water Acute LC50 137000 µg/l Fresh water Acute LC50 84000 µg/l Fresh water	Crustaceans - <i>Artemia sp.</i> Daphnia - <i>Daphnia magna</i> Fish - <i>Pimephales promelas</i>	48 hours 48 hours 96 hours

### Persistence and degradability

Not available.

### Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
Carbon Dioxide	0.83	-	Low
Ethylene oxide	-0.3	-	Low

### Mobility in soil

Soil/water partition coefficient (K<sub>oc</sub>) : Not available.

Other adverse effects : No known significant effects or critical hazards.

## Section 13. Disposal information





**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

## Section 14. Transport information

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	UN	ADR/RID	IMDG	IATA
UN number	UN1952	UN1952	UN1952	UN1952
UN proper shipping name	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide
Transport hazard class(es)	2.2 	2 	2.2 	2.2 
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.

## Additional information

- UN** : **Special provisions** 392
- ADR/RID** : **Hazard identification number** 20  
**Limited quantity** 120 ml  
**Special provisions** 662, 392  
**Tunnel code** (C/E)
- IMDG** : **Emergency schedules** F-C, S-V  
**Special provisions** 392
- IATA** : **Quantity limitation** Passenger and Cargo Aircraft: 75 kg. Packaging instructions: 200. Cargo Aircraft Only: 150 kg. Packaging instructions: 200. Limited Quantities - Passenger Aircraft: Forbidden. Packaging instructions: Forbidden.
- Hazchem code** : 2T

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to IMO instruments** : Not available.

## Section 15. Regulatory information

### International regulations

#### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

#### Montreal Protocol

Not listed.

#### Stockholm Convention on Persistent Organic Pollutants

Not listed.

#### Rotterdam Convention on Prior Informed Consent (PIC)

List name	Ingredient name	Status
Pesticide	Ethylene oxide (ISO); Amprolene; Oxirane; 1,2-Epoxyethane; EO	Listed

#### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

### Inventory list

**Australia** : All components are listed or exempted.

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<b>Canada</b>	: All components are listed or exempted.
<b>China</b>	: All components are listed or exempted.
<b>Eurasian Economic Union</b>	: <b>Russian Federation inventory</b> : All components are listed or exempted.
<b>Japan</b>	: <b>Japan inventory (CSCL)</b> : All components are listed or exempted. <b>Japan inventory (ISHL)</b> : All components are listed or exempted.
<b>New Zealand</b>	: All components are listed or exempted.
<b>Philippines</b>	: All components are listed or exempted.
<b>Republic of Korea</b>	: All components are listed or exempted.
<b>Taiwan</b>	: All components are listed or exempted.
<b>Thailand</b>	: All components are listed or exempted.
<b>Turkey</b>	: All components are listed or exempted.
<b>United States</b>	: All components are active or exempted.
<b>Viet Nam</b>	: All components are listed or exempted.

## Section 16. Other information

### History

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**Key to abbreviations** :

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- N/A = Not available
- SGG = Segregation Group
- UN = United Nations

**References** : Not available.

🔍 Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.