

Solid Carbon Dioxide

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

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Version 3

Ref. No.: MS108

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name DRY ICE
Chemical Formula CO₂
Trade Names Dry Ice [snow or blocks]
Company Identification BOC Zimbabwe
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 Southerton, Harare
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EMERGENCY NUMBER **0800 322230 (24 hours)**

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name Carbon Dioxide
Chemical Family Carbon Anhydride
CAS No. 7440-37-1
UN No. 1845
Hazard Warning 2 C Non-flammable Gas

3 HAZARDS IDENTIFICATION

Main Hazards

Carbon dioxide does not support life. It can act as a simple asphyxiant by diluting the concentration of oxygen in air to below the levels necessary to support life. As the vapour is heavier than air it will tend to concentrate at lower levels. As solid carbon dioxide has a temperature of approximately -78°C, extreme care must be taken when handling this product.

Adverse Health Effects

Carbon dioxide acts as a stimulant and a depressant on the central nervous system. Increases in heart rate and blood pressure have been noted at a concentration of 7.6 % and dyspnea (laboured breathing), headache, dizziness and sweating occur if exposure at that level is prolonged.

Chemical Hazards

Carbon dioxide is relatively non-reactive and non-toxic. It will not burn or support combustion.

Biological Hazards

The greatest physiological effect of carbon dioxide is to stimulate the respiratory centre, thereby controlling the volume and rate of respiration. It is able to cause dilation and constriction of blood vessels and is vital constituent of the acid-base mechanism that controls the pH of the blood.

Vapour Inhalation

At concentrations of 10% and above, unconsciousness can result in one minute or less. Impairment in performance has been noted during prolonged exposure to concentrations of 3% carbon dioxide, even when the oxygen concentration was 21%.

4 FIRST AID MEASURES

Eye Contact: Solid carbon dioxide at temperature of approximately 78°C coming into contact with eyes or skin could result in serious "cold" burns.

Skin Contact: Consult a physician if cold burn has resulted in blistering of skin or deep tissue freezing, or if frostbite has occurred.

Ingestion: Solid CO₂ can cause severe cold burns to mouth & throat. Prompt medical attention is mandatory in all cases of overexposure to carbon dioxide. Rescue personnel should be equipped with self-contained breathing apparatus. In case of frostbite from contact with solid carbon dioxide, place the frost-bitten part in warm water, about 40 - 42°C. If warm water is not available or is impractical to use, wrap the affected part gently in blankets. Encourage the patient to exercise the affected part whilst it is being warmed. Do not remove clothing whilst frosted. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be removed to an uncontaminated area, and given mouth-to-mouth resuscitation and supplemental oxygen.

5 FIRE FIGHTING MEASURES

Extinguishing Media

Carbon dioxide is an extinguishing medium.

Specific Hazards

Carbon dioxide does not support life. It can act as a simple asphyxiant by diluting the concentration of oxygen in the air below the levels to support life.

Emergency Actions

If possible, contain the source of excess carbon dioxide (Assuming that dry ice is in a container that is insulated). Evacuate area. CONTACT THE NEAREST AFROX BRANCH.

Protective Clothing

Self-contained breathing apparatus. Safety gloves and shoes, or boots, should be worn when handling solid carbon dioxide.

Environmental Precautions

Carbon dioxide is heavier than air and could accumulate in low-lying areas. Care should be taken when entering a potentially oxygen-deficient environment. If possible, ventilate the affected area.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions

Do not enter any area where carbon dioxide has been spilled unless tests have shown that it is safe to do so.

Environmental Precautions

As carbon dioxide is classified as a "green-house" gas, any spillage should be avoided at all times.

Small Spills

Contain the source of excess carbon dioxide vapourising from dry ice blocks. Ventilate the area.

Large Spills

Evacuate the area. Shut off the source of the spill if this can be done without risk. Restrict access to the area until completion of the clean-up procedure. Ventilate the area using forced-draught if necessary.

7 HANDLING AND STORAGE

Do not handle solid carbon dioxide with bare hands. Use heavy gloves or dry-ice tongs. Dry-ice should be stored in well-insulated storage containers, preferably in a cool well-ventilated area. Use a "first-in first-out" inventory system to prevent containers from being stored for excessive periods of time. Keep out of reach of children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Hazards

As carbon dioxide is a simple asphyxiant, avoid any areas where spillage has taken place. Only enter once testing has proved atmosphere to be safe, and remember that gas is heavier than air.

Engineering Control Measures

Engineering control measures are preferred to reduce exposure to Oxygen-depleted atmospheres. General methods include forced-draught ventilation, separate from other exhaust ventilation systems. Ensure that sufficient fresh air enters at, or near, floor level.

Personal Protection

Self-contained breathing apparatus should be worn when entering area where oxygen depletion may have occurred. Safety goggles, gloves, shoes or boots should be worn when handling containers of dry-ice. Wear loose-fitting overalls, preferably without pockets.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	CO ₂
Molecular Weight	44.01 g/mole
Specific volume @ 101,325 kPa	- 78.45°C
Density, solid	1560 kg/m ³
Relative density (Air=1) @ 101,325 kPa	1.53
Latent heat of fusion	180,64 kJ/kg
Colour	White
Taste	Acidic
Odour	None

10 STABILITY AND REACTIVITY

Conditions to avoid

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Dilution of oxygen concentration in the atmosphere to levels - which cannot support life.

Incompatible Materials

Special materials of construction are required for containers operating below -28,8°C.

Hazardous Decomposition Products None

11 TOXICOLOGICAL INFORMATION

Acute Toxicity	TLV 5000 VPM
Skin & eye contact	No known effect
Chronic Toxicity	No known effect
Carcinogenicity	No known effect
Mutagenicity	No known effect
Reproductive Hazards	No known effect

(For further information see Section 3. Adverse Health effects)

12 ECOLOGICAL INFORMATION

Carbon dioxide is heavier than air and can cause pockets of oxygen depleted atmosphere in low-lying areas. It does not pose a hazard to the ecology.

13 DISPOSAL CONSIDERATIONS

Disposal Methods

Solid carbon dioxide (dry-ice) blocks or snow should be placed in a remote area and allowed to sublime until no solid is left. The disposal area should be protected from unauthorised personnel and located such that hazardous concentrations of carbon dioxide vapours will not build up near any work space or otherwise populated area. Alternatively if it is not practical to remove the dry-ice to a remote location, guard any areas in which dry-ice has accumulated from unauthorised and unprotected persons until it has sublimed.

Disposal of Packaging

If in doubt for disposal of containers, contact the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No	1845
ERG No	120
Hazchem warning	2C Non-flammable Gas

SEA TRANSPORTATION

IMDG	
Class	
Packaging group	
Label	Non-flammable Gas

AIR TRANSPORTATION

ICAO/IATA Code	1845
Class	
Packaging group	
Packaging instructions	

- Cargo	904
- Passenger	904
Maximum quantity allowed	
- Cargo	200kg
- Passenger	200kg

15 REGULATORY INFORMATION

EEC Hazard class Non-flammable
National legislation OHSact and Regulations 85 of 1993
Reference SANS 10234 and its supplement.

16 OTHER INFORMATION

Bibliography

Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases – 3rd Edition
Matheson. Matheson Gas Data Book – 6th Edition
SABS 0265 - Labelling of Dangerous Substances

EXCLUSION OF LIABILITY

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